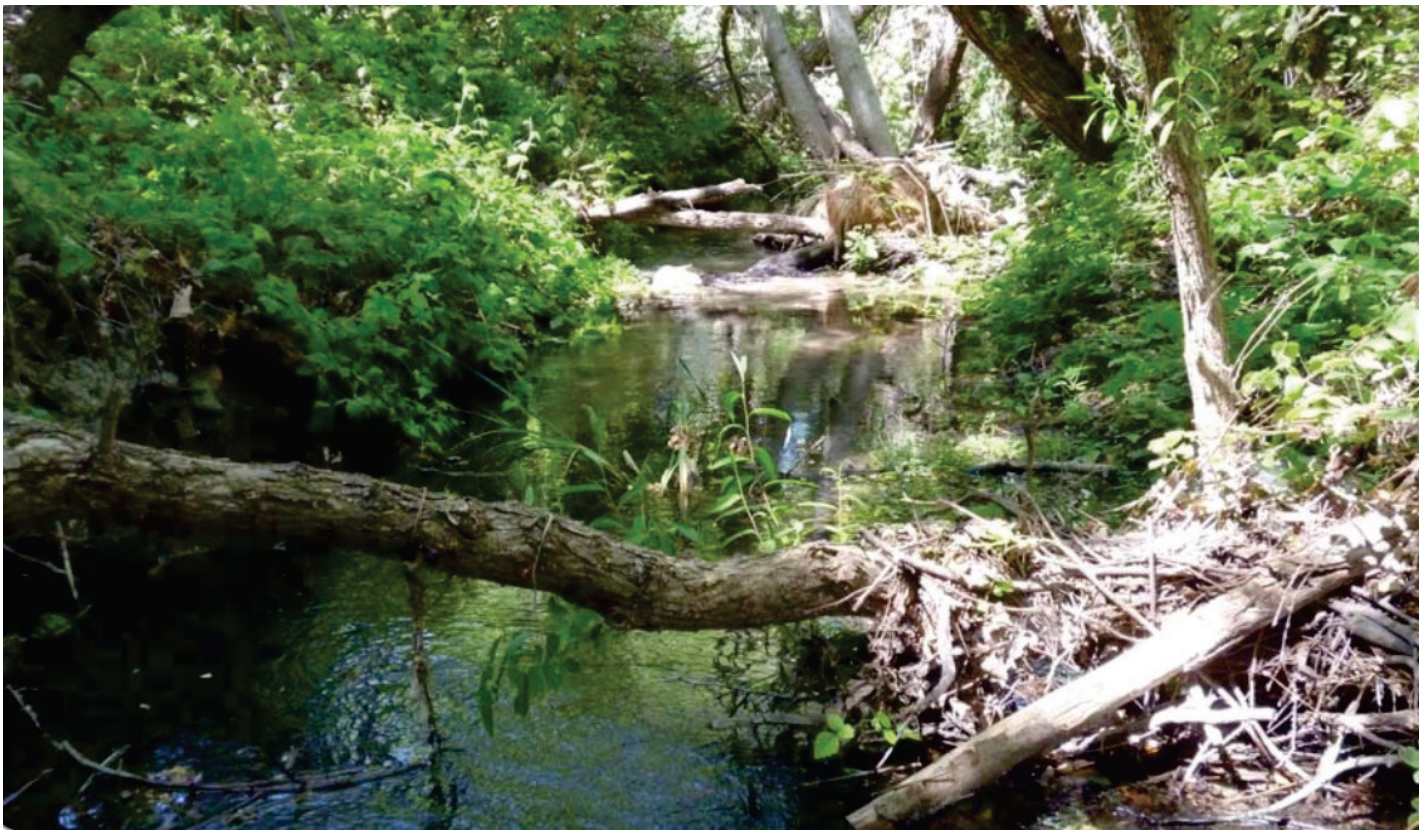
# PERMANENTE CREEK RESTORATION PLAN

## Supplemental Environmental Impact Report

Prepared for
County of Santa Clara Department of
Planning and Development

February 2023

ESA



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County of Santa Clara Department of
Planning and Development

State Clearinghouse No. 2021040331
File No. PLN17-2250

February 2023

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**Acronyms and Other Abbreviations**

| | |
|---|---|
| °F | degrees Fahrenheit |
| µg/m$^3$ | micrograms per cubic meter |
| 90% Design Memo | *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* |
| 2011 Creek Restoration Plan | draft Permanente Creek Long-Term Restoration Plan |
| 2012 EIR | certified 2012 Reclamation Plan Amendment Environmental Impact Report |
| 2012 Reclamation Plan Amendment | 2012 amendment to the 1985 Permanente Quarry reclamation plan |
| 2017 CAP | Clean Air Plan |
| AB | Assembly Bill |
| ABAG | Association of Bay Area Governments |
| AEP | Association of Environmental Professionals |
| Amended Consent Decree | amended consent decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016 |
| APM | applicant-proposed measure |
| AR4 | IPCC Fourth Assessment Report |
| ASA | Architecture and Site Approval |
| BAAQMD | Bay Area Air Quality Management District |
| BACT | best available control technology |
| BMP | best management practice |
| CAL FIRE | California Department of Forestry and Fire Protection |
| Cal. Code Regs. | California Code of Regulations |
| CalEEMod | California Emissions Estimator Model |
| California Register | California Register of Historical Resources |
| CARB | California Air Resources Board |
| CDFW | California Department of Fish and Wildlife |
| CDFW Restoration Manual | California Department of Fish and Wildlife California Salmonid Stream Habitat Restoration Manual |
| CEC | California Energy Commission |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| $CH_4$ | methane |
| CO | carbon monoxide |

| | |
|---|---|
| $CO_2$ | carbon dioxide |
| $CO_2e$ | carbon dioxide–equivalent |
| COA | condition of approval |
| Construction General Permit | National Pollutant Discharge Elimination System construction general permit adopted by the State of California on September 2, 2009 (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) |
| County | County of Santa Clara |
| County Planning Department | County of Santa Clara Department of Planning and Development |
| CRLF | California red-legged frog |
| DPM | diesel particulate matter |
| DPS | Distinct Population Segment |
| Draft 2012 EIR | December 2011 draft of the 2012 Reclamation Plan Amendment Environmental Impact Report |
| Drainage Manual | *Santa Clara County California Drainage Manual* |
| EIR | environmental impact report |
| EMSA | East Materials Storage Area |
| ESM | engineered streambed material |
| ESU | Evolutionarily Significant Unit |
| FOS | Factor(s) of Safety |
| FRAP | Fire and Resource Assessment Program |
| FTS | Final Treatment System |
| General Plan | Santa Clara County General Plan |
| GHG | greenhouse gas |
| GIS | geographic information system |
| Golder | Golder Associates |
| GWP | global warming potential |
| H:V | horizontal to vertical |
| Hanson | Hanson Permanente Cement, Inc. |
| HEC-RAS | Hydrologic Engineering Center River Analysis System |
| HFC | hydrofluorocarbon |
| HHDT | heavy-heavy duty trucks |
| HRA | health risk assessment |
| Individual NPDES Permit | individual facility-wide NPDES permit obtained by the Permanente Quarry subsequent to the 2012 EIR, NPDES Permit Number CA0030210, currently embodied in RWQCB Order Number R2-2019-0024 |
| IPCC | Intergovernmental Panel on Climate Change |
| LDT | light-duty trucks |
| LEHCP | Low-Effect Habitat Conservation Plan |
| Lehigh | Hanson Permanente Cement, Inc. and Lehigh Southwest Cement Company, collectively |
| Lehigh Southwest | Lehigh Southwest Cement Company |
| Lower FTS | Final Treatment System–Lower |
| LSAA | Lake and Streambed Alteration Agreement |
| MAMP | Monitoring and Adaptive Management Plan |
| MEIR | maximally exposed individual receptor |
| MHDT | heavy-duty trucks |
| MidPen | Midpeninsula Regional Open Space District |

| | |
|---|---|
| mph | miles per hour |
| MTC | Metropolitan Transportation Commission |
| $N_2O$ | nitrous oxide |
| National Register | National Register of Historic Places |
| NECPA | National Energy Conservation Policy Act |
| $NF_3$ | nitrogen trifluoride |
| NHTSA | National Highway Traffic Safety Administration |
| NO | nitric oxide |
| $NO_2$ | nitrogen dioxide |
| NOP | notice of preparation |
| $NO_X$ | nitrogen oxides |
| NPDES | National Pollutant Discharge Elimination System |
| OEHHA | Office of Environmental Health Hazard Assessment |
| OGB | Office of Governor Edmund G. Brown Jr. |
| OM&C Plan | Operations, Maintenance, and Contingency Plan |
| PCRA | Permanente Creek Restoration Area |
| PCRP | Permanente Creek Restoration Plan |
| PFC | perfluorocarbon |
| $PM_{2.5}$ | particulate matter less than 2.5 microns in diameter |
| $PM_{10}$ | particulate matter less than 10 microns in diameter |
| ppm | parts per million |
| Project | Permanente Creek Restoration Project, specifically the PCRP to the extent that the 90% Design Memo differs from the restoration activities previously proposed within the PCRA and analyzed in the 2012 EIR |
| PSD | Prevention of Significant Deterioration |
| REL | reference exposure level |
| ROG | reactive organic gas |
| RWQCB | Regional Water Quality Control Board |
| SB | Senate Bill |
| SCAQMD | South Coast Air Quality Management District |
| SEIR | supplemental environmental impact report |
| $SF_6$ | sulfur hexafluoride |
| SFBAAB | San Francisco Bay Area Air Basin |
| SIP | State Implementation Plan |
| SJVAPCD | San Joaquin Valley Air Pollution Control District |
| SMARA | Surface Mining and Reclamation Act |
| $SO_2$ | sulfur dioxide |
| Stantec | Stantec Consulting Services Inc. |
| SWPPP | Stormwater Pollution Prevention Plan |
| SWRCB | State Water Resources Control Board |
| TAC | toxic air contaminant |
| TDS | total dissolved solids |
| U.S. EPA | U.S. Environmental Protection Agency |
| Upper FTS | Final Treatment System–Upper |
| USACE | U.S. Army Corps of Engineers |
| USDOT | U.S. Department of Transportation |

| | |
|---|---|
| USFWS | U.S. Fish and Wildlife Service |
| VMT | vehicle miles traveled |
| Water Collaborative Guidelines | *Water Collaborative Guidelines and Standards for Land Uses Near Streams* |
| WDR | waste discharge requirement |
| WMSA | West Materials Storage Area |
| WRCC | Western Regional Climate Center |

## Key Terms

The terms necessary for a clear understanding of the process being undertaken by the County of Santa Clara Department of Planning and Development (County Planning Department), and of the project proposed and analyzed in this environmental review document, are listed below in an order that is intended to aid understanding, rather than alphabetically. Additional definitions and details are provided in the chapters and sections that follow.

| | |
|---|---|
| CEQA | The County Planning Department is conducting this environmental review pursuant to the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and its implementing regulations, the CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.). Because only minor additions or changes would be necessary to make prior environmental documentation adequately apply to the current project, the County Planning Department has elected to prepare a supplemental environmental impact report (SEIR). See Section ES.1, *Introduction*, in the Executive Summary for additional details. |
| Lehigh | This SEIR refers to Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc., collectively as "Lehigh." Lehigh is the applicant for a Grading Approval (County File No. PLN17-2250) submitted for consideration by the County Planning Department. |
| Amended Consent Decree | An Amended Consent Decree between the Sierra Club and Lehigh, dated May 11, 2016, is called the "Amended Consent Decree" in this SEIR. A copy of the Amended Consent Decree is provided in Appendix B. |
| Permanente Creek Restoration Plan (PCRP) | Pursuant to the Amended Consent Decree, the currently proposed creek restoration plan is called the Permanente Creek Restoration Plan (PCRP). The PCRP is the "Project" being analyzed in this SEIR pursuant to CEQA. Under the PCRP, creek restoration activities would be implemented within an area of up to 135.6 acres:<br>• The 120.2-acre Permanente Creek Restoration Area (PCRA) described and analyzed in the 2012 Reclamation Plan Amendment Environmental Impact Report (EIR).<br>• A 12.9-acre portion of the existing reclamation plan boundary where creek restoration activities were not described and analyzed in the 2012 EIR.<br>• An additional 2.5 acres beyond the existing reclamation plan boundary where restoration work would occur pursuant to the PCRP. |

| | |
|---|---|
| | The 135.6-acre area where the PCRP would be implemented is the "Project site" for purposes of this SEIR. |
| 90% Design Memo | Restoration activities proposed to occur as part of the PCRP are described in the *Lehigh Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum*, prepared in 2019 and updated in 2022 by Waterways Consulting Inc. A copy of the Updated 90% Design Memo is provided in Appendix C. |
| 2012 EIR | This SEIR cites individual sections and pages of the 2012 Reclamation Plan Amendment EIR for the Lehigh Permanente Quarry. References in this SEIR to that document as a whole (i.e., the Draft EIR plus responses to comments document) are cited to the "2012 EIR." When a reference is specifically to the December 2011 draft of the 2012 EIR, the citation is to the "Draft 2012 EIR." When a reference is specifically to the responses to comments document or changes that were made to the Draft EIR, citations are to the "Final 2012 EIR." |
| 2011 Creek Restoration Plan | The creek restoration requirements identified in paragraphs 33–42 of the Consent Decree reflect restoration duties imposed on Lehigh that stem from San Francisco Bay Regional Water Quality Control Board Cleanup and Abatement Order No. 99-018, which led to the development of the draft 2011 Creek Restoration Plan. |
| Permanente Creek Restoration Area (PCRA) | The portion of the draft 2011 Creek Restoration Plan that was described and analyzed in the 2012 EIR as the "Permanente Creek Restoration Area" or "PCRA" consisted of a 120.2-acre area, of which 49.2 acres was approved for disturbance pursuant to creek restoration activities. Restoration activities anticipated by the 2012 EIR to occur in the PCRA were described in the 2011 Creek Restoration Plan and, as revised and updated in the Amended Consent Decree, are included in the Amended Consent Decree. See Figure 2-3, *Correlation of PCRA Subareas and PCRP Reaches.* |

# EXECUTIVE SUMMARY

## ES.1 Introduction

Hanson Permanente Cement, Inc. (Hanson) owns, and the Lehigh Southwest Cement Company (Lehigh Southwest) operates (collectively "Lehigh"), two adjacent facilities in the Santa Clara County foothills west of the City of Cupertino in an unincorporated area of Santa Clara County: Permanente Quarry and the Lehigh Cement Plant. The Permanente Quarry is a limestone and aggregate mining operation that operates subject to vested rights and the provisions of a Reclamation Plan that was originally approved in 1985 and then amended in 2012 (2012 Reclamation Plan Amendment).

Lehigh submitted a Grading Approval application for the Permanente Creek Restoration Project (PCRP) to restore and modify specific segments of Permanente Creek located within and outside of the existing Reclamation Plan boundary for the Permanente Quarry. This Draft Supplemental Environmental Impact Report (SEIR) analyzes the direct, indirect, and cumulative environmental impacts of the PCRP, which includes revisions made by Lehigh to the March 2011 (draft) Permanente Creek Long-term Restoration Plan (2011 Creek Restoration Plan), the environmental impacts of which were analyzed by the County of Santa Clara (the County) as part of the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report, State Clearinghouse No. 2010042063 (2012 EIR). Lehigh has revised the draft 2011 Creek Restoration Plan since 2012 in part to fulfill the requirements set forth in the Amended Consent Decree between the Sierra Club and Lehigh dated May 11, 2016 (Amended Consent Decree). The creek restoration requirements, set forth in paragraphs 33 through 42 of the Amended Consent Decree, reflect restoration duties imposed on Lehigh that originally stem from San Francisco Regional Water Quality Control Board Cleanup and Abatement Order No. 99-018, which led to the development of the draft 2011 Creek Restoration Plan. The revised restoration plan is called the Permanente Creek Restoration Plan (PCRP). Events leading up to the development of the draft 2011 Creek Restoration Plan, the County's 2012 EIR, and the 2016 Amended Consent Decree are described in Section 1.1, *Project Context*. The draft 2011 Creek Restoration Plan and the 2012 EIR are available for review on the County's website;[1] a copy of the Amended Consent Decree is provided in **Appendix B**, *Amended Consent Decree;* a copy of the *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* (90% Design Memo), which is the technical document that describes the PCRP, is provided in **Appendix C**.

[1] County of Santa Clara, 2021. Permanente Creek Restoration Project (File PLN17-2250). https://plandev.sccgov.org/policies-programs/smara/permanente-quarry-lehighhanson/PLN17-2250.

Both the draft 2011 Creek Restoration Plan and the PCRP (which is the Project being analyzed in this SEIR) focus on the removal of structures in and adjacent to Permanente Creek, and restoration of the creek's riparian zone. The draft 2011 Creek Restoration Plan proposed to restore portions of Permanente Creek within the subset of the Permanente Quarry's existing Reclamation Plan boundary that the 2012 EIR called the Permanente Creek Restoration Area (PCRA). The PCRP builds on the earlier-approved restoration work by proposing to restore and modify specific segments of Permanente Creek within and beyond the earlier plan. More specifically, pursuant to the PCRP, creek restoration activities would be implemented within an up-to 135.6-acre area, which consists of the 120.2-acre PCRA described and analyzed in the 2012 EIR, a 12.9-acre portion of the existing Reclamation Plan boundary where creek restoration activities were not described and analyzed in the 2012 EIR, and an additional 2.5 acres beyond the existing Reclamation Plan boundary where restoration work would occur pursuant to the PCRP. The 135.6-acre area where the PCRP would be implemented is the "Project site" for purposes of this SEIR. The PCRP is described and shown in detail on figures included in the 90% Design Memo.

Grading is proposed in the PCRP outside the existing Reclamation Plan boundary in Reaches 6 through 8. See **Figure 2-3**, *Correlation of PCRA Subareas and PCRP Reaches*. Accordingly, grading work in these areas would require the County of Santa Clara Department of Planning and Development (County Planning Department) to issue a discretionary Grading Approval (County File No. PLN17-2250). Discretionary decisions such as this require environmental review pursuant to the California Environmental Quality Act (CEQA, Public Resources Code Section 21000 et seq.) and its implementing regulations (the CEQA Guidelines, 14 Cal. Code Regs. Section 15000 et seq.). Because only minor additions or changes would be necessary to make the 2012 EIR adequately apply to the Project in the changed situation, the County has elected to prepare an SEIR.

The SEIR analyzes whether the PCRP would cause one or more new significant impacts or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR and, on the basis of this analysis, has determined that it would not. The analysis in Chapter 3, *Project Impacts and Mitigation Measures*, focuses on three things:

1. PCRP areas outside of the existing Reclamation Plan boundary for which Grading Approval would be required (i.e., in Reaches 6 through 8).
2. PCRP areas within the Reclamation Plan boundary and within the 120.2-acre PCRA but outside of the PCRA's 49.2-acre disturbance area.
3. More generally, whether the PCRP proposes work at greater intensity than previously considered in the 2012 EIR.

Based on the explanation provided in Section 2.3, *Focus of the Supplemental EIR*, including as summarized in Table 2-1, *Specific Areas of Focus for the Supplemental EIR*, the analysis of Project impacts in Chapter 3, *Project Impacts and Mitigation Measures*, focuses on Reaches 6 through 13 and Reaches 17 and 18 as key areas for evaluation. See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a correlation of the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in

this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.[2]

# ES.2 Purpose, Focus, and Use of this SEIR

## ES.2.1 Purpose of this SEIR

This SEIR is an informational document whose purpose is not to recommend either approval or denial of the requested Grading Approval, but to inform agency decision-makers and the public of the potential environmental effects of the PCRP as they compare to the project analyzed in the 2012 EIR. This SEIR assesses the direct, indirect, and cumulative environmental impacts that could occur as a result of Lehigh's proposed revisions of the creek restoration project that are documented in the PCRP relative to the draft 2011 Creek Restoration Plan. It also assesses the impacts of the alternatives to the PCRP described in Chapter 4, *Alternatives*.

## ES.2.2 Focus of this SEIR

In its initial evaluation of the PCRP as described in Lehigh's Grading Approval application and supporting materials, the County preliminarily determined that the PCRP had the potential to cause one or more new significant impacts or substantially increase the severity of one or more significant impacts previously disclosed and evaluated in the 2012 EIR in some resource areas. However, for most resource areas, the 2012 EIR was sufficient to analyze the effects of the PCRP. The County sought input from trustee, responsible, and other agencies, as well as from members of the public, as to the scope of the SEIR in its Notice of Preparation (NOP), which advised agencies and the public of its intention to focus the analysis on seven specific resource areas (i.e., air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gas (GHG) emissions, and hydrology and water quality). No comments were received from agencies or the public questioning this planned approach. A copy of the NOP and input received in response to the NOP are included in **Appendix A**, *Scoping Report*. Accordingly, these seven topics are evaluated in detail in Chapter 3, *Project Impacts and Mitigation Measures*, and in Chapter 4, *Alternatives*.

The remaining CEQA Guidelines Appendix G Environmental Checklist resource areas are addressed in Section 3.8, *Project Consistency with 2012 EIR*. Topics for which the PCRP has been confirmed to be consistent with the 2012 EIR include: aesthetics, agriculture and forestry resources, hazards and hazardous materials, land use/planning, mineral resources, noise, population and housing, public services, recreation, transportation, and utilities and service systems. The discussion in Section 3.8 explains the basis for the determinations of consistency. Further, although the 2012 EIR did not analyze potential impacts on tribal cultural resources or wildfire, which were not added to the CEQA Guidelines Appendix G Environmental Checklist as

[2] The United States Geological Survey (USGS) defines "reach" as "a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying conditions) between two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage. In practical use, a reach is just any length of a stream or river. The term is often used by hydrologists when they're referring to a small section of a stream or river rather than its entire length." (USGS 2021)

suggested topics of consideration until December 2018, this SEIR does so. As analyzed in Section 3.8.12, *Tribal Cultural Resources*, and in Section 3.8.14, *Wildfire*, the PCRP would not result in a significant impact on either of these considerations.

## ES.2.3 Use of this SEIR

The County will rely on the SEIR as it may be amended in response to agency and public input received following their review of this Draft SEIR, along with other information in the formal record, in deciding whether to approve, approve with modifications, or disapprove the requested authorization. Because environmental considerations are but one of multiple factors that may be considered when an agency is deciding whether to approve a project, factors that are outside the scope of CEQA that were raised during the scoping process or that may be raised in comments following the issuance of the Draft SEIR may be considered as part of the decision-making process. Other agencies with trustee responsibilities or permitting authority over the PCRP, including but not limited to the San Francisco Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (CDFW), also may rely on this document in deciding whether to approve or issue other authorizations for the PCRP. See Section 2.6, *Permits and Approvals*, for additional details.

## ES.2.4 Materials Incorporated by Reference

The information in this SEIR supplements and incorporates by reference information from the documents listed below, each of which is available for review on the County Planning Department's website (https://plandev.sccgov.org/policies-programs/surface-mining-and-reclamation-act-smara/permanente-quarry-lehighhanson/permanente-quarry-reclamation-plan-amendments#2250-2012):

- County of Santa Clara, 2011. Lehigh Permanente Quarry Reclamation Plan Amendment Draft Environmental Impact Report.
- County of Santa Clara, 2012a. Lehigh Permanente Quarry Reclamation Plan Amendment Final Environmental Impact Report. As noted on the list of Key Acronyms and Terms, the 2011 Draft EIR and the 2012 Final EIR collectively are referred to as the "2012 EIR."
- County of Santa Clara, 2012b. Final Conditions of Approval for the Reclamation Plan Amendment for Lehigh Permanente Quarry. Approved by Planning Commission, June 7, 2012, and modified by the Board of Supervisors on June 26, 2012 (a copy of which is provided in **Appendix H** to this Draft SEIR).

# ES.3 Overview of Impacts and Mitigation Measures

The analysis of impacts in the 2012 EIR and this SEIR are analyzed in relation to pertinent significance criteria. Impacts are classified as one of five categories:

1. **Significant and Unavoidable**: A substantial or potentially substantial adverse change from the environmental baseline that meets or exceeds significance criteria, where either no feasible mitigation can be implemented, or the impact remains significant after implementation of mitigation measures.

2. **Less than Significant with Mitigation Incorporated**: A substantial or potentially substantial adverse change from the environmental baseline that can be avoided or reduced to below applicable significance thresholds.
3. **Less-than-Significant Impact**: An adverse impact that does not meet or exceed the significance criteria of a particular resource area and therefore does not require mitigation.
4. **Beneficial Effect**: An impact that would result in an improvement to the physical environment relative to baseline conditions.
5. **No Impact**: A change associated with the Project that would not result in an impact on the physical environment relative to baseline conditions.

## ES.3.1 Significant and Unavoidable Impacts

Section 15126.2 of the CEQA Guidelines requires that an EIR describe any significant impacts, including those that can be mitigated but not reduced to less-than-significant levels if a project is implemented. Draft 2012 EIR Section 7.1 (at page 7-1 et seq.) identified significant unavoidable impacts of the Reclamation Plan Amendment (including creek restoration work in the PCRA as one component of the project as a whole) in four resource areas: aesthetics, biological resources, cultural resources, and hydrology. As a reminder, the 2012 EIR analyzed the amendment of a March 1985 surface mine Reclamation Plan for a 20-year period, where mine reclamation activities would occur within a 1,238.7-acre area that included the 120.2-acre PCRA. The 2012 EIR analyzed the impacts of that project as whole, and did not segment significance determinations specifically attributable to the PCRA. For this reason, impacts identified in the 2012 EIR as significant and unavoidable were not necessarily caused by the proposed creek restoration work.

As demonstrated by the analysis in Chapter 3, *Project Impacts and Mitigation Measures*, the PCRP would cause no new significant unavoidable impacts and no substantial increase in the severity of a significant unavoidable impact, either at the Project-level or cumulatively, than was previously disclosed and evaluated in the 2012 EIR.

## ES.3.2 Summary of Other Impacts and Mitigation Measures

For each of the resource areas identified in Section ES.2.2, *Focus of this SEIR*, Sections 3.1 through 3.7 provide an overview of the setting; analyze the potential direct, indirect, and cumulative impacts of the PCRP; and identify mitigation measures designed to reduce potential significant impacts below established thresholds for each of the seven resource areas of focus. In each case, the implementation of one or more mitigation measures could reduce the severity of potential significant impacts below established thresholds, resulting in conclusions that these impacts would be less than significant with mitigation incorporated.

For the resource areas where the PCRP was found to be consistent with the 2012 EIR, Section 3.8 briefly summarizes the rationale for concluding that the proposed creek restoration would not result in a potential significant impact on the resource that would be new or substantially more severe than was disclosed in the 2012 EIR. The PCRP would cause either no impact or a less-than-significant impact with respect to each of the factors considered for these resources.

As discussed in Chapter 2, *Project Description*, the PCRP includes the construction best management practices (BMPs) identified in Section 2.5.9.1 and the additional applicant-proposed measures (APMs) identified in Section 2.5.9.2. These BMPs and APMs are part of the Project and are not mitigation measures for purposes of CEQA.

Mitigation measures imposed by the County in the context of the 2012 EIR are ongoing obligations of Lehigh. Compliance with them is enforceable by the County independent of its consideration of the PCRP. Accordingly, the 2012 mitigation measures are being carried forward (unchanged) for purposes of this analysis as part of the baseline condition. See **Appendix H1**, *Summary of Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*. Other conditions of the 2012 approval that would be implemented or occur as part of the baseline condition for the PCRP are set forth in **Appendix H2**, *2012 Conditions of County Approval*.

**Table ES-1**, *Summary of Environmental Issue Areas and Impact Conclusions*, identifies the environmental issue areas analyzed in the County's certified 2012 EIR, those analyzed in this Draft SEIR, and the CEQA significance conclusions reached for each area in each document.

Where the PCRP (including BMPs and APMs) could result in a change in the baseline physical environment (including with the implementation of the 2012 EIR mitigation measures and conditions of approval) such that a new significant impact or a substantial increase in the severity of a previously identified significant impact could result, this SEIR recommends the addition of modified versions of one or more of the mitigation measures identified in the 2012 EIR or identifies one or more new mitigation measures, the implementation of which could reduce the severity of the impact below established thresholds. **Table ES-2**, included at the end of this Executive Summary, summarizes the impacts of and mitigation measures for the PCRP independent of and in addition to the 2012 EIR mitigation measures, the implementation of which continue to be required by the existing 2012 approvals. Detailed analyses of impacts are contained in Chapter 3.

**TABLE ES-1**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Aesthetics, Visual Quality, and Light and Glare** | | | |
| **4.1-1:** Construction of the Project would have a substantially adverse effect on a scenic vista during an interim period. (Draft 2012 EIR, p. 4.1-40) | Significant and Unavoidable | No Impact (SEIR Section 3.8.2) | No |
| **4.1-2:** Monitoring and Maintenance of the Project would not have a substantially adverse long-term effect on a scenic vista. (Draft 2012 EIR, p. 4.1-41) | Less than Significant | No Impact (SEIR Section 3.8.2) | No |
| **4.1-3:** Construction of the Project would substantially damage scenic resources within a state- or County-designated scenic highway or route during the period of time when active reclamation activities are occurring. (Draft 2012 EIR, p. 4.1-42) | Significant and Unavoidable | No Impact (SEIR Section 3.8.2) | No |
| **4.1-4:** Neither active reclamation activities nor monitoring and maintenance of the Project would result in long-term substantial damage to scenic resources within a state- or County-designated scenic highway or route. (Draft 2012 EIR, p. 4.1-44) | Less than Significant | No Impact (SEIR Section 3.8.2) | No |
| **4.1-5:** The Project would alter and substantially degrade the existing visual character or quality of the Project area during the period of time when active reclamation activities are occurring. (Draft 2012 EIR, p. 4.1-45) | Significant and Unavoidable | No Impact (SEIR Section 3.8.2) | No |
| **4.1-6**: The implementation of active reclamation activities would alter, but not permanently substantially degrade, the existing visual character or quality of the Project area. (Draft 2012 EIR, p. 4.1-47) | Less than Significant | No Impact (SEIR Section 3.8.2) | No |
| **4.1-7:** Lighting required for the Project would not adversely affect daytime or nighttime views in the Project area. (Draft 2012 EIR, p. 4.1-48) | Less than Significant with Mitigation Incorporated | No Impact (SEIR Section 3.8.2) | No |
| **4.1-8:** The Project would not create new permanent sources of light or glare that would affect daytime or nighttime views in the area. (Draft 2012 EIR, p. 4.1-49) | Less than Significant | No Impact (SEIR Section 3.8.2) | No |
| **6-1:** Project construction activities could make a cumulatively considerable contribution a substantial adverse effect on a scenic vista and degradation of the existing visual character or quality of the Project area. (Draft 2012 EIR, p. 6-14) | Significant and Unavoidable | No Impact (SEIR Section 3.8.2) | No |
| **Agriculture and Forestry Resources** | | | |
| No impacts | No impacts | No impact (SEIR Section 3.8.3) | No |
| **Air Quality** | | | |
| **4.3-1:** The Project would generate emissions of criteria air pollutants that could contribute to existing nonattainment conditions and further degrade air quality. (Draft 2012 EIR, p. 4.3-18) | Less than Significant | Less than Significant (SEIR Section 3.1.3.4) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Air Quality (cont.)** | | | |
| **4.3-2:** Project traffic associated with operational and reclamation activities would generate localized [carbon monoxide] CO emissions on roadways and at intersections in the Project vicinity. (Draft 2012 EIR, p. 4.3-21) | Less than Significant | Less than Significant (SEIR Section 3.1.3.4) | No |
| **4.3-3:** The Project would expose people to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer. (Draft 2012 EIR, p. 4.3-26) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.1.3.4) | No |
| **4.3-4:** The Project would expose people to increased levels of toxic air contaminants, which could increase acute and chronic health risks. (Draft 2012 EIR, p. 4.3-31) | Less than Significant | Less than Significant (SEIR Section 3.1.3.4) | No |
| **4.3-5:** The Project would increase emissions of [particulate matter less than 2 microns in diameter] $PM_{2.5}$, which could adversely affect human health. (Draft 2012 EIR, p. 4.3-32) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.1.3.4) | No |
| **Biological Resources** | | | |
| **4.4-1:** Project activities could result in adverse effects on special-status and migratory birds. (Draft 2012 EIR, p. 4.4-32) | Less than Significant | Less than Significant (SEIR Section 3.2.3.3) | No |
| **4.4-2:** Project activities could result in adverse effects on special-status bats. (Draft 2012 EIR, p. 4.4-34) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.2.3.3) | No |
| **4.4-3:** Project activities could result in adverse effects on the San Francisco dusky-footed woodrat. (Draft 2012 EIR, p. 4.4-36) | Less than Significant | Less than Significant (SEIR Section 3.2.3.3) | No |
| **4.4-4:** Project activities could result adverse effects on special status aquatic organisms. (Draft 2012 EIR, p. 4.4-36) | Less than Significant | Less than Significant (SEIR Section 3.2.3.3) | No |
| **4.4-5:** Project activities could result in selenium-burdened runoff reaching aquatic habitats and, thereby, in deleterious effects to aquatic organisms and their prey base. (Draft 2012 EIR, p. 4.4-37) | Significant and Unavoidable | Less than Significant with Mitigation Incorporated (SEIR Section 3.2.3.3) | No |
| **4.4-6:** Project activities could result in the loss or degradation of riparian habitat associated with Permanente Creek. (Draft 2012 EIR, p. 4.4-38) | Less than Significant | Less than Significant (SEIR Section 3.2.3.3) | No |
| **4.4-7:** Project activities could result in the loss of native oak woodland as defined by Oak Woodlands Conservation Law. (Draft 2012 EIR, p. 4.4-39) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.2.3.3) | No |
| **4.4-8:** Project activities could result in substantial adverse effects on wetlands and jurisdictional waters associated with Permanente Creek through direct removal, filling, hydrological interruption, or other means. (Draft 2012 EIR, p. 4.4-41) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.2.3.3) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Cultural and Paleontological Resources** | | | |
| **4.5-1:** Project activities could cause an adverse change in the significance of an historical resource pursuant to Section 15064.5 of the CEQA Guidelines and the County's Historic Preservation Ordinance. (Draft 2012 EIR, p. 4.5-24) | Significant and Unavoidable | No Impact (SEIR Section 3.3.3.4) | No |
| **4.5-2:** Project activities could cause an adverse change in the significance of an archaeological resource as defined in Section 15064.5 of the CEQA Guidelines. (Draft 2012 EIR, p. 4.5-26) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.3.3.4) | No |
| **4.5-3:** Project activities could directly or indirectly destroy a unique paleontological resource or site. (Draft 2012 EIR, p. 4.5-27) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.5.3.2) | No |
| **4.5-4:** Project activities could disturb human remains, including those interred outside of formal cemeteries. (Draft 2012 EIR, p. 4.5-29) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.3.3.4) | No |
| **Energy Conservation** | | | |
| **4.6-1:** The Project would include means for avoiding or reducing wasteful and/or unnecessary consumption of energy. (Draft 2012 EIR, p. 4.6-6) | Less than Significant | Less than Significant (SEIR Section 3.4.3.4) | No |
| **Geology, Soils, and Seismicity** | | | |
| **4.7-1:** Rock and soil slopes constructed as part of the proposed reclamation of the [East Materials Storage Area] EMSA, quarry pit, and [West Materials Storage Area] WMSA could fail under static or seismic forces if not properly engineered and constructed. (Draft 2012 EIR, p. 4.7-29) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.5.3.2) | No |
| **4.7-2:** In the event of a major earthquake in the region, seismic ground shaking could result in injury to site workers, damage to quarry equipment and structures, or trigger slope failures. In addition, a large earthquake on the San Andreas Fault could result in minor ground deformation along traces of the Berrocal or Monte Vista Fault Zones. (Draft 2012 EIR, p. 4.7-37) | Less than Significant | Less than Significant (SEIR Section 3.5.3.2) | No |
| **4.7.3:** Earthmoving and other ground disturbance associated with the phased reclamation of the site could temporarily promote accelerated erosion and soil loss. (Draft 2012 EIR, p. 4.7-39) | Less than Significant | Less than Significant (SEIR Section 3.5.3.2) | No |
| **Greenhouse Gas Emissions** | | | |
| **4.8-1:** The Project could result in an increase in GHG emissions and contribute to climate change. (Draft 2012 EIR, p. 4.8-11) | Less than Significant with Mitigation Incorporated | Less than Significant with Mitigation Incorporated (SEIR Section 3.6.3.3) | No |
| **4.8-2:** The Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. (Draft 2012 EIR, p. 4.8-14) | Less than Significant | Less than Significant (SEIR Section 3.6.3.3) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Hazards and Hazardous Materials** | | | |
| **4.9-1:** The Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. (Draft 2012 EIR, p. 4.9-14) | Less than Significant | Less than Significant (SEIR Section 3.8.4) | No |
| **4.9-2:** The Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. (Draft 2012 EIR, p. 4-9-16) | Less than Significant | Less than Significant (SEIR Section 3.8.4) | No |
| **4.9-3:** Sedimentation basins planned for erosion control at the Project site could provide breeding grounds for vectors. (Draft 2012 EIR, p. 4.9-16) | Less than Significant | Less than Significant (SEIR Section 3.8.4) | No |
| **Hydrology and Water Quality** | | | |
| **4.10-1:** Post-reclamation conditions in the EMSA, WMSA, and quarry pit would increase selenium concentrations in Permanente Creek to levels exceeding baseline conditions and RWQCB Basin Plan objectives. (Draft 2012 EIR, p. 4.10-29) | Less than Significant with Mitigation Incorporated | N/A | No |
| **4.10-2:** Interim reclamation activities within the Project area would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek. (Draft 2012 EIR, p. 4.10-42) | Significant and Unavoidable | Less than Significant (SEIR Section 3.7.3.2) | No |
| **4.10-3:** The PCRA reclamation activities would contribute concentrations of selenium, TDS, and sediment in Permanente Creek. (Draft 2012 EIR, p. 4.10-47) | Less than Significant | Less than Significant (SEIR Section 3.7.3.2) | No |
| **4.10-4:** The Project would alter the existing drainage pattern of the site, which could result in increased stormwater runoff rates and on- or off-site flooding. (Draft 2012 EIR, p. 4.10-48) | Significant and Unavoidable | Less than Significant (SEIR Section 3.7.3.2) | No |
| **4.10-5:** Groundwater discharge from the quarry pit after backfilling and reclamation is complete would adversely alter surface water flows to Permanente Creek. (Draft 2012 EIR, p. 4.10-49) | Less than Significant | N/A | No |
| **4.10-6:** The Project would alter the existing drainage pattern of the site, which could result in increased stormwater ponding, accumulation of selenium, and flooding. (Draft 2012 EIR, p. 4.10-50) | Less than Significant with Mitigation Incorporated | N/A | No |
| **6-2:** Incremental Project-specific activities could contribute to downstream flooding. (Draft 2012 EIR, p. 6-24) | Significant and Unavoidable | Less than Significant (SEIR Section 3.7.3.2) | No |
| **Land Use and Planning** | | | |
| **4.11-1:** The Project would be incompatible with adjacent land uses. (Draft 2012 EIR, p. 4.11-10) | Less than Significant | Less than Significant (SEIR Section 3.8.5) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Mineral Resources** | | | |
| **4.12-1:** The planned backfill of the quarry pit would hinder further extraction of cement-grade limestone and aggregate resources from the quarry pit, thereby resulting in the loss of availability of a mineral resource of state, regional, and local significance. (Draft 2012 EIR, p. 4.12-4) | Less than Significant | Less than Significant (SEIR Section 3.8.6) | No |
| **Noise** | | | |
| **4.13-1:** Operations associated with reclamation during Phase 1 would exceed County noise standards and increase ambient noise levels at noise-sensitive uses in the vicinity. (Draft 2012 EIR, p. 4.13-17) | Less than Significant with Mitigation Incorporated | Less than Significant (SEIR Section 3.8.7) | No |
| **4.13-2:** Operations associated with reclamation during Phase 2 would increase ambient noise levels at noise-sensitive uses in the vicinity. (Draft 2012 EIR, p. 4.13-22) | Less than Significant | Less than Significant (SEIR Section 3.8.7) | No |
| **4.13-3:** Operations associated with reclamation Phase 3 may be audible at noise-sensitive uses in the vicinity. (Draft 2012 EIR, p. 4.13-24) | Less than Significant | Less than Significant (SEIR Section 3.8.7) | No |
| **Noise (cont.)** | | | |
| **4.13-4:** Operations within the PCRA may be audible at noise-sensitive uses in the vicinity. (Draft 2012 EIR, p. 4.13-26) | Less than Significant | Less than Significant (SEIR Section 3.8.7) | No |
| **Population and Housing** | | | |
| No impacts | No impacts | No impacts (SEIR Section 3.8.8) | No |
| **Public Services** | | | |
| No impacts | No impacts | No impacts (SEIR Section 3.8.9) | No |
| **Recreation** | | | |
| **4.16-1:** The Project would be near a public park and trail and could affect existing or future recreational opportunities. (Draft 2012 EIR, p. 4.16-5) | Less than Significant | Less than Significant (SEIR Section 3.8.10) | No |
| **Transportation/Traffic** | | | |
| **4.17-1:** The Project would cause increases in traffic volumes on area roadways, but would not conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system. (Draft 2012 EIR, p. 4.17-7) | Less than Significant | Less than Significant (SEIR Section 3.8.11) | No |
| b) Would the Project conflict or be inconsistent with CEQA Guidelines Section 15064.3(b) [vehicle miles traveled analysis]? | Not evaluated in 2012 EIR | Less than Significant (SEIR Section 3.8.11) | No |
| **4.17-2:** Traffic generated by Project activities could affect traffic safety of pedestrians and bicyclists. (Draft 2012 EIR, p. 4.17-9) | Less than Significant | Less than Significant (SEIR Section 3.8.11) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Transportation/Traffic (cont.)** | | | |
| **4.17-3:** The Project would provide safe access, and would not obstruct access to nearby uses or fail to provide for future street right-of-way. (Draft 2012 EIR, p. 4.17-9) | Less than Significant | Less than Significant (SEIR Section 3.8.11) | No |
| **4.17-4:** Traffic generated by the Project would contribute to pavement wear-and-tear on area roadways. (Draft 2012 EIR, p. 4.17-9) | Less than Significant | Less than Significant (SEIR Section 3.8.11) | No |
| **Tribal Cultural Resources** | | | |
| a) Whether the Project could cause a substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources. Code Section 5020.1(k). | Not evaluated in 2012 EIR | Less than Significant with Mitigation Incorporated (SEIR Section 3.8.12) | No |
| b) Whether the Project could cause a substantial adverse change in the significance of a tribal cultural resource that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision I of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivisil(c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | Not evaluated in 2012 EIR | Less than Significant with Mitigation Incorporated (SEIR Section 3.8.12) | No |
| **Utilities and Service Systems** | | | |
| **4.18-1:** The Project would require and result in the construction of new stormwater drainage facilities, the construction of which could cause environmental effects. (Draft 2012 EIR, p. 4.18-8) | Less than Significant | Less than Significant (SEIR Section 3.8.13) | No |
| **4.18-2:** The Project may not be able to be served by a landfill with sufficient permitted capacity to accommodate the Project's solid waste disposal needs. (Draft 2012 EIR, p. 4.18-8) | Less than Significant | Less than Significant (SEIR Section 3.8.13) | No |
| **Wildfire** | | | |
| a) The Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. (Draft 2012 EIR, p. 4.9-13) | No Impact | No Impact (SEIR Section 3.8.14) | No |
| b) The Project would not, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose Project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. | Not evaluated in 2012 EIR | Less than Significant (SEIR Section 3.8.14) | No |

**TABLE ES-1 (CONTINUED)**
**SUMMARY OF ENVIRONMENTAL ISSUE AREAS AND IMPACT CONCLUSIONS**

| Environmental Impacts Identified in the 2012 EIR | Significance Conclusion Reached in 2012 EIR | Significance Conclusion Reached in this Draft SEIR | New Significant Impact or Substantial Increase in the Severity of a Significant Impact Identified in the 2012 EIR? |
|---|---|---|---|
| **Wildfire (cont.)** | | | |
| c) The Project would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines, or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment. | Not evaluated in 2012 EIR | Less than Significant (SEIR Section 3.8.14) | No |
| d) The Project would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. | Not evaluated in 2012 EIR | Less than Significant (SEIR Section 3.8.14) | No |

# ES.4 Significant Irreversible Changes

CEQA requires that an EIR analyze the extent to which the effects of a proposed project would impact the environment by committing non-renewable resources to uses that future generations would not be able to reverse (Public Resources Code Section 21100(b)(2)(B)). Section 15126.2(c) of the CEQA Guidelines defines an irreversible impact as an impact that uses nonrenewable resources during the initial and continuing phases of the project. Irreversible impacts also can result from damage caused by environmental accidents associated with a project. Irretrievable commitments of resources are evaluated to ensure that such consumption is justified.

Draft 2012 EIR Section 7.2 (at page 7-2 et seq.) explains why the Reclamation Plan Amendment, including creek restoration work within the PCRA, would not result in significant irreversible changes. That conclusion and the rationale provided remain accurate for purposes of the PCRP and this SEIR.

# ES.5 Growth-Inducing Impacts

CEQA Guidelines Section 15126.2(d) states that an EIR must discuss "the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." Growth can be induced in a number of ways, including directly through implementation of projects that create new housing and employment opportunities, and indirectly through elimination of obstacles to growth and stimulation of economic activity within a region. CEQA requires a discussion of how a project could increase population, employment, or housing in the areas surrounding the project, as well as an analysis of the infrastructure and planning changes that would be necessary to implement the project.

Draft 2012 EIR Section 7.3 (at page 7-3 et seq.) explains why the Reclamation Plan Amendment, including creek restoration work within the PCRA, would not result in growth inducement. That conclusion and the rationale provided remain accurate for purposes of the PCRP and this SEIR. See also Section 3.8.8, *Population and Housing*.

# ES.6 Summary of Alternatives

Draft 2012 EIR Section ES.5 (at page ES-4 et seq.) summarized three alternatives to the 2011 Reclamation Plan Amendment: Alternative 1 – Complete Backfill Alternative; Alternative 2 – Central Materials Storage Area Alternative; and No Project Alternative. None of the three focuses specifically on the creek restoration work proposed in the PCRA.

This SEIR provides detailed analysis of two alternatives to the PCRP: Alternative A – No Grading Approval Alternative, and Alternative B – No Project. Alternatives A and B are described below. Additional potential alternatives were initially considered, but not carried forward for more detailed analysis for the reasons explained in Section 4.2, *Potential Alternatives Initially Considered but Not Carried Forward for Detailed Review*.

## ES.6.1 Alternative A – No Grading Approval Alternative

Under the No Grading Approval Alternative, no Grading Approval would be issued, but the remainder of the restoration proposed in the PCRP could occur. In this case, the Project site would be restored in accordance with the PCRP, except in areas outside the existing Reclamation Plan boundary (where Grading Approval would be required) because, within the Reclamation Plan boundary, no further discretionary authorization would be required from the County Planning Department and because other agencies with jurisdiction over resources in and adjacent to Permanente Creek reasonably could be expected to authorize the proposed restoration. Thus, under this scenario, the restoration activities would proceed as proposed in all areas of the Project site except in Reaches 6–8. See Table 2-1, *Specific Areas of Focus for the Supplemental EIR*, for a summary of the activities and locations of the restoration work that would occur under the No Grading Approval Alternative (i.e., in Reaches 1–5 and 9–22).

## ES.6.2 Alternative B – No Project Alternative

CEQA Guidelines Section 15126.6(e) requires consideration of a No Project Alternative. This analysis discusses the existing conditions at the time the NOP was published (i.e., on or about April 13, 2021, when the County Planning Department issued notice of its intention to prepare this SEIR), as well as what reasonably would be expected to occur in the foreseeable future if neither the lead agency nor any of the responsible or trustee agencies approved necessary authorizations to implement the PCRP.

Under the No Project Alternative, the Project site would be restored in accordance with 2011 Creek Restoration Plan as analyzed in the 2012 EIR. None of the revisions included as part of the PCRP would be implemented within the existing Reclamation Plan boundary.

### ES.6.3 Environmentally Superior Alternative

The CEQA Guidelines define the environmentally superior alternative as that alternative with the least adverse impacts to the project area and its surrounding environment. In the case of a restoration project, the County considers the environmentally superior alternative to be that alternative with the greatest long-term benefit to the physical environment of the Project area and its surroundings. This Draft SEIR identifies the PCRP as the environmentally superior alternative for CEQA purposes because it would cause no new or more significant impacts relative to the project analyzed in the 2012 EIR and because it would result in the restoration and related long-term benefits to acres outside the existing Reclamation Plan boundary.

## ES.7 Known Areas of Controversy

CEQA Guidelines Section 15123(b)(2) requires that an EIR include a brief summary of areas of known controversy. Any of the environmental issues considered during scoping or in this Draft SEIR could become an issue of controversy. Preliminarily, the County has identified areas of controversy as including the issues and questions raised in agency and public comments received during pre-scoping and scoping activities, which relate to: air quality, biological resources, cultural resources, hydrology and water quality, and mineral resources. The County also received input during scoping requesting clarification of the PCRP relative to the Lehigh Permanente Quarry Reclamation Plan Amendment that was submitted in May 2019, and regarding the identification of alternatives to the Project and considerations to be evaluated as part of the cumulative scenario. See Section 1.3.3, *Pre-scoping Activities;* Appendix A, *Scoping Report*, County of Santa Clara (2020) (County Planning Department's January 22, 2020 completeness letter); Environmental Science Associates (2021) (Data Request 3); and Lehigh (2021) (Response to Data Request 3). Each of these areas of known controversy is being evaluated by County Planning Department decision-makers as part of their consideration of potential significant impacts, mitigation measures, and alternatives and in the context of any decision whether to approve the requested Grading Approval for the Project.

## ES.8 Issues to be Resolved

CEQA Guidelines Section 15123(b)(3) requires that an EIR identify issues to be resolved, which include the choice among alternatives and whether or how to mitigate significant impacts. The following major issues are to be resolved:

- Determine whether the SEIR adequately describes the environmental impacts of the Project.
- Choose among alternatives.
- Determine whether the recommended mitigation measures should be adopted or modified.
- Determine whether or not additional mitigation measures need to be applied to the Project.

**TABLE ES-2**
**PCRP IMPACTS AND MITIGATION MEASURES**

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Air Quality** | | |
| **Impact 3.1-1:** The PCRP would generate emissions of criteria air pollutants that could contribute to existing nonattainment conditions and further degrade air quality. | None required. | None required. |
| **Impact 3.1-2:** PCRP-related traffic would generate localized [carbon monoxide] CO emissions on roadways and at intersections in the PCRP vicinity. | None required. | None required. |
| **Impact 3.1-3:** The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer. | **Mitigation Measure 4.3-3a:** Within 90 days of Project approval, the Applicant shall submit to the County and the [Bay Area Air Quality Management District (BAAQMD)] a comprehensive inventory of all Project-related off-road construction equipment expected to be used during any portion of the Project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the Project.<br>**Mitigation Measure 4.3-3b:** Within 90 days of Project approval, the Applicant shall provide a plan for approval by the County and the BAAQMD demonstrating that Project-related off-road equipment would achieve a Project (EMSA-specific) wide fleet-average 35 percent reduction in [diesel particulate matter (DPM)] emissions compared to the proposed fleet in the ALG report (ALG 2011a) during Phase 1 of the Project. The plan shall be updated and submitted annually throughout the duration of the Project. Options for reducing emissions may include, but are not limited to:<br>• Using newer model engines (e.g., engines that meet U.S. EPA interim/final Tier 4 engine standards);<br>• Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by [the California Air Resources Board (CARB)] (http://www.arb.ca.gov/diesel/verdev/verdev.htm);<br>• Use of low-emissions diesel products or alternative fuels;<br>• Use of alternative material handling options (e.g., conveyor system); or | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Air Quality (cont.)** | | |
| Impact 3.1-3 (cont.) | • Other options as may become commercially available and verifiable.<br>Or<br>**Mitigation Measure 4.3-3c:** The Applicant shall submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project. | |
| **Impact 3.1-4:** The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could increase chronic and acute health risks. | None required. | None required. |
| **Impact 3.1-5:** The PCRP would increase exhaust emissions of $PM_{2.5}$, which could adversely affect human health. | Mitigation Measure 4.3-3a and either Mitigation Measure 4.3-3b or Mitigation Measure 4.3-3c. | No additional mitigation measures required. |
| **Biological Resources** | | |
| **Impact 3.2-1:** The Project may have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status species. | **California Red-legged Frog**: None required. | **California Red-legged Frog**<br>**Mitigation Measure 3.2-1, California Red-legged Frog (CRLF)**. The Applicant shall obtain authorization for incidental take of CRLF through consultation under Section 7 of the federal Endangered Species Act between [the U.S. Army Corps of Engineers (USACE)] and [U.S. Fish and Wildlife Service (USFWS)]. All requirements imposed by USACE and USFWS under Section 7 shall be fulfilled by the Applicant. The Applicant shall also implement avoidance and minimization measures consistent with the 2014 Programmatic Biological Opinion for CRLF (USFWS 2014), the 2022 Section 10(a)(1)(B) Incidental Take Permit for the Lehigh Southwest Cement Company's Permanente Site Operation and Maintenance Project (USFWS 2022b), or alternative Project-specific measures identified in the formal Section 7 consultation with USFWS. At a minimum, the following measures shall be implemented:<br>• Qualified biologists and monitors approved by USFWS shall be retained to ensure all required impact avoidance and minimization measures are properly implemented. Biologists and monitors shall have authority to stop work if environmental requirements are not being fulfilled and if a CRLF is determined to be in danger. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-1 (cont.) | | • Employee education training shall be conducted for on-site employees working on PCRP activities. Personnel shall be required to attend the presentation, which shall describe CRLF characteristics and natural history; avoidance, minimization, and conservation measures; legal protection of CRLF; and other related issues.<br>• To the extent practicable, restoration activities in the Permanente Creek channel and suitable pond habitats shall be conducted between August 15 and October 15, to minimize potential impacts on CRLF tadpoles.<br>• Specific methodology for capture and relocation of CRLF found in PCRP work areas shall be developed and approved by USFWS before on-site PCRP activities begin. This methodology shall identify the on-site location(s) to which CRLF shall be relocated.<br>• Preconstruction surveys for CRLF shall be conducted by a USFWS-approved biologist/monitor within 24 hours before the start of initial PCRP ground disturbance. If any CRLF adults, subadults, juveniles, tadpoles, or eggs are observed and determined to be in potential danger, a USFWS-approved biologist shall remove them from the work area and relocate them in compliance with established USFWS-approved methodology.<br>• To the maximum extent practicable, PCRP activities in CRLF habitat shall not occur during rain events or within 24 hours following a rain event. A USFWS-approved biologist/monitor shall inspect work areas and all equipment/materials for the presence of CRLF before Project activities resume after rain events. Any CRLF found in the work area shall be avoided and allowed to leave on its own or relocated in compliance with established USFWS-approved methodology.<br>• Restoration activities within suitable aquatic habitat for CRLF shall be conducted under the supervision of a USFWS-approved biologist/monitor. Aquatic habitat shall be surveyed for CRLF at the beginning of each day and periodically throughout the workday. Any CRLF in the work area and determined to be in potential danger shall be relocated in compliance with established USFWS-approved methodology.<br>• Plastic monofilament netting, loosely woven netting, or other materials using fixed weaves, polypropylene, polymer, or other synthetic materials shall not be used during Project implementation. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-1 (cont.) | | • For on-site storage of pipes, conduits, and other materials that could provide shelter for CRLF, an open-top trailer shall be used to elevate the materials above ground.<br>• Trenches or pits 1 foot or deeper to be left unfilled for more than 48 hours shall be securely covered with boards or other materials to prevent CRLF from falling into them. If this is not possible, dirt or wooden ramps or other structures of suitable surface that provide adequate footing for CRLF shall be placed in the trench or pit to allow for their unaided escape. The trench, pit, or hole shall be inspected by a USFWS-approved biologist/monitor each workday morning prior to initiation of work and in the late afternoon no more than 1 hour after work has ceased to determine if any individuals have become trapped. If the ramps fail to allow the animal to escape, a USFWS-approved biologist shall remove the CRLF and transport it to a safe location in compliance with established capture and relocation methodology.<br>• A USFWS-approved biologist shall remove aquatic exotic wildlife species such as bullfrogs and crayfish (if any) during PCRP activities. |
| | **Aquatic Life**: | **Aquatic Life**: No additional mitigation measures required. |
| | **Mitigation Measure 4.4-5: Selenium-related Impacts to Aquatic Habitat**. Implement Mitigation Measures 4.10-2a: Interim Stormwater Control and Sediment Management; 4.10-2b: EMSA Interim Stormwater Monitoring Plan; Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA; Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit; and Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit. | |
| | **Nesting Birds:** None required. | **Nesting Birds**: None required. |
| | **Bats:** | **Bats:** |
| | **Mitigation Measure 4.4-2a:** Use of Buffers near Active Roosts. During the November 1 to March 31 hibernation season, work shall not be conducted within 100 feet of woodland habitat that provides suitable bat roosting habitat. Bat presence is difficult to detect using emergence surveys during this period due to decreased flight and foraging behavior. If a qualified bat biologist | **Mitigation Measure 3.2-2: Roosting Bats, Maternity Roosting Season.** Nighttime evening emergence surveys, acoustic surveys, inspection for guano and culled insect parts, and/or visual inspection for roosts within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts in and within 100 feet of Project work areas. All active roosts identified during surveys shall be protected by a buffer to be |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-1 (cont.) | determines that woodland areas do not provide suitable hibernating conditions for bats and they are unlikely to be present in the area, work may commence as planned.<br><br>**Mitigation Measure 4.4-2c: Bat Roost Replacement**. All special-status bat roosts destroyed by the Project shall be replaced by the Applicant at a 1:1 ratio on site with a roost suitable for the displaced species (e.g., bat houses for colonial roosters). The design of such replacement habitat shall be coordinated with [the California Department of Fish and Wildlife (CDFW), formerly known as the California Department of Fish and Game (CDFG)]. The new roost shall be in place prior to the time that the bats are expected to use the roost (e.g., prior to April 1 if the roost destroyed by the Project was used by a maternity colony), and shall be monitored periodically for 5 years to ensure proper roosting habitat characteristics (e.g., suitable temperature and no leaks). The roost shall be modified as necessary to provide a suitable roosting environment for the target bat species.<br><br>**San Francisco Dusky-footed Woodrat**: None required. | determined by a qualified bat biologist in consultation with CDFW. The buffer shall be determined by the type of bat observed, topography, slope, aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance, etc. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date, surveys shall be repeated.<br><br>Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season.<br><br>**San Francisco Dusky-footed Woodrat**: None required |
| **Impact 3.2-2:** The Project may have a substantial adverse effect on riparian habitat or other sensitive natural community. | None required. | None required. |
| **Impact 3.2-3:** The Project may have a substantial adverse effect on state or federally protected wetlands. | **Mitigation Measure 4.4-8a: Wetland Identification and Avoidance.** A qualified wetland biologist shall physically delineate all federal and state waters and wetland features mentioned above and identified in the 2008 wetland delineation (WRA 2008). This shall occur before any PCRA activities begin, and when feasible, reclamation activities shall completely avoid these areas. Silt fence shall be installed between jurisdictional waters or wetlands and areas sprayed with hydroseed to prevent filling of wetlands with tackifier or other hydroseed material. Use of hand-seeding or working with hand tools may be required to avoid equipment impacting wetlands.<br><br>**Mitigation Measure 4.4-8b: Wetland Mitigation Plan.** If avoidance of jurisdictional waters or wetlands is not feasible, the following measures shall be implemented:<br><br>A qualified wetland biologist shall prepare a Mitigation and Monitoring Plan (MMP) for impacts on wetlands and waters under state or federal jurisdiction. The MMP shall outline the anticipated mitigation obligations for temporary and permanent impacts to waters of the state and/or U.S., including wetlands, resulting from PCRA activities. The MMP shall include:<br><br>– | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-3 (cont.) | • Baseline information;<br>• Anticipated habitat enhancements to be achieved through compensatory actions, including whether mitigation will occur within the Project Area along Permanente Creek or at an offsite location, as well as mitigation site location and hydrology;<br>• When possible, a preference for mitigation within the Permanente Quarry property, for impacts to both jurisdictional waters and wetlands;<br>• Performance and success criteria for habitat enhancement of Permanente Creek or other waterways to compensate for impacts to Other Waters, including:<br>– A replanting plan for appropriate native riparian woody vegetation, including but not limited to arroyo willow, white alder, California wild rose, and snowberry, bigleaf maple, western creek dogwood, and Oregon ash;<br>– An 80 percent overall revegetation planting success for all mitigation areas over a 10-year period;<br>– A minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;<br>– Plantings that are self-reliant, exhibit average or better health and vigor and have observable growth in stems and leaves at least two years prior to the end of the ten-year monitoring period;<br>– Visual inspection of all revegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;<br>– Observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new non-native species; and<br>– Annual monitoring reports submitted to CDFG and RWQCB documenting revegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.<br>• Performance and success criteria for wetland creation or enhancement including, but not limited to, the following:<br>– At least 70 percent survival of installed plants for each of the first three years following planting. | |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-3 (cont.) | – Performance criteria for vegetation percent cover in Years 1–4 as follows: at least 10 percent cover of installed plants in Year 1; at least 20 percent cover in Year 2; at least 30 percent cover in Year 3; at least 40 percent cover in Year 4.<br>– Performance criteria for hydrology in Years 1–5 as follows: Fourteen or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of three of the five monitoring years; OR establishment of a prevalence of wetland obligate plant species.<br>– Invasive plant species that threaten the success of created or enhanced wetlands shall not be allowed to contribute relative cover greater than 35 percent in Year 1, 20 percent in Years 2 and 3, 15 percent in Year 4, and 10 percent in Year 5. | |
| **Impact 3.2-4:** The Project may have a substantial adverse effect on oak woodland habitat. | **Mitigation Measure 4.4-7: Sudden Oak Death Minimization Measures.** To reduce the possibility of spreading Sudden Oak Death [SOD] to oak woodlands in the study area, the Applicant shall implement the following measures:<br>• Prior to any reclamation work within the Project area, equipment shall be sanitized, including shoes, pruning gear, trucks, and heavy equipment such as earthmoving, tree trimming, chipping, or mowing equipment. Except for trucks, this equipment shall remain on site for the duration of Project activities and shall not be transferred between this and other worksites, as doing so increases the potential of transferring infected spores to or from another site.<br>• After the completion of work activities, any accumulation of plant debris (especially leaves), soil, and mud shall be washed off of equipment or otherwise removed on site, and air filters shall be blown out.<br>• All contractors shall have sanitation kits on site for cleaning equipment. Sanitation kits should contain chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-Up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves.<br>• All organic material imported for mixing with quarry pit backfill shall have been composted at a facility that meets the standards of Title 14 California Code of Regulations, Division 7, Chapter 3.1; alternative sources of organic material may be used if approved by the County of Santa Clara Agricultural Commissioner as being as effective as the composting process to sanitize SOD-infected materials. | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Biological Resources (cont.)** | | |
| Impact 3.2-4 (cont.) | • All other imported fill material, soil amendments, gravel, etc. required for construction and/or restoration activities to be placed within the upper 12 inches of the ground surface shall be free of vegetation or plant material. | |
| **Impact 3.2-5:** The Project may conflict with the provisions of an adopted habitat conservation plan. | None required. | None required. |
| **Cultural Resources** | | |
| **Impact 3.3-1:** Project activities could cause an adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines and the County's Historic Preservation Ordinance. | **Mitigation Measure 4.5-1a:** The Applicant shall document the physical characteristics and their historic context of the contributing features of the Kaiser Permanente Quarry Mining District, including archival photo-documentation, mapping, and recording of historical and engineering information including measured drawings about the property according to the standards of the Historic American Buildings Survey/Historic American Engineer Record/Historic American Landscapes Survey (HABS/HAER/HALS), to be placed in a local public archive such as the Archives of the County of Santa Clara.<br><br>**Mitigation Measure 4.5-1b:** The Applicant shall salvage and/or relocate a representative portion of the Permanente Quarry Conveyor System and the remains of the early 1940s crusher, which constitute character-defining features that otherwise would be lost as a part of implementation of the Project.<br><br>**Mitigation Measure 4.5-1c**: The Applicant shall prepare public information programs to educate the general public on the historic nature of the potential Kaiser Permanente Quarry Mining District, including but not limited to exhibits at the Quarry office, publications available at the Quarry office, and an online presentation available on the Applicant's website (www.lehighpermanente.com). | No additional mitigation measures required. |
| **Impact 3.3-2:** Project activities could cause an adverse change in the significance of an archaeological resource as defined in Section 15064.5 of the CEQA Guidelines. | **Mitigation Measure 4.5-2**: If cultural resources are encountered during Project implementation, the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified archaeologist and a Native American representative. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Cultural Resources (cont.)** | | |
| Impact 3.3-2 (cont.) | privies; and deposits of metal, glass, and/or ceramic refuse. If the archaeologist and Native American representative determine that the resources may be significant and cannot be avoided, they shall notify the County and an appropriate treatment plan for the resources shall be developed by the Applicant in consultation with the County and the archaeologist. Measures in the treatment plan could include preservation in place (capping) and/or data recovery. The archaeologist shall consult with Native American representatives in determining appropriate treatment for prehistoric or Native American cultural resources. Ground disturbance shall not resume within 100 feet of the find until an agreement has been reached as to the appropriate treatment of the find. | |
| **Impact 3.3-3:** Project activities could disturb human remains, including those interred outside of formal cemeteries. | **Mitigation Measure 4.5-4**: In the event that human skeletal remains are encountered, the Applicant is required by Health and Safety Code Section 7050.5, Public Resources Code Section 5097.98, Title 14 California Code of Regulations Section 15064.5l, and County Ordinance No. B6-18 to immediately notify the County Coroner. Upon determination by the County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivisil(c) of §7050.5 of the Health and Safety Code and the County Coordinator of Indian affairs. No further disturbance of the site shall be made except as authorized by the County Coordinator of Indian Affairs in accordance with the provisions of state law and the County Ordinance. If artifacts are found on the site, a qualified archaeologist shall be contacted along with the County Planning Office. No further disturbance of the artifacts shall be made except as authorized by the County Planning Office. | No additional mitigation measures required. |
| **Energy** | | |
| **Impact 3.4-1:** The Project would not result in wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction. | None required. | None required. |
| **Geology and Soils** | | |
| **Impact 3.5-1:** Restoration activities proposed under the PCRP could cause slope instability and failure if restoration components are not properly engineered and constructed.<br>(Project-specific and cumulative) | **Mitigation Measure 4.7-1: Avoidance and containment of shallow slumps and/or fall-back of overburden material.** In all areas requiring the use of excavators for grading within the PCRA (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), the Applicant and/or its contractor shall begin excavations from the top of slope and proceed downward. The Applicant and/or its contractor shall not | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Geology and Soils (cont.)** | | |
| Impact 3.5-1 (cont.) | undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas of the PCRA where excavations would occur in sloped materials, the Applicant and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding farther downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles, wooden shoring systems, wire mesh, or other containment measures(s), and the Applicant and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design, and installation method of such measures shall be prepared and certified, or reviewed and approved by a California State registered geotechnical engineer. | |
| **Impact 3.5-2:** Seismic ground shaking and associated ground failures could disrupt or damage restoration elements of the PCRP. | None required. | None required. |
| **Impact 3.5-3:** Earthmoving, excavation, and other ground disturbance associated with the restoration could temporarily promote accelerated erosion and soil loss. | None required. | None required. |
| **Impact 3.5-4:** Project activities could directly or indirectly destroy a unique paleontological resource or site.<br>(Project-specific and cumulative) | **Mitigation Measure 4.5-3:** If a paleontological resource is encountered during implementation of the [Reclamation Plan Amendment (RPA)], the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified paleontologist as defined by the Society of Vertebrate Paleontology Guidelines (SVP 1995). The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the County and the Applicant, in consultation with the County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the County and Applicant prior to allowing work in the 100-foot radius to resume. | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Greenhouse Gas Emissions** | | |
| **Impact 3.6-1:** The PCRP could result in an increase in greenhouse gas emissions and contribute to climate change.<br>(Project-specific and cumulative) | **Mitigation Measure 4.8-1a: Develop Annual GHG Inventory.** The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.<br>**Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan.** The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT $CO_2e$ per year. The GHG Plan shall include, but not be limited to, the following measures:<br>1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.<br>2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the West Materials Storage Area (WMSA) to reclaim the quarry pit.<br>If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT $CO_2e$ per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):<br>1. On-site offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Greenhouse Gas Emissions (cont.)** | | |
| Impact 3.6-1 (cont.) | emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.<br>2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.<br>3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by CARB as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund. | |
| **Impact 3.6-2:** The PCRP would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. | None required. | None required. |
| **Hydrology and Water Quality** | | |
| **Impact 3.7-1:** Construction of the PCRP would not violate water quality standards, waste discharge requirements, or otherwise substantially degrade water quality. | **Mitigation Measure 4.10-1a: Professional Geologist Verification of Non-Limestone-Containing Material Use**. A California-certified Professional Geologist shall be on site during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the quarry pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the Geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The Geologist shall inspect and document whether limestone is present at the source area (quarry pit and WMSA), whether limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and quarry pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of | |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Hydrology and Water Quality (cont.)** | | |
| Impact 3.7-1 (cont.) | suspect rock fragments. If observation, field testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the Geologist shall document its presence, temporarily halt fill operations, and notify the County Planning Office and field superintendent. Once notified, the Applicant shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification.<br><br>**Mitigation Measure 4.10-1b: Verification Water Quality Monitoring.** The Applicant shall implement the following water monitoring and verification program within 90 days of Project approval and continue the program throughout the backfilling and reclamation phases and for 5 years following completion of reclamation. As part of this program, the Applicant shall:<br><br>• Collect quarterly quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium.<br><br>• Perform quarterly electrical conductivity and pH measurements of the quarry water.<br><br>• Measure and record daily volumes of any water that is pumped from the pit area.<br><br>• Conduct annual seep surveys in March or April of each year within the quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall be estimated.<br><br>• Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered.<br><br>• Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and revegetation results in runoff water quality that meets Basin Plan Water Quality Objectives and all other applicable water quality standards). Stormwater runoff monitoring and sampling shall be conducted following the placement and final grade of the 1-food-run-of-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding the Basin Plan Water Quality Objectives. Three rounds of representative surface | |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Hydrology and Water Quality (cont.)** | | |
| Impact 3.7-1 (cont.) | water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer.<br>• The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last 5 years of active mining. Based on the results of any refined water balance and water quality projections, the Applicant shall also review and refine the water management procedures.<br>• Reclamation of the quarry pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate, to the satisfaction of the Director of Planning and Development, that selenium in surface water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Objective | |
| **Impact 3.7-2:** The PCRP would not substantially alter existing drainage patterns, including through the alteration of Permanente Creek, in a manner that would result in substantial erosion, sedimentation, or additional sources of polluted runoff. | None required. | None required. |
| **Impact 3.7-3:** The PCRP would not substantially alter existing drainage patterns, including through the alteration of Permanente Creek, such that conveyance capacity is exceeded and flooding on- or off site occurs. | **Mitigation Measure 4.10-4: Construction of On-site Detention Facility.** The Applicant shall design and construct detention facilities that would: (1) manage increased runoff caused by the reclaimed quarry pit, (2) reduce excessive discharges to Permanente Creek, and (3) develop the capacity to detain and release the 100-year flow using on-site detention basins while optimizing groundwater infiltration. The final drainage design shall ensure that off-site, downstream flows would not cause an increased flooding potential or lead to hydromodification effects. In addition to the detention facilities for the quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas (such as the EMSA) are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with [the Santa Clara Valley Water District (SCVWD)] on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control | No additional mitigation measures required. |

| SEIR Impact | Applicable 2012 EIR Mitigation Measures | Additional Mitigation |
|---|---|---|
| **Hydrology and Water Quality (cont.)** | | |
| Impact 3.7-3 (cont.) | improvement project. Design considerations for on-site detention basins shall include the following performance standards. The basin shall be designed to:<br>• Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB.<br>• Effectively drain between storm events within the period of time specified by the County of Santa Clara 2007 Drainage Manual.<br>• Enhance the settlement of fine sediment while limiting the potential for sediment-laden water to be discharged to Permanente Creek.<br>• Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods.<br>• Control surface water inflows to the detention facility using energy reduction features (i.e., riprap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin.<br>• Infiltrate surface water to the extent practicable while accounting for and protecting the local groundwater condition and water quality<br>In addition to the detention facilities for the quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas (such as the EMSA) are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows off site in relation areas of existing flooding and to the current SCVWD flood control improvement project. | |
| **Impact 3.7-4:** The PCRP would not place structures that would impede or redirect flood flows within a 100-year flood hazard area. | **Mitigation Measure 4.10-4: Construction of Onsite Detention Facility.** | No additional mitigation measures required. |

# ES.9 References

County of Santa Clara, 2011. Lehigh Permanente Quarry Reclamation Plan Amendment Draft Environmental Impact Report.

County of Santa Clara, 2012a. Lehigh Permanente Quarry Reclamation Plan Amendment Final Environmental Impact Report.

County of Santa Clara, 2012b. Final Conditions of Approval for the Reclamation Plan Amendment for Lehigh Permanente Quarry. Approved by Planning Commission, June 7, 2012, and modified by the Board of Supervisors on June 26, 2012.

County of Santa Clara, 2020. Letter from Robert Salisbury, Senior Planner, to Erika Guerra regarding *Grading Approval for Permanente Creek Restoration Project (File No. PLN17-2250)*. January 22, 2020.

Environmental Science Associates, 2021. Memorandum from Janna Scott, Project Manager, to Robert Salisbury and Manira Sandhir with copy to Erika Guerra, Lehigh regarding *Permanente Creek Restoration Plan Supplemental EIR: Data Request 3*. June 25, 2021.

Lehigh, 2021. Email of Erika Guerra, Environmental and Land Resources Director to Janna Scott regarding *PCRP: Response to Data requests: #2, 2a & 3*. July 23, 2021.

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# CHAPTER 1
# Introduction

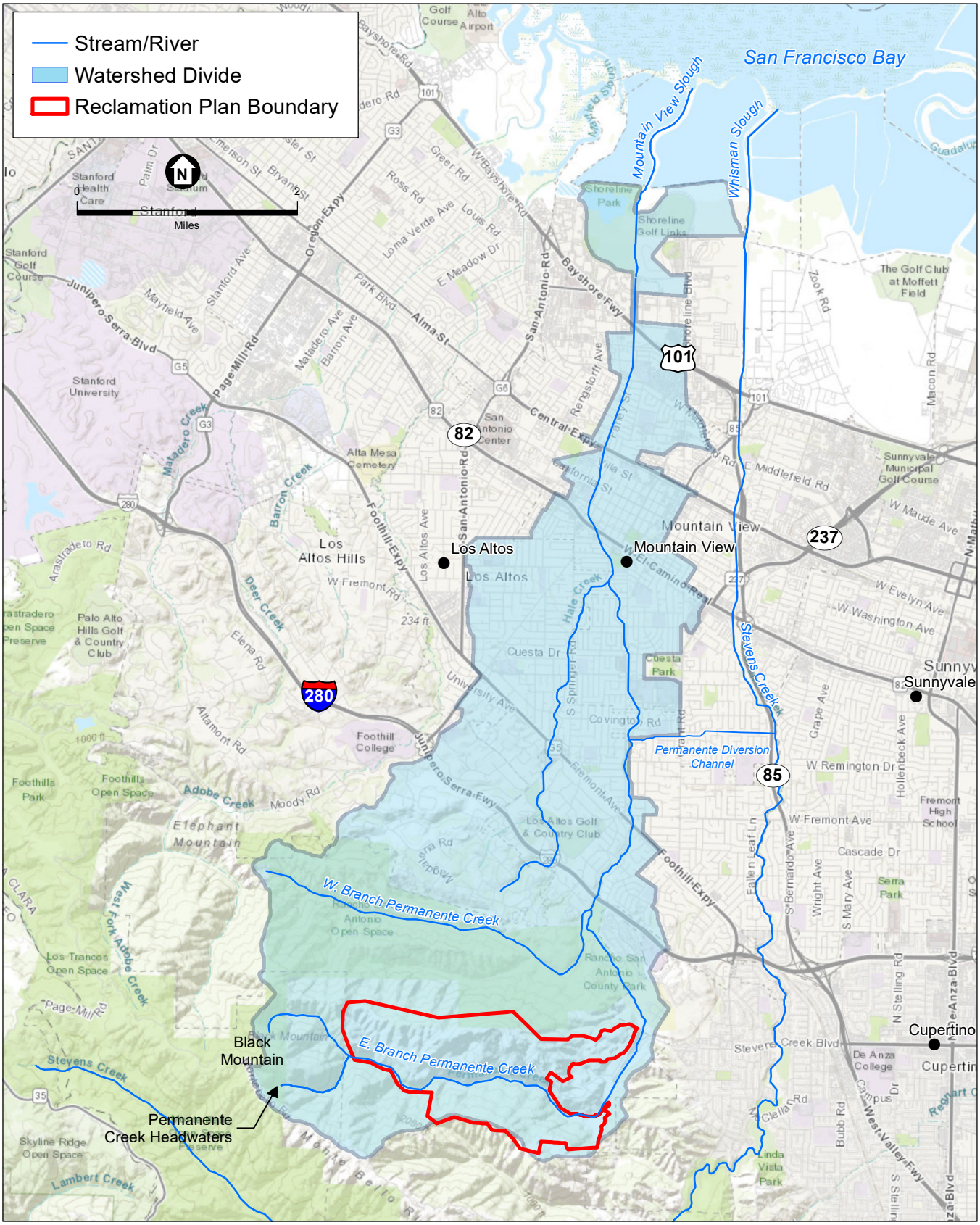
## 1.1 Project Context

Hanson Permanente Cement, Inc. (Hanson) owns, and Lehigh Southwest Cement Company (Lehigh Southwest) operates, two adjacent facilities located in the foothills west of Cupertino in unincorporated Santa Clara County: the Permanente Quarry and the Lehigh Cement Plant. (This document refers to the two cement companies collectively as "Lehigh.") The Permanente Quarry is a limestone and aggregate mining operation that operates subject to vested rights and the provisions of a Reclamation Plan that was originally approved in 1985 and amended in 2012 (referred to herein as the "2012 Reclamation Plan Amendment"). The cement plant operates pursuant to a use permit issued by the County of Santa Clara (County), approved by the Planning Commission on April 28, 1939.

These facilities are located along the east branch of Permanente Creek within the Permanente Creek watershed (**Figure 1-1**). Permanente Creek's main channel is approximately 13.1 miles long. The creek's headwaters rise on the southeast side of Black Mountain approximately 0.6 mile west of the western boundary of Lehigh's property. Approximately 4.2 miles of Permanente Creek traverse the property, including portions of the creek that have been realigned into a straight channel or placed in underground culverts. From Lehigh's property, Permanente Creek flows through the cities of Los Altos and Mountain View in two locations: The creek flows into Mountain View Slough and north into San Francisco Bay; it also flows east into the Permanente Creek Diversion Channel, with flows continuing north in Stevens Creek and Whisman Slough before discharging into the bay (Figure 1-1).

Mining wastes, overburden,[1] and sediment have entered Permanente Creek over time to the detriment of water quality, habitat, and the creek's natural function. In March 2011, Lehigh proposed the draft Permanente Creek Long-Term Restoration Plan (2011 Creek Restoration Plan) to the San Francisco Bay Regional Water Quality Control Board (RWQCB) pursuant to San Francisco Bay RWQCB–imposed Cleanup and Abatement Order No. 99-018. Details about Cleanup and Abatement Order No. 99-018, and the subsequent consent decree entered into by Lehigh that refined the 2011 Creek Restoration Plan to become the Permanente Creek Restoration Project (Project), are provided below.

[1] In the quarry context and as defined in the Draft 2012 Reclamation Plan Amendment Environmental Impact Report (page ES-3), *overburden* refers to rock materials that are not suitable for use as limestone or aggregate.




SOURCE: Creek and Watershed Map of the Santa Clara basin, 2005; Benchmark Resources, 2021



**Figure 1-1**
Permanente Creek

ESA

As part of the draft 2011 Creek Restoration Plan, Lehigh proposed to restore the streambed, banks, and floodplain in an area in and adjacent to Permanente Creek that overlapped with Lehigh's then-proposed quarry reclamation activities. The County analyzed the potential environmental impacts of the quarry reclamation and creek restoration in the 2012 Reclamation Plan Amendment Environmental Impact Report (2012 EIR) (State Clearinghouse No. 2010042063), certified by the County Board of Supervisors in June 2012. The 2012 EIR referred to the area of overlap as the "Permanente Creek Restoration Area" or "PCRA."

After the County certified the 2012 EIR, Lehigh further developed and refined the draft 2011 Creek Restoration Plan, in part to fulfill the requirements of an amended consent decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016 (Amended Consent Decree). For a copy of the Amended Consent Decree, see **Appendix B**. Provisions of the Amended Consent Decree, specifically including the creek restoration requirements in paragraphs 33–42, identify restoration duties imposed on Lehigh that stem from Cleanup and Abatement Order No. 99-018. The resulting modifications to the draft 2011 Creek Restoration Plan are reflected in Lehigh's *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* (90% Design Memo), prepared in 2019 and updated in 2022 by Waterways Consulting Inc. (**Appendix C**). The refined plan is called the Permanente Creek Restoration Plan (PCRP). See Section 1.2 and Chapter 2 for details.

Modifications in the PCRP have changed the Project analyzed in the 2012 EIR in a way that warrants further discretionary approval by the County, in the form of a Grading Approval by the Planning Official at the County of Santa Clara Department of Planning and Development (County Planning Department) for work proposed outside the Reclamation Plan boundary that was approved in 2012. Accordingly, the County Planning Department must conduct additional environmental review under the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 et seq.) and its implementing regulations (the CEQA Guidelines, California Code of Regulations [Cal. Code Regs.] Title 14, Section 15000 et seq.) before the proposed creek restoration work may proceed (Public Resources Code Section 21166; 14 Cal. Code Regs. Section 15162). See Section 1.3.1 regarding necessary approvals and Section 1.3.2 regarding the CEQA process for the PCRP.

On July 27, 1999, the San Francisco Bay RWQCB issued Cleanup and Abatement Order No. 99-018 regarding the "discharge of concrete and other wastes into Permanente Creek" from the Permanente Quarry and Lehigh Cement Plant (RWQCB 1999). The order required the implementation of interim and long-term corrective actions. To fulfill the last requirement of Order No. 99-018, Lehigh[2] prepared the draft 2011 Creek Restoration Plan.

The draft 2011 Creek Restoration Plan identified reach-specific and site-specific restoration recommendations, identified optional restoration design alternatives, contained implementation

[2] Henry J. Kaiser founded the Kaiser Permanente Cement Plant in 1939. Hanson Permanente Cement, Inc., acquired Kaiser Cement in 1986, and the cement company was renamed Hanson Permanente Cement in 1999. The Permanente Quarry and Cement Plant are currently owned by Hanson Permanente Cement, Inc., and operated by Lehigh Southwest Cement, a wholly owned subsidiary of Lehigh Cement Company LLC, which is a wholly owned subsidiary of Lehigh Hanson, Inc. Lehigh Hanson, Inc. is a wholly owned indirect subsidiary of Heidelberg Cement AG.

schedules, and updated prior reports based on more recent field reconnaissance. The plan focused on the long-term removal of structures in and adjacent to the creek and restoration of the creek's riparian zone. In the draft 2011 Creek Restoration Plan, Lehigh presented a prioritized list of recommended actions that could be implemented without interfering with active operations. The actions were recommended to address erosion or other potential sediment sources to Permanente Creek, previously installed infrastructure no longer necessary or beneficial, and geomorphological conditions that could be improved.

On December 19, 2011, the Sierra Club sued Lehigh in federal district court, alleging ongoing violations of the Clean Water Act at the Permanente Quarry and Cement Plant. The lawsuit included allegations that Lehigh caused overburden and sediment to enter the bed and banks of Permanente Creek without the necessary permitting pursuant to Clean Water Act Section 404 (U.S. Code Title 33, Section 1344) and that such fill could degrade the creek's water quality, habitat, and natural function. The lawsuit resulted in a negotiated Consent Decree between Lehigh and the Sierra Club in June 2013. The Consent Decree was substantively amended in 2016 to update the scope of the PCRP (Appendix B).

At the same time the San Francisco Bay RWQCB was evaluating water quality issues related to the quarry and cement plant, the County was evaluating Lehigh's proposed 2012 Reclamation Plan Amendment. The County issued a draft EIR in December 2011, issued the final EIR in May 2012, and certified it in June 2012. The draft version of the 2012 EIR is referred to in this document as the "Draft 2012 EIR." The final 2012 EIR, including responses to comments and revisions made to the Draft 2012 EIR, is referred to in this document as the "Final 2012 EIR." The certified EIR, including the Draft 2012 EIR together with the responses to comments and revisions identified in the Final 2012 EIR, is referred to simply as the "2012 EIR."

In June 2012, Lehigh received County approval to extend the term of its Reclamation Plan until 2032. The area within the 2012 Reclamation Plan Amendment's boundaries totaled 1,238.7 acres, including an up to 49.2-acre area of disturbance along Permanente Creek, as well as the adjacent hillsides within a 120.2-acre area referred to in the 2012 EIR as the PCRA (Draft 2012 EIR Section 1.2, page 1-2). The PCRA had been affected by mining activities, erosion events, and activities to control erosion in that area (Draft 2012 EIR Section 2.6.7, page 2-12). The 2012 EIR identified the PCRA as one of the primary areas to be reclaimed, and a subset of those activities includes the PCRP (Draft 2012 EIR Section ES.4.1, page ES-3; Section 2.1, page 2-1). For mapping and illustrative purposes, the PCRA was divided into seven subareas (Draft 2012 EIR Section 2.7.8, page 2-26).

## 1.2 Permanente Creek Restoration Plan

The PCRP further develops and refines the previously proposed creek restoration work that was analyzed in the 2012 EIR. The work described in the plan would restore and modify specific segments of Permanente Creek located within and outside of the existing Reclamation Plan boundary for the Lehigh Permanente Quarry. It is described and shown in detail on figures included in the 90% Design Memo (Appendix C); see also Figure 2-3, *PCRA Subareas and PCRP Reaches*, in Chapter 2. The PCRP would be implemented within an area of up to 135.6 acres and result in the

restoration of approximately 9,000 linear feet of Permanente Creek along the southern edge of Lehigh's property.

The PCRP, to the extent that Lehigh's 90% Design Memo differs from what was analyzed in the PCRA in the 2012 EIR, is the proposed "Project" for purposes of this analysis. To the extent that the PCRP activities and impacts are the same in Lehigh's 90% Design Memo as described and analyzed in the 2012 EIR, this document does not reanalyze them.

The Project includes the following major components:

- **Concrete Channel Area**: In this area (Reach 6), Lehigh would:
  - Encourage the development of a mature riparian canopy along the southern bank to shade the existing concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules.
  - Preserve existing native vegetation.
  - Remove non-native species and suppress weeds around existing native seedlings and smaller native plants to encourage their establishment.
  - Install native vegetation.
- **Channel Widening Area, Including the Rock Pile and Pond 13**: In this area (Reaches 8-13), Lehigh would:
  - Remove concrete road segments.
  - Decommission or narrow dirt roads, construct floodplain bench areas with habitat elements, and reduce access road width.
  - Remove 1,190 linear feet of culverts (approximately 260 linear feet at the Channel Widening Area and an additional 930 linear feet at the Rock Pile Area), and daylight the creek to improve passage conditions for fish (e.g., rainbow trout) and increase ecological complexity.
  - Install large woody debris at two culvert removal sites.
  - Remove imported sediment from the bed and banks of a tributary reach.
  - Selectively remove rock slope protection and concrete rubble bank protection in an area where adequate mature riparian vegetation is providing root reinforcement to bank soils.

  Specifically in the Rock Pile Area, Lehigh would:

  - Remove concrete road segments and road-related fill material.
  - Remove additional culverts and daylight the creek to help improve fish passage conditions and ecological complexity.
  - Construct a new channel with floodplain bench areas with habitat elements.

  - Remove the existing stockpile of aggregate material and the idled rock plant conveyor system and associated infrastructure.

  Lehigh would also remove the Pond 13 dam infrastructure and construct a restored channel through the area. Native vegetation would be installed throughout the Channel Widening Area.

- **Material Removal Area, including the "Old Crusher Foundation":** In this area (Reaches 17 and 18), Lehigh would:

  - Remove overburden/fill and cut back a portion of what is referred to as the "old concrete crusher foundation" that abuts the creek channel,[3] and remove two upslope relic concrete structures.

  - Move the north toe of the slope northward.

  - Construct a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity.

  - Install native vegetation.

# 1.3 CEQA Process Overview

## 1.3.1 Discretionary Approvals Required

Permits and other authorizations, including a discretionary permit from the County Planning Department, are expected to be required to implement the PCRP. The following approvals are expected to be necessary.

- *From the County:* A County Planning Department–level discretionary Grading Approval to authorize grading proposed in areas outside the existing Reclamation Plan boundary (County File No. PLN17-2250).

- *From the San Francisco Bay RWQCB:* A Clean Water Act Section 401 certification associated with the U.S. Army Corps of Engineers (USACE) Section 404 nationwide permit.

- *From CDFW:* A California Fish and Game Code Section 1602 streambed alteration agreement.

- *From USACE:* A Clean Water Act Section 404 nationwide permit, and USACE's consultation with the U.S. Fish and Wildlife Service (USFWS) regarding federally listed species, including the California red-legged frog, pursuant to federal Endangered Species Act Section 7 (USACE File No. 2008-00356; USFWS File No. 08ESMF00-2016-TA-2377).

[3] Work on the old concrete crusher foundation would be performed using reasonable methods and equipment, including small equipment with materials and spoils lowered and raised via a constant rate descender or equivalent.

## 1.3.2 Decision to Prepare a Supplemental Environmental Impact Report

A lead agency may choose to prepare a supplement to an existing EIR if any of the conditions described in CEQA Guidelines Section 15162 would require the preparation of a subsequent EIR, and if only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation (Public Resources Code Section 21166; 14 Cal. Code Regs. Section 15163[a]).

In the 2012 EIR, the County evaluated the impacts of Lehigh's proposed restoration of Permanente Creek within the seven subareas collectively identified as the PCRA. Lehigh now proposes to implement the PCRP with the modifications described in Chapter 2, *Project Description*, and has requested that the County consider a Grading Approval application for a modification of the previously proposed and evaluated work. The County Planning Department is continuing in its lead agency role for purposes of the Project's CEQA analysis. In this capacity, the County Planning Department has determined that only minor additions or changes would be necessary for the 2012 EIR to adequately apply to the PCRP, and thus has decided to prepare a supplemental EIR (SEIR). An SEIR need only contain the information necessary to make the previous EIR adequate for the project as revised (14 Cal. Code Regs. Section 15163[b]).

This SEIR has been prepared in accordance with CEQA and the CEQA Guidelines. It focuses exclusively on the PCRP, including:

- Aspects of restoration proposed outside the existing Reclamation Plan boundary, where a Grading Approval authorization would be required.
- Aspects of restoration proposed within the Reclamation Plan boundary but outside the disturbance areas within the PCRA subareas, where a Grading Approval would not be required (County Ordinance Section C12-407).
- To ensure that the impacts of the whole of the Project are considered, aspects of restoration proposed within one or more of the previously analyzed PCRA subareas.

The SEIR focuses on whether the Project as revised could cause a new significant impact or a substantial increase in the severity of a significant impact previously identified and evaluated in the 2012 EIR. It does not reevaluate other aspects of the 2012 EIR or other activities that may occur on Lehigh's property, such as operation of the cement plant, ongoing mining activities, or any proposed amendments to the Lehigh Permanente Quarry 2012 Reclamation Plan Amendment (File PLN19-0106).

The County Planning Department is aware that "a development proposal cannot be 'segmented' or otherwise divided into parts for purposes of CEQA analysis," and it has not done so here. CEQA defines "project" as "the development proposal" received by an agency, and "the activity which is being approved" or considered for approval (14 Cal. Code Regs. Sections 15378[c] and 15378[d]). The County Planning Department received and is considering an application for a Grading Approval for the creek restoration work that would occur outside the existing Reclamation Plan boundary. The scope of this CEQA analysis is appropriately tailored to the

environmental considerations attendant to the evaluation of the potential impacts of the whole of the grading work.

### 1.3.3 Pre-scoping Activities

The County Planning Department initiated pre-scoping activities after receiving the application for Grading Approval. Pre-scoping activities included initial agency outreach, which resulted in input that was considered as part of the application completeness process and that identified potential issues of concern for further consideration as part of the CEQA process. Pre-scoping input was received, for example, from the following agencies:

- The San Francisco Bay RWQCB, regarding the following topics (Wines, pers. comm., 2019):
  - The 2019 version of the 90% Design Memo prepared by Waterways Consulting, Inc. (which, as updated in 2022, is included in Appendix C).
  - The Geologic and Geomorphic Assessment of Permanente Creek prepared by Golder in 2019 (**Appendix G1**).
  - Differentiation of native soils and overburden/mining wastes.
  - Geotechnical recommendations.
  - The nature of materials in the channel near the Yeager Yard slope.
  - Characteristics of the proposed silt fencing.
  - Characterization of existing selenium levels in sediments in ponds.
  - Continued operation of the Final Treatment System–Upper ("FTS-Upper"), which treats water generated from the site.
- CDFW, regarding proposed activities and potential impacts in the Rock Pile Area and site-specific geotechnical and engineering geologic studies (Garrison, pers. comm., 2019).
- USFWS, regarding the potential for "take" (i.e., harm, capture, injury, or mortality) of California red-legged frog as a result of the excavation of sediments within the Project site (Terry, pers. comm., 2019).

### 1.3.4 Scoping Activities

CEQA Guidelines Section 15083 provides that a "Lead Agency may…consult directly with any person…it believes will be concerned with the environmental effects of the project." Scoping is the process of early consultation with affected agencies and the public before completion of a draft EIR. CEQA Guidelines Section 15083(a) states that scoping can be "helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." Scoping is an effective way to bring together and consider the concerns of affected state, regional, and local agencies, the project proponent, and other interested persons (14 Cal.

Code Regs. Section 15083[b]). The purpose of scoping is to determine the scope of information and analysis to be included in an EIR, and thereby to ensure that an appropriately comprehensive and focused EIR will be prepared that provides a firm basis for informed decision-making.

The scoping process for this SEIR included the following:

- **Notice of preparation (NOP)**: On April 13, 2021, the County Planning Department published and distributed an NOP to advise interested federal, state, regional, and local agencies and the public that an SEIR would be prepared for the Project. The NOP was provided to the State Clearinghouse and the County Clerk, and was emailed to recipients on the "Lehigh interested parties" list. An electronic copy of the NOP also was posted on the County Planning Department's website: https://plandev.sccgov.org/policies-programs/smara/permanente-quarry-lehighhanson/PLN17-2250.

- **Agency-specific scoping:** County Planning Department staff held an agency-specific scoping call with San Francisco Bay RWQCB staff on June 24, 2021, regarding key issues to be addressed in the SEIR and related data needs.

- **Public scoping meeting:** The County Planning Department conducted a virtual public scoping meeting on Thursday, April 29, 2021, from 6 to 8 p.m. The presentation included an overview of the Project, the environmental review process, and instructions for public participation.

- **Scoping period:** The SEIR scoping period lasted from April 13, 2021, to May 13, 2021. In addition to oral comments made at the public scoping meeting, nine comment letters were received during the scoping period. The County Planning Department received scoping input regarding air quality, biological resources, cultural and tribal cultural resources, hydrology and water quality, mineral resources, the Project description, and potential alternatives. All input received on or before the end of the scoping period is documented in the scoping report provided in **Appendix A** to this Draft SEIR.

### 1.3.5 Draft SEIR

Preparation of the Draft SEIR has followed and been informed by the scoping process. Article 9 of the CEQA Guidelines (14 Cal. Code Regs. Sections 15120–15132) establishes the required contents of an EIR. These contents, as they apply to the environmental analysis of the Project, are summarized below.

- **Table of contents or an index**: A table of contents is provided.

- **Summary**: An executive summary is provided.

- **Project description**: A description of the Project is provided in Draft SEIR Chapter 2.

- **Environmental Setting**: The environmental setting for the Project is described on a resource-by-resource basis in the 2012 EIR and, for the areas of focus in this SEIR, in Draft SEIR Chapter 3.

- **Analysis of direct, indirect, and cumulative impacts of the proposed project**: Potential impacts of the PCRP are described in Draft SEIR Chapter 3 to determine whether the

conclusions about potential effects of the PCRP may differ from the analysis documented in the 2012 EIR.

- **Consideration and discussion of mitigation measures proposed to minimize potential significant impacts**: As described in Draft SEIR Chapter 3, the PCRP would cause no new significant impacts and no substantial increase in the severity of significant impacts previously identified in the 2012 EIR. Consequently, no new mitigation measures are required to reduce the effects of the PCRP activities. **Table 3.0-1**, *Summary of Environmental Issue Areas and Impact Conclusions*, identifies the impact conclusions from the 2012 EIR, and identifies the mitigation measures that would continue to be implemented in connection with the Permanente Creek restoration activities.

- **Consideration and discussion of alternatives to the proposed project, including a No Project Alternative**: The alternatives development screening process, alternatives rejected from detailed consideration, and the alternatives evaluated in detail are described in Draft SEIR Chapter 4.

- **Organizations and persons consulted**: Federal, state, and local agencies; tribal entities and members; and organizations and individuals consulted pursuant to the preparation of this Draft SEIR are identified in Section 5.3, *Entities Consulted and Recipients of the Draft SEIR*.

### 1.3.6 Agency and Public Review

As required by CEQA, this Draft SEIR is being made available for agency and public review and comment for at least 45 days. Copies were provided to the State Clearinghouse for circulation to interested state agencies. Printed copies of the Draft SEIR and electronic copies of all appendices and all documents referenced in the Draft SEIR are available for public review during normal business hours at the County Planning Department. An electronic copy of the Draft SEIR is available for all-hours access on the County's website: https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx.

Notifications of the availability of the Draft SEIR and information about how to access it were sent directly to responsible, trustee, and local agencies; the County Clerk's office; and the tribal entities and members, organizations, and individuals identified in Section 5.3, *Entities Consulted and Recipients of the Draft SEIR*. Notice of the availability of the Draft SEIR was also published in the *Cupertino Courier*.

Please submit any written comments on the Draft SEIR to the following address:

County of Santa Clara Department of Planning and Development, Planning Office
**Attention: Robert Salisbury**
County Government Center
70 West Hedding Street, 7th Floor, East Wing
San Jose, CA 95110
Email: Robert.Salisbury@pln.sccgov.org

The County Planning Department will review all substantive comments received during the review period and provide written responses in a Final SEIR. The Final SEIR will be made available to agencies and the public, and will provide a basis for agency decision-making.

### 1.3.7 Final EIR

After the end of the Draft SEIR's public review period, the County Planning Department will review and consider the Final SEIR before taking action on the requested Grading Approval for the PCRP.

### 1.3.8 Findings of Fact and Decision-Making

After publication of the Final SEIR and before deciding whether to certify the SEIR or approve, modify, or deny the requested Grading Approval for the PCRP, the Planning Official will make the following findings regarding each significant impact consistent with Public Resources Code Section 21081:

- Changes or alterations have been required in, or incorporated into, the PCRP that mitigate or avoid the significant effects on the environment.
- Those changes or alterations are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. OR
- Specific economic, legal, social, technological, or other considerations, including considerations for the provision of employment opportunities for highly trained workers, make infeasible the mitigation measures or alternatives identified in the SEIR.

With respect to any significant effects that are subject to the third finding, the Planning Official must find that specific overriding economic, legal, social, technological, or other benefits of the Project outweigh its potential to result in significant unavoidable adverse effects on the environment before it could approve the Project. A statement of overriding considerations would not otherwise be required.

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## 1.4 References

Garrison, Kristin. Environmental Scientist. California Department of Fish and Wildlife, Bay-Delta Region, Habitat Conservation Program, Fairfield, CA. December 10, 2019—email to Claudia Garcia of Ascent Environmental containing comments on Lehigh Revised Materials for Permanente Creek Restoration Project.

San Francisco Bay RWQCB (San Francisco Bay Regional Water Quality Control Board). 1999. Cleanup and Abatement Order No. 99-018 Hanson Permanente Cement Company, Inc. (Formerly Kaiser Cement Corporation) Cupertino, Santa Clara County, California.

Terry, Joseph. U.S. Fish and Wildlife Service. February 11, 2019—email to Erika Guerra, Lehigh Hanson, containing responsive information on Permanente Creek Restoration Project, Santa Clara County (File Number 2008-00356).

URS Corporation. 2011. *Permanente Creek Long-Term Restoration Plan*. Oakland, CA. Prepared for Lehigh Southwest Cement Company, Cupertino, CA. March 11, 2011.

Wines, Brian. Water Resource Control Engineer. San Francisco Bay Regional Water Quality Control Board. December 9, 2019—email to Claudia Garcia of Ascent Environmental and Lindsay Whalin, Lisa McCann, and John Madigan of San Francisco Bay Regional Water Quality Control Board containing comments on Lehigh Revised Materials for Permanente Creek Restoration Project.

# CHAPTER 2
# Project Description

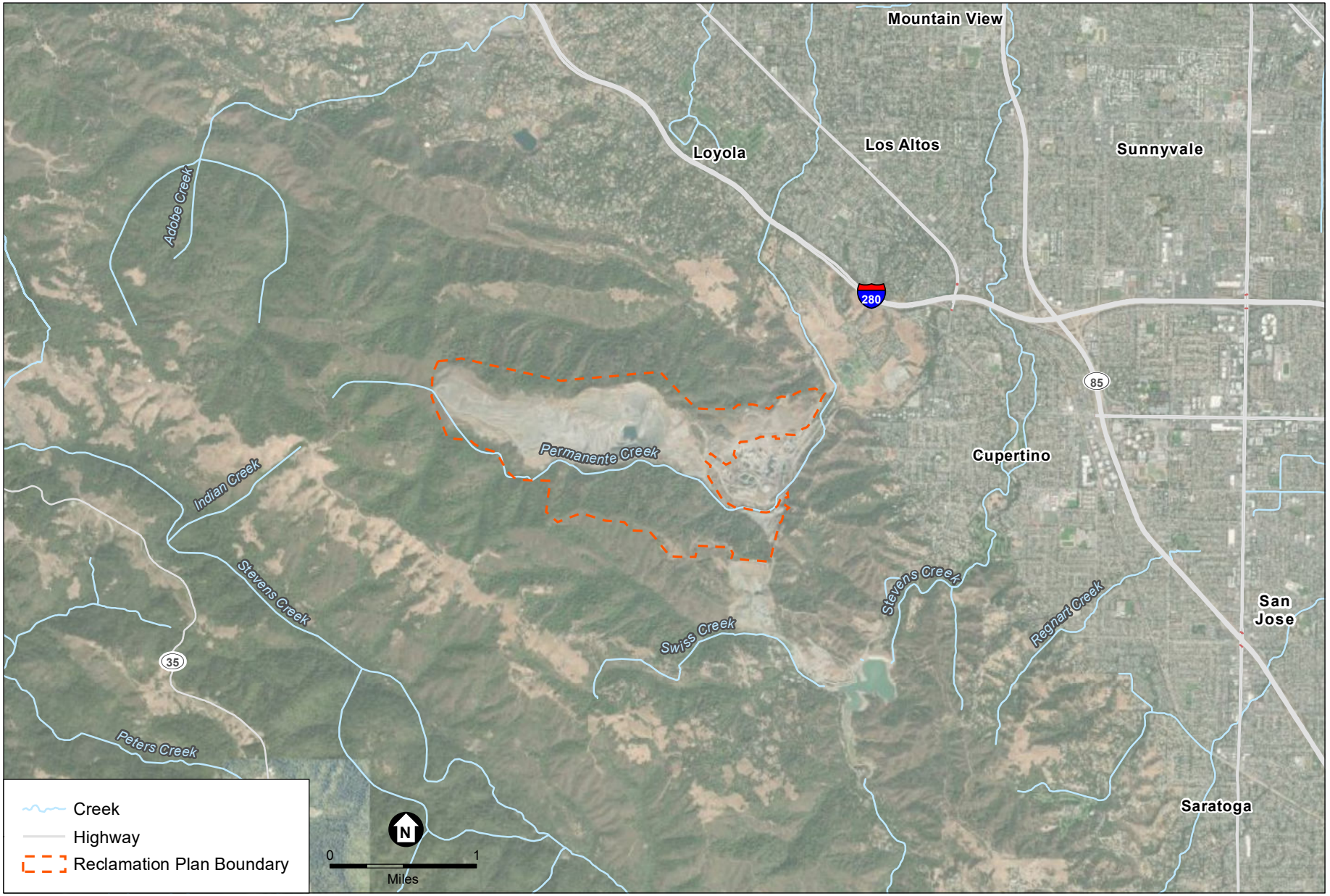
## 2.1 Overview

Together, Hanson Permanente Cement, Inc., and Lehigh Southwest Cement Company (referred to collectively in this document as "Lehigh") propose to restore and modify approximately 9,000 linear feet of Permanente Creek (135.6 acres) in accordance with the provisions of the Amended Consent Decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016 (Amended Consent Decree), a copy of which is provided in **Appendix B**. The subject segments of Permanente Creek are located within the Permanente Creek watershed along the southern edge of Lehigh's property both within and outside of the existing Reclamation Plan boundary of Lehigh's Permanente Quarry. See **Figure 2-1**, *Project Location*, and **Figure 1-1**, *Permanente Creek.* The creek restoration requirements, set forth in paragraphs 33–42 of the Amended Consent Decree, reflect restoration duties imposed on Lehigh that originally stem from San Francisco Bay Regional Water Quality Control Board (RWQCB) Cleanup and Abatement Order No. 99-018. Those requirements led to the development of a draft 2011 Creek Restoration Plan, a portion of which was described and analyzed in the 2012 Reclamation Plan Amendment Environmental Impact Report (2012 EIR) as part of the "Permanente Creek Restoration Area" or "PCRA."

Pursuant to the Amended Consent Decree, the currently proposed creek restoration plan is called the Permanente Creek Restoration Plan (PCRP). The PCRP is described in the Lehigh *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* (90% Design Memo), prepared in August 2022 by Waterways Consulting Inc. (**Appendix C**), and is illustrated in detail on **Figure 2-2**, *PCRP Overview.*

Section 2.2 identifies Lehigh's objectives for the PCRP. Section 2.3 explains the focus of this supplemental environmental impact report (SEIR) and Section 2.4 describes the correlation between the 2012 EIR's analysis of the draft 2011 Creek Restoration Plan and the PCRP. Section 2.5 details the PCRP's proposed activities on a reach-by-reach basis.[1] Section 2.6 summarizes the permits and approvals expected to be required.

[1] The U.S. Geological Survey (USGS) defines "reach" as "a section of a stream or river along which similar hydrologic conditions exist, such as discharge, depth, area, and slope. It can also be the length of a stream or river (with varying conditions) between two stream gages, or a length of river for which the characteristics are well described by readings at a single stream gage. In practical use, a reach is just any length of a stream or river. The term is often used by hydrologists when they're referring to a small section of a stream or river rather than its entire length." (USGS 2021.)

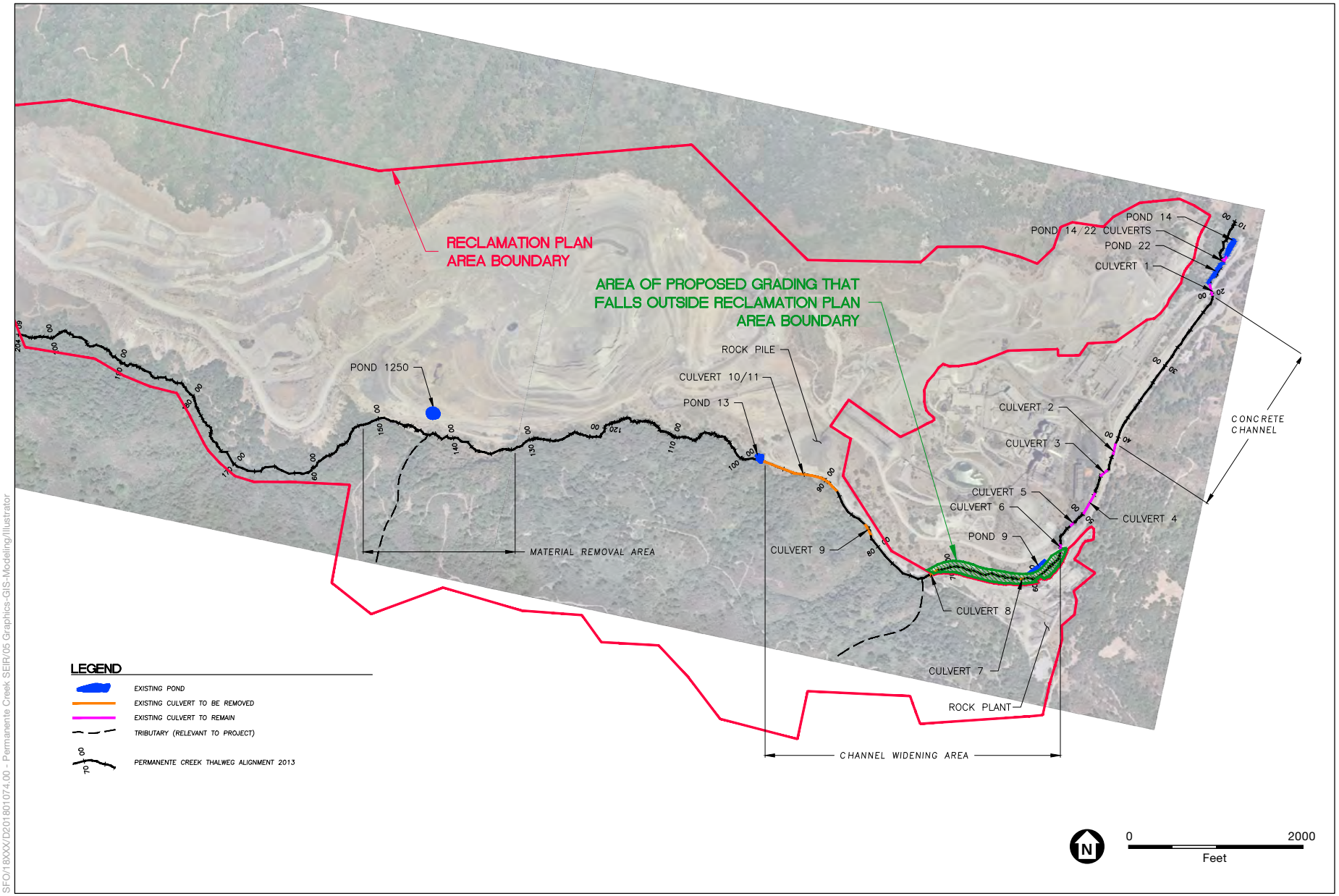



SOURCE: Benchmark Resources, 2021

Permanente Creek Restoration Plan Supplemental Environmental Impact Report

**Figure 2-1**
Project Location

ESA




SFO/18XXX/D2018010774.00 - Permanente Creek SEIR/05 Graphics-GIS-Modeling/Illustrator

SOURCE: Waterways Consulting, Inc., 2022. Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum. August 26, 2022 (Appendix C to Draft SEIR).

Permanente Creek Restoration Plan Supplemental Environmental Impact Report

**Figure 2-2**
Project Overview

ESA

## 2.2 Project Objectives

As stated in Section IV.A.33 of the Amended Consent Decree and Section 1.2 of the 90% Design Memo, Lehigh's objectives for the PCRP are as follows:

(a) Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity (e.g., cascade and step channeling, floodplain roughness with floodplain logs, boulders, planting pockets, live stake trench packs), increased channel cover, and fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless California Department of Fish and Wildlife (CDFW) California Salmonid Stream Habitat Restoration Manual (CDFW Restoration Manual, CDFW 2010) hydraulic design criteria cannot be met due to: (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist.

(b) Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function.

(c) Remove mining-related fill and sediments in the bed, banks, and adjacent slopes.

(d) Remove or alter human-made structures so as to improve riparian habitat.

(e) Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent overburden/fill from entering the creek.

(f) Require restoration that is no less stringent than any restoration that is approved or required by any agency,[2] including but not limited to the County of Santa Clara Department of Planning and Development (County Planning Department), the CDFW, and the RWQCB, and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the County Planning Department, the CDFW, and the RWQCB.

These objectives are consistent with and supplemental to the project objectives stated in the 2012 EIR. Consistent with California Environmental Quality Act (CEQA) Guidelines Section 15126.6(a), the County Planning Department will consider Lehigh's objectives as part of its screening criteria for evaluating potential alternatives to the PCRP as proposed. See Section 4.2, *Screening Methodology*, of the 2012 EIR for additional details.

## 2.3 Focus of the Supplemental EIR

The PCRP is the "Project" being analyzed in this SEIR under CEQA, and is a component of the overall activities referenced and evaluated in the 2012 EIR. Pursuant to the PCRP, creek restoration activities would be implemented within an area of up to 135.6 acres. This area consists of the 120.2-acre PCRA described and analyzed in the 2012 EIR (49.2 acres of the 120.2-arce PRCA would be disturbed for restoration purposes); a 12.9-acre portion of the existing Reclamation Plan boundary where creek restoration activities were not described and analyzed in the 2012 EIR; and an additional 2.5 acres beyond the existing Reclamation Plan boundary where

[2] For purposes of the analysis, this SEIR understands "restoration that is no less stringent than any restoration that is approved or required by any agency" to mean that the creek restoration activities can be no less stringent than set forth in permits or other approvals issued by regulatory agencies for the proposed Project.

restoration work would occur pursuant to the PCRP. See Figure 2-2, *PCRP Overview*; see also Figure 2-3, *Correlation of PCRA Subareas and PCRP Reaches.* The 135.6-acre area where the PCRP would be implemented is the "Project site" for purposes of this SEIR.

Section 2.6.7 of the December 2011 draft of the 2012 EIR (the "Draft 2012 EIR") specifically describes the 49.2-acre portion of the PCRA within which restoration-related disturbance would occur as the area "along Permanente Creek and the adjacent hillsides that have been affected by mining activities, erosion events, and activities to control erosion in that area." This characterization of the PCRA as an area within the existing Reclamation Plan boundary for Lehigh's Permanente Quarry remains accurate. Within the PCRA, the draft 2011 Creek Restoration Plan focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. In turn, the PCRP would restore and modify specific segments of Permanente Creek located in an area of up to 135.6 acres that lies partly within and partly outside of the existing Reclamation Plan boundary. Consistent with the draft 2011 Creek Restoration Plan, the PCRP also focuses on the removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone.

Because only minor additions or changes would be necessary to make the 2012 EIR apply to the Project in the changed situation, the County Planning Department is preparing an SEIR. The SEIR will determine whether the PCRP, including its revisions to the draft 2011 Creek Restoration Plan, would cause new significant impacts or more significant impacts than disclosed in the 2012 EIR. To do this, the analysis in Chapter 3, *Project Impacts and Mitigation Measures*, will focus on three things:

(a) PCRP areas that are located outside of the existing Reclamation Plan boundary.

(b) PCRP areas located within the Reclamation Plan boundary and within the 120.2-acre PCRA but outside of the PCRA's 49.2-acre disturbance area.

(c) More generally, whether the PCRP proposes work within the PCRA at greater intensity than previously considered in the 2012 EIR.

Based on this approach, **Table 2-1**, *Specific Areas of Focus for the Supplemental EIR*, identifies Reaches 6–13 and Reaches 17 and 18 as key areas of focus.

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**TABLE 2-1**
**SPECIFIC AREAS OF FOCUS FOR THE SUPPLEMENTAL EIR**

| Amended Consent Decree Reach | Summary of Proposed Restoration per PCRP | | In the Existing Reclamation Plan Boundary? | In the 2012 EIR PCRA? | Subject to Grading Approval? | A Focus of this SEIR? |
|---|---|---|---|---|---|---|
| Reaches 1–5 | The PCRP proposes no work in Reaches 1–5. | | No | No | No | No, because the PCRP proposes no work in Reaches 1–5. |
| Reach 6 and Reach 7 | Reach 6 is identified as the "Concrete Channel Area." Proposed work in Reach 6 includes:<br>• Encouragement of the development of a mature riparian canopy along the southern bank to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules.<br>• Preservation of existing native vegetation.<br>• Removal of non-native species and suppression of weeds around existing native seedlings and smaller native plants to encourage their establishment.<br>• Installation of native vegetation. | | No | No | Yes | Yes. Although the 2012 EIR described and analyzed revegetation south of Permanente Creek (see, e.g., Draft 2012 EIR Table 2-6, pages 2-30 and 2-31), it did not contemplate activities in these proposed locations. As a result, work proposed in Reach 6 and Reach 7 was not covered by the 2012 EIR. |
| Reach 8 | Reaches 8–12 are identified as part of the "Channel Widening Area." Proposed work includes:<br>• Removal of concrete road segments.<br>• Construction of floodplain bench areas with habitat elements and reduction of access road width.<br>• Removal of 260 linear feet of culverts, including a road crossing, and daylighting of the creek to improve fish passage conditions and ecological complexity.<br>• Installation of large woody debris at the Culvert 7 and Culvert 8 removal sites.<br>• Removal of old tractor tires along streambanks at a culvert removal site.<br>• Removal of imported sediment from the bed and banks of a tributary reach.<br>• Select removal of rock slope protection and concrete rubble bank protection at an area that now has adequate mature riparian vegetation that is providing root reinforcement to bank soils.<br>• Removal of the idled Rock Plant conveyor system and associated infrastructure.<br>• Installation of native vegetation. | | No | No | Yes | Yes, because the PCRP proposes restoration work outside the existing Reclamation Plan boundary that, as a result, was not covered by the 2012 EIR. |
| Reach 9 | | | Yes | No, Reaches 9–11 were not included in the 2012 EIR's PCRA boundary. | No, because any grading proposed to implement the PCRP would occur within the existing Reclamation Plan boundary. | Yes. Although the 2012 EIR analyzed the types of activities proposed to be implemented in Reaches 9–11, it did not analyze related potential impacts in these locations.<br>The 2012 EIR analyzed the impacts of restoration proposed in Reaches 12 and 13. The SEIR will evaluate whether any changes in the types or methods of restoration activities in these reaches would cause a new significant impact or a substantial increase in the severity of a previously identified significant impact, relative to the impacts identified in the 2012 EIR. |
| Reach 10 | | | | | | |
| Reach 11 | | The Channel Widening Area includes the "Rock Pile Area," which consists of Reaches 11 and 12 and Pond 13, which is in Reach 13. The "Rock Pile" is referred to in the 2012 EIR as the "Surge Pile." While the terms are synonymous, this SEIR uses the term "Rock Pile Area" for consistency with the Amended Consent Decree and Grading Approval application. Proposed work includes:<br>• Removal of concrete road segments and road-related fill material.<br>• Removal of 930 linear feet of culverts and daylighting of the creek that would help improve fish passage conditions and ecological complexity.<br>• Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity.<br>• Removal of Rock Pile and idled Rock Plant conveyor system and associated infrastructure.<br>• Removal of Pond 13 dam infrastructure.<br>• Construction of a restored channel through abandoned Pond 13.<br>• Installation of native vegetation. | Yes, Reaches 12 and 13 were included in Subarea 7. | |
| Reach 12 | | | | | | |
| Reach 13 | | | | | | |
| Reach 14 | The PCRP proposes no change to previously analyzed activities within Reaches 14–16. | | Yes | Yes, Reaches 14–16 were included in Subarea 6 and Subarea 7. | No, because Reaches 14–16 are within the existing Reclamation Plan boundary and because no change to previously analyzed work is proposed in these locations. | No, because the PCRP proposes no change to previously analyzed activities within Reaches 14–16. |
| Reach 15 | | | | | | |
| Reach 16 | | | | | | |
| Reach 17 | Reach 17 is identified as containing the "Old Crusher Foundation." Proposed work includes cutting back the concrete block that is projecting into the channel to better conform to the natural creek bank. | Reaches 17 and 18 are identified as the "Material Removal Area." Proposed work includes:<br>• Removal of overburden/fill and a relic concrete structure, and relocation of the north toe of slope northward (Pond 4A has been decommissioned; Pond 1250 and the Upper Facility Treatment System (Upper FTS) would be relocated as needed).<br>• Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity.<br>• Installation of native vegetation. | Yes | Yes, Reaches 17 and 18 and part of Reach 19 are located within Subareas 4 and 5. | No, because any grading proposed to implement the PCRP would occur within the existing Reclamation Plan boundary. | Yes. The 2012 EIR analyzed the impacts of restoration proposed in Reaches 17 and 18. The SEIR will evaluate whether any changes in the types or methods of restoration activities in these reaches would cause a new significant impact or a substantial increase in the severity of a previously identified significant impact, relative to the impacts identified in the 2012 EIR. |
| Reach 18 | | | | | | |
| Reaches 19–22 | The PCRP proposes no change to previously analyzed activities within Reaches 19–22. | | Yes | Yes, Reaches 19–22 are located within Subareas 1, 2, 3, and 4. | No, because any grading proposed to implement the PCRP would occur within the existing Reclamation Plan boundary. | No, because the PCRP proposes no change to previously analyzed activities within Reaches 19–22. |

NOTES: 2012 EIR = certified 2012 Reclamation Plan Amendment Environmental Impact Report; Amended Consent Decree = amended consent decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016; PCRA = Permanente Creek Restoration Area; PCRP = Permanente Creek Restoration Plan

SOURCE: 2012 EIR; Lehigh 2021

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# 2.4 Correlation between the 2012 EIR PCRA and the PCRP

## 2.4.1 The PCRA

The 2012 EIR divided the PCRA into seven subareas for mapping and illustrative purposes. Section 2.7.8 of the Draft 2012 EIR described the specific reclamation and restoration treatment to occur within each subarea. Briefly, creek restoration–related activities were described to include removal of overburden[3] materials and facilities from the Permanente Creek channel, channel widening, restoration of a more natural creek alignment,[4] replacement of the instream Pond 13 outflow and downstream half-culvert with a wider and more natural creek channel, catch basin improvements, erosion control and revegetation, road work, and monitoring and maintenance. The work was proposed to be conducted mostly by light vehicles and foot crews to avoid damage and destabilization to the channel and slopes adjacent to the creek. Additional details were included in the Reclamation Plan Amendment Revegetation Plan (WRA 2011a) and the engineering drawings and details provided with the 2012 EIR.

The 2012 EIR prescribed reclamation and restoration treatments as follows:

(a) PRCA Subarea 1 Reclamation Treatments (Draft 2012 EIR Table 2-3)

(b) PRCA Subarea 2 Reclamation Treatments (Draft 2012 EIR Table 2-4)

(c) PRCA Subarea 3 Reclamation Treatments (Draft 2012 EIR Table 2-5)

(d) PRCA Subarea 4 Reclamation Treatments (Final 2012 EIR Table 2-6)

(e) PRCA Subarea 5 Reclamation Treatments (Final 2012 EIR Table 2-7)

(f) PRCA Subarea 6 Reclamation Treatments (Draft 2012 EIR Table 2-8)

(g) PRCA Subarea 7 Reclamation Treatments (Final 2012 EIR Table 2-9)

Performance standards were identified in Final 2012 EIR Table 2-17, *Proposed Five-Year Performance Standards for Revegetation in the PCRA*. The descriptions and prescribed treatments provided in the 2012 EIR (including in Section 2.7.8 of the Draft 2012 EIR) remain accurate except as clarified and supplemented below by restoration actions identified in the PCRP. Performance standards and mitigation measures identified in the 2012 EIR remain in place and are being implemented as part of the current, baseline condition.

## 2.4.2 The PCRP's Relationship to the PCRA

The PCRP uses different nomenclature following the convention established in the Amended Consent Decree: It refers to specific segments of the creek as "reaches." The location of each reach is identified in **Table 2-2**, *Amended Consent Decree Reach Locations*. The 2012

3 In the quarry context and as defined in the Draft 2012 EIR (p. ES-3), "overburden" refers to rock materials that are not suitable for use as limestone or aggregate.

4 Additional details regarding the proposed restoration toward a more natural creek are provided in Section 2.5, and in Sections 2.2 through 2.5 of the *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum*.

Reclamation Plan Amendment[5] PCRA subareas analyzed in the 2012 EIR and the PCRP reaches analyzed in this SEIR relate to one another as shown in **Table 2-3**, *2012 EIR Subarea Restoration Details and Correlation with Amended Consent Decree Reaches*, and **Figure 2-3**, *Correlation of PCRA Subareas and PCRP Reaches*. Work required in the PCRA by the 2012 Reclamation Plan Amendment outside the scope of the PCRP will be performed as part of Lehigh's separate reclamation obligations under the Surface Mining and Reclamation Act (SMARA).

**TABLE 2-2**
**AMENDED CONSENT DECREE REACH LOCATIONS**

| Reach | Reach Boundary | Survey Marker* | |
|---|---|---|---|
| | | Latitude | Longitude |
| 1 | I/(2–3B) | 37.32411111 | 122.08348564 |
| 2 | 2/3A | 37.32372222 | 122.08319439 |
| 3 | (3A–3B)/4 | 37.32302778 | -122.08397139 |
| 4 | 4/5 | 37.32258333 | -122.08427219 |
| 5 | 5/6 | 37.32227778 | -122.08436153 |
| 6 | 6/7 | 37.31513889 | -122.08907528 |
| 7 | 7/8 | 37.31397222 | -122.08994808 |
| 8 | 8/9 | 37.31316667 | -122.09482547 |
| 9 | 9/10 | 37.31419444 | -122.09728333 |
| 10 | 10/11 | 37.31563889 | -122.09885892 |
| 11 | 11/12 | 37.31608333 | -122.10045472 |
| 12 | 12/13 | 37.31641667 | -122.10164806 |
| 13 | 13/14 | 37.31702778 | -122.10300819 |
| 14 | 14/15 | 37.31725000 | -122.10435689 |
| 15 | 15/16 | 37.31766667 | -122.10726281 |
| 16 | 16/17 | 37.31713889 | -122.11072903 |
| 17 | 17/18 | 37.31750000 | -122.11611706 |
| 18 | 18/19 | 37.31747222 | -122.11741150 |
| 19 | 19/20 | 37.31647222 | -122.12272900 |
| 20 | 20/21 | 37.31877778 | -122.12545628 |
| 21 | 21/22 | 37.32005556 | -122.13101986 |

NOTE:
* Field stake "Carsonite" marker location coordinates.

SOURCE: Lehigh 2021

5 In this SEIR, the "2012 Reclamation Plan Amendment" refers to the 2012 amendment to the 1985 Permanente Quarry Reclamation Plan.

**TABLE 2-3**
**2012 EIR SUBAREA RESTORATION DETAILS AND CORRELATION WITH AMENDED CONSENT DECREE REACHES**

| Amended Consent Decree Reaches | 2012 EIR PCRA Subarea Restoration Details | |
|---|---|---|
| 1–11 | Not applicable (off-site). | |
| 12, 13, 14, 15 (part) | Subarea 7 is described in Draft 2012 EIR Section 2.7.8.7, *PCRA Subarea 7*. | |
| | North of Creek Revegetation | Hydroseeding of disturbed areas with a specified seed mix and hand-planting of riparian vegetation at the toe of the slope in areas where sufficient hydrology exists to support it. (2012 Draft EIR, page 2-32.) |
| | Slope BMPs | Staking in place of fiber rolls, spaced at 15-foot intervals in disturbed areas where the slope angle is 2.0:1.0 (H:V) or flatter, and at 10-foot intervals in disturbed areas that are steeper than 2.0H:1.0V. Removal by hand (where possible) of silt collected at the toe of the slope. (Draft 2012 EIR Table 2-9, page 2-32.) |
| | Monitoring and Maintenance | Monitoring and maintenance of revegetation and erosion controls added to treatment areas on the northern side of the creek, according to the reclamation performance standards set forth in Section 2.8 of the Draft 2012 EIR (Table 2-9, page 2-32). |
| | Creek Restoration | (a) Removal of the Pond 13 outflow and replacement of the downstream half-culvert with a wider and more natural creek channel. The removal of the Pond 13 outflow would involve the following restoration measures: Re-contouring of the pond floor and sides to establish a new bankfull bench and stable channel; removal of pond infrastructure and any accumulated sediment; installation of step pools, drop structures, and other stream control devices as needed for a stable channel; and revegetation of riparian areas. (Draft 2012 EIR Table 2-9, page 2-32.)<br>(b) Replacement of the downstream half-culvert, involving the following restoration measures: Removal of the half-culvert and surrounding fill material; establishment of a new bankfull bench and floodplain; installation of step pools, drop structures, and other stream control devices as needed for a stable channel; and revegetation of riparian areas. (Draft 2012 EIR Table 2-9, page 2-32.)<br>(c) Implementation of BMPs for removing limestone boulders from Permanente Creek as identified in the 2012 Reclamation Plan Amendment. (Draft 2012 EIR Section 2.7.8.8, page 2-32, citing Enviromine 2011 [Attachment J]). |
| 15 (part), 16 (part) | Subarea 6 is described in Draft 2012 EIR Section 2.7.8.6, *PCRA Subarea 6*. Details are not summarized here because no work related to the PCRP is proposed in Subarea 6. | |
| 16 (part), 17 (part) | Subarea 5 is described in Draft 2012 EIR Section 2.7.8.5, *PCRA Subarea 5*. Details are not summarized here because no work related to the PCRP is proposed in Subarea 5. | |
| 17 (part), 18, 19 (part) | Subarea 4 is described in Draft 2012 EIR Section 2.7.8.4, *PCRA Subarea 4*. | |
| | North of Creek Revegetation | Hydroseeding of disturbed areas with specified seed mix and hand-planting of riparian vegetation at the toe of the slope in areas where sufficient hydrology exists. (Draft 2012 EIR Table 2-6, page 2-30.) |
| | South of Creek Revegetation | Seeding of areas of mining disturbance on the south side of the creek, using a broadcast seeder or hand-seeding, in areas above the ordinary high-water mark. (Draft 2012 EIR Table 2-6, page 2-30.) |
| | Slope BMPs | Placement of erosion blankets across the slope for erosion control. Staking in place of fiber rolls, spaced at 15-foot intervals, in disturbed areas where the slope angle is 2.0:1.0 (H:V) or flatter, and at 10-foot intervals in disturbed areas steeper than 2.0H:1.0V. Removal—by hand by work crews, where possible—of silt collected at the toe of the slope. (Draft 2012 EIR Table 2-6, page 2-30.) |

**TABLE 2-3 (CONTINUED)**
**2012 EIR SUBAREA RESTORATION DETAILS AND CORRELATION WITH AMENDED CONSENT DECREE REACHES**

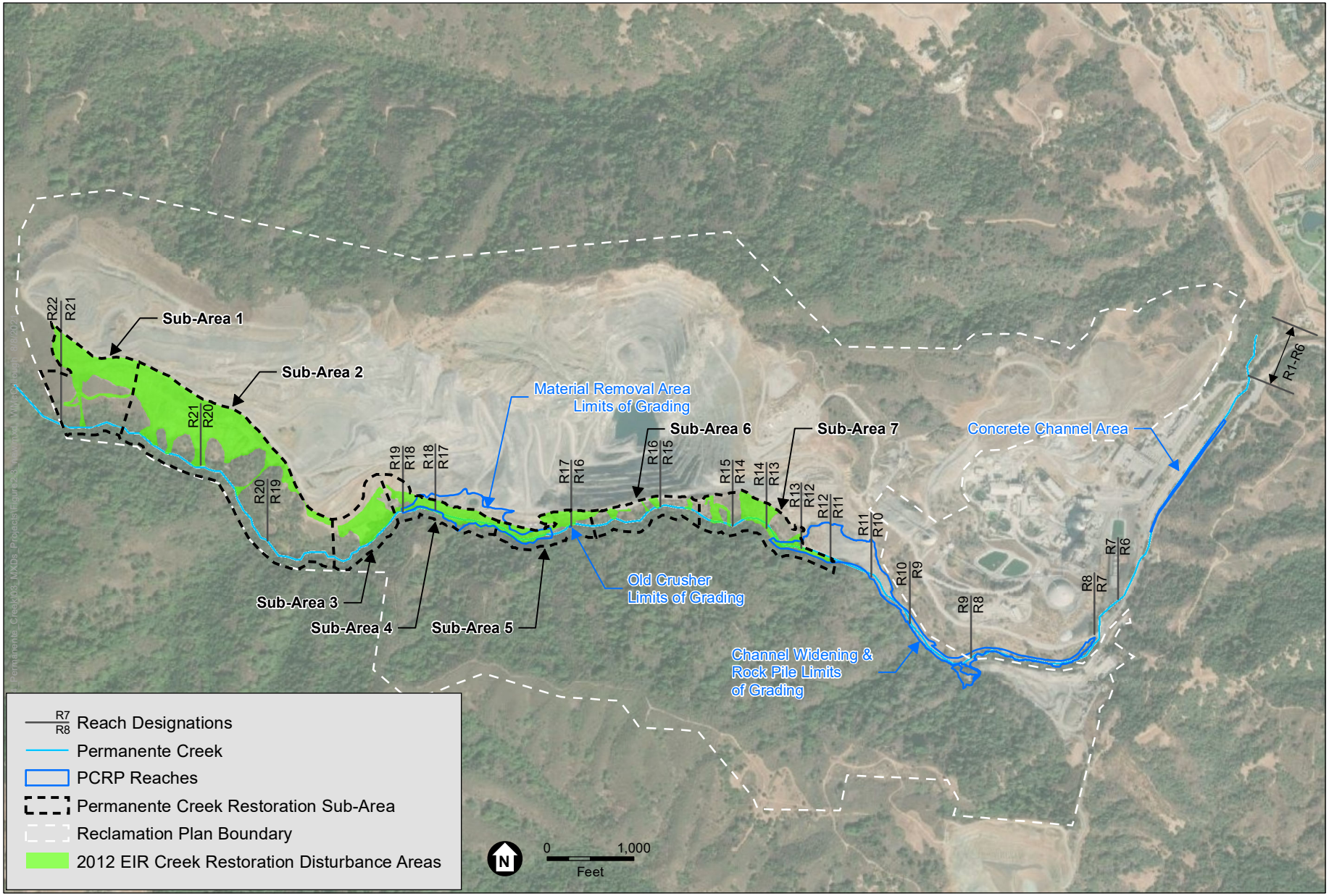
| Amended Consent Decree Reaches | 2012 EIR PCRA Subarea Restoration Details | |
|---|---|---|
| 17 (part), 18, 19 (part) (cont.) | Monitoring and Maintenance | Monitoring and maintenance of revegetation and erosion controls added on the northern and southern sides of the creek, according to the reclamation performance standards set forth in Section 2.8 of the Draft 2012 EIR (Table 2-6, page 2-30). |
| | Creek Restoration | Removal of overburden and silts, including the following (Draft 2012 EIR Table 2-6, pages 2-30 and 2-32, citing Enviromine 2011 [Attachment J]):<br>(a) Removal of overburden material and sediment deposits.<br>(b) Creation of a stable channel, subject to geotechnical and groundwater investigations as needed to determine the location of bedrock and other constraints on channel design.<br>(c) Establishment of a new bankfull bench and floodplain.<br>(d) Installation of step pools, drop structures, and other stream control devices as needed for a stable channel.<br>(e) Revegetation of riparian areas.<br>(f) Implementation of BMPs for removing limestone boulders from Permanente Creek as identified in the 2012 Reclamation Plan Amendment. |
| 19 (part) | Subarea 3 is described in Draft 2012 EIR Section 2.7.8.3, *PCRA Subarea 3*. | |
| | Geotechnical Work | Soil treatment, specifically: To prepare the steep slopes for revegetation, a winched sheepsfoot (tethered to a bulldozer) would be lowered from above and tracked across disturbed portions of the slope to create a textured slope that resists erosion and better holds hydroseeded material. Disturbed areas located downslope of areas the sheepsfoot would traverse would be prepared with silt fencing to be installed at the toe of the slope. (Draft 2012 EIR Table 2-5, page 2-29.) |
| | North of Creek Revegetation | Hydroseeding of disturbed areas with specified seed mix and hand-planting of riparian vegetation at the toe of the slope in areas where sufficient hydrology likely exists. (Draft 2012 EIR Table 2-5, page 2-29.) |
| | Road Treatment | Removal of the uppermost fills and any sources of erosion for the reclaimed lower slopes. (Draft 2012 EIR Section 2.7.8.3, page 2-29.) |
| | Slope BMPs | Staking in place of fiber rolls, spaced at 15-foot intervals, in disturbed areas where the slope angle is 2.0:1.0 (H:V) or flatter, and at 10-foot intervals in disturbed areas steeper than 2.0H:1.0V. Removal—by hand by work crews, where possible—of silt collected at the toe of the slope. (Draft 2012 EIR Table 2-5, page 2-29.) |
| | Monitoring and Maintenance | Monitoring and maintenance of revegetation and erosion controls according to the reclamation performance standards set forth in Section 2.8 of the Draft 2012 DEIR (Table 2-5, page 2-29). |
| 19 (part), 20, 21 (part) | Subarea 2 is described in Draft 2012 EIR Section 2.7.8.2, *PCRA Subarea 2*. Details are not summarized here because no work related to the PCRP is proposed in Subarea 2. | |
| | Basin Improvements | Basin outlets and flow control work that would include installation of two new sedimentation basins (numbered 40B, 40C) at the southern edge of the West Materials Storage Area once the West Materials Storage Area has been excavated to its final contours. The basins would release flows to existing drainages located in the PCRA. The outlets would extend to the bottom of the slope and the outfall pipes would release to engineered flow dissipaters (grouted riprap pads) to be installed within the existing drainages. The grouted riprap would dissipate the outflow energy, would provide an armored blanket that protects the ravines from erosion, and would be used to direct the outflow to the existing rock drainage to minimize the potential for erosion. (Draft 2012 EIR Table 2-4, page 2-28.) |
| | Geotechnical Work | Soil treatment, specifically: To prepare steep slopes for revegetation, a winched sheepsfoot (tethered to a bulldozer) would be lowered from above and tracked across disturbed portions of the slope. This would create a textured surface that resists erosion and better holds hydroseeded material. Disturbed areas located downslope of areas the sheepsfoot would traverse would be protected by silt fencing. (Draft 2012 EIR Table 2-4, page 2-28.) |

**TABLE 2-3 (CONTINUED)**
**2012 EIR SUBAREA RESTORATION DETAILS AND CORRELATION WITH AMENDED CONSENT DECREE REACHES**

| Amended Consent Decree Reaches | 2012 EIR PCRA Subarea Restoration Details | |
|---|---|---|
| 19 (part), 20, 21 (part) (cont.) | North of Creek Revegetation | Hydroseeding of disturbed areas with the specified seed mix and hand-planting of riparian vegetation at the toe of the slope in areas where sufficient hydrology exists. (Draft 2012 EIR Table 2-4, page 2-28.) |
| | Slope BMPs | Staking in place of fiber rolls, spaced at 15-foot intervals, in disturbed areas where the slope angle is 2.0:1.0 (H:V) or flatter, and at 10-foot intervals in disturbed areas steeper than 2.0:1.0 (H:V). Removal—by hand by work crews, where possible—of silt collected at the toe of the slope. (Draft 2012 EIR Table 2-4, page 2-28.) |
| | Monitoring and Maintenance | Monitoring and maintenance of revegetation and erosion controls according to the reclamation performance standards set forth in Section 2.8 of the Draft 2012 EIR (Table 2-4, page 2-28). |
| 21 (part), 22 | Subarea 1 is described in Draft 2012 EIR Section 2.7.8.1, *PCRA Subarea 1*. Details are not summarized here because no work related to PCRP is proposed in Subarea 1. | |

NOTES: 2012 EIR = certified 2012 Reclamation Plan Amendment Environmental Impact Report; 2012 Reclamation Plan Amendment = the 2012 amendment to the 1985 Permanente Quarry Reclamation Plan ;.Amended Consent Decree = amended consent decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016; BMP = best management practice; Draft 2012 EIR = December 2011 draft of the 2012 Reclamation Plan Amendment Environmental Impact Report; H:V = horizontal to vertical; PCRA = Permanente Creek Restoration Area; PCRP = Permanente Creek Restoration Plan

SOURCES: Lehigh 2021 and as otherwise cited.




SOURCE: Benchmark Resources, 2021

Permanente Creek Restoration Plan Supplemental Environmental Impact Report

**Figure 2-3**
Correlation of PCRA Subareas and PCRP Reaches

ESA

# 2.5 Permanente Creek Restoration Plan

Restoration activities would occur during the dry seasons (i.e., April through October) over a period of up to 6 years. These activities would require hand-operated equipment and hand labor, as well as the use of heavy construction equipment, including excavators, a dozer, a water truck, a hydroseeding truck, other heavy trucks (e.g., haul trucks, dump trucks), a compactor, and loaders. Daily restoration crew sizes may range between six and 12 workers depending on the activity being conducted (Lehigh 2023). The specific restoration activities that would occur under the PCRP by reach are described below.

## 2.5.1 Concrete Channel (Reach 6)

The "Concrete Channel Area" is within Reach 6 as described in Section 2.7.1 of the 90% Design Memo (**Appendix C**). Pursuant to Amended Consent Decree Section VI.A.40, Lehigh is to plant native riparian vegetation and trees on the southern bank along the concrete channelized portion of Permanente Creek at locations devoid of needed native vegetation, thus providing improved shading and reducing vegetation growth within the channel to improve sediment transport and enhance fish passage.[6] Appendix C (Sheet L1) includes details about the planting that would occur in this area.

As further described in Section 1.2.1 and Section 2.7.1 of the 90% Design Memo, Lehigh's efforts in this area would encourage the development of a mature riparian canopy along the southern bank of the creek in the upland slopes above the concrete channel, on property owned by Lehigh. The objectives of developing the mature riparian canopy would be to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of cattails; preserve existing native vegetation, including oak seedlings; remove non-native species and suppress weeds around existing native seedlings and smaller native plants to encourage their establishment; and install native riparian plantings.

No other work is currently proposed within the concrete channelized portion of the creek, as the Union Pacific Railroad—and not Lehigh—owns the property upon which the concrete channel is located.

## 2.5.2 Channel Widening Area (Reaches 8–13)

Amended Consent Decree Section VI.A.39 describes Reaches 8–10, Section VI.A.38 describes Reaches 11 and 12, and Section VI.A.37 describes Reach 13. Reaches 8–12 are identified as the "Channel Widening Area" in Section 2.7.2 of the 90% Design Memo. These reaches encompass the "Rock Pile Area." Amended Consent Decree Sections VI.A.39 and VI.A.38 and Section 1.2.1 of the 90% Design Memo identify the activities Lehigh would implement to restore this area with a naturalized channel, improve channel stability, and enhance ecological function by removing concrete road segments and decommissioning or narrowing dirt roads, removing 1,190 linear feet

[6] Additional details regarding fish passage hydrology, including CDFW's prescribed upper and lower fish passage design flows for rainbow trout, and the proposed approach to the PCRP's fish passage evaluation are provided in Section 2.1.2 and Section 2.3, respectively, of the 90% Design Memo (Appendix C).

of culverts (including a road crossing), establishing an enlarged creek channel, and enhancing the potential for any resident trout passage through these reaches consistent with a geomorphologically stable, self-sustaining channel.

Channel widening is proposed in several places to more closely mimic historical conditions, consisting of a bankfull channel with floodplains of varying size. For example, as described in additional detail below, Permanente Creek is artificially channelized downstream of the instream Pond 13 dam in an open corrugated half-pipe that conveys flow to a buried full culvert. That infrastructure would be removed; an open, natural channel would be restored through a widened corridor with floodplains to provide channel complexity and allow the creek to adjust in response to flood flows and sediment inputs. Additional complexity is proposed for the Channel Widening Area in the form of floodplain roughness with logs, boulders, planting pockets, and live stake trench packs (Sheet C35). In addition, an operational road adjacent to the creek within the downstream portion of the Channel Widening Area was historically constructed to be wide enough for large haul trucks, thereby constraining the space available for the creek. This section of road would be narrowed, and floodplain would be created and widened where present to create channel complexity and provide room for the creek to adjust in response to flood flows and sediment inputs. In addition, culverts that historically provided vehicular access over the creek and confined the channel would be removed.

To provide more room for a natural streambed and banks, Lehigh would set back and narrow the road and accompanying vehicle barrier, reducing the road's total width to no greater than 20 feet at any point, as measured from the toe of the inside slope to the top of the creekside vehicle barrier. The existing vehicle barriers along the Channel Widening Area range from approximately 2.5 to 3.5 feet tall, with slopes ranging from 1.3 to 3.6 horizontal (H) to 1 vertical (V). The proposed vehicle barrier height would be 1.5 feet tall, and the slope of the creekside vehicle barrier would be no steeper than 1.5:1 (H:V) (67 percent slope). Regarding vehicle barrier and road work details, see, e.g., Appendix C, Sheets C11, C12, C13, C14, C15, C17, C18, C19, C20, C21, and C38. Lehigh would control drainage along the modified road segments by outsloping the roadway and constructing reverse grade dips to direct runoff from the road. Four-to-five-foot openings would be left within vehicle barriers every 50–60 feet to allow for unobstructed drainage off of roadways (Appendix C, Sheet C38). To implement these improvements, Lehigh would complete the following actions:

(1) Excavate the north bank to form a floodplain bench at the estimated bankfull (1.5-year) water surface elevation.[7]

(2) Remove the existing aggregate rock pile, conveyor system, and associated infrastructure.

(3) Remove approximately 1,190 linear feet of culverts (including Culverts 7–10 and the half-culvert [Culvert 11] immediately downstream of existing Pond 13), riprap, and the road on top of the creek (concrete ramp).

[7] For additional details regarding the geomorphic design basis, including bankfull width and depth, and an evaluation of geometry data from four nearby "reference" channel reaches, where the channel is considered to be "natural," see Section 2.2 of the 90% Design Memo.

Lehigh's proposed riprap revetment design would be implemented consistent with the Federal Highway Administration's hydraulic engineering guidance (FHWA 1989).

When flood flows occur, the constructed floodplain in this area would provide a depositional zone for fine sediment and smaller coarse material that could be mobilized from areas formerly referenced as the "Rock Pile Area" and "Material Removal Areas" during the first couple of years after their construction, as floodplain and riparian vegetation become established (Section 2.3.3 of the 90% Design Memo).

The restored course of Permanente Creek in Reaches 11–13 would follow exposed bedrock and/or the "pre-disturbance" streambed as identified by uncovering large boulders, cobbles, and sands and gravels not sourced from limestone-containing mine wastes or overburden. Where either bedrock or the historical creek alignment are not uncovered during excavation, a natural channel would be constructed as shown on Appendix C, Sheet C19. The channel would be protected with engineered streambed material (ESM).[8]

As part of existing regulatory permits and the 2012 Reclamation Plan Amendment, Lehigh will take measures to prevent further mining-related sediment and material from this drainage from reaching Permanente Creek in the future. Specific measures and procedures are outlined in the 2012 Reclamation Plan Amendment, and as appropriate, will be incorporated into the existing facility Operations, Maintenance, and Contingency Plan (OM&C Plan) and Stormwater Pollution Prevention Plan (SWPPP).[9] Lehigh completes routine facility inspections, including standard observations, and containment inspections based on the OM&C Plan and SWPPP. Lehigh would revegetate the floodplain and ephemeral channel with native vegetation. Reach-by-reach details are provided below.

#### 2.5.2.1 Reaches 8 and 9

Amended Consent Decree Section VI.A.39 describes Reaches 8–10 as requiring improved channel stability and enhanced ecological function (Appendix B). Responsive work described in the 90% Design Memo (Appendix C) for Reaches 8 and 9 is summarized in this section.

In Reach 8, Culvert 7 is an 11.5-foot-diameter culvert with fill placed over the top of the culvert. Culvert 7 would be entirely removed and the area restored with a floodplain bench to be incorporated along the northern bank. Biomechanical bank stabilization treatments (including the installation of vegetated rock slope protection) would be installed along the southern bank to support the toe of the hillslope where the culvert and associated fill are proposed for removal. A pool that would include the installation of a large woody debris structure in the Culvert 7 removal

8 The 90% Design Memo uses "engineered streambed material (ESM)" as a term derived from the CDFW Design Guidelines to refer to a well-graded mixture of boulders, cobble, gravel, sand, and fines, proportioned in a way that is stable under design flood flows and still meets habitat enhancement goals. See Section 2.4.1 of the 90% Design Memo (Appendix C) for additional details.

9 A SWPPP prepared pursuant to the Construction General Stormwater National Pollutant Discharge Elimination System (NPDES) Permit has not yet been prepared for the Project but will encompass standard construction best practices and is required under the Construction General Stormwater NPDES Permit. The SWPPP will address particular site characteristics, phasing of the work, and the potential variations on final geometry and surface materials (e.g., bedrock vs. alluvium in channel banks) (Appendix C, Section 2.4.5, *Project Best Management Practices [BMPs]*).

area would provide habitat and cover for aquatic species (Appendix C). Lehigh would use redwood or fir for the large woody debris structures. See Section 2.4.3 of the 90% Design Memo (Appendix C) for details about vegetated rock slope protection, and Appendix C, Section 2.5 and Sheet C35, for details about the proposed large woody debris structure. The log structures would be designed to remain stable during the 100-year flow and would be expected to remain in place for decades. Specifically, regarding work proposed in Reaches 8 and 9, see Appendix C, Table 3, *Proposed Channel Dimensions for Constructed Reaches*, and Appendix C, Sheet C11.

Reach 9 is referred to in the 90% Design Memo as the "Sediment Removal Area." In Reach 9, Culvert 8 would be entirely removed and the area restored with a floodplain bench incorporated along the northern bank. A pool that would include the installation of a large woody debris structure in the Culvert 8 removal area would provide habitat and cover for aquatic species. Lehigh would use redwood or fir for the large woody debris structures. See Section 2.5 (and Sheet C35) of Appendix C for details about the proposed large woody debris structure. The log structures would be designed to remain stable during the 100-year flow and would be expected to remain in place for decades. Accumulated sediments and fill materials would be removed from within the Sediment Removal Area as necessary to restore pre-disturbance geometry within the tributary channel and adjacent floodplain area. The access road and existing storage area would be revegetated. Final grades would be dependent upon subsurface conditions (i.e., the location of bedrock). All disturbed areas would be revegetated with native riparian species. See Appendix C, Sheets C14, C15, and C16.

In Reaches 8 and 9, fish passage design criteria for depth and velocity would be met when compared to the hydraulic design parameters established under the hydraulic design approach described in Appendix C.

### 2.5.2.2 Reach 10

Amended Consent Decree Section VI.A.39 describes Reaches 8–10 as requiring improved channel stability and enhanced ecological function (Appendix B). Responsive work described in the 90% Design Memo (Appendix C) for Reach 10 is summarized in this section.

Culvert 9 consists of an existing 60-inch-diameter corrugated metal pipe that is perched above the channel in the south bank within Reach 10. Under existing conditions, stream flow velocities are high. Stream flows do not pass through Culvert 9 and rock slope protection is exposed along the channel margins. Cobbles and boulders present along the channel bed provide sufficient armoring to resist erosion, and the mature riparian vegetation present along the channel banks provides rooting strength to bank soils. See Appendix C (Sheet C18), which shows the existing average bank slope near the creek in this area.

With implementation of the PCRP, Culvert 9 would be entirely removed and the bank restored in the culvert removal area. Biomechanical bank stabilization treatments would likely be required to restore the southern streambank where the culvert is removed unless bedrock is exposed during demolition. Biomechanical treatment work, if needed, would include the installation of vegetated rock slope protection. Substantial vegetation pruning and disturbance of roots would be required; however, the proposed implementation design anticipates that there would be limited impacts on

the channel bed and existing vegetation during the culvert removal work, and that the native alders and willows would rebound quickly to provide shade and rooting strength to any disturbed bank soils, as stated by Lehigh.[10]

### 2.5.2.3 Reaches 11 and 12 (the "Rock Pile" Area)

Amended Consent Decree Section VI.A.38 describes Reaches 11 and 12 as containing "the Rock Pile," a large existing stockpile of aggregate material that consists primarily of mining overburden and artificial fills, as well as some natural landslide deposits. These materials have been placed along the creek margin (where the creek is culverted) and up the hillside to a height of more than 200 vertical feet, with an estimated thickness ranging up to 100 feet. See Section 7.5 of **Appendix G1**, *Geotechnical and Geomorphic Assessment of Permanente Creek, Lehigh Hanson Permanente Quarry, Santa Clara County, CA*. See also **Appendix G5**, *Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment*.

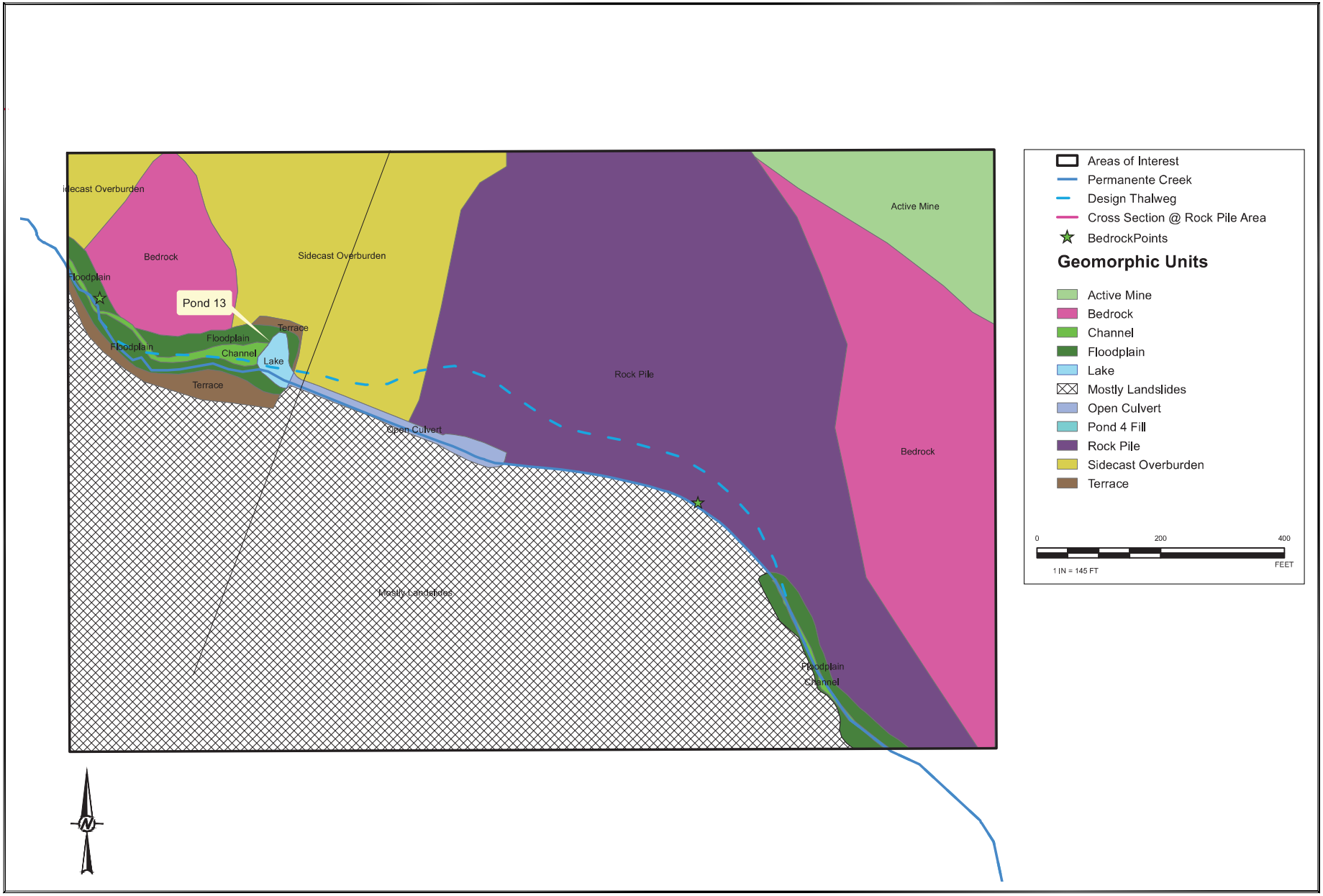
The Rock Pile material would be removed via aggregate or other processing and/or removal (Appendix G1). In Reaches 11 and 12, the PCRP proposes extensive channel realignment and reconstruction, including removal of the Rock Pile as well as Culverts 10 and 11 and riprap near the Culvert 10 outlet. For Project details for the Rock Pile Area, see Appendix C, Sheet C20 and Sheet C34. Pre-Project modification of these reaches has resulted in existing conditions that reflect a flattened profile downstream of Pond 13 at Culvert 11 (a half-culvert) and a very steep profile through Culvert 10. The geomorphology of the Rock Pile Area is shown in **Figure 2-4**, *Geomorphic Map of the Rock Pile Area*.

The PCRP proposes to optimize fish passage conditions through these reaches and to help maintain sediment transport continuity and channel stability through the Rock Pile Area by reconstructing the channel profile with a minimum slope of 4 percent and a maximum of 12 percent unless bedrock is encountered and a steeper historical profile is present (Section 2.3.3 of Appendix C). Cuts 30–40 feet deep may be required. Steps and pools would be incorporated into the Rock Pile Area as shown on the Typical Cascade and Step-Pool Reach Details in Appendix C (Sheet C34). Additional complexity would be added to the Rock Pile Area by creating floodplain roughness with logs, boulders, planting pockets, and live stake trench packs (Sheet C35). The head of large pools would be reinforced with boulder weirs[11] to promote plunging flow into the pool and provide profile grade control. Boulder weirs would be keyed into adjacent floodplain armor. See Appendix C (Sheet C36). The boulder weirs would extend 5–7 feet into the floodplain armor to protect against flanking.[12] The newly excavated floodplain benches would be

[10] During site inspections in 2022, it appeared that most of the alders shown on the drawings mapped during 2013–2015 have died and been replaced by willow volunteers.

[11] A notch or depression in a levee, dam, embankment, or other barrier across or bordering a stream, through which the flow of water is measured or regulated; a barrier constructed across a stream to divert fish into a trap; a dam (usually small) in a stream to raise the water level or divert its flow.

[12] Flanking is the process of erosion along the lateral edge or around the end of an instream feature or structure. If flanking were to occur at a boulder weir, the main flow path would follow the area of erosion around the weir rather than over it. Keying the weir boulders into the floodplain armor will help prevent this undesirable process from occurring.




SOURCE: GOLDER, 2019

Permanente Creek Restoration Plan Supplemental Environmental Impact Report

**Figure 2-4**
Geomorphic Map of the Rock Pile Area

ESA

lined with a mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Floodplain roughness elements (e.g., log structures and/or boulder sills) would be incorporated to minimize channel migration into the benches until vegetation becomes well established. See Section 2.4.1 of the 90% Design Memo for additional details about the steps and pools proposed in this area, Section 2.4.2 of the 90% Design Memo for additional details about the proposed floodplain armor, and Appendix C (Sheets C19 and C20).

The Rock Pile and associated infrastructure would be removed to accommodate the lowered and widened channel. See Appendix C (Sheet C21). An 18-foot-wide, dirt access road would be constructed for the maintenance of Pond 13B. The road width would include a concrete K-rail vehicle barrier with a 2-foot base width, leaving a clear travel way of 16 feet. Upland hillslopes disturbed by PCRP activities, the constructed channel, and floodplains would be vegetated with native species. To ensure the geotechnical stability of the slope exposed below the Rock Pile and the proposed access road, Lehigh proposes to have these areas inspected by the geotechnical engineer or Project geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary.

#### 2.5.2.4 Reach 13 (Pond 13)

Amended Consent Decree Section VI.A.37 and Sections 1.2.1 and 2.7.7 of the 90% Design Memo (Appendix C) describe the activities Lehigh would implement in Reach 13. Activities include removal of the dam infrastructure at Pond 13, replacement of the dam with a boulder weir grade control structure (if the upper limit of potential design channel invert is constructed), construction of a restored channel through the abandoned Pond 13, removal of impounded fine sediments so the material is not transported downstream following restoration, and installation of native vegetation.

Within Reach 13, Lehigh would establish a new, enlarged creek channel that includes increased channel complexity with a defined floodplain and restored vegetation. The horizontal dimensions of the new channel would be determined by the extent of excavation within the "grading envelope" shown in Appendix C (Sheet C20). Lehigh would provide for enhanced ecological function and passage by resident trout consistent with a geomorphically stable, self-sustaining channel unless the CDFW Restoration Manual's hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist.

Lehigh would reconstruct the channel at a lowered profile, aligning the channel within the "grading envelope," and would excavate to the lower limit of the potential design channel invert shown in the 90% Design Memo. If excavation work encounters bedrock before reaching the lowest elevation at any location within the grading envelope, an independent professional geologist would assess and make a final determination of the existence and extent of any such bedrock. The course of the restored Permanente Creek would follow exposed bedrock and/or the "pre-disturbance" streambed (i.e., exposed large boulders, cobbles, sands and gravels not sourced

from limestone-containing mine wastes or overburden) uncovered during excavation. A new, enlarged creek channel upstream of Pond 13 would be constructed.

The limits and thickness of existing, accumulated sediment have not been surveyed. However, fine sediment currently impounded within Pond 13 would be removed below elevation 805.0 feet until alluvial material (i.e., sand, gravel/cobble) or bedrock is encountered. Engineered fill would be placed to raise grades, where necessary, and a channel would be constructed through the previously ponded area to restore an open channel.

### 2.5.3 Reaches 14–16

As noted above, Reaches 14–16 are within the existing Reclamation Plan boundary and no change to previously analyzed work under the 2012 Reclamation Plan Amendment is proposed in these locations associated with the PCRP.[13]

### 2.5.4 Material Removal Area (Reaches 17 and 18)

Reaches 17 and 18 are referred to in Section 2.7.8 and Section 2.7.9 of the 90% Design Memo as the "Material Removal Area," which includes the "old crusher foundation" in Reach 17. See Appendix C, Sheets C10 and C22, specifically regarding the Old Crusher Foundation; see Sheets C23, C24, C25, and C26 more generally for Material Removal Area details. See also **Appendix G5**, *Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment*, which provides additional restoration details about the Material Removal Area.

These reaches have been modified by the placement of material within and adjacent to the creek channel: Lehigh proposes to remove the material by excavating it to establish a more uniform profile gradient, then reconstructing the channel profile with a minimum slope of 4 percent and a maximum of 12 percent unless bedrock is encountered and a steeper historical profile is present.[14] The PCRP would establish an enlarged creek channel and floodplain, the horizontal dimensions of which would be determined by the extent of excavation within the "grading envelope." The October 31, 2021, geologic and geomorphic assessment for the PCRP conducted by Golder and Associates indicates that bedrock throughout the Material Removal Area is close to the surface except in a few localized places where depths may be in the range of 15–20 feet below ground surface (Appendix G1, Section 6.2.1). The course of the restored creek would follow exposed bedrock, and/or large boulders, cobbles, sands, and gravels not sourced from limestone-containing mine wastes or overburden, if such materials are encountered before reaching the "lower limit of potential design channel invert" shown on Sheets C23 and C24.

13 The woody debris installations originally prescribed for these reaches in paragraph 36 of the Amended Consent Decree have been moved to other locations within the Project footprint to ensure stability and to fulfill ecological purpose (Appendix C).

14 While fish passage of potential rainbow trout species is an objective of the proposed restoration of Reaches 17 and 18, studies show that adult anadromous salmonids (not present here) are able to navigate steeper slopes than resident rainbow trout (California State Coastal Conservancy 2004). Thus, successful fish passage cannot be guaranteed due to site constraints, the majority of which exceed CDFW's estimated limit to anadromy, which is a sustained slope of over 8 percent.

More specifically, Amended Consent Decree Section VI.A.35 describes Lehigh's proposed restoration work in Reaches 17 and 18 as including the excavation and permanent export of overburden and mining-related sediment from the creek bed and banks—and from upland slopes to the extent that upland slope materials pose a risk of entering Permanente Creek—with the goals of reestablishing the approximate pre-disturbance creek alignment and slopes and facilitating above-grade flows. Work in these reaches would enhance ecological function and passage by resident trout consistent with a geomorphically stable, self-sustaining channel unless the CDFW Restoration Manual's hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist.

Lehigh would reconstruct the channel at a lowered profile (at the depth of bedrock), with the maximum extent of excavation being the Lower Limit of Potential Design Channel shown in Appendix C, Sheets C23 and C24, unless bedrock or the "pre-disturbance" streambed is encountered at a higher elevation within the "grading envelope." To inform the understanding of existing conditions as well as the proposed restoration design, a seismic refraction analysis was performed to estimate the depth to bedrock (see Appendix G1). Based on the results of the seismic refraction analysis, the proposed design reflects the anticipated best fit to bedrock elevations. There is some uncertainty regarding the exact extent and depth of bedrock given the limited subsurface data, and identifying more precise locations of bedrock would require extensive subsurface exploration such as drilling or trenching. To accommodate this uncertainty, a grading envelope was developed that includes an Upper and Lower Limit of Potential Design Channel Invert to guide Project construction (Appendix C, Sheets C23 and C24). The Lower Limit of Potential Design Channel Invert is shown in profile and represents the lowest grade at which the channel invert would be constructed if bedrock or the "pre-disturbance" streambed is not encountered.[15] The Upper Limit of Potential Design Channel Profile is also shown in profile and reflected in the grading plan shown in Appendix C, Sheets C23 and C24. Proposed cuts extend to depths of 30–40 feet below the existing ground level. If bedrock or the "pre-disturbance" streambed is not encountered at the Material Removal Area and the profile representing the Lower Limit of Potential Design Channel Invert is constructed, then the maximum depth of excavation below existing ground would be approximately 48 feet. The Upper Limit of Potential Design Channel Invert includes profile grades ranging from 7.1 percent to 22.7 percent. These grades assume that the restored channel would follow the peaks of the subsurface bedrock profile as informed by the seismic refraction analysis. Ultimately, final grades would be determined in the field to best fit bedrock exposures encountered during excavation and could vary from those shown on the design drawings.

The County of Santa Clara (County) understands that the regulatory agencies have requested, and the 90% Design Memo includes, plans for the existing Upper FTS to be relocated if still necessary to treat water generated from the quarry pit.

The proposed centerline of the creek was established by extending the existing southern hillside slope down at 1.5:1 (H:V) to meet the new profile grade, and then leaving room for a bench that varies in width at bankfull elevation. The newly excavated floodplain benches would be lined with a

[15] Design drawings for the Lower Limit of Potential Design Channel Invert that include a grading plan and cross sections are included on Figures 1–4 in Appendix L of the Updated 90% Level Design Memorandum (Appendix C to this SEIR).

mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Steps and pools would be incorporated into the Material Removal Area channel profile as shown on the Typical Cascade and Step-Pool Reach Details in Appendix C (Sheet C34). Additional complexity would be added to the channel by creating floodplain roughness with logs, boulders, planting pockets, and live stake trench packs (Sheet C35). As would occur in the Rock Pile Area, the head of large pools in the Material Removal Area would be reinforced with boulder weirs to promote plunging flow into the pool and provide profile grade control. Boulder weirs would be keyed into adjacent floodplain armor. See Appendix C (Sheet C36). The weir boulders would extend 5–7 feet into the floodplain armor to protect against flanking. Floodplain roughness elements (such as log structures and/or boulder sills) would be incorporated to minimize channel migration into the benches until vegetation becomes well established. See Section 2.4.1. of the 90% Design Memo for additional details about the steps and pools proposed in this area.

Lehigh would lay back and regrade the north overburden slope to provide a stable slope no steeper than 2:1 (50 percent grade) and remove sufficient material to relocate the north toe of the slope northward by 25 feet, except at the downstream end of the reach where the relocation of the north toe of slope would be less than 25 feet to accommodate the Upper FTS and existing access road.

"Relic concrete structures" are shown in Appendix C (Sheet C24). This includes two large concrete remnants along the left bank of the stream channel. Lehigh would remove both structures as part of the PCRP grading operation to facilitate construction of a restored channel with floodplains. Pending the location and orientation of bedrock exposed during channel excavation, Lehigh would construct weirs and steps to help dissipate energy and provide channel complexity using material with a minimum size meeting the D50 of the specified material and boulder sills would be incorporated using boulders with a minimum size meeting the D84[16] (Appendix G1).

The "old concrete crusher foundation" is located approximately 250 feet downstream of the Material Removal Area. Lehigh would cut back the portion of the concrete block that served as the "old concrete crusher foundation" that is currently located in the creek so that it would match the natural direction and slope of the creek and bank. The foundation currently buried within the hillside slope would remain in place to support the bank. The proposed removal of the "old concrete crusher foundation" would be performed using hand-operated equipment and hand labor, including small equipment with materials and spoils lowered and raised via a constant rate descender or equivalent. The concrete foundation would likely be broken into fragments by drilling holes into it and using an expanding epoxy or similar compound to break apart the concrete. Concrete fragments would be placed in 5-gallon buckets or similar and carried by hand, with assistance from the constant rate descender, to the top of the slope. All concrete fragments would be disposed of off-site.

16 The term "D50" is an important parameter characterizing particle size. It means the median diameter or the medium value of the particle size distribution, and is the value of the particle diameter at 50 percent in the cumulative distribution. The term "D84" also is a statistical parameter that can be read directly from the cumulative particle size distribution; it indicates the size below which 84 percent of all particles are found.

The Upper FTS infrastructure (including the 1250 Pond, associated facilities, and road) that has been installed to remove selenium from water removed from the Quarry Pit is located along the top of the creek bank in the Material Removal Area. This infrastructure is presently needed to comply with the facility's National Pollutant Discharge Elimination System (NPDES) permit (RWQCB Order R2-2019-0024, NPDES No. CA0030210), which requires treatment by the Upper FTS of the first 450 gallons sought to be discharged from the Quarry Pit at Discharge Point 001 each dry season (May 1 through October 31), after which all remaining Quarry Pit flows can be routed to the Final Treatment System–Lower (Lower FTS) for discharge at Discharge Point 007. As reclamation activities continue per the 2012 Reclamation Plan, the Lower FTS will become unnecessary, as discharge from the Quarry Pit will no longer occur. Notes regarding removal and relocation of the existing infrastructure associated with the Upper FTS are shown in Appendix C (see Sheet C23 and Sheet C24).

Any relocation of the Upper FTS and associated infrastructure would be considered when determining construction sequencing. Work at the Material Removal Area may be sequenced to occur after other portions of the Project are constructed, in which case the Upper FTS and Pond 1250 would remain in their current location at the start of Project implementation. These facilities may be relocated in the localized area to accommodate changes to the slope if the facilities are necessary for post-Project facility operations associated with quarry dewatering and reclamation. The location of Pond 1250 is shown in Appendix C (Sheet C28).

All disturbed areas would be revegetated with native species appropriate to the site as indicated in the proposed revegetation plan (see Appendix C, Sheets L2, L3, L4, L5, and L6). A riparian vegetation impact assessment for the Project prepared by Waterways Consulting, Inc. confirms that the number of trees and shrubs to be installed as part of Project implementation far exceeds the number of trees and shrubs to be removed (a copy of the assessment is provided in **Appendix E3**). The revegetation plans would be updated, as necessary, as part of future permitting tasks to ensure that tree and shrub replacement ratios are appropriate for the PCRP. The specific monitoring obligations that would also be associated with the revegetation plan would be addressed via future permitting tasks for the Project.

## 2.5.5 Reaches 19–22

No work is being proposed in these reaches.[17]

## 2.5.6 Vegetation and Erosion Protection

Lehigh proposes vegetation as an essential component not only of erosion control on slopes above the limits of floodplain armor (i.e., 10-year water surface), but also of the proposed protection of habitat value on excavated slopes, constructed floodplains, and the reconstructed channel banks.

Flow velocities along the lateral margin of floodplain areas above the limits of proposed floodplain armor average less than 3 feet per second during the 100-year flood. Revegetated soils

[17] The woody debris installations originally prescribed for these reaches in paragraph 34 of the Amended Consent Decree have been moved to other locations within the Project footprint to ensure stability and to fulfill ecological purpose.

can resist flow velocities of 4–6 feet per second. With implementation of the PCRP, these areas would be seeded and planted. Mulch and/or erosion control fabric would be provided as appropriate pending constructed geometry, with fabric preferred on slopes steeper than 2.5:1 (H:V).

All areas disturbed during construction would be revegetated with native species appropriate to the setting. Planting would include "live staking," container planting, and seeding. See Appendix C (Sheets L2, L3, L4, L5, and L6), which shows proposed planting areas and provides details about the proposed species, container sizes, on-center spacings, seed quantities, and other installation information. Planting tables are included for each work area (e.g., Rock Pile Area) for both floodplain and riparian areas. For revegetation purposes, the "riparian" planting zone has been defined as the areas extending 10 vertical feet up the channel bank from the toe of slope at the edge of constructed floodplain benches at the Rock Pile Area and Material Removal Area and along the bank leading up to the narrowed road through the Channel Widening Area. Revegetation would occur in floodplain areas with live willow stakes and container plants, and by seeding mix. Revegetation would occur via container plant installation and by seeding at the riparian planting areas. All disturbed areas not receiving rock treatments would be seeded with a mixture of native species to provide a diversity of riparian and upland species throughout the Project area (Lehigh 2022).

The included seed mix tables in Appendix C (Sheet L2) identify the seed mixes that would be applied to areas disturbed by PCRP implementation. The seed is expected to help provide short-term erosion control through establishment of a ground cover including grasses and herbaceous species. Woody species and container plantings are proposed to contribute to long-term erosion control and habitat value. Container plants would be installed in planting pockets, and live stakes would be installed throughout the floodplain armor and engineered streambed material at floodplain and streambank areas at the spacings shown in the planting tables and relevant details. Live stake trench packs and live willow transplants also would be installed throughout floodplain areas. Information about trench pack and willow transplant installation and spacing is provided in Appendix C (Sheets C35, C36, and C37).

An irrigation system would be employed to maintain installed plantings during their establishment period. The irrigation plan would consist primarily of drip emitters at container plants, and may include overhead sprinklers to irrigate seeds during initial establishment only. The source of irrigation water would be either treated water from the facility or potable water. Piping would be installed above ground. Approximately 13.35 acre-feet of water would be required, which assumes that installed plants would receive three full seasons of irrigation following the year of construction.

The specific monitoring and maintenance obligations associated with vegetation and erosion protection would be addressed via future permitting for the Project.

## 2.5.7 Construction Sequencing

Pursuant to the Amended Consent Decree, Lehigh initially intended to complete work within five work-window dry seasons (i.e., May through October) from when final permits for the

PCRP are issued, with the schedule to be extended as needed to comply with permit requirements. For purposes of the analysis, this SEIR assumes that Lehigh would implement the PRCP over a 6-year period, following the sequencing recommendations set forth in Section 3.1 of the 90% Design Memo. See **Table 2-4**, *PCRP Construction Schedule*. Seeding would occur before the onset of winter rains. However, plant installation may occur outside the dry season to help ensure successful establishment of the plants. As shown in drawings included in Appendix C (Sheets C29, C30, C31, C32, and C33) and as described in Section 2.4.5 of Appendix C, implementation of the PCRP would be phased within each work window. Lehigh would limit the diversion of flows each year to those areas where work is occurring. The work window dates for construction activities within the creek channel would be in accordance with the work period included in permits received for the Project from the resource agencies.

**TABLE 2-4**
**PERMANENTE CREEK RESTORATION PLAN CONSTRUCTION SCHEDULE**

| Year | Activity |
|---|---|
| Year 1 | • *Concrete-Lined Channel:* Install native riparian vegetation along the southern bank at locations void of native species along approximately 1,575 linear feet of channel. (Appendix C, Sheet L1.)<br>• *Channel Widening Area (Phase 1):* Perform approximately 1,450 linear feet of grading to create an inset floodplain bench and reduce the existing road width. (Appendix C, Sheets C11, C12, C13, and L2.)<br>• Remove Culvert #7 and construct an open channel segment.<br>• Remove sediment from tributary and fan along the southern bank of Permanente Creek. (Appendix C, Sheets C14 and L3.)<br>• Revegetate all areas disturbed by construction during Year 1. |
| Year 2 | • *Rock Pile Area (Phase 1):* Perform demolition and rough grading for approximately 800 linear feet. Pond 13 and Culverts #10 and #11 to remain. (Appendix C, Sheets C19, C20, C21, C34, C35, and C36.)<br>• Revegetate all areas disturbed by construction during Year 2. |
| Year 3 | • *Rock Pile Area (Phase 2):* Remove Culverts #10 and #11 and the Pond 13 infrastructure. Construct a maximum of 1,345 linear feet of restored channel. (Appendix C, Sheets C19, C20, C21, C34, C35, and C36.)<br>• Revegetate all areas disturbed by construction during Year 3. |
| Year 4 | • *Channel Widening (Phase 2):* Perform 1,775 linear feet of grading to create an inset floodplain bench and reduce the existing road width. (Appendix C, Sheets C11, C14, C15, C16, and C18.)<br>• Remove Culverts #8 and #9 and construct open channel segments. (Appendix C, Sheets C14, C15, C16, and C18.)<br>• Revegetate all areas disturbed by construction during Year 4. |
| Year 5 | • Partially remove Old Crusher Foundation. (Appendix C, Sheets C5 and C22.)<br>• *Material Removal Area (Phase 1):* Perform mass grading to lower the haul road and Pond 4 access road for approximately 1,100 linear feet. Construct access road down to the channel to locate bedrock at critical locations along the design alignment. (Appendix C, Sheets C23, C24, C25, and C26.)<br>• Revegetate all areas disturbed by construction during Year 5. |
| Year 6 | • *Material Removal Area (Phase 2):* Construct a maximum of 1,945 linear feet of restored channel. (Appendix C, Sheets C23, C24, C25, and C26.)<br>• Revegetate all areas disturbed by construction during Year 6. |

SOURCE: Waterways Consulting 2021

## 2.5.8 Monitoring and Adaptive Management

### 2.5.8.1 Monitoring

Creek restoration activities within the existing Reclamation Plan boundary would be monitored pursuant to the requirements of SMARA and the County's 2012 Reclamation Plan Amendment's conditions of approval, including the mitigation monitoring program developed as part of the 2012 CEQA process. SMARA's reclamation requirements govern wildlife habitat; backfilling, regrading, slope stability, and recontouring; revegetation; drainage, diversion structures, waterways, and erosion control; building, structure, and equipment removal; stream protection, including surface water and groundwater; topsoil salvage, maintenance, and redistribution; and mine waste management. Applicable requirements are described on a resource-by-resource basis throughout Chapter 4 of the Draft 2012 EIR, as modified by the Final 2012 EIR, and would continue to apply to creek restoration under the PCRP within the existing Reclamation Plan boundary. Monitoring in areas outside the reclamation boundary would occur in accordance with conditions of the County's Grading Approval and Lehigh's future Monitoring and Adaptive Management Plan (MAMP) developed in accordance therewith, which is described further below in Section 2.5.8.2. The specific types and length of monitoring and maintenance obligations would be addressed via future permitting for the PCRP.

### 2.5.8.2 Adaptive Management

Because it is not possible to predict all future adjustments that may (or may need to) occur to achieve the goal of restoring natural channels, the PCRP includes the adaptive management provisions described in Section 4 of the 90% Design Memo and summarized below.

With implementation of the PCRP, the reconstructed channel and floodplains would be protected with engineered streambed material and floodplain armor. It is anticipated that the engineered streambed material, floodplain armor, and boulder sills would perform as designed to protect against erosion from large flooding events that may occur in the initial years after Project construction while vegetation is becoming established. However, adjustments or areas of erosion could occur that require attention to ensure that the Project evolves and functions as intended.

The creation of inset floodplain benches is proposed to allow for substantial sediment storage within the Project reaches, or for the low-flow channel to adjust laterally without consequence in most instances. However, sediment mobilized from Project areas or from areas outside the influence of Project construction may accumulate in undesirable locations within the reconstructed channel segments. Lehigh's restoration engineers would evaluate areas of substantial aggradation and corrective measures would be proposed as necessary. Areas exceeding 100 square feet with 18 inches or greater of sediment deposition would be considered substantial for monitoring purposes. In the initial years after Project implementation, it would be important to ensure that sediment/debris does not accumulate at locations that may direct future flood flows in a manner that could affect Project stability.

Lehigh selected the plants proposed for the revegetation effort based on experience revegetating other areas of the Project site. Although a certain percentage of die-off is typical with any native

revegetation effort, it is expected that the selected species would do well in the proposed locations. If Lehigh's restoration specialists determine that the revegetation effort is not meeting the Project's performance standards, Lehigh would evaluate the cause and either use alternative species or increase the species that are performing well to ensure that the PCRP meets required performance standards for vegetation establishment. Monitoring is anticipated to occur following each phase of revegetation. Performance standards and monitoring requirements would be included in a MAMP to be prepared by Lehigh.

Each work area described in Section 2.5 would be inspected during the first year after construction after storms delivering 1.5 inches or more of rainfall have occurred. If erosion or sedimentation does occur,[18] then Lehigh would evaluate the cause of the issue and, if determined appropriate in consultation with the RWQCB or the County,[19] would develop further adaptive management practices to help stabilize the area. Potential adaptive management approaches would vary depending on the type and severity of erosion or sedimentation and may include raking to remove rills; removal of accumulated sediments; mulching using straw or wood chips; seeding and/or installation of container plants or live stakes; installation of fiber rolls or biodegradable erosion control fabric; grading to control drainage; or installation of rock armoring. The default approach at areas of erosion would be to install additional vegetation where this approach is a viable solution to help halt erosion. Should Lehigh's restoration engineers determine that the area of erosion is substantial and installing additional vegetation is not a potential solution, then an approach would be developed and the resource agencies would be engaged if heavy equipment is involved.

During the permitting process, a MAMP would be prepared for review and approval by the resource agencies. The MAMP would establish monitoring protocols, performance criteria, the monitoring period, and reporting requirements; it also would discuss potential adaptive management strategies and approaches. Ultimately the MAMP would be a tool for helping to ensure long-term channel stability and successful establishment of the revegetation effort. Informed by permit requirements, Lehigh will consider including provisions in the MAMP related to the duration of and protocols for specific monitoring efforts (e.g., for bats, fish, or geological or other conditions) and the extent of survey radii, and/or wildlife behavior–based buffers.

[18] Erosion that would trigger evaluation of the cause and potential adaptive management measures includes: Hillslopes with erosional rills exceeding a depth of 8 inches for a length of 10 feet or greater; streambed or floodplain areas exceeding 100 square feet with 18 inches or greater of erosion/scour; and incision along the streambed or within a floodplain area exceeding 18 inches for a length of 10 feet or greater. Sedimentation that would trigger evaluation of the cause and potential adaptive management measures includes: streambed or floodplain areas with sediment accumulation exceeding 100 square feet with a depth of 18 inches or greater.

[19] For example, the restoration design anticipates that Permanente Creek would continue to be dynamic and that it would be allowed to evolve within reasonable parameters. Erosion and sedimentation thresholds triggering an evaluation of cause may not warrant remedial actions in all cases (e.g., redistribution of stream sediments may be more acceptable than hillslope erosion). Lehigh and the County would reach consensus on the remedial actions, if any, to be taken, including whether supplemental environmental review would be required.

## 2.5.9 Best Management Practices and Applicant-Proposed Measures

Project proponents frequently identify best management practices (BMPs) or applicant-proposed measures (APMs) as part of a proposal to help to avoid or reduce anticipated construction-related or other environmental impacts. BMPs and APMs properly are considered elements of the project and are not mitigation measures for purposes of CEQA. Lehigh has proposed to incorporate standard construction BMPs (e.g., as would be required by the Construction General Stormwater Permit) and other measures to help avoid or reduce anticipated environmental impacts.

### 2.5.9.1 Best Management Practices

As described in more detail in Section 2.4.5 of the 90% Design Memo (Appendix C), the primary BMPs for the PCRP include the following:

**BMP-1: Construction Fencing**. Construction fencing would be installed along limits of disturbance before grading activities begin. Access to project areas would be along existing quarry access roads. See Appendix C (Sheets C27 and C28).

**BMP-2: Equipment Fueling**. Equipment would be staged and refueled within established staging areas. See Appendix C (Sheet C27).

**BMP-3: Dust Control**. Continuous dust control would be provided throughout construction in accordance with the dust control notes shown in Appendix C (Sheet C27), which consist of the following: "1) the contractor shall be responsible for continuous dust control, throughout the construction, in accordance with the permit conditions of approval, the contractor shall be responsible for the regular cleaning of all mud, debris, etc., from any and all adjacent roads and sidewalks, at least once every 24 hours when operations are occurring; 2) all disturbed areas, including unpaved access roads or storage piles, not being actively utilized for construction purposes, shall be effectively stabilized of dust emissions using water, chemical stabilizer/suppressant, or vegetative ground cover; 3) all ground-disturbing activities (e.g., clearing, grubbing, scraping, and excavation) shall be effectively controlled of fugitive dust emissions utilizing application of water or by pre-soaking; 4) all materials transported offsite shall be covered or effectively wetted to limit dust emissions; 5) following the addition of materials to, or the removal of materials from, the surfaces of outdoor storage piles, said piles shall be effectively stabilized of fugitive dust emissions utilizing sufficient water or chemical stabilizer/suppressant; 6) onsite vehicle speed on unpaved surfaces shall be limited to 15 mph; [and] 7) disturbed areas shall be seeded prior to October 15$^{th}$ or earlier as required by the applicable permit conditions."

**BMP-4: Dewatering**. Dewatering would occur at all sites where surface water is present and grading is proposed along the channel bed, or where access across the channel is required (i.e., at the Culvert 9 removal area in Reach 10). Approximate temporary diversion dam locations are shown in Appendix C (Sheets C29, C30, C31, and C32), with a typical dewatering plan and details shown on Sheet C33. Block nets would be installed upstream/downstream of the area to be dewatered, and fish and other aquatic organisms would be removed and relocated by a qualified biologist prior to the installation of dewatering facilities. Where removal of seepage water is required within an isolated construction area, the water would be pumped to a depression or temporary basin either to infiltrate or be detained until it is routed through a sediment treatment facility, as needed. Any

pumping of surface water with the potential to entrain aquatic organisms would be screened using a mesh with a maximum opening size of 5 millimeters. The screen would be checked regularly to ensure it is functioning as intended and that animals are not becoming entrapped.

**BMP-5: Discharge Controls**. Turbid waters would be prevented from discharging into Permanente Creek.

**BMP-6: Sediment Removal**. At the end of construction, all accumulated sediment would be removed from the dewatered work area, characterized, and, if appropriate, placed elsewhere within the 2012 Reclamation Plan boundary in a manner that would not result in erosion or mobilization of sediment to Permanente Creek, and that would be performed consistent with Waste Discharge Requirements (WDRs) Order No. R2-2018-0028. The placement of material also would adhere to the requirements set forth in those WDRs including but not limited to the Facility Operations and Maintenance plan protocols.

**BMP-7: Erosion Control**. Lehigh proposes the following BMPs to control erosion:

a) ***Fiber rolls***. Fiber rolls would be installed around staging areas and a sediment barrier fence[20] would be installed along the creek-side edge of the proposed floodplain bench excavation areas at the Channel Widening Area. Lehigh would coordinate with U.S. Fish and Wildlife Service (USFWS) staff to develop fiber roll specifications where it would be used as a barrier to prevent sediment and debris from entering the creek during floodplain bench excavation at the Channel Widening Area. The analysis in this SEIR assumes that the fiber rolls would be placed so as to trap mobilized sediment in the event there is rain during construction, and that the sediment barrier fence would act as a barrier to any loose material during floodplain bench excavation. Sediment barrier fence details and fiber roll spacing details are provided in Appendix C (Sheet C38).

b) ***Rock mixtures and/or vegetation***. Constructed channel areas and bank slopes would be protected from erosion using the rock mixtures and/or vegetation shown on the restoration plan drawings. Erosion control fabric would be utilized if needed. Fiber rolls would be installed across excavated slopes as shown in Appendix C (Sheets C29, 30, 31, and C32). Prior to revegetating slopes, the areas would be track-walked to ensure drainage in the intended direction and to provide smooth transitions to undisturbed slopes. Fiber rolls and container plants would be installed where specified, and the slopes would be hydroseeded with the specified seed mix. The hydroseed mixture would include hydromulch, amendment/fertilizer, and tackifier to assist with erosion control and seed establishment.

c) ***Erosion and Sediment Control Plan.*** A detailed erosion and sediment control plan will be prepared as part of the Construction General Stormwater NPDES Permit/SWPPP before construction documents are finalized.

d) Additional erosion control notes, including those protecting Permanente Creek from discharges of earthen materials and imposing seasonal and weather forecast-specific activities to prevent erosion, also are described in Appendix C (Sheet C40).

**BMP-8: Time of Year Restriction**. Lehigh shall conduct construction only during the summer months when Permanente Creek flow and precipitation is typically at a seasonal low,

[20] Lehigh would coordinate with USFWS staff during the Section 7 Consultation to identify an appropriate fabric for use as a sediment barrier.

reducing the potential for storm runoff–based erosion and the transport of sediment to downstream waters.

**BMP-9: Hazardous Materials Controls and Planning**. A hazardous materials controls and spill prevention plan and a spill prevention and countermeasure plan would be developed in accordance with the Access and Staging Area notes shown in Appendix C (Sheet C27).

### 2.5.9.2 Applicant-Proposed Measures

Lehigh has identified an additional suite of measures to help avoid or reduce anticipated environmental impacts of the PCRP. The APMs set forth below are consistent with the voluntary measures proposed and analyzed as part of the 2012 EIR (although APM-BIO-1, APM-BIO-3, APM-BIO-4, and APM-BIO-5 have been updated to reflect comments received by CDFW and USFWS) and would be implemented as part of the PCRP both within and outside of the existing Reclamation Plan boundary.

1. **APM-BIO-1: Nesting Birds.** Vegetation removal will be conducted outside the bird nesting season to the extent feasible. During the breeding season (defined for purposes of this SEIR as January 15 to September 15), two surveys for active bird nests will be conducted by a qualified biologist (with at least 2 seasons of bird nest surveys/monitoring experience) within 14 days prior to the beginning of Project construction; the second survey will be conducted within 48 hours of beginning Project construction. Surveys will be conducted for all suitable nesting habitat within the work area and the following minimum radii surrounding the work area: 1) 250 feet for passerines; ii) 500 feet for small raptors such as accipiters; and iii) 1,000 feet for larger raptors such as buteos. If the qualified biologist documents active nests within the Project area or in nearby surrounding areas, an appropriate buffer between the nest and active construction will be established. The buffer will be clearly marked and maintained until the young have fledged and are foraging independently or the nest is otherwise no longer active. Before construction begins, the qualified biologist will conduct baseline monitoring of the nest to characterize "normal" bird behavior and establish a buffer distance that allows the birds to continue normal behavior. The buffer will be determined by the species of nesting bird, topography, slope, aspect, surrounding vegetation, nest stage, etc. The qualified biologist will monitor the nesting birds daily during construction activities and modify the buffer if the birds show signs of unusual or distressed behavior (e.g., defensive flights and vocalizations, standing up from a brooding position, and/or flying away from the nest). If implementation of an effective buffer is not possible to allow work to continue in the area, then the qualified biologist or construction foreman will have the authority to cease all construction work in the area until the young have fledged or the nest is otherwise no longer active.

2. **APM-BIO-3: Roosting Bats, Non-hibernation and Non-maternity Roosting Seasons.** Where evidence of roosting (e.g., guano, culled insect parts) is observed within or immediately adjacent to the work area during the non-hibernation and non-maternity roosting seasons (defined for purposes of the 2012 EIR and this SEIR as September 1 to October 31), non-essential Project activities will be halted within an appropriately-sized exclusion buffer to be determined by a qualified bat biologist (with at least 2 seasons of bat surveys/monitoring experience). If bats are roosting in trees that must be removed, branches and trunks that contain cavities, cracks, crevices, or deep bark fissures that provide roosting habitat will be gently lowered to the ground, under the supervision of a qualified biologist and left undisturbed for 48 hours before being removed from the work area.

3. **APM-BIO-4: Roosting Bats, Hibernation Season.** During hibernation season (defined for purposes of the 2012 EIR and this SEIR as November 1 to March 31), surveys (inspection for guano and culled insect parts, visual inspection for roosts, night-time evening emergence surveys, and/or acoustic surveys) will be conducted within suitable roosting habitat to identify hibernation roosts in and within 100 feet of Project work areas before Project construction begins. All active roosts identified during surveys will be protected by an appropriately sized exclusion buffer to be determined by a qualified bat biologist and in coordination with CDFW.

4. **APM-BIO-5: Roosting Bats, Maternity Roosting Season**. During maternity roosting season (defined for purposes of the 2012 EIR and this SEIR as April 1 to August 31), surveys (inspection for guano and culled insect parts, visual inspection for roosts, night-time evening emergence surveys and/or acoustic surveys) will be conducted within suitable roosting habitat to identify bat maternity roosts in and within 100 feet of Project work areas before Project construction begins. All active roosts identified during surveys will be protected by an appropriately-sized buffer to be determined by a qualified biologist and in coordination with CDFW. The buffer will be determined by the type of bat observed, topography, slope, aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance, etc. A qualified biologist will monitor and may modify the buffer depending on site-specific conditions, species, and behavior of the breeding adults or young. Each exclusion zone would remain in place until the end of the maternity roosting season. If no active roosts are identified then activities may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date, surveys should be repeated.

5. **APM-BIO-6: San Francisco Dusky-Footed Woodrat.** Active woodrat stick nests will be flagged and avoided whenever feasible. If avoidance is not feasible, then the stick nests shall be dismantled and reconstructed by hand under the supervision of a biologist. If young are encountered during the dismantling process, the material will be placed back on the nest and the nest will remain unmolested for two to three weeks in order to give the young enough time to mature and leave the nest on their own accord. After two to three weeks, the nest dismantling process may begin again. Nest material will be moved to suitable adjacent areas (oak woodland, scrub, or chaparral) that will not be disturbed.

6. **APM-BIO-7: Plant Pathogen Avoidance**. Lehigh will incorporate the best management practices identified by the Working Group for Phytophthoras in Native Habitats to minimize the potential for the introduction and spread of plant pathogens by minimizing the use of nursery-grown container plants unless the nursery can demonstrate best management practices that ensure that the nursery-grown container plants and soils are free of Prytophthora.

7. **APM-GEO-1: Geotechnical Slope Inspection and Recommendations**. Lehigh will require the Project Geotechnical Engineer and/or Project Engineering Geologist to conduct ongoing geotechnical inspection of interim alluvial/overburden slopes or final bedrock slopes during implementation of the PCRP. This measure includes the inspection of the native bedrock slopes following the removal of the Rock Pile. The Geotechnical Engineer and/or Engineering Geologist must be registered in the State of California, possess a comprehensive understanding of the geotechnical issues at Lehigh's property in Cupertino, California, and have experience with slope stability issues associated with Franciscan Complex bedrock and mining overburden. If field inspection determines that slopes or portions of slopes are not adequately stable, the engineer/geologist must recommend to Lehigh remedial measures to

improve slope stability. Geotechnical remedial measures could include the removal of additional material, slope laybacks and benching, engineered drainage controls, or slope buttresses comprised of compacted rockfill. Field observations and recommendations, if any, must be provided in weekly reports to the County of Santa Clara Department of Planning and Development during the duration of the PCRP.

## 2.6 Permits and Approvals

Permits and approvals would be required to implement the PCRP, potentially including those identified in **Table 2-5**, *Summary of Permits and Approvals*.

**TABLE 2-5**
**SUMMARY OF PERMITS AND APPROVALS**

| Agency | Permit/Approval |
|---|---|
| **Local** | |
| County of Santa Clara Department of Planning and Development | Certification of the SEIR and issuance of Grading Approval by the Planning Official for the concrete channel work proposed in Reach 6. |
| **State** | |
| State Water Resources Control Board and/or Regional Water Quality Control Board | Clean Water Act Section 401 certification. |
| California Department of Fish and Wildlife | Streambed alteration agreement (Fish and Game Code Section 1600 et seq.) for the creek and adjacent riparian vegetation. |
| **Federal** | |
| U.S. Army Corps of Engineers | Clean Water Act Section 404 Nationwide Permit. |
| U.S. Fish and Wildlife Service | Federal Endangered Species Act Section 7 consultation with U.S. Army Corps of Engineers regarding effects on federally listed species. |

## 2.7 References

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# CHAPTER 3
# Project Impacts and Mitigation Measures

## 3.0 Introduction to Environmental Analysis

This chapter describes the relevant environmental and regulatory setting; identifies the significance criteria and thresholds relied upon in the analysis; and evaluates the direct, indirect, and cumulative environmental impacts of the Permanente Creek Restoration Plan (PCRP) to determine whether its implementation could result in one or more new significant impacts or a substantial increase in the severity of any significant impacts previously identified in the 2012 EIR. Based on the explanation provided in Section 2.3, *Focus of the Supplemental EIR*—including as summarized in Table 2-4, *Specific Areas of Focus for the Supplemental EIR*—the analysis of Project impacts in this chapter focuses on PCRP Reaches 6–13, 17, and 18 as key areas for evaluation specifically for seven resource areas: air quality, biological resources, cultural resources, energy conservation, geology and soils, greenhouse gas emissions, and hydrology and water quality. The remaining resource areas included in the CEQA Guidelines Appendix G Environmental Checklist are addressed in Section 3.8, *Project Consistency with 2012 EIR*. This initial section of Chapter 3 introduces key concepts and the framework for the analysis of potential resource impacts in this chapter.

### 3.0.1 Environmental Baseline

CEQA requires that an EIR "include a description of the physical environmental conditions in the vicinity of the project" (CEQA Guidelines Sections 15125[a] and 15126.2[a]). This environmental setting as of the date of the notice of preparation normally constitutes the baseline physical conditions by which a lead agency determines whether an impact would be significant. However, when a supplemental EIR (SEIR) is prepared, the lead agency's scope of environmental review is limited to whether the existing EIR is sufficient or whether further analysis is needed (CEQA Guidelines Sections 15162 and 15163). If further analysis is needed, then it is included in the SEIR. In the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed to exist. Therefore, this SEIR analyzes the impacts of the PCRP by comparing existing conditions plus the PCRP against existing conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein.

The mitigation measures imposed by the County in the context of the 2012 EIR are ongoing obligations for Lehigh. Compliance with those measures is enforceable by the County independent of its consideration of the PCRP. Because the 2012 mitigation measures are part of the baseline condition for this SEIR for purposes of CEQA, they are being carried forward (unchanged). See **Appendix H1**, *Summary of Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*. Other conditions of approval for the 2012

approvals that would be implemented or occur as part of the baseline conditions for the PCRP are set forth in **Appendix H2**, *2012 Conditions of County Approval*.

## 3.0.2 Types of Impacts

Impacts analyzed are either project-specific or cumulative. The terms "direct impacts," "indirect impacts," and "cumulative impacts" are defined below, consistent with CEQA Guidelines Sections 15064(d) and 15355.

**Direct and Indirect Impacts:** Project impacts can be direct or indirect. Examples of direct physical changes in the environment (i.e., direct impacts) include dust, noise and odors generated during construction, or the loss of sensitive biological habitat due to grading and excavation during project construction or operation. An indirect physical change in the environment (i.e., an indirect impact) is not immediately related to the project, but flows from it. Stated another way, if a direct physical change in the environment in turn causes another change in the environment, then the other change is an indirect physical change in the environment. For example, the construction of new utility capacity may facilitate population growth in the service area due to the increased capacity, and that growth may in turn lead to an increase in air pollution. An indirect physical change is considered only if that change is a reasonably foreseeable consequence of the project. A change that is speculative or unlikely to occur is not reasonably foreseeable.

**Cumulative Impacts:** A cumulative impact occurs when two or more individual impacts, when considered together, are considerable or that compound or increase other environmental impacts, even if the individual effects of either one would not. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time. The scenarios used for defining and analyzing cumulative impacts are discussed in Section 3.0.5.

## 3.0.3 CEQA Significance Criteria and Determinations

CEQA lead agencies rely on impact significance criteria as benchmarks to determine whether changes to the existing environment caused by a project or an alternative would cause a significant adverse effect. CEQA defines a significant impact on the environment as "a substantial, or potentially substantial, adverse change in the environment" (Public Resources Code Section 21068), and the CEQA Guidelines further clarify that a significant impact is a substantial adverse change "in any of the physical conditions within the area affected by the project, including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance" (14 Cal. Code Regs. Section 15382). To guide the County Planning Department (as the lead agency for the PCRP) in determining whether the Project or an alternative may cause a significant impact on the environment, the preparers of this SEIR (who are identified in Chapter 5, *Report Preparation*) have considered the series of questions routinely considered by the County pursuant to its own environmental checklist as well as those provided in CEQA Guidelines Appendix G. Case law interpreting CEQA has recognized that lead agencies generally have broad discretion to formulate significance thresholds and to draw significance conclusions based on information in the record for a particular project activity, including the impact's setting: "For example, an activity which may not be significant in an urban area may be significant in a rural area" (CEQA Guidelines Section 15064(a)(1)(b)). Impact conclusions reached in this SEIR are made based on information

in the County's official record, including credible science-based research, reference materials, and informed professional judgments of qualified scientists and SEIR preparers. Technical studies and analyses relied upon are cited in each section of the SEIR; additional Project-specific or site-specific analyses are provided in the appendices. Materials relied upon have been published, peer-reviewed, or independently reviewed on the County's behalf. They follow applicable protocols and otherwise are believed to be appropriate for consideration in the SEIR. Representatives of the County and members of the County's environmental consultant team who have the relevant professional credentials and experience independently reviewed all applicant-provided studies and technical reports on behalf of the County. All impact determinations are projections based on the expectation that the described impacts, or lack thereof, would occur if the Project or an alternative is approved and implemented.

The categories used to designate impact significance in the 2012 EIR were:

- **No Impact.** There would be no impact if there is no Project-caused change in the environment (for example, if the environmental resource does not occur within the Project site or the area of potential effect). For example, there would be no impact related to tree removal if no tree removal is proposed in the Project site.
- **Less than significant.** This determination applies if a Project-caused change would result, but that it would not exceed the applicable significance threshold.
- **Less than significant with mitigation incorporated.** This determination applies if the Project would result in an adverse impact that meets or exceeds the applicable significance threshold, but feasible mitigation is available that would eliminate any adverse impact or reduce it to a less-than-significant level.
- **Significant and unavoidable.** This determination applies if the Project would result in an adverse effect that meets or exceeds the applicable significance threshold but, even with the implementation of mitigation measures to lessen the impact, if available, the residual effect would remain significant.

In the context of this SEIR, the categories used to designate impact significance are whether the Project would cause any **new significant impact** or **substantially increase the severity of a significant impact** previously disclosed and evaluated in the 2012 EIR.

## 3.0.4 Mitigation Measures

As discussed in Section 3.0.1, *Environmental Baseline*, mitigation measures imposed as part of the 2012 EIR are part of the analytical baseline for this SEIR. Where the PCRP could result in a change in the baseline physical environment (including with the implementation of the 2012 EIR mitigation measures and conditions of approval) such that a new significant impact or a substantial increase in the severity of a previously identified significant impact could result, this SEIR identifies one or more new mitigation measures, the implementation of which could reduce the severity of the impact below established thresholds. Detailed analyses of impacts and the identification of mitigation measures specific to the PCRP are contained in this chapter.

## 3.0.5 Cumulative Effects Analysis

### 3.0.5.1 Cumulative Considerations in this SEIR

CEQA Guidelines Section 15130 requires a discussion of the cumulative impacts of a project when the project's incremental contribution to a significant cumulative effect is "cumulatively considerable." This means that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. An incremental, project-specific contribution to a cumulative impact is less than cumulatively considerable and is not significant if, for example, the project is required to implement or fund its fair share of a mitigation measure(s) designed to alleviate the cumulative impact.

Consistent with CEQA, the analysis of potential cumulative impacts is "guided by the standards of practicality and reasonableness" (CEQA Guidelines Section 15130(b)). The purpose of the cumulative analysis is to allow decision-makers to better understand the impacts that might result from approval of past, present, and reasonably foreseeable future projects, in conjunction with the Project addressed in this SEIR.

The CEQA Guidelines advise that a discussion of cumulative impacts should reflect both their severity and the likelihood of their occurrence (CEQA Guidelines Section 15130(b)). Consistent with CEQA Guidelines Section 15130(b), the lead agency has prepared a list of past, present, and reasonably foreseeable future projects that could result in related or cumulative impacts. This list includes projects outside the control of the lead agency. The analysis of cumulative impacts also considers projections contained in planning documents designed to evaluate regional or area-wide conditions. Existing conditions within the cumulative impacts area of effect reflect a combination of the natural condition and the effects of past actions in the affected area. The following factors also were used to determine an appropriate list of projects to be considered in this cumulative analysis:

- **Similar Environmental Impacts** – The analysis considers "reasonably foreseeable" projects that would contribute to effects on resources also affected by the Project in the vicinity of the Project site.
- **Geographic Scope** – The appropriate geographic area of cumulative analysis is identified for the resource areas of focus in this SEIR as dictated by relevant physical and/or environmental boundaries. Where the relevant geographic scope has not changed subsequent to the 2012 EIR, the information is not repeated. For ease of reference, however, **Table 3.0-1** summarizes the different geographic areas used to evaluate cumulative impacts.
- **Timing and Temporal Scope** – Incremental impacts of the Project could combine with the incremental impacts of other projects to cause or contribute to cumulative effects if the Project's periods of activity or ongoing impacts would coincide in terms of timing with the effects of the other projects in the cumulative scenario. Where the relevant temporal scope has not changed subsequent to the 2012 EIR, the information is not repeated.

**TABLE 3.0-1**
**GEOGRAPHIC CONSIDERATIONS IN CUMULATIVE ANALYSIS**

| Resource Area | Geographic Area |
|---|---|
| Aesthetics | Viewshed from U.S. 101 in Project vicinity |
| Air Quality | San Francisco Bay Area Air Basin and North Central Coast Air Basin |
| Biological Resources | Habitat Plan Area |
| Cultural Resources and Tribal Cultural Resources | Project site and vicinity |
| Energy | Countywide |
| Geology, Soils, and Paleontological Resources | Project site and vicinity in areas with similar soil and geologic conditions |
| Greenhouse Gases | Statewide |
| Hazards and Hazardous Materials | Project site, adjacent parcels, and truck hauling routes |
| Hydrology and Water Quality | Permanente Creek watershed, groundwater basins in the vicinity of the Project site |
| Mineral Resources | Countywide |
| Noise and Vibration | Project site and adjacent parcels |
| Transportation/Traffic | Adjacent roadways and highways |
| Utilities and Service Systems | Unincorporated County areas |
| Wildfire | Countywide, including in accordance with fire hazard maps prepared by the California Department of Forestry and Fire Protection (CAL FIRE) as part of the Fire and Resource Assessment Program (FRAP) (CAL FIRE 2022). |

### 3.0.5.2 Characterization of Cumulative Effects Conclusions in this SEIR

The analysis documented in the 2012 EIR determined whether the 2012 Reclamation Plan Amendment, including the creek restoration activities proposed for implementation within the PCRA, would cause or contribute to any cumulatively significant impact and, if so, whether the contribution would be "cumulatively considerable" as defined by CEQA Guidelines Section 15065(a)(3). The analysis in this SEIR focuses on whether changes to the earlier-described project (i.e., the restoration plan refinements described in the Amended Consent Decree [Appendix B] and Updated 90% Design Memo [Appendix C]) would cause any new significant impact or any substantial increase in the severity of a significant impact already disclosed and evaluated in the 2012 EIR.

### 3.0.5.3 Cumulative Scenario

Section 6.1 of the Draft 2012 EIR (at page 6-2 et seq.) summarized the projects considered in the cumulative effects analysis for the 2012 EIR. Because the geographic scope of the 2012 Reclamation Plan Amendment, nature of potential direct and indirect effects, and the duration of the reclamation activities analyzed were more extensive than the change to that project reflected in the Updated 90% Design Memo that is the subject of this SEIR, the cumulative projects list in the 2012 EIR was predictably more extensive. For this SEIR, **Table 3.0-2** identifies a list of

projects that have potential to be part of the cumulative scenario. To identify them, the lead agency solicited input from agencies and others during the scoping process about past, other present, and reasonably foreseeable future projects that would cause impacts that could overlap with those of the PCRP. Table 3.0-2 also describes the approximate geographic location and timing of effects of each of the potentially cumulative projects. These projects include a range of project types. They primarily consist of infrastructure and capital improvement projects, as well as private site development projects. These projects are considered reasonably likely to be constructed and/or operated in a similar timeframe as the PCRP and could contribute incremental impacts that are similar to those of the PCRP. Because a number of the projects identified as cumulative projects are market-driven and/or have yet to be fully funded, the status and construction dates are not certain. Therefore, for the purposes of this cumulative analysis, the lead agency assumes they would cause impacts concurrently with this Project.

**TABLE 3.0-2**
**CUMULATIVE PROJECTS LIST**

| Project Name | Location | Approximate Distance from Project Site (miles) | Project Description | Status and Estimated Schedule |
|---|---|---|---|---|
| Transportation demand strategies at Rancho San Antonio Open Space Preserve | Rancho San Antonio Open Space Preserve | 0.5 | Phased implementation of transportation demand management strategies designed to encourage alternative modes of transportation to the preserve. | Implemented in phases over several years; no confirmed plan/scope/timeline |
| Permanente Creek Trail | Charleston Road and Amphitheatre Parkway, City of Mountain View | 6.5 | Two creek crossings in the North Bayshore area. | Project is substantially complete |
| Colony Street Connection to Permanente Creek Trail | Colony Street, City of Mountain View | 6.5 | Pedestrian/bike bridge across Permanente Creek. | In design |
| McKelvey Park | McKelvey Park, City of Mountain View | 4.5 | Baseball park acts as a stormwater basin for creek flows and was done in partnership with Valley Water. | Complete |
| Permanente Creek Widening and New Bike/Ped Bridge | 1860-2159 Landings Drive, City of Mountain View | 6.5 | Improvements to Permanente Creek and its riparian habitats through widening of the creek and restoration of native vegetation to support local biodiversity. A pedestrian-bicycle path is proposed along the eastern side of Permanente Creek and would connect to a new east-west pedestrian/bicycle bridge over the creek. | Approved |

SOURCES: Midpeninsula Regional Open Space District 2021, City of Mountain View 2021

The County Planning Department received Lehigh's application for a proposed 2019 Reclamation Plan Amendment. However, the proposal became the subject of litigation and was withdrawn. The County Planning Department has determined that it is reasonably foreseeable that Lehigh will submit a new application for a Reclamation Plan Amendment while the CEQA process for

the PCRP is underway. Nonetheless, the details of a potential future application cannot be known with sufficient specificity to evaluate them as part of the cumulative effects analysis for the proposed creek restoration plan evaluated in this SEIR.

The U.S. Fish and Wildlife Service (USFWS) approved the Lehigh Permanente Site Operation and Maintenance Low-Effect Habitat Conservation Plan (LEHCP) and accompanying incidental take permit in 2022 for a 20-year permit term (GEI Consultants, Inc. 2022; USFWS 2022a, 2022b). The LEHCP includes portions of PCRP Reaches 8–12 and provides measures to protect the California red-legged frog from activities including stormwater capture/sedimentation basin operation and maintenance, erosion control, material transport, vehicle and equipment operation, and road and vegetation maintenance. Monarch butterfly host plant and nectar plant surveys also are required.

In addition to the previous project list, the Santa Clara County General Plan 1995-2010 (County of Santa Clara 1994), San Benito County 2035 General Plan (County of San Benito 2015), and Santa Clara Valley Habitat Plan (County of Santa Clara et al. 2012) were reviewed for potential future development projects, new roadway corridors, or changes in allowed development patterns that could result in cumulative impacts. None were identified in the Project vicinity. The surrounding area is General Plan designated and zoned for agricultural, rangeland, and open space uses—similar to existing conditions at the Project site and in the vicinity. The location of the California High-Speed Rail Authority stations and alignment were considered (components are proposed approximately 3 miles north of the Project site) and impacts related to biological resources are discussed. Significant, specific land use changes that would impact the cumulative scenario due to the Sargent Ranch Quarry project are not expected in the Project site.

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## 3.0.6 References

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# 3.1 Air Quality

This section identifies and evaluates issues related to air quality to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that is a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of previously identified significant impacts than was disclosed in the 2012 EIR. To do this, as explained in Section ES.1, *Introduction*, and in Section 2.3, *Focus of the Supplemental EIR*, including as summarized in Table 2-4, *Specific Areas of Focus for the Supplemental EIR*, this analysis focuses on three things: (1) PCRP areas that are outside of the existing reclamation plan boundary (for which Grading Approval would be required); (2) PCRP areas within the reclamation plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP would include work at a greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. This analysis is based in part on the Air Quality and Greenhouse Gas Emissions Technical Report provided in **Appendix D**, *Air Quality and Greenhouse Gas Emissions*. This technical report was prepared on the County's behalf.

The County received scoping comments from the Town of Los Altos Hills (Letter C) and a member of the public (Letter A) pertaining to emissions from both trucks serving the Project site and the facility itself contributing to asthma and other health concerns, especially for children. Copies of both letters are provided in **Appendix A**, *Scoping Report*.

## 3.1.1 Setting

### 3.1.1.1 Study Area

The study area for this analysis of potential impacts on air quality consists of the Project site located in an unincorporated area of the western foothills of Santa Clara County near the City of Cupertino, as illustrated in Chapter 2, *Project Description*, Figure 2-3, as well as the greater San Francisco Bay Area Air Basin (SFBAAB), which encompasses all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the southern portions of Solano and Sonoma counties.

### 3.1.1.2 Environmental Setting

Section 4.3.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of air quality, including the general climate and meteorology (Section 4.3.1.1, page 4.3-1 et seq.); existing air quality (Section 4.3.1.1, page 4.3-2 et seq.), and sensitive uses

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a cross reference between the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.

(Section 4.3.1.1, page 4.3-4 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below.

### *Geography and Climate*

The *General Climate and Meteorology* discussion presented in Section 4.3.1.1 of the 2012 EIR remains relevant and accurate; nonetheless, additional details are provided herein. The PCRP would occur in the western foothills of Santa Clara County near the southern end of Santa Clara Valley (Valley), which is oriented northwest-southeast and bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north, and the convergence of the Gabilan Range and the Diablo Range to the south. The climate includes warm, dry summers and cool winters with modest rainfall (Bay Area Air Quality Management District [BAAQMD] 2019). Approximately 10 miles to the east-northeast of the Project area is the City of San Jose, where average maximum and minimum winter (i.e., January) temperatures are 58 degrees Fahrenheit (°F) and 41 °F, respectively, while average summer (i.e., July) maximum and minimum temperatures are 82 °F and 56 °F, respectively. Total precipitation in the area averages 15 inches per year, with most precipitation occurring from November through April (Western Regional Climate Center [WRCC] 2021).

As a result of the Valley's northwest-southeast axis, wind patterns in the Valley include north-northwesterly sea breeze typically developing during the daytime with stronger winds in the spring and summer (BAAQMD 2019). Based on data from January 2015 through December 2015 from the San Jose Station, winds blow from the southwest most of the time. Specifically, the winds from the southwest direction comprise about 36 percent of all hourly wind directions. The station rarely experienced winds at speeds greater than 13 miles per hour (mph) (WRCC 2016).

Air pollution in Santa Clara County can be high because of the large population base and extent of mobile sources in the area. Ozone is the primary pollutant of concern in the summer and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) is the primary pollutant of concern in the winter. Ozone frequently forms on hot summer days when the prevailing seasonal northerly winds carry ozone precursors southward across the county, causing health standards to be exceeded. The high population density, wood smoke, industrial and freeway traffic, and poor wintertime air circulation caused by extensive hills to the east and west that block wind flow into the region can cause many exceedances of $PM_{2.5}$ during the winter months.

### *Criteria Air Pollutants*

The U.S. Environmental Protection Agency (U.S. EPA) has identified certain air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria (see Section 3.1.1.3, *Regulatory Setting*, below). The criteria air pollutants were described in Section 4.3 of the Draft 2012 EIR and are supplemented with the health-related information provided below.

### Ozone

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections in humans. It can also cause substantial damage to vegetation and other materials, when present in sufficiently high atmospheric concentrations. Ozone is not emitted directly into the atmosphere. Instead, it is a secondary air pollutant that is produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides ($NO_X$). ROG and $NO_X$ are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours.

Ozone is a regional air pollutant because it is not emitted directly by sources but is formed downwind from sources of ROG and $NO_X$ under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath (U.S. EPA 2021a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of asthma attacks; and make the lungs more susceptible to infection (U.S. EPA 2021a). Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development, and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (U.S. EPA 2021a). Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (California Air Resources Board [CARB] 2021).

People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (U.S. EPA 2022). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (U.S. EPA 2021a).

### Nitrogen Dioxide

Nitrogen dioxide ($NO_2$) is an air quality pollutant of concern because it acts as a respiratory irritant. $NO_2$ is a major component of the group of gaseous nitrogen compounds commonly referred to as $NO_X$. A precursor to ozone formation, $NO_X$ is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, $NO_X$ emitted from fuel combustion is in the form of nitric oxide (NO) and $NO_2$, with the vast majority (95 percent) of the $NO_X$ emissions being comprised of NO. NO is converted to $NO_2$ in the atmosphere when it reacts with ozone or undergoes photochemical reactions. Short-term exposures to $NO_2$ can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as

coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms, while longer exposures to elevated concentrations of $NO_2$ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (U.S. EPA 2021b).

#### Carbon Monoxide

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion; it is mostly associated with emissions from motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

#### Particulate Matter

Particulate matter less than 10 microns in diameter ($PM_{10}$) and $PM_{2.5}$ represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, wildfire smoke, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a study prepared by CARB, exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), is associated with approximately 14,000 to 24,000 premature annual deaths per year statewide (CARB 2010). Particulate matter also can damage materials and reduce visibility.

### *Toxic Air Contaminants*

Toxic air contaminants (TACs) are airborne substances that can cause short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes over 200 compounds, including DPM emissions from diesel-fueled engines (CARB 2021). The main TAC of concern for the PCRP is DPM from off-road diesel equipment and on-road diesel vehicles, in addition to some trace metals found in fugitive dust in disturbance areas and on paved and unpaved roads.

### *Existing Air Quality*

BAAQMD's regional monitoring network measures the ambient concentrations of criteria air pollutants. Monitoring on the Project site has not been completed; however, existing levels of air quality at the Project site can be inferred from ambient air quality measurements conducted by

BAAQMD at its closest air quality monitoring stations to the Project site, which are the Jackson Street San Jose monitoring station (approximately 11 miles to the east-northeast) and the University Avenue Los Gatos monitoring station (approximately 9 miles southeast). The San Jose station monitors ozone, $PM_{10}$, $PM_{2.5}$, and $NO_2$, and the Los Gatos station monitors ozone. **Table 3.1-1** shows a 3-year (2019 through 2021) summary of the most up-to-date available data monitored at the San Jose monitoring station. The data are compared to the California Ambient Air Quality Standards (state standards) and National Ambient Air Quality Standards (national standards). The data are similar to those disclosed in the 2012 EIR, with the exception of relatively high $PM_{10}$ and $PM_{2.5}$ concentrations experienced in 2020, which were likely a result of the large wildfires in northern California that year (BAAQMD 2020a).

**TABLE 3.1-1**
**AIR QUALITY DATA SUMMARY (2019–2021) FOR THE PROJECT AREA**

| Pollutant | Standard | Monitoring Data by Year | | |
|---|---|---|---|---|
| | | 2019 | 2020 | 2021 |
| **Ozone** | | | | |
| Highest State 1-Hour Average (ppm) | 0.09 ppm | 0.095 | 0.106 | 0.098 |
| Days over State Standard | | 1 | 1 | 3 |
| Highest National 8-Hour Average (ppm) | 0.070 ppm | 0.081 | 0.085 | 0.084 |
| Days over National Standard | | 2 | 2 | 4 |
| **Respirable Particulate Matter ($PM_{10}$)** | | | | |
| Highest State 24-Hour Average (µg/m$^3$)<br>Highest 24-hour average, µg/m$^3$ | 50 µg/m$^3$ | 77.1 | 137.1 | 45.1 |
| Measured Days over State Standard | | 4 | 10 | 0 |
| Measured Days over National Standard | 150 µg/m$^3$ | 0 | 0 | 0 |
| State Annual Average (µg/m$^3$) | 20 µg/m$^3$ | 19.1 | * | 20.1 |
| **Fine Particulate Matter ($PM_{2.5}$)** | | | | |
| Highest National 24-Hour Average (µg/m$^3$)<br>Highest 24-hour average, µg/m$^3$ | 35 µg/m$^3$ | 27.6 | 120.5 | 38.1 |
| Measured Days over National Standard | | 0 | 12 | 1 |
| State Annual Average (µg/m$^3$) | 12 µg/m$^3$ | 9.1 | 11.5 | 8.9 |
| **Nitrogen Dioxide ($NO_2$)** | | | | |
| Highest National Hourly Average (ppm)<br>Highest 24-hour average, µg/m$^3$ | 0.100 ppm | 0.060 | 0.052 | 0.048 |
| Measured Days over National Standard | | 0 | 0 | 0 |

NOTES:

Measurements are from the Jackson Street monitoring station in San Jose.

ppm = Parts per million
µg/m$^3$ = Micrograms per cubic meter
* = Insufficient data available to determine the value.

SOURCE: CARB 2022

As shown in Table 3.1-1, the state 1-hour ozone and federal 8-hour ozone standards were exceeded one to four times each year during the 3-year study period. The 24-hour state $PM_{10}$ standard was exceeded four times in 2019 and ten times in 2020, with no exceedances in 2021. There were no exceedances of the national 24-hour or state annual average $PM_{10}$ standards recorded during the 3-year study period, but insufficient data were available for 2020 relative to state annual average. The $PM_{2.5}$ 24-hour national standard was exceeded 12 times in 2020 and once in 2021, with no exceedances in 2019. The $PM_{2.5}$ annual average concentration did not exceed the state standard during the 3-year study period. There were no exceedances of the $NO_2$ standards during the 3-year study period.

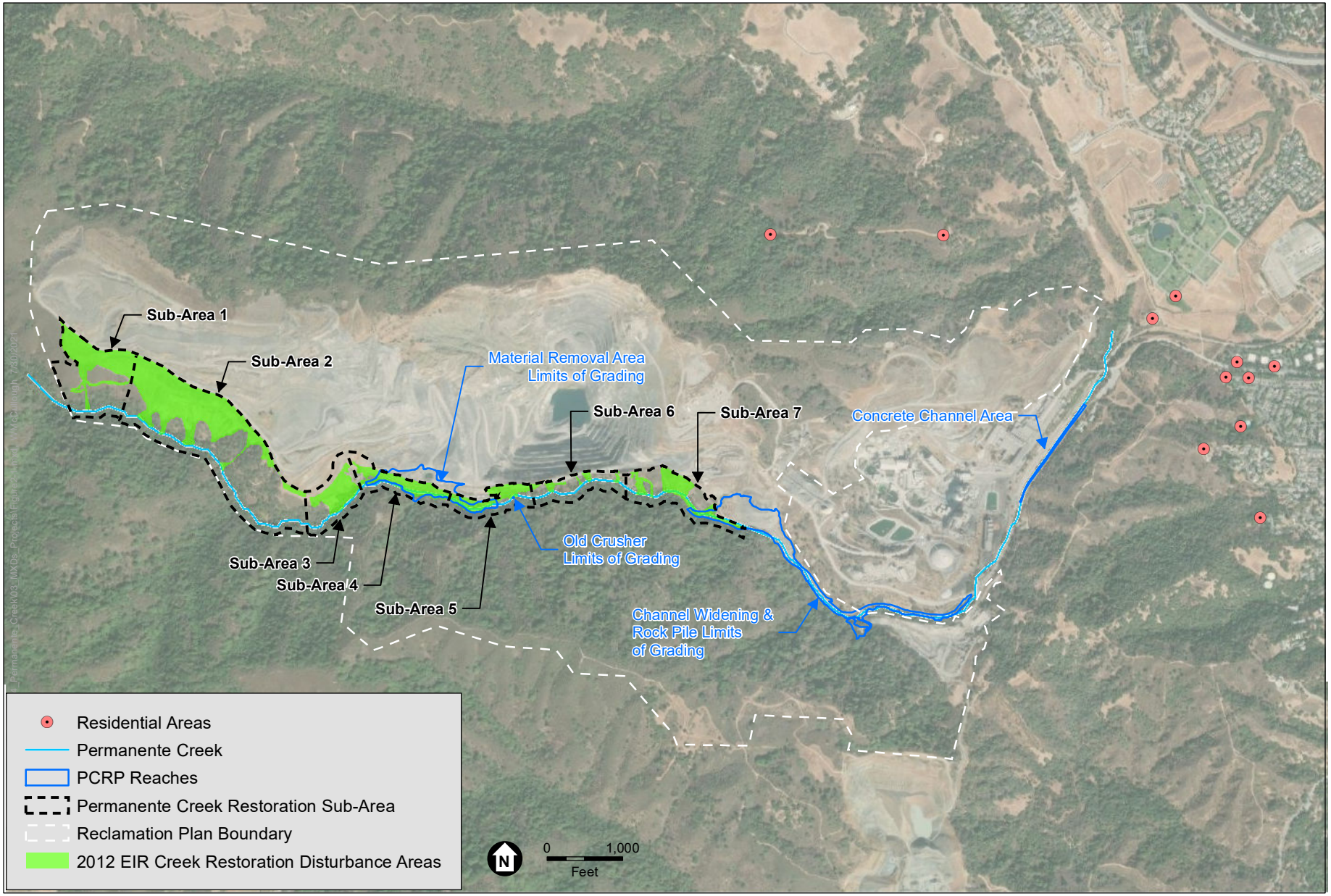
### *Sensitive Receptors*

For the purposes of this air quality analysis, sensitive receptors are defined as facilities and land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and daycare centers. The reasons for greater-than-average sensitivity include pre-existing health problems, proximity to emissions sources, and/or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are sensitive to poor air quality because these sensitive individuals may be present at a residence. In addition, the majority of each 24-hour period tends to be spent by individuals in and around the residence, leading to greater exposure durations of the location's ambient air quality concentrations.

The description of sensitive residential land uses in the vicinity of the Project site presented in Draft 2012 EIR Section 4.3.1.1 remains accurate, with one exception. The 2012 EIR identified the caretaker's residence associated with the Historical Society that is located approximately 700 feet east of the East Materials Storage Area (EMSA) on the north side of Permanente Road as the closest residence. Lehigh has since confirmed that this residence would not serve as a dwelling during implementation of the PCRP. The next closest residences are approximately 2,000 feet to the east, south of Permanente Road. Residences in the vicinity of the Project site are shown in **Figure 3.1-1**.

## 3.1.1.3 Regulatory Setting

Section 4.3.1.2 of the Draft 2012 EIR (page 4.3-4 et seq.) described the regulatory setting for the analysis of potential impacts on air quality, including federal, state and local laws, regulations, plans and policies applicable to the analysis of the proposed creek restoration, and other Project components that were evaluated in the 2012 EIR. The section summarized federal and state ambient air quality standards and attainment status for criteria pollutants, BAAQMD plans and regulations, regulatory setting for odors and nuisances, regulatory setting for TACs, and the Santa Clara County General Plan. The description of the regulatory setting remains accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below.




SOURCE: Benchmark Resources, 2021

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**Figure 3.1-1**
Residential Areas in the Vicinity of the Project Site

ESA

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The U.S. EPA is responsible for implementing the programs established under the federal Clean Air Act, such as establishing and reviewing the federal ambient air quality standards and reviewing State Implementation Plans (SIPs), described further below. However, the U.S. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. In California, CARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the U.S. EPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. An air quality management district is primarily responsible for regulating stationary emission sources at facilities within its geographic areas, and for preparing the air quality plans that are required under the federal Clean Air Act and the 1988 California Clean Air Act. The BAAQMD is the regional agency with regulatory authority over emissions sources in the nine-county San Francisco Bay Area.

## *Federal and State Ambient Air Quality Standards*

Criteria air pollutants are regulated through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal Clean Air Act and its subsequent amendments established national ambient air quality standards (national standards) for six criteria pollutants: ozone, $NO_2$, sulfur dioxide ($SO_2$), particulate matter (including $PM_{10}$, $PM_{2.5}$), CO, and lead. California has adopted more stringent state standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between some of the state and federal standards in California, as shown in **Table 3.1-2**. As noted in the table, the federal primary standard for 8-hour ozone is now 0.070 parts per million (ppm), which is a reduction from the 0.075 ppm standard that was in place at the time of the 2012 EIR. All other ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.

The ambient air quality standards are established to protect public health and welfare, and they incorporate a margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

### Attainment Status

Under amendments to the federal Clean Air Act, U.S. EPA has classified air basins or portions thereof as either “attainment” or “non-attainment” for each criteria air pollutant, based on whether the national standards have been achieved. The California Clean Air Act, which is patterned after the federal Clean Air Act, also requires areas to be designated as “attainment” or “non-attainment” for the state standards. Thus, areas in California have two sets of attainment / non-attainment

**TABLE 3.1-2**
**AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS**

| Pollutant | Averaging Time | State Standard | SF Air Basin Attainment Status for State Standard | National Primary Standard | SF Air Basin Attainment Status for National Standard |
|---|---|---|---|---|---|
| Ozone | 8 hour | 0.070 ppm | Non-Attainment | 0.070 ppm | Non-Attainment |
| | 1 hour | 0.090 ppm | Non-Attainment | --- | --- |
| Carbon Monoxide | 8 hour | 9.0 ppm | Attainment | 9 ppm | Attainment |
| | 1 Hour | 20 ppm | Attainment | 35 ppm | Attainment |
| Nitrogen Dioxide | Annual Average | 0.030 ppm | --- | 0.053 ppm | Attainment |
| | 1 Hour | 0.18 ppm | Attainment | 0.100 ppm | Unclassified |
| Sulfur Dioxide | Annual Average | --- | --- | 0.030 ppm | Attainment |
| | 24 Hour | 0.04 ppm | Attainment | 0.14 ppm | Attainment |
| | 1 Hour | 0.25 ppm | Attainment | 0.075 ppm | Attainment |
| Respirable Particulate Matter (PM10) | Annual Arithmetic Mean | 20 μg/m3 | Non-Attainment | --- | --- |
| | 24 hour | 50 μg/m3 | Non-Attainment | 150 μg/m3 | Unclassified |
| Fine Particulate Matter (PM2.5) | Annual Arithmetic Mean | 12 μg/m3 | Non-Attainment | 15 μg/m3 | Unclassified/Attainment |
| | 24 hour | --- | --- | 35 μg/m3 | Non-Attainment |
| Sulfates | 24 hour | 25 μg/m3 | Attainment | --- | --- |
| Lead | Calendar Quarter | --- | --- | 1.5 μg/m3 | Attainment |
| | 30 Day Average | 1.5 μg/m3 | --- | --- | Attainment |
| | 3-month Rolling Average | --- | --- | 0.15 μg/m3 | Attainment |
| Hydrogen Sulfide | 1 hour | 0.03 ppm | Unclassified | --- | --- |
| Vinyl Chloride | 24 hour | 0.010 ppm | No information available | --- | --- |
| Visibility Reducing Particles | 8 hour | Extinction of 0.23/km; visibility of 10 miles or more | Unclassified | --- | --- |

NOTES: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

SOURCE: BAAQMD 2017a.

designations: one set with respect to the national standards and one set with respect to the state standards. Table 3.1-2 shows the attainment status of the SFBAAB with respect to the national and state ambient air quality standards for different criteria pollutants. The attainment statuses relative to the state and federal ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.

### Federal

The U.S. EPA is responsible for implementing programs established by the federal Clean Air Act, such as establishing and reviewing the national standards for the following air pollutants: CO, ozone, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. The federal CAA also requires the U.S. EPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each criteria air pollutant, depending on whether the area meets the national standards. If an area is designated as non-attainment, it does not meet the national standards and is required to create and maintain a SIP for achieving compliance with the national standards. Conformity to the SIP is defined under the 1990 Clean Air Act Amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the national standards and achieving expeditious attainment of these standards. Air quality within the SFBAAB is classified as nonattainment for the federal 8-hour ozone and 24-hour $PM_{2.5}$ standards.

The U.S. EPA has identified emissions standards for nonroad diesel engines and vehicles including four categories referred to as Tier 1, Tier 2, Tier 3, and Tier 4. The standards have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. Tier 1 is the least restrictive, and Tier 4 is the most restrictive.

### State

CARB is the agency delegated responsibility for preparing and submitting the SIP to the U.S. EPA. CARB also oversees air quality policies in California and has established state standards for $NO_2$, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$, ozone, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. The state standards are at least as stringent (and typically more stringent) than the national standards.

The California Clean Air Act was approved in 1988. It requires each local air district in the state to prepare an air quality plan to achieve compliance with the state standards. Similar to the U.S. EPA, CARB designates counties or air basins in California as attainment or non-attainment with respect to the state standards. Air quality within the SFBAAB does not attain the state standards for ozone, $PM_{10}$, and $PM_{2.5}$.

## *Toxic Air Contaminants*

TACs are airborne substances that can cause short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. TACs include both organic and inorganic chemical substances. They may be emitted by a variety of common sources: gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently than criteria air pollutants at both the federal and state levels. At the federal level, these pollutants are called "hazardous air pollutants." California's list of TACs identifies 243 substances, and the federal list of hazardous air pollutants identifies 189 substances.

CARB identified DPM as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic and carcinogenic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and DPM concentrations are higher near heavily traveled highways and rail lines with diesel locomotive operations. The risk from DPM, as determined by CARB, declined from 750 in one million in 1990 to 540 in one million in 2000, but remains the highest risk TAC to California's ambient air quality. In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Further regulations of diesel emissions by CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-road Diesel Vehicle Regulation, and the New Off-road Compression Ignition Diesel Engines and Equipment Program. These regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment. Because new cleaner vehicles and equipment are put into service every year and older less-clean vehicles and equipment are retired every year, current diesel-powered vehicles and equipment result in fewer DPM exhaust emissions on average compared to those that were active in 2012.

In 2004, CARB adopted a measure to limit idling of diesel-fueled commercial motor vehicles. Heavy-duty diesel vehicles with a Gross Vehicle Weight Rating of 10,000 pounds or heavier are prohibited from idling for more than 5 minutes within California's borders. Exceptions to the rule apply for certain circumstances.

## *Local*

### Bay Area Air Quality Management District

The Project site is located within the jurisdiction of the BAAQMD, the local agency responsible for preparing, adopting, and implementing stationary and area air emissions control measures and standards. Specifically, BAAQMD conducts monitoring, evaluation, and education programs; implements control measures to reduce emissions from stationary sources; issues permits to operate for stationary sources and inspects emissions sources; and enforces air quality regulations.

#### BAAQMD Air Quality Plans

The 1977 Clean Air Act amendments require that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards specified in the Clean Air Act. The California Clean Air Act also requires development of air quality plans and strategies to meet state air quality standards in areas designated as non-attainment (except for areas designated as non-attainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated non-attainment to ensure continued attainment of the standards. As indicated above, air quality plans developed to meet federal requirements are referred to as SIPs.

For state air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the

BAAQMD update the Clean Air Plan every 3 years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. BAAQMD also must review the Bay Area's record of progress in implementing previous measures. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). After the certification of the 2012 EIR, the BAAQMD adopted the most recent revision to the Clean Air Plan—the 2017 Bay Area Clean Air Plan (2017 CAP) (BAAQMD 2017b). The 2017 CAP serves to:

- Protect the environment and offer a long-range vision of how the Bay Area could function in a year 2050 post-carbon economy and describe a control strategy that the BAAQMD will implement over the next 3 to 5 years.
- Update the most recent BAAQMD ozone plan, the 2010 Clean Air Plan, to fulfill state ozone planning requirements. The 2017 control strategy includes all feasible measures to reduce emissions of ROG and $NO_x$ and reduce the transport of ozone and its precursors to neighboring air basins.
- Build upon and enhance the BAAQMD's efforts to reduce emissions of fine particulate matter and TACs.

Under the California Clean Air Act, the BAAQMD is required to develop an air quality attainment plan for non-attainment criteria pollutants within the air district.

#### Santa Clara County General Plan

The 2012 EIR identifies air quality policies associated with the Health and Safety Chapter of the Santa Clara County General Plan, 1995-2010 (Santa Clara County 1994) that apply to the 2012 Reclamation Plan Amendment. The Santa Clara County General Plan, 1995-2010 remains current.

## 3.1.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.3 of the 2012 EIR determined that the proposed Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Conflict with or obstruct implementation of the applicable air quality plan;

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation;

c) Result in a cumulatively considerable net increase of any nonattainment pollutant (including releasing emissions that exceed quantitative thresholds for ozone precursors);

d) Expose sensitive receptors to substantial pollutant concentrations; or

e) Create objectionable odors affecting a substantial number of people.

Updates to the CEQA Guidelines Appendix G Environmental Checklist that were finalized in December 2018 made only non-substantive revisions to these significance criteria. Specifically, the content of criteria b) and c) have been combined and are now reflected as criterion b), and the odors criterion has been refined to include reference to "other emissions." The 2018 revised criteria b) and d) are shown below.

A project would result in a significant impact to air quality if it would:

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard;

d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The 2018 revised criteria address the same types of impacts that are addressed in the 2012 EIR. Accordingly, the significance criteria used in the 2012 EIR remain relevant to this SEIR's consideration of whether the PCRP would cause any new significant impacts or a substantial increase in the severity of previously identified significant impacts than were disclosed in the 2012 EIR.

## 3.1.3 Direct and Indirect Effects

### 3.1.3.1 Methodology

#### *Emissions Applicability Factors*

The 2012 EIR evaluated impacts of Permanente Creek restoration within the PCRA. The PCRP area overlaps the PCRA in many respects (see Figure 2-3, *PCRA Subareas and PCRP Reaches*). Given that substantially similar restoration activities would be implemented in the areas of overlap, the emissions resulting from those activities have not been reevaluated as part of this assessment.

Emissions are estimated for the activities of each proposed PCRP phase and then scaled based on the percentage of PCRA area overlap associated with the 2012 EIR's assessed regions. These scaling values, referred to as Emissions Applicability Factors, have been determined for each PCRP phase. All emissions associated with PCRP components outside of the existing reclamation plan boundary are evaluated in this SEIR. See **Appendix D,** Table 1-1 for the percent of emissions by phase determined to be evaluated in the 2012 EIR and the Emissions Applicability Factors used to estimate emissions for evaluation in this SEIR.

#### *Air Quality Plans*

Before approving a project where an air quality plan consistency determination is required, BAAQMD recommends that the lead agency analyze the project with respect to the following questions:

(1) Does the project support the primary goals of the 2017 CAP?

(2) Does the project include applicable control measures from the 2017 CAP?

(3) Does the project disrupt or hinder implementation of any 2017 CAP control measures?

If the first two questions are concluded in the affirmative and the third question is concluded in the negative, then the BAAQMD considers the project consistent with the 2017 Clean Air Plan.

Any project that would not support the 2017 CAP goals would not be considered consistent with the 2017 CAP. Whether the PCRP supports these goals has been determined based on its consistency with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the Project would not be considered to support the 2017 CAP goals, and the associated impact would be significant.

### *Criteria Pollutant Emissions*

The analysis of criteria pollutants considers the impacts related to emissions of non-attainment pollutants and their precursors. Although ozone would not be directly emitted by PCRP-related construction equipment, the ozone precursors ROG and $NO_x$ would be emitted and are therefore, along with particulate matter, the focus of the impact assessment. Given that ozone formation occurs through a complex photo-chemical reaction between $NO_x$ and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basin-wide or regional basis instead of a localized basis. The ambient air quality standards for ozone are concentration-based; they are not based on the mass of their precursor pollutants (i.e., $NO_x$ and ROG). It is not necessarily the mass of precursor pollutants that causes human health effects, as opposed to the concentration of resulting ozone or particulate matter. Because of the complexity of ozone formation and the non-linear relationship of ozone concentration with its precursor gases and given the state of environmental science modeling in use at this time, it is infeasible to convert specific emissions levels of $NO_x$ or ROG emitted in a particular area to a particular concentration of ozone in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone (South Coast Air Quality Management District [SCAQMD] 2014, San Joaquin Valley Air Pollution Control District [SJVAPCD] 2014).

#### Significance Thresholds

The 2012 EIR relied on the methods and significance thresholds identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After certification of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in *California Building Industry Association v. BAAQMD* (2015) 62 Cal.4th 369. However, as it pertains to projects such as the PCRP that do not include proposed residences, the methods and significance criteria identified in the 2017 BAAQMD CEQA Guidelines are essentially the same as those identified in the 2010 BAAQMD CEQA Guidelines. The analysis presented in this SEIR uses the same general methodologies as those used for the 2012 EIR for ease in comparison.

Project-related air quality impacts typically fall into two categories: short-term impacts due to construction or decommissioning, and long-term impacts due to project operations. The PCRP would

generate air pollutant emissions on a short-term basis during construction over a period of approximately 6 years; there would be no long-term sustained operational impacts. Impacts related to the PCRP contributing to an existing or projected air quality violation and whether the PCRP would result in a cumulatively considerable net increase of any criteria pollutant or associated precursors are judged by comparing estimated direct and indirect PCRP exhaust emissions to the significance thresholds, which for short-term construction emissions are 54 pounds per day for ROG, $NO_x$, and $PM_{2.5}$; and 82 pounds per day for $PM_{10}$. Only the exhaust portion of $PM_{2.5}$ and $PM_{10}$ emissions are compared against the construction thresholds. The BAAQMD considers implementation of its recommended mitigation measures for fugitive dust (BAAQMD 2017c) sufficient to ensure that construction-related fugitive dust is reduced to a less-than-significant level. Therefore, the BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. For long-term operations, the BAAQMD has two sets of significance thresholds, including daily thresholds that are the same as the construction thresholds, and annual thresholds that are 10 tons per year for ROG, $NO_x$, and $PM_{2.5}$; and 15 tons per year for $PM_{10}$. These significance thresholds are the same as those used in the 2012 EIR to evaluate impacts associated with criteria pollutants. Although emissions resulting from implementation of the PCRP would be considered short-term construction emissions and appropriately evaluated with respect to the BAAQMD construction significance thresholds, for purposes of continuity with the 2012 EIR, this analysis compares the PCRP emissions to both the average daily significance thresholds (i.e., the construction significance thresholds) as well as the annual significance thresholds.

### Emissions Estimates

During construction (short-term), the PCRP would generate ozone precursors and affect local particulate concentrations primarily due to fugitive dust and diesel exhaust emissions from construction equipment.

Lehigh provided the County with scheduling assumptions for five main activity types that would be associated with the PCRP that would occur over eight phases (Lehigh 2023). The Project is proposed to occur 5 days a week, approximately 132 workdays per year during the dry seasons (i.e., April 15 through October 15) of 2024 through 2029. Below is a list of the PCRP phases by anticipated year of construction:

- 2024: Concrete Channel/Channel Widening (Phase 1).
- 2025: Rock Pile Area (Phase 1).
- 2026: Rock Pile Area (Phase 2).
- 2027: Channel Widening (Phase 2) and Old Crusher Foundation.
- 2028: Material Removal Area (Phase 1).
- 2029: Material Removal Area (Phase 2).

Lehigh provided a list of off-road construction equipment that would be used during each PCRP construction phase and indicated that each piece of equipment would comply with U.S. EPA Tier 4

non-road engine standards and would operate between 4 and 8 hours each workday for a specified number of days based on the applicable construction phase (Lehigh 2021, 2023). The average hours per day each equipment type would operate for a given construction phase were estimated by dividing the total operation hours per year by the estimated number of workdays for that phase. Engine horsepower ratings for the equipment types were estimated by Environmental Science Associates based on specification sheets found online for the provided equipment types, or California Emissions Estimator Model (CalEEMod) defaults were used. For the assumed engine horsepower ratings, amounts, and types of construction equipment that would be required to complete each phase of the PCRP, refer to Appendix D.

For on-road vehicle trips that would be associated with the PCRP, Lehigh has indicated that each construction phase would require between 8 and 16 worker one-way daily trips, 216 vendor truck one-way daily trips (except for the Concrete Channel and Older Crusher Foundation phases, which would require 25 vendor truck one-way daily trips), and 2 to 1,418 haul truck one-way total trips (Lehigh 2023). For the purposes of the on-road emissions estimates, it is assumed that worker vehicles would be light duty trucks (i.e., LDT1), vendor trucks would be a mix of heavy-duty trucks (i.e., LHDT1, LHDT2, and MHDT), and haul trucks would be heavy-heavy duty trucks (i.e., HHDT).

Construction-related on-site exhaust emissions were estimated based on the assumptions described above using the CalEEMod version 2020.4.0. On-road vehicle exhaust emissions, on the other hand, were estimated outside of CalEEMod. This is because CalEEMod version 2020.4.0 uses vehicle emission factors from CARB's EMFAC2017 model to estimate on-road mobile exhaust emissions, whereas CARB and U.S. EPA have adopted the EMFAC2021 version of the model. The PCRP's on-road vehicle exhaust emissions were estimated outside of CalEEMod using emissions factors for the vehicle types described above obtained from the EMFAC2021 model. BAAQMD currently recommends use of these models to estimate project emissions subject to CEQA; however, these emissions models were not available when the 2012 EIR was certified. Therefore, the emissions presented in the 2012 EIR were estimated using currently outdated emissions models. The comparison of the 2012 EIR emissions with the emissions estimated for the PCRP is valid for this SEIR because only the changes associated with the PCRP are subject to this CEQA review.

In addition, fugitive dust from bulldozing on the disturbance areas and travel on paved and unpaved roads were calculated using factors from U.S. EPA's AP-42, which is a compilation of emissions factors for various industries and activities. Emissions factors for grading equipment passes from AP-42, Chapter 11, were used to estimate fugitive $PM_{10}$ and $PM_{2.5}$ bulldozing emissions, and factors from Chapter 13 were used to estimate paved and unpaved road re-suspended $PM_{10}$ and $PM_{2.5}$ (U.S. EPA 1998, 2006, 2011). The 2012 EIR also reported metals sampled from overburden and road dust, which were speciated from the $PM_{10}$ fugitive calculations. This information was also used in the health risk assessment (HRA) for the PCRP, as discussed below.

The modeled emissions for each construction phase of the PCRP were multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the

applicable emissions in this SEIR (see *Emissions Applicability Factors* discussion above). Calculated emissions for this SEIR were then summed and added to the baseline emissions (see Section 3.1.3.2) for comparison to BAAQMD's applicable regional significance thresholds and to determine if the PCRP could cause any new significant impact or any substantial increase in the severity of previously identified significant direct, indirect, and/or cumulative environmental effects compared with the Project analyzed in the 2012 EIR. Detailed emissions assumptions and summaries, including the CalEEMod and EMFAC2021 assumptions and output, are included in Appendix D, Exhibit A. For information about the 2012 Reclamation Plan Amendment emissions estimates, see Section 3.1.3.2, below. For all assumptions associated with the 2012 EIR emissions estimates, see 2012 EIR Appendix B.

Lehigh has committed to the following fugitive dust emission reduction measures, which for purposes of this analysis are considered equivalent to the BAAQMD's basic measures for dust control:

- Water unpaved roads (BMP-3, *Dust Control*, as set forth in Section 2.5.9.1, *Best Management Practices)*; and
- Water active areas consistent with a dust mitigation plan submitted by Lehigh to the BAAQMD in 2010 (Draft 2012 EIR, at page 4.3-19).

Therefore, due to BAAQMD guidance, PCRP fugitive dust-related $PM_{10}$ emissions have been estimated mainly for disclosure, but also for the purpose of estimating, for the HRA, metals that could be entrained in the atmosphere with dust during construction (see below).

### Health Impacts

After certification of the 2012 EIR, the California Supreme Court published its decision in *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502 (known as the "Friant Ranch" case), which held that CEQA requires that a connection be drawn between potential project emissions and human health impacts. The Court found that while there will be some scientific limits to the analytical tools available to draw and quantify these connections, the EIR "must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential health impacts further." The Court faulted the EIR in that case for "fail[ing] to indicate the concentrations at which [certain] pollutants would trigger identified symptoms." The Court concluded that "the public would have no idea of the health consequences that result when more pollutants are added to a nonattainment basin." The Court found that even if it were impossible to do more, the Friant Ranch EIR would have been found insufficient "because it failed to explain why it was not feasible to provide an analysis that connected the air quality effects to human health consequences."

The BAAQMD significance thresholds described above were set at emissions levels tied to the region's attainment status relative to the national and state ambient air quality standards designed to protect public health. They are emissions levels at which stationary pollution sources permitted by the BAAQMD must offset their emissions and CEQA projects must use feasible mitigations; they are not intended to be indicative of any localized human health impact that a project may have. Therefore, a PCRP-related exceedance of the mass regional emissions threshold (e.g.,

pounds per day or tons per year $NO_x$ thresholds) prior to mitigation from construction-related activities could indicate that the PCRP could cause or contribute to the exposure of sensitive receptors to ground-level concentrations greater than health-protective levels.

Furthermore, models available today are designed to determine regional, population-wide health impacts, and cannot necessarily accurately quantify ozone-related health impacts caused by PCRP-related $NO_x$ or VOCs emissions. Therefore, it is currently infeasible to connect $NO_x$ emissions associated with a project of limited scope, such as the short-term PCRP, to ozone-related health impacts.

The primary health concern with exposure to $NO_x$ emissions is the secondary formation of ozone. Given the complexity of ozone formation, and the state of environmental science modeling in use at this time, it is infeasible and would be speculative to determine whether, or the extent to which, a single project's precursor (i.e., $NO_x$ and ROG) emissions would result in the formation of secondary ground-level ozone and the geographic and temporal distribution of such secondary formed emissions (SCAQMD 2014, SJVAPCD 2014). Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone. Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by $NO_x$ or ROG emissions from a local-level project of limited scope.

### *Community Health Risk Due to Toxic Air Contaminants*

Impacts associated with the Project exposing sensitive receptors or the general public to substantial pollutant concentrations are evaluated by assessing the health risks posed by the placement of new sources of TAC emissions near existing sensitive receptors. Specifically, according to the BAAQMD, the Project would have a significant air quality impact if the construction phase would expose persons to substantial levels of TACs, such that the probability of contracting cancer exceeds 10 in one million, or if it would expose persons to pollutants such that a chronic Hazard Index of 1.0 would be exceeded. In addition, a significant impact would occur if the Project would result in an incremental increase in annual average concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$) at a sensitive receptor location (BAAQMD 2017c).

In addition, for assessing community risks and hazards relative to the criteria discussed above, the BAAQMD recommends use of a 1,000-foot radius around the project property boundary where the siting of a new source or receptor should be quantitatively assessed, considering both individual and nearby cumulative sources (i.e., proposed project plus existing and foreseeable future projects). For this analysis, the closest sensitive receptors were evaluated, even though they are located farther than 1,000 feet from where PCRP activities would occur on site. Haul trucks and vendor trucks arriving and departing from the site are a source of TACs and would travel closer than 1,000 feet from sensitive receptors for brief periods of time along the truck route.

An HRA was conducted to evaluate the cancer risks and non-cancer health effects associated with exposure to TACs that would be emitted because of the PCRP. TACs associated with the Project include various metals within fugitive dust (such as mercury and chromium), crystalline silica, and DPM. Cancer risks are evaluated based on assumed lifetime exposure to TACs over the

expected lifespan of the Project. Non-cancer health risks evaluated include adverse health effects from both acute (highest 1-hour exposure) and chronic (average annual exposure). As recommended by BAAQMD, the HRA also calculated the annual average $PM_{2.5}$ concentrations.

The HRA follows the protocols outlined by the BAAQMD, CARB, the California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA), and U.S. EPA. Consistent with guidelines and recommendations from these agencies, the HRA evaluated the incremental increase in lifetime cancer risks and non-cancer chronic and acute health risk from exposure to TAC emissions. At the time of the 2012 EIR, the OEHHA *2003 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* was the applicable guidance document for conducting HRAs (OEHHA 2003). Consistent with the 2012 EIR, the HRA conducted for this SEIR assesses impacts from the PCRP based on the 2003 OEHHA guidance. After the 2012 EIR was certified, OEHHA released the *2015 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, which revised some of the exposure parameters, such as breathing rates and age sensitivity factors. The 2015 OEHHA guidance was not available nor was its release reasonably foreseeable at the time the 2012 EIR was certified. For information and disclosure purposes, the HRA also presents the health risk values using the 2015 OEHHA Guidance.

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed in the HRA as the chances in one million of contracting cancer (for example, 10 cancer cases among one million people exposed). Non-cancer adverse health risks are measured against a Hazard Index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the Project to published reference exposure levels (RELs) that can cause adverse chronic (long-term) and acute (short-term) health effects.

For additional information related to the emissions sources, sensitive receptors, and the details regarding the HRA methodology, refer to Appendix D and its Exhibit B.

#### *Odors*

Impacts related to the PCRP creating or exposing a substantial number of people to objectionable odors is evaluated based on the potential for the PCRP to generate odors that could affect nearby sensitive receptors.

### 3.1.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that, in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved Project is assumed. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein. For purposes of this analysis of potential impacts on air quality, the baseline is described below.

## *2012 EIR Baseline*

The baseline for the 2012 EIR reflects the physical environmental conditions in the vicinity of the PCRP area as they existed on June 29, 2007, when the County published the NOP in connection with Lehigh's amendment of the 1985 Reclamation Plan. As described in Draft 2012 EIR Section 4.3.2, documentation pertinent to the air quality analysis establishes that, by 2007, some materials storage already had occurred in the EMSA. The 2012 Reclamation Plan Amendment involved an existing quarry operation characterized by fluctuating production and associated air emissions, in response to continually changing market demands. The baseline air pollutant emissions identified in the 2012 EIR air quality analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The daily and annual 2012 EIR baseline criteria pollutant emissions are shown in **Tables 3.1-3** and **3.1-4**.

The 2012 EIR included a health risk assessment and modeling of $PM_{2.5}$ concentrations. The 2012 EIR baseline health risk impacts are shown in **Tables 3.1-5** and **3.1-6**. The 2012 EIR baseline $PM_{2.5}$ concentrations are shown in **Table 3.1-7**.

## *2012 Emissions and Analysis*

### Criteria Pollutants

Baseline and maximum daily 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD daily thresholds (as disclosed in the 2012 EIR) are summarized in **Table 3.1-3**. Baseline and maximum annual 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD annual thresholds are summarized in **Table 3.1-4**. The 2012 Reclamation Plan Amendment emissions identified in the tables below include emissions associated with creek restoration activities proposed within the disturbance areas of the PCRA. As shown in Tables 3.1-3 and 3.1-4, the Reclamation Plan Amendment (including the proposed creek restoration work) was found to result in net emissions reductions for all nonattainment air pollutants ($PM_{10}$, $PM_{2.5}$, and the ozone precursors $NO_x$ and ROG) due to its decreased emissions relative to the baseline emissions, and therefore was disclosed to not exceed the BAAQMD daily or annual thresholds of significance. The net emissions reductions were due to additional emission reduction measures associated with the Reclamation Plan Amendment that were not part of the baseline emissions scenario for the 2012 EIR. The additional emission reduction measures include: watering active areas consistent with a dust mitigation plan submitted to the BAAQMD in 2010; use of an overland conveyor system, powered by electric motors; and watering conveyor transfer points and screens associated with the overland conveyor system. Reclamation Plan Amendment-related criteria pollutant emissions were found to result in a less-than-significant impact.

**TABLE 3.1-3**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM DAILY CRITERIA AIR POLLUTANT EMISSIONS (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Baseline Emissions | 5,411 | 893 | 2,440 | 167 | 2,641 | 27 |
| Reclamation Plan Amendment Emissions | 1,970 | 311 | 2,124 | 123 | 1,891 | 32 |
| Maximum Daily Incremental Change | (3,441) | (582) | (316) | (44) | (750) | 5 |
| BAAQMD Threshold | 82 | 54 | 54 | 54 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | -- | -- |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3.

**TABLE 3.1-4**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL CRITERIA AIR POLLUTANT EMISSIONS (TONS/YEAR)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Baseline Emissions | 754 | 122 | 324 | 24 | 288 | 1 |
| Reclamation Plan Amendment Emissions | 291 | 45 | 301 | 18 | 222 | 3 |
| Maximum Annual Incremental Change | (463) | (77) | (23) | (6) | (66) | 2 |
| BAAQMD Threshold | 15 | 10 | 10 | 10 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | -- | -- |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4.

### Toxic Air Contaminants

An HRA was conducted to analyze potential health risks from emissions associated with the 2012 Reclamation Plan Amendment. That HRA was part of the impact analysis in the 2012 EIR. The HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. EPA *Haul Road Workgroup Recommendations Final Report* (U.S. EPA 2011), OEHHA *Air Toxics Hot Spots Program Guidance* (OEHHA 2003), and the BAAQMD's *Health Risk Screening Analysis Guidelines* (BAAQMD 2005).

The reported health risks for that analysis were associated with off-road equipment used for the quarrying and overburden activities. On-road haul truck activity included in the HRA analysis consists of trucks hauling material to customers from the rock plant and trucks associated with importing mulched green waste to mix with the West Materials Storage Area (WMSA) material as it is used to backfill the quarry pit in Phase 2. A summary of the 2012 EIR HRA impacts are shown in **Tables 3.1-5** and **3.1-6**.

**TABLE 3.1-5**
**2012 RECLAMATION PLAN AMENDMENT HEALTH RISK SUMMARY**

| Risk | MEIR - Child Resident South of Stevens Creek Blvd. (per million) | Caretaker's Residence (per million) |
|---|---|---|
| Cancer – Draft 2012 EIR | 8.98 | 8.61 |
| BAAQMD significance thresholds | 10 | 10 |
| Exceeds threshold? | No | No |

NOTE: MEIR: maximally exposed individual receptor.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-8 and 4.3-11.

**TABLE 3.1-6**
**2012 RECLAMATION PLAN AMENDMENT ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS**

| Health Risk | Location | 2012 EIR Value[a] |
|---|---|---|
| Chronic | MEIR | 0.13 |
| Acute | MEIR | 0.52 |

NOTE:
a The chronic and acute risk values from the 2012 EIR were reported for the caretaker's residence.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-10 and 4.3-13.

### $PM_{2.5}$ Concentrations

As shown in **Table 3.1-7**, the 2012 EIR determined that the maximum incremental annual $PM_{2.5}$ exhaust concentration at the maximally exposed individual receptor (MEIR) at the caretaker's residence would be 0.40 µg/m$^3$ without mitigation, which would exceed the BAAQMD threshold of 0.3 µg/m$^3$. The 2012 EIR identified Mitigation Measures 4.3-3a and 4.3-3b to reduce $PM_{2.5}$ concentrations to below the threshold. These mitigation measures would be implemented as part of the baseline condition, and compliance with the requirement to implement them would be an independently enforceable obligation of the 2012 approvals.

**TABLE 3.1-7**
**ESTIMATED $PM_{2.5}$ CONCENTRATION IMPACTS (µG/M$^3$)**

| Location | Annual Average Concentration |
|---|---|
| 2012 EIR Value[a] (Unmitigated) | 0.40 |
| 2012 EIR Value[a] (Mitigated) | 0.29 |

NOTE:
a The $PM_{2.5}$ concentration from the Draft 2012 EIR is reported for the caretaker's residence.

SOURCE: Draft 2012 EIR. Section 4.3.5.1, Table 4.3-15.

### 3.1.3.3 Discussion of Criteria with No Air Quality Impact

Criteria a) and e) as set forth in Section 3.1.2 were eliminated from more detailed consideration in the 2012 EIR for the reasons explained on Draft 2012 EIR pages 4.3-16 and 4.3-17. For similar reasons as explained there, the PCRP would not have the potential to cause a significant impact related to these criteria. The discussion associated with criterion a) has been revised as shown below to reflect the new applicable air quality plan, but there are no changes to the odors discussion of criterion e); therefore, this criterion is not considered further in this SEIR.

#### a) Whether the Project would conflict with or obstruct implementation of the applicable air quality plan.

The most recently adopted air quality plan for the PCRP area is the 2017 CAP. The 2017 CAP focuses on two closely related goals: protecting public health and protecting the climate. The 2017 CAP is an update to the BAAQMD's 2010 Ozone Strategy to comply with state air quality planning requirements. The 2017 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The 2017 CAP control strategy includes revised, updated, and new measures in the three control measure categories: stationary sources, transportation, and buildings and energy.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 CAP. The BAAQMD-recommended measure for determining PCRP support of these goals is consistency with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the PCRP would not be considered to support the 2017 CAP goals, and the associated impact would be significant. As presented in the Impact 3.1-1 discussion below, the PCRP would not exceed the BAAQMD significance thresholds; therefore, the PCRP would be considered to support the primary goals of the 2017 CAP, and would have no significant impact.

2017 CAP Transportation Control Measure TR22, *Construction, Freight, and Farming Equipment*, would be the only measure applicable to the PCRP. It provides incentives for the early deployment of electric, Tier 3, and Tier 4 off-road engines used in construction, freight, and framing equipment. Lack of consistency with these incentives could be considered a significant impact associated with conflict with or obstruction of implementation of the applicable air quality plan. Lehigh has committed to using off-road diesel construction equipment compliant with U.S. EPA Tier 4 Final engine standards. Therefore, the PCRP would be consistent with the intent of Transportation Control Measure TR22, and there would be no significant impact.

In summary, the PCRP would support the primary goals of the 2017 CAP, it would include all applicable 2017 CAP control measures, and it would not disrupt or hinder implementation of any 2017 CAP control measures. Therefore, the PCRP would not conflict with or obstruct implementation of the 2017 CAP and there would be **no new significant impact and no substantial increase in the severity of the significant impact** than was identified in the 2012 EIR.

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### 3.1.3.4 Direct and Indirect Effects of the Project

The analysis in this section evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or more severe significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.1-1: The PCRP would generate emissions of criteria air pollutants that could contribute to existing nonattainment conditions and further degrade air quality.**

This impact analysis corresponds to 2012 EIR significance criteria b) and c) as set forth in Section 3.1.2 and addresses PCRP-related emissions of criteria air pollutants that could contribute to cumulative adverse air quality conditions and further degrade air quality. In the context of Impact 4.3-1 (page 4.3-18 et seq.), the 2012 EIR concluded that interim reclamation activities, including those proposed within the PCRA, would be less than significant because net emissions reductions would result for all nonattainment air pollutants ($PM_{10}$, $PM_{2.5}$, and the ozone precursors $NO_x$ and ROG), and therefore would not exceed the BAAQMD daily or annual thresholds of significance. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion b) or c).

As presented in the *Emissions Estimates* discussion under *Criteria Pollutants*, in Section 3.1.3.1, *Methodology*, the criteria pollutant emissions that would be generated associated with the PCRP would be short term and periodic in nature and would occur during the dry seasons of years 2024 through 2029. Below are summaries of the PCRP criteria pollutant and ozone precursor emissions estimate results in terms of applicable PCRP emission estimates compared to the CEQA baseline. For summaries of the total PCRP emissions estimates by phase prior to and after the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR, see Appendix D.

#### PCRP Emissions Estimates Compared to CEQA Baseline

**Table 3.1-8** presents the net maximum pounds per day emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum daily incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum daily emissions reflect a slight increase in emissions for $PM_{10}$, $PM_{2.5}$, $NO_x$ and ROG (but still an overall net emissions reduction in the context of the 2012 EIR) and no change for $SO_2$ compared to the maximum daily incremental change emissions disclosed in the 2012 EIR.

**TABLE 3.1-8**
**MAXIMUM DAILY NET CRITERIA POLLUTANT EMISSIONS (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a] | (3,441) | (582) | (316) | (44) | (750) | 5 |
| PCRP Maximum Daily Emissions (2023) not Evaluated in the 2012 EIR[b] | 196.20 | 26.62 | 8.51 | 1.13 | 27.90 | 0.08 |
| Net Emissions | (3,245) | (555) | (307) | (43) | (722) | 5 |
| BAAQMD Threshold | 82 | 54 | 54 | 54 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | --[c] | --[d] |

NOTES:
a Reclamation Plan Amendment maximum daily incremental change emissions were estimated using AP-42, Offroad2007, and EMFAC2007, Version 2.3. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b PCRP maximum daily emissions were estimated using CalEEMod version 2020.4.0, EMFAC2021, and U.S. EPA's AP-42.
c See Impact 3.1-2 for a discussion of CO significance.
d The Bay Area is in attainment for $SO_2$ standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3; Appendix D, Exhibit A.

**Table 3.1-9** presents the net maximum tons per year emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum annual emissions are not substantial and reflect only a slight increase in net emissions compared to the maximum annual incremental change emissions disclosed in the 2012 EIR.

**TABLE 3.1-9**
**MAXIMUM ANNUAL NET CRITERIA POLLUTANT EMISSIONS (TONS/YEAR)**

| Scenario | PM10 | PM2.5 | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a] | (463) | (77) | (23) | (6) | (66) | 2 |
| PCRP Maximum Annual Emissions (2023) not Evaluated in the 2012 EIR | 11.45 | 1.71 | 0.56 | 0.07 | 1.84 | 0.01 |
| Maximum Annual Incremental Change | (452) | (75) | (22) | (6) | (64) | 2 |
| BAAQMD Threshold | 15 | 10 | 10 | 10 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | --[c] | --[d] |

NOTES:
a Reclamation Plan Amendment maximum daily incremental change emissions were estimated using AP-42, Offroad2007, and EMFAC2007, Version 2.3. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b PCRP maximum daily emissions were estimated using CalEEMod version 2020.4.0, EMFAC2021, and U.S. EPA's AP-42.
c See Impact 3.1-2 for a discussion of CO significance.
d The Bay Area is in attainment for $SO_2$ standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4; Appendix D, Exhibit A.

### Impact Conclusion

As can be seen from the data in Tables 3.1-8 and 3.1-9, implementation of the PCRP would continue to result in net emissions reductions when combined with the 2012 Reclamation Plan Amendment maximum daily incremental change emissions disclosed in 2012 EIR for all nonattainment air pollutants ($PM_{10}$, $PM_{2.5}$, and the ozone precursors NOx and ROG), and therefore would not exceed the BAAQMD daily or annual thresholds of significance.

As identified in the County's 2012 EIR, this would be a less-than-significant impact. Accordingly, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR relating to a contribution to existing nonattainment conditions. The significance of CO emissions from the Project is addressed in Impact 3.1-2, below.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.1-2: PCRP-related traffic would generate localized CO emissions on roadways and at intersections in the PCRP vicinity.**

This impact analysis corresponds to 2012 EIR significance criterion d) as set forth in Section 3.1.2 and addresses PCRP-generated localized CO emissions. In the context of Impact 4.3-2 (page 4.3-21 et seq.), the 2012 EIR concluded that interim reclamation activities, including restoration activities within the PCRA, would result in a less-than-significant impact because traffic emissions would not lead to violations of the CO standards. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion d).

The 2017 BAAQMD CEQA Air Quality Guidelines recommend use of the same screening criteria for the evaluation of CO emissions on roadways and intersections as recommended in the 2012 Guidelines that were used in the 2012 EIR analysis. Under the recommended criteria, a project would result in a less-than-significant impact on localized CO concentrations if the following screening criteria are met:

1. The project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.
3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The PCRP would result in the temporary generation of vehicle trips but would not exceed the standards included in the Santa Clara County Congestion Management Plan established by the Santa Clara Valley Transportation Authority. Regarding the second and third criteria, intersection traffic volumes (including external PCRP traffic) would be substantially less than 44,000 and 24,000 vehicles per hour, respectively. The estimated increase in traffic volumes caused by reclamation-related traffic (a maximum of approximately 127 round trips per day) would not be substantial, nor would PCRP traffic significantly disrupt daily traffic flow on area roadways.

Based on the BAAQMD's criteria, PCRP-related traffic would not lead to violations of the CO standards and, therefore, no further analysis is required for CO impacts of the PCRP; as disclosed in the 2012 EIR, the impact continues to be less than significant.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.1-3: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer.**

This impact analysis corresponds to 2012 EIR significance criterion d) as set forth in Section 3.1.2 and addresses exposure to TACs that would be generated by the PCRP that could lead to an increase in the risk of cancer. In the context of Impact 4.3-3 (page 4.3-26 et seq.), the 2012 EIR concluded that interim reclamation activities, including the restoration activities proposed within the PCRA, would result in total cancer risks that would be above the BAAQMD CEQA threshold of 10 in one million for the residence-adult but below the threshold for residence-child and school children; however, the significant impact was found to be reduced to a less-than-significant level with implementation of Mitigation Measures 4.3-3a and 4.3-3b (or, alternatively, Mitigation Measure 4.3-3c). As previously noted, all mitigation measures identified in the 2012 EIR and adopted as conditions of approval for the 2012 Project would be implemented as part of the baseline condition for the PCRP. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** related to cancer risk than was disclosed in the 2012 EIR related to significance criterion d).

Cancer risks were modeled for activities that would emit DPM and metals, which include diesel equipment and fugitive dust containing metals at the PCRP disturbance areas, as well as diesel trucks and fugitive dust containing metals on paved and unpaved roads. Cancer risk was calculated using the resulting DPM and metals concentrations modeled with AERMOD, along with equations and factors from the OEHHA 2003 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2003; BAAQMD 2016). Cancer risk represents a cumulative exposure over the duration of the Project.

**Table 3.1-10** presents the modeled cancer risk of 0.51 in one million at the MEIR location, which is a residence just south of Stevens Creek Boulevard, approximately 2,500 feet east of the Permanente Quarry entrance. This represents the cancer risk for the PCRP duration from 2024 through 2029, as cancer risk is cumulative over the exposure duration.

The MEIR identified in the 2012 EIR was modeled at the caretaker's residence, and the second-highest cancer risk was modeled at a residence near Stevens Creek Boulevard. For the purposes of this analysis, this is assumed to be the same residence as this HRA's MEIR. Cancer risk values for the 2012 EIR and this HRA are shown for the caretaker's residence and the residence just south of Stevens Creek Boulevard.

**TABLE 3.1-10**
**ESTIMATED CANCER RISK AT THE MEIR AND CARETAKER'S RESIDENCE**

| Risk | MEIR - Child Resident South of Stevens Creek Blvd. (per million) | Caretaker's Residence (per million) |
|---|---|---|
| Cancer - PCRP | 0.51 | 0.03 |
| Cancer – Draft 2012 EIR | 8.98 | 8.66 |
| Combined Total | 9.49 | 8.70 |
| BAAQMD significance thresholds | 10 | 10 |
| Exceeds threshold? | No | No |

SOURCE: 2012 EIR Section 4.3.5.1, Tables 4.3-11 and 4.3-12; Appendix D, Exhibit B.

As shown in Table 3.1-10, the incremental risk at the MEIR, when added to the value from the 2012 EIR, is below the BAAQMD CEQA threshold of 10 in one million. This also is true for the value at the caretaker's residence. Most of the cancer risk is due to DPM that would be generated from on-road diesel trucks traveling past neighborhoods close to Stevens Creek Boulevard.

When the 2012 EIR was certified, the 2015 OEHHA guidance was not available nor was its release reasonably foreseeable. The impact conclusion in that certified EIR remains valid, as it was based on the latest analysis methodology at that time. However, since the updated guidance from OEHHA was used for this SEIR, the risk results from the 2012 EIR have been adjusted to illustrate what the risks would be using the most recent OEHHA guidance. This was done for information and disclosure purposes only and does not change the conclusion of the less-than-significant impact in the 2012 EIR.

Based on research conducted by OEHHA after the 2003 *Air Toxics Hot Spots Program* (used in the 2012 EIR) was promulgated, OEHHA found that children are more susceptible to the effects of carcinogens, in part due to their higher breathing rates resulting in increased intake of these compounds. Thus, the 2015 OEHHA guidance methods reflect this updated approach. The health risk values based on the exposure parameters from the OEHHA 2015 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015) are provided herein. Using the exposure parameters from the 2015 OEHHA guidance, the cancer risk value for the 2012 EIR would be approximately 12.34 in one million, and the cancer risk value for the PCRP would be approximately 0.78 in one million, for a total risk of approximately 13.12 in one million. The 2012 EIR risk was multiplied by a factor of 1.37 to adjust it to 2015 OEHHA exposure parameters (the 2012 OEHHA result multiplied by the factor equals the 2015 OEHHA result or [8.98 per million] x 1.37 = [12.34 per million]). This factor was derived from breathing rate ratios from the 2015 OEHHA guidance to the 2003 OEHHA guidance. Based on the

exposure parameters from the 2015 OEHHA guidance, the risk from the PCRP on its own would neither cause a new significant impact nor result in a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.3-3a and either Mitigation Measure 4.3-3b or Mitigation Measure 4.3-3c. The full text of each measure is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.1-4: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could increase chronic and acute health risks.**

This impact analysis corresponds to 2012 EIR significance criterion d) as set forth in Section 3.1.2 and addresses exposure to TACs that would be generated by the PCRP that could increase chronic and acute health risks. In the context of Impact 4.3-4 (page 4.3-31 et seq.), the 2012 EIR concluded that interim reclamation activities, including those within the PCRA, would result in a less-than-significant impact because the chronic hazard would be below the significance threshold of 1.0. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion d) relating to chronic hazard.

Chronic and acute, non-cancer health risks were evaluated based on emissions of pollutants with such health effects. DPM and some of the metals found in the fugitive dust at the PCRP disturbance areas and in road dust result in chronic health effects. In addition, some of the metals result in acute (short-term) health effects, but DPM does not have a short-term, acute health risk effect. Acute impacts were modeled at residential receptors and at locations where the public could have access on a short-term basis. As discussed in Draft 2012 EIR Section 4.3.1.1, these receptors include the trails north of the Project site and the Gate of Heaven cemetery to the northeast of the Project site.

Non-cancer adverse health risks, both for acute (short-term) and chronic (long-term) timeframes, are measured against a Hazard Index, which is defined as the ratio of the incremental exposure concentrations of the various non-carcinogens from the project to published RELs that can cause adverse health effects. OEHHA establishes the RELs based on epidemiological evidence. The ratio (referred to as the Hazard Quotient) of each substance with a non-carcinogenic effect that affects a certain organ system is added to produce an overall Hazard Index for that organ system. As a worst case, it was assumed that all of the toxic substances with established RELs would affect the same organ and the individual Hazard Quotients were summed to calculate an overall Hazard Index. If the Hazard Index exceeds 1.0, the potential health impact would be significant.

**Table 3.1-11** presents the maximum chronic Hazard Index, plus the maximum acute Hazard Index. The maximum impact location for both the chronic and acute Hazard Indices is the MEIR located just south of Stevens Creek Boulevard. The maximum chronic and acute Hazard Index

values would occur based on activities in the years 2025 and 2029, respectively. As shown in Table 3.1-11, the maximum chronic and acute Hazard Indices for the PCRP combined with the 2012 EIR index values indicates that the impacts associated with the 2012 Reclamation Plan Amendment would continue to be less than significant, and there would be no new significant impact and no substantial increase in the severity of a previously-identified significant impact. The maximum acute Hazard Index would be due primarily to nickel (as a component in fugitive dust from the roadway).

**TABLE 3.1-11**
**ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS**

| Health Risk | PCRP Hazard Index | Location | Year | 2012 EIR Value[a] |
|---|---|---|---|---|
| Chronic | 0.01 | MEIR | 2025 | 0.13 |
| Acute | 0.06 | MEIR | 2029 | 0.52 |

NOTE:
a The chronic and acute risk values from the 2012 EIR were reported for the caretaker's residence.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-13 and 4.3-14; Appendix D, Exhibit B.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.1-5: The PCRP would increase exhaust emissions of $PM_{2.5}$, which could adversely affect human health.**

This impact analysis corresponds to 2012 EIR significance criterion d) as set forth in Section 3.1.2 and addresses exposure to $PM_{2.5}$ exhaust emissions that would be generated by the PCRP that could affect human health. In the context of Impact 4.3-5 (page 4.3-32 et seq.), the 2012 EIR concluded that interim reclamation activities, including those proposed within the PCRA, would result in $PM_{2.5}$ exhaust concentrations that would be above the BAAQMD CEQA threshold of 0.3 $\mu g/m^3$; however, the significant impact was found to be reduced to a less-than-significant level with implementation of Mitigation Measures 4.3-3a and 4.3-3b (or, alternatively, Mitigation Measure 4.3-3c). These mitigation measures would continue to be implemented as an ongoing, independently enforceable obligation of the 2012 approvals. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion d) relating to $PM_{2.5}$ exhaust-related impacts on human health.

An analysis was conducted to determine the maximum annual increase in $PM_{2.5}$ exhaust concentrations for sensitive receptors in the vicinity of the PCRP. BAAQMD policy is to conduct this analysis for exhaust emissions only. Under the PCRP, Lehigh would continue to comply with its existing Fugitive Dust Control Plan (dated January 21, 2011).

As shown in **Table 3.1-12**, the maximum incremental annual $PM_{2.5}$ concentration at the MEIR south of Stevens Creek Boulevard would be 0.001 µg/m$^3$, which would be below the BAAQMD threshold of 0.3 µg/m$^3$ and would therefore result in a less-than-significant impact. Therefore, implementation of the PCRP would not result in a new significant and no substantial increase in the severity of a significant $PM_{2.5}$ concentration impact than was disclosed in the 2012 EIR.

**TABLE 3.1-12**
**ESTIMATED PM2.5 CONCENTRATION IMPACTS (µG/M$^3$)**

| Location | Annual Average Concentration |
|---|---|
| PCRP MEIR – South of Stevens Creek Boulevard | 0.001 |
| 2012 EIR Value – South of Stevens Creek Boulevard | Not Reported |
| PCRP MEIR – Caretaker's Residence | <0.001 |
| 2012 EIR Value – Caretaker's Residence | 0.29 |
| Total at Caretaker's Residence | 0.29 |

SOURCE: See Appendix D, Exhibit B.

**Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.3-3a and either Mitigation Measure 4.3-3b or Mitigation Measure 4.3-3c. The full text of each measure is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.

**Additional Mitigation:** None required.

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## 3.1.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.3, *Air Quality* (pages 6-15 and 6-16), concluding that the 2012 Reclamation Plan Amendment, including the creek restoration activities that would occur within the PCRA, would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context than was disclosed in the 2012 EIR.

### 3.1.4.1 Criteria Pollutants

The geographic scope of potential cumulative criteria air pollutant impacts encompasses the Project vicinity, Project site, areas along the access and hauls routes to the Project site, and the SFBAAB. The temporal scope includes construction, operation, and maintenance of the Project. The past, present, and reasonably foreseeable future projects described as part of the cumulative scenario include transportation demand management strategies at Rancho San Antonio Open Space Preserve, improvements to Permanente Creek Trail, a baseball park, and a creek widening project that could increase the criteria air pollutant emissions within the Project vicinity and SFBAAB. According to the BAAQMD, no single project is sufficient in size to, by itself, result in nonattainment of ambient

air quality standards within the regional air basin. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. In addition, according to the BAAQMD *CEQA Air Quality Guidelines*, if a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in significant adverse air quality impacts on the region's existing air quality conditions (BAAQMD 2017c). Alternatively, if a project does not exceed the identified significance thresholds, then the project would not be considered cumulatively considerable and would result in less-than-significant air quality impacts.

As described in Section 3.1.3, *Direct and Indirect Effects*, in the context of Impact 3.1-1, Project emissions of ROG, $NO_x$, $PM_{10}$, $PM_{2.5}$, and CO would not exceed the applicable BAAQMD thresholds; therefore, the PCRP would not be cumulatively considerable, and the cumulative impact regarding criteria pollutants would be less than significant.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

### 3.1.4.2 Toxic Air Contaminants

The BAAQMD's *CEQA Air Quality Guidelines* include standards and methods for determining the significance of cumulative health risk impacts for individual projects (BAAQMD 2017b). The method for determining health risk requires the tallying of health risk from permitted sources and major roadways in the vicinity of a project, then adding the project impacts to determine whether the cumulative health risk thresholds are exceeded. Cumulative health impacts of cancer risks, chronic impacts, and $PM_{2.5}$ concentrations are analyzed.

BAAQMD has developed a geo-referenced database of permitted TAC emissions sources throughout the San Francisco Bay Area and has developed the *Stationary Source Risk & Hazard Analysis Tool* (2020b) for estimating health risks from permitted sources. The risk and $PM_{2.5}$ values for the two stationary sources closest to the PCRP are shown in **Table 3.1-13**. Based on the BAAQMD stationary source risk tool, these sources contribute negligible cancer, chronic, and $PM_{2.5}$ risks to the closest receptor (BAAQMD 2020b). BAAQMD also has developed a geo-referenced database of mobile sources and has estimated risk and $PM_{2.5}$ values from highways, major streets, and rail throughout the SFBAAB. Risk and $PM_{2.5}$ values provided by BAAQMD in a geographic information system (GIS) database are shown in a screenshot at the end of Appendix D, Exhibit B. These values are shown for the MEIR location in Table 3.1-13. In addition, the values disclosed in the 2012 EIR for the 2012 Reclamation Plan Amendment cement trucks on Stevens Creek Boulevard are also included in the table to show the health impacts resulting from ongoing truck traffic on Stevens Creek Boulevard associated with the hauling of cement and aggregate from the Lehigh Quarry site.

**TABLE 3.1-13**
**CUMULATIVE HEALTH IMPACTS**

| Facility/Source Type | Address | Cancer Risk (per million) | Acute Hazard Index[a] | Chronic Hazard Index[a] | PM2.5 (µg/m$^3$)[a] |
|---|---|---|---|---|---|
| Reclamation Plan Amendment Cement Trucks Disclosed in 2012 EIR | Stevens Creek Boulevard east of Ridgeway Drive | 8.98 | 0.52 | 0.13 | 0.29 |
| Nearby Major Streets | N/A | 0.15 | N/A | N/A | 0.003 |
| Rail | N/A | 1.01 | N/A | N/A | 0.002 |
| Nearby Highways | N/A | 3.85 | N/A | N/A | 0.108 |
| Santa Clara Co. Fire Dept. | 22620 Stevens Creek Blvd | 1.32 | 0 | 0 | 0 |
| Sunny View Retirement Community | 22445 Cupertino Road | 2.92 | 0 | 0 | 0 |
| PCRP MEIR | South of Stevens Creek Boulevard | 0.51 | 0.06 | 0.01 | 0.001 |
| **Total: PCRP + Cumulative** | | 18.74 | 0.58 | 0.14 | 0.404 |
| **BAAQMD Cumulative Significance Criteria** | | **100** | **10** | **10** | **0.8** |
| **Significant Cumulative Impact?** | | **No** | **No** | **No** | **No** |

NOTES:
a The locations of maximum impact disclosed in the 2012 EIR are reported at the caretaker's residence, so adding the maximum impacts together is an overestimate of what the actual maximum cumulative impact would be at the MEIR sensitive receptor for the PCRP (located adjacent to Stevens Creek Boulevard).

SOURCES: Draft 2012 EIR Section 4.3.5.1, Table 4.3-11; Appendix D, Exhibit B; BAAQMD, 2020b, Permitted Stationary Source Risks and Hazards map.

Table 3.1-13 shows the cumulative cancer risk, chronic hazard, and $PM_{2.5}$ concentrations (in µg/m$^3$) associated with trucks on Stevens Creek Boulevard and the PCRP. As indicated in Table 3.1-13, the cumulative total cancer risk, acute and chronic hazard, and $PM_{2.5}$ concentrations would be below the respective BAAQMD significance thresholds; therefore, the proposed PCRP would not be cumulatively considerable, and the cumulative health risk impact would be less than significant.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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## 3.1.5 References

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# 3.2 Biological Resources

This section identifies and evaluates issues related to vegetation and wildlife resources, both aquatic and terrestrial, to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. To do this, this analysis focuses on three things: (1) PCRP areas that are outside of the existing Reclamation Plan boundary (for which Grading Approval would be required); (2) PCRP areas within the Reclamation Plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP proposes work at greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. The analysis is based in part on the technical reports listed below. These technical reports were prepared by or on behalf of Lehigh and reviewed by the County and its environmental consultant to ensure that they can be relied on (in combination with other materials included in the formal record) in the preparation of this Draft SEIR. A copy of each report is provided in Appendix E, *Biological Resources*.

- GEI Consultants, Inc. & AECOM. 2016. Revised Draft Biological Assessment for the Permanente Creek Restoration Project. Prepared for Lehigh Southwest Cement Company, May 2016 (Appendix E1).
- GEI Consultants, Inc. 2021. Aquatic Resources Report. Preliminary Delineation of Waters of the United States, Including Wetlands (Appendix E2).
- Waterways Consulting, Inc., 2022. Technical Memorandum, Permanente Creek Restoration Project: Temporary Riparian Vegetation Impact Assessment, August 26, 2022 (Appendix E3).
- GEI Consultants, Inc. 2022. Low-Effect Habitat Conservation Plan, Permanente Site Operation and Maintenance. Prepared for Lehigh Southwest Cement Company, Cupertino, CA.

The 2016 reports in Appendices E1 and E2 were based on an earlier design level than the Updated 90% Design Memo provided in Appendix C of this SEIR. Lehigh is in the process of updating these 2016 reports to reflect the current design; nonetheless, considered together with the Updated 90% Design Memo, the information contained in the 2016 reports in Appendix E1 and Appendix E2 remains informative.

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a cross reference between the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis. See Section ES.1, *Introduction*, and Section 2.3, *Focus of the Supplemental EIR*, for additional details about the identification of these reaches as areas of focus for the SEIR.

The County received scoping input from the California Department of Fish and Wildlife (CDFW) (Letter H), the Midpeninsula Regional Open Space District (MidPen) (Letter F), and a member of the public (Letter E) regarding aquatic and riparian communities and habitats, special-status species, birds and nests, and other biological resources-related considerations. A copy of each of these letters is included in Appendix A, *Scoping Report*. These comments are considered in the analysis provided below.

## 3.2.1 Setting

### 3.2.1.1 Study Area

The "study area" for this analysis of potential impacts on biological resources consists of the Project site described in Section 2.3.2 of the Project Description and shown in Figure 2-3. As described in the Draft 2012 EIR Section 4.4.1.1 *Study Area* (page 4.1-1 et seq.), the study area is located in unincorporated western Santa Clara County, in the eastern foothills of the Santa Cruz Mountains, which are part of the California Coast Range. Natural communities in the region range from tidal salt marshes to chaparral to oak woodlands. The area surrounding the quarry remains generally undeveloped and contains high-quality habitat for a number of sensitive species. As stated above, Reaches 6–13 and Reaches 17 and 18 of Permanente Creek are the focus of this analysis.

### 3.2.1.2 Environmental Setting

Section 4.4.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of biological resources, including biological communities and wildlife habitat types (Section 4.4.1.2, page 4.4-2 et seq.), jurisdictional waters and wetlands (Section 4.4.1.2, page 4.4-12), special-status species (page 4.4.1.2, page 4.4-2 et seq.), and sensitive natural communities (page 4.4.1.2, page 4.4-17). Rare plants were deemed absent from the site following two protocol-level rare plant surveys (page 4.4-13). Based on review of documents produced for the site in the intervening years (see Appendix G) and historical imagery on Google Earth, biological resources descriptions remain accurate for purposes of this analysis of the PCRP.

The listing status of five species in the Project region changed since publication of the 2012 EIR. The foothill yellow-legged frog (*Rana boylii*) Central Coast Distinct Population Segment (DPS) became a state-listed endangered species in 2020 and was proposed as a federal threatened species in December 2021. The mountain lion (*Puma concolor*) Southern California/Central Coast Evolutionarily Significant Unit (ESU) became a state candidate for listing as threatened in 2020. The monarch butterfly (*Danaus plexippus*) was named a candidate for federal listing status in December 2020. Two native bumblebees, western bumblebee (*Bombus occidentalis occidentalis*) and crotch bumblebee (*B. crotchii*), are candidates for state listing as of September 2022. These bumblebees have not been recorded in the PCRP area (CDFW 2022) and would be unlikely to be impacted by Project activities. Habitat for foothill yellow-legged frog does not occur in the Project area; hence, no changes are needed to reflect the Project baseline for this species. Mountain lions occur in remote habitats on the San Francisco Peninsula, potentially including forested areas surrounding the quarry; monarch butterflies are known to overwinter in

trees in San Mateo and Santa Cruz counties; hence, brief descriptions of these species are provided below.

### *Mountain Lion (Puma concolor) Southern California/Central Coast ESU*

Mountain lions, or cougars, are solitary, opportunistic large predators that are often found in mountainous areas. They also occur in forests, wetlands, or deserts where they have adequate open space to range. Their home ranges are large, from 20 to more than 100 square miles. Cougars feed on deer and smaller mammals; females raise litters of one to four young every 2 years. They range from Canada into South America, but have declined greatly due to hunting, poaching, poisoning, and habitat loss and fragmentation. Cougars have low potential to occur at the Project site due to human traffic and disturbance, but they may occasionally cross the site between nearby areas of suitable habitat.

### *Monarch butterfly (Danaus plexippus)*

The monarch butterfly is a federal candidate species and a California special animal. This species migrates along the Pacific Coast and often overwinters in wind-protected groves of trees, such as eucalyptus and Monterey cypress, between October and March. Their breeding and larval habitat is on milkweed plants in open fields and meadows. Monarch butterflies occur in the PCRP area; however, the area does not provide suitable overwintering roost trees, and no milkweed plants were observed during focused surveys in June 2021. Thus, monarchs are unlikely to overwinter or roost in the PCRP area.

## 3.2.1.3 Regulatory Setting

Section 4.4.1.3 of the Draft 2012 EIR (page 4.4-17 et seq.) described the regulatory setting for the analysis of potential impacts on biological resources, including federal, state, and local laws, regulations, plans, and policies applicable to the analysis of the proposed creek restoration and other Project components that were considered in the 2012 EIR. The section summarized provisions of the Federal Endangered Species Act and Federal Migratory Bird Treaty Act. It also summarized relevant provisions of the Surface Mining and Reclamation Act, CEQA, California Oak Woodlands Conservation Act, and California Fish and Game Code, including the California Endangered Species Act, California Native Plant Protection Act, and laws governing nesting birds, fully protected species, and sensitive natural communities. Section 4.4.1.3 of the Draft 2012 EIR (page 4.4-22 et seq.) further summarized provisions relating to jurisdictional waters subject to oversight by the U.S. Army Corps of Engineers (USACE), the San Francisco Bay Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Game pursuant to the Clean Water Act and the Porter Cologne Water Quality Control Act; and local plans and policies such as the Santa Clara County General Plan (1994) and Santa Clara County Oak Woodlands Impact Guidelines (County of Santa Clara 2011). The description of the regulatory setting remains accurate for purposes of this analysis of the PCRP.

## 3.2.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.4 of the 2012 EIR determined that the proposed Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW[2] or the USFWS.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

d) Have a substantial adverse effect on oak woodland habitat as defined by Oak Woodlands Conservation Law (conservation/loss of oak woodlands) (Pub. Res. Code §21083.4).

e) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

f) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

g) Conflict with any local policies or ordinances protecting biological resources:

   i. Tree Preservation Ordinance (Section C16)

   ii. Wetland Habitat (General Plan Policy R-RC 25-30)

   iii. Riparian Habitat (General Plan Policy R-RC 31-41)

The County prepared the 2012 EIR pursuant to the provisions of CEQA and the CEQA Guidelines that were current at the time. Since then, the Environmental Checklist Form in CEQA Guidelines Appendix G has been revised to address legislative changes to CEQA, clarify certain portions of the existing CEQA Guidelines, and update the CEQA Guidelines to be consistent with more recent court decisions. The thresholds and analyses contained in the 2012 EIR are supplemented in this SEIR to reflect the latest CEQA Guidelines, current as of the publication of this SEIR. Accordingly, criterion c) above is revised as follows:

c) Have a substantial adverse effect on *state or* federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

CEQA Guidelines Section 15065 directs lead agencies to find that a project may have a significant impact if it has the potential to substantially degrade the quality of the environment;

[2] Since the 2012 EIR was published, on January 1, 2013 the California Department of Fish and Game changed its name to the California Department of Fish and Wildlife.

substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or wildlife community; or reduce the number or restrict the range of an endangered, rare, or threatened species. CEQA Guidelines Section 15380 provides that a plant or wildlife species, even if not on one of the official lists, may be treated as "rare or endangered" if, for example, it is likely to become endangered in the foreseeable future. In addition to the above, the CDFW and USFWS consider a project to have a significant impact if it were to cause a change in species composition or result in the measurable degradation of sensitive habitats, such as wetlands.

## 3.2.3 Direct and Indirect Effects

### 3.2.3.1 Methodology

The effects of implementing the Project are evaluated for biological resources that may be impacted during and as a result of the implementation of restoration proposed as part of the PCRP. Direct and indirect impacts on biological resources, including special-status plant and wildlife species and sensitive natural communities, could occur during on-land or in-water construction activities, or following the completion of restoration activities, as a result of alteration of the Permanente Creek channel, bed, banks, and floodplain. Effects following completion of the Project are expected to be beneficial to biological resources. The impact analyses determine whether the Project would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was identified in the 2012 EIR. The severity of an impact is determined based on the significance criteria identified in Section 3.2.2.

Compliance with applicable federal, state, and local laws and regulations is assumed in the analysis of impacts because these regulatory requirements are mandatory and the application of the associated protective measures (such as standard construction best management practices [BMPs], monitoring and reporting plans, and the application of corrective actions) are non-discretionary, and are proven to minimize and/or avoid biological resource impacts. Further, regulatory agencies with technical jurisdiction and authority for oversight would require adherence to regulatory requirements as a condition of Project or permit approval and would continue to enforce applicable requirements throughout Project construction/restoration and operation phases. The analysis considers whether compliance with regulatory requirements designed to protect biological resources would be adequate such that the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was identified in the 2012 EIR related to biological resources.

### 3.2.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that, in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved Project is assumed. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein. For purposes of this analysis of potential impacts on

biological resources, the baseline includes the existing surface mining disturbance area, plus restoration of the full 49.2-acre disturbance area identified in the 2011 Creek Restoration Plan.

### 3.2.3.3 Discussion of Criteria with No Biological Resources Impact

Criteria e) and g) as set forth in Section 3.2.2 were eliminated from more detailed consideration in the 2012 EIR for the reasons explained in Draft 2012 EIR Section 4.4.4 (pages 4.4-31 and 4.4-32).

The reasons explained there apply also to this SEIR; thus, these criteria are similarly not considered further. As discussed in the 2012 EIR (page 4.4-31) for criterion e), creek restoration activities would be conducted for the most part in habitats already impacted by mining activities. Further, the applicant-proposed measures (APMs) identified in Section 2.5.9.2 of Chapter 2, *Project Description*, are consistent with the APMs that were evaluated as part of the 2012 EIR and similarly would protect nesting and breeding habitats. Ultimately, following construction, Project activities would result in beneficial effects to the Permanente Creek riparian corridor. No impacts were identified on mountain lion, which became a state candidate threatened species in 2020; hence, no APMs or mitigation measures are warranted to reduce impacts on this species. For criterion g), as discussed in the 2012 EIR (page 4.4-32), application for a tree removal permit would not be required by the Project. The Revegetation Plan for the Project would include replanting oak woodland.

### 3.2.3.4 Direct and Indirect Effects of the Project

This analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.2-1: The Project may have a substantial adverse effect, either directly or through habitat modifications, on species identified as a candidate, sensitive, or special-status species.**

#### California Red-legged Frog (CRLF)

This impact analysis corresponds to significance criterion a) as set forth in Section 3.2.2 and addresses impacts on sensitive aquatic species; California red-legged frog (CRLF) is the only sensitive aquatic species found at the Project site. In the context of Impact 4.4-4 (page 4.4-36 et seq.), the 2012 EIR concluded that the proposed reclamation activities, including creek restoration activities within the PCRA, would have less-than-significant impacts on CRLF, based on surveys showing that no frogs had been found within the 2012 Project area. Since the 2012 EIR, additional habitat assessments, surveys, and monitoring for CRLF during Lehigh's activities have provided additional information regarding the CRLF population currently found in and downstream of the PCRP area. This information is summarized in the Low-Effect HCP (LEHCP)

for ongoing routine operation and maintenance of existing facilities and associated Biological Opinion (USFWS 2022b). Specifically, CRLF were previously identified in Ponds 9, 14, 21, and 22 (see Figure 2-2), and downstream of the 2012 disturbance area, but the PCRA boundary extends farther downstream (Figure 2-3) and the Project would impact aquatic habitat for CRLF in Ponds 9 and 13.[3]

The new and expanded restoration area would require vegetation removal and grading in occupied CRLF habitat, temporarily affecting aquatic and upland habitat, as well as permanent removal of suitable aquatic habitat at Pond 13 (Appendix E1). To address this potential new significant impact of the PCRP, a new mitigation measure is identified below (Mitigation Measure 3.2-1, *California Red-legged Frog*). The implementation of Mitigation Measure 3.2-1 would ensure Lehigh obtains coverage for take of CRLF incidental to Project implementation and that appropriate impact avoidance and minimization measures are implemented. In addition, as described in the LEHCP, implementation of the PCRP would restore and enhance more CRLF habitat than was proposed in the 2012 EIR and would more than double the amount of suitable habitat for this species in the affected area, ultimately providing a beneficial effect to this species. Thus, with the implementation of Mitigation Measure 3.2-1 below, based on the Biological Opinion (USFWS 2022b), the impacts of the PCRP on CRLF and its habitat would remain less than significant.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:**

**Mitigation Measure 3.2-1, California Red-legged Frog**. The Applicant shall obtain authorization for incidental take of CRLF through consultation under Section 7 of the federal Endangered Species Act between USACE and USFWS. All requirements imposed by USACE and USFWS under Section 7 shall be fulfilled by the Applicant. The Applicant shall also implement avoidance and minimization measures consistent with the 2014 Programmatic Biological Opinion for CRLF (USFWS 2014), the 2022 Section 10(a)(1)(B) Incidental Take Permit for the Lehigh Southwest Cement Company's Permanente Site Operation and Maintenance Project (USFWS 2022b), or alternative Project-specific measures identified in the formal Section 7 consultation with USFWS. At a minimum, the following measures shall be implemented:

- Qualified biologists and monitors approved by USFWS shall be retained to ensure all required impact avoidance and minimization measures are properly implemented. Biologists and monitors shall have authority to stop work if environmental requirements are not being fulfilled and if a CRLF is determined to be in danger.

- Employee education training shall be conducted for on-site employees working on PCRP activities. Personnel shall be required to attend the presentation, which shall

[3] Input received from the USFWS regarding Lehigh's Updated 90% Design Memo notes CRLF breeding habitat in Pond 14 (USFWS 2022a); however, the Project would not affect Pond 14, as that off-channel feature is downstream from the PCRP boundary. See Appendix C, which explains that Pond 14 is not involved in the proposed restoration work.

describe CRLF characteristics and natural history; avoidance, minimization, and conservation measures; legal protection of CRLF; and other related issues.

- To the extent practicable, restoration activities in the Permanente Creek channel and suitable pond habitats shall be conducted between August 15 and October 15, to minimize potential impacts on CRLF tadpoles.

- Specific methodology for capture and relocation of CRLF found in PCRP work areas shall be developed and approved by USFWS before on-site PCRP activities begin. This methodology shall identify the on-site location(s) to which CRLF shall be relocated.

- Preconstruction surveys for CRLF shall be conducted by a USFWS-approved biologist/monitor within 24 hours before the start of initial PCRP ground disturbance. If any CRLF adults, subadults, juveniles, tadpoles, or eggs are observed and determined to be in potential danger, a USFWS-approved biologist shall remove them from the work area and relocate them in compliance with established USFWS-approved methodology.

- To the maximum extent practicable, PCRP activities in CRLF habitat shall not occur during rain events or within 24 hours following a rain event. A USFWS-approved biologist/monitor shall inspect work areas and all equipment/materials for the presence of CRLF before Project activities resume after rain events. Any CRLF found in the work area shall be avoided and allowed to leave on its own or relocated in compliance with established USFWS-approved methodology.

- Restoration activities within suitable aquatic habitat for CRLF shall be conducted under the supervision of a USFWS-approved biologist/monitor. Aquatic habitat shall be surveyed for CRLF at the beginning of each day and periodically throughout the workday. Any CRLF in the work area and determined to be in potential danger shall be relocated in compliance with established USFWS-approved methodology.

- Plastic monofilament netting, loosely woven netting, or other materials using fixed weaves, polypropylene, polymer, or other synthetic materials shall not be used during Project implementation.

- For on-site storage of pipes, conduits, and other materials that could provide shelter for CRLF, an open-top trailer shall be used to elevate the materials above ground.

- Trenches or pits 1 foot or deeper to be left unfilled for more than 48 hours shall be securely covered with boards or other materials to prevent CRLF from falling into them. If this is not possible, dirt or wooden ramps or other structures of suitable surface that provide adequate footing for CRLF shall be placed in the trench or pit to allow for their unaided escape. The trench, pit, or hole shall be inspected by a USFWS-approved biologist/monitor each workday morning prior to initiation of work and in the late afternoon no more than 1 hour after work has ceased to determine if any individuals have become trapped. If the ramps fail to allow the animal to escape, a USFWS-approved biologist shall remove the CRLF and transport it to a safe location in compliance with established capture and relocation methodology.

- A USFWS-approved biologist shall remove aquatic exotic wildlife species such as bullfrogs and crayfish (if any) during PCRP activities.

With the implementation of Mitigation Measure 3.2-1, the Project's impacts on CRLF would be reduced to a less-than-significant level.

### Aquatic Life

This impact analysis corresponds to significance criterion a) as set forth in Section 3.2.2 and addresses impacts on sensitive aquatic species. In the context of Impact 4.4-5 (page 4.4-37 et seq.), the 2012 EIR concluded that the proposed reclamation activities including excavation, grading, and boulder removal could result in exposing limestone from which selenium could leach into Permanente Creek. Selenium is a bioaccumulative pollutant that causes deformities in larval and juvenile fish and bird species which feed on them. The amount and extent of leaching was impossible to determine because it depended on the amount of limestone exposed, the amount of selenium present, and the amount of precipitation and other environmental conditions which promote leaching.

The potential for selenium toxicity was reduced by application of Mitigation Measure 4.4-5, *Selenium-related Impacts on Aquatic Habitat*, which applied stormwater control and monitoring to minimize runoff; however, because the potential for selenium-contaminated runoff could not be eliminated, the 2012 EIR determined this impact to be significant and unavoidable for the duration of Project implementation. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion a) with respect to aquatic organisms. The new restoration area is now subject to the facility-wide Individual National Pollutant Discharge Elimination System (NPDES) permit, Operations & Maintenance Plan, and Stormwater Pollution Prevention Plan (SWPPP), which implement safeguards to reduce contaminants in stormwater runoff from the newly constructed slopes and operate to reduce the risk identified in the 2012 Reclamation Plan Amendment. Further, recent analysis suggests that creek restoration excavation activity is unlikely to result in selenium mobilization in exceedance of RWQCB water quality standards (Golder 2022). Thus, the continuing potential for selenium reaching Permanente Creek in runoff is considered a less-than-significant impact with the implementation of Mitigation Measure 4.4-5 from the 2012 EIR.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.4-5, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

### Nesting Birds

This impact analysis corresponds to significance criterion a) as set forth in Section 3.2.2 and addresses impacts on nesting birds. In the context of Impact 4.4-1 (page 4.4-32 et seq.), the 2012 EIR concluded that the proposed reclamation activities, including creek restoration activities proposed within the PCRA, would result in a less-than-significant impact with respect to nesting

migratory birds with application of APMs BIO-1 (Special Status Avian Species, Non-breeding Season) and BIO-2 (Special Status Avian Species, Breeding Season Surveys). For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion a) with respect to nesting birds. The new restoration area would similarly require removal of trees, shrubs, and other vegetation capable of supporting nesting birds (as analyzed in the 2012 EIR). Pursuant to APM BIO-1 in Section 2.5.9 of Chapter 2, Lehigh would conduct vegetation removal outside the nesting season if possible. If vegetation removal is conducted during the nesting season, Lehigh would provide for preconstruction nesting surveys by a qualified biologist, avoidance of active nests with a suitable buffer identified by a qualified biologist, and monitoring by a qualified biologist to modify buffers if nesting birds appear distressed by Project activities. Nest buffers would be maintained until young have fledged or the nest is abandoned. These measures would ensure that Project impacts on nesting birds would be less than significant.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

### Bats

This impact analysis corresponds to significance criterion a) as set forth in Section 3.2.2 and addresses impacts on special-status bat species. In the context of Impact 4.4-2 (page 4.4-34 et seq.), the 2012 EIR concluded that the proposed reclamation activities, including creek restoration activities proposed within the PCRA, would reduce impacts with respect to roosting bats with application of APMs BIO-3 (Roosting Bats, Non-roosting Season), BIO-4 (Roosting Bats, Non-hibernation and Non-maternity Seasons), and BIO-5 (Roosting Bats, Maternity Roosting Season). In addition to these APMs, to result in a less-than-significant impact, Mitigation Measures 4.4-2a, Use of Buffers Near Active Roosts; 4.4-2b, Roosting Bats, Maternity Roosting Season; and 4.4-2c, Bat Roost Replacement were applied. Each of these measures shall be implemented as part of the baseline condition for the PCRP. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion a) with respect to roosting bats. The new restoration area would require removal of additional mature trees, some of which may be capable of supporting roosting bats, while the 2012 restoration area required removal of trees and of structures capable of supporting roosting bats; these impacts are potentially significant, but, as in the 2012 EIR, impacts on roosting bats would be reduced to a less-than-significant level by the implementation of APMs BIO-3, BIO-4, and BIO-5 in Section 2.5.9 of Chapter 2, *Project Description*, and by the implementation of Mitigation Measures 4.4-2a, 4.4-2b, and 4,4-2c from the 2012 EIR.

**Baseline Mitigation from 2012 EIR:** Mitigation Measures 4.4-2a and 4.4-2c. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*. Mitigation Measure 4.4-2b from the 2012 EIR also would contribute to a conclusion of less-than-significant impacts on roosting bats, but for purposes of this SEIR has been replaced by Mitigation Measure 3.2-2, *Roosting Bats, Maternity Roosting Season*. Mitigation Measure 3.2-2

reflects revisions made to the 2012 EIR's Mitigation Measure 4.4-2b to address input received from CDFW and USFWS in the context of this SEIR.

**Additional Mitigation:**

**Mitigation Measure 3.2-2: Roosting Bats, Maternity Roosting Season.** Nighttime evening emergence surveys, acoustic surveys, inspection for guano and culled insect parts, and/or visual inspection for roosts within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts in and within 100 feet of Project work areas. All active roosts identified during surveys shall be protected by a buffer to be determined by a qualified bat biologist in consultation with CDFW. The buffer shall be determined by the type of bat observed, topography, slope, aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance, etc. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date, surveys shall be repeated.

Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season.

### San Francisco Dusky-footed Woodrat

This impact analysis corresponds to significance criterion a) as set forth in Section 3.2.2 and addresses impacts on San Francisco dusky-footed woodrat, a special-status species. In the context of Impact 4.4-3 (page 4.4-36), the 2012 EIR concluded that the proposed reclamation activities, including creek restoration activities within the PCRA, had potential to disturb woodrat nests, but would result in a less-than-significant impact with respect to San Francisco dusky-footed woodrat with application of APM BIO-6, San Francisco Dusky-footed Woodrat. APM BIO-6 as set forth in Section 2.5.9.2 in Chapter 2, *Project Description*, is substantively similar to APM-BIO-6 from the 2012 EIR. For purposes of the PCRP, APM-BIO-6 requires surveys in all suitable habitat, avoidance of active woodrat stick nests where feasible, and dismantling and reconstructing any active woodrat stick nests where complete avoidance is infeasible. If young are found, the nests shall be reconstructed and left undisturbed until the young are independent. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion a) with respect to dusky-footed woodrat. The new, expanded restoration area similarly would require vegetation removal, grading, or other ground disturbance in wooded or scrub habitats where this species is known to nest, which has the potential to injure or disturb nesting woodrats. Impacts on dusky-footed woodrat would remain less than significant by application of APM BIO-6 in all suitable habitat where nesting woodrats may be found.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

**Impact 3.2-2: The Project may have a substantial adverse effect on riparian habitat or other sensitive natural community.**

This impact analysis corresponds to significance criterion b) as set forth in Section 3.2.2 and addresses riparian and other sensitive natural communities. In the context of Impact 4.4-6 (page 4.4-38 et seq.), the 2012 EIR concluded that boulder removal, vegetation removal, pipe installation, and soil treatment would temporarily disrupt riparian vegetation communities along Permanente Creek. This effect was considered less-than-significant because riparian tree removal was not expected, the disturbed area would be revegetated, and the long-term impact of the Project would be beneficial through creation of additional riparian habitat. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion b). The PCRP would similarly cause a temporary loss of riparian vegetation during ground disturbance activities associated with habitat restoration, such as from vegetation removal and grading; grading limits cover 13.4 acres for Reaches 8–13 and 7.72 acres for Reaches 17 and 18, including both riparian and upland areas. While individual trees would be removed, over the long term, the acreage of riparian community along Permanente Creek would increase as a result of Project implementation because the Project would improve riparian habitat conditions by connecting existing patchy riparian vegetation at the Project site into a more continuous corridor along the creek, which would be seeded with native species, improving habitat quality for wildlife (Appendix G1). Thus, the impact would remain less than significant with no mitigation required.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.2-3: The Project may have a substantial adverse effect on state or federally protected wetlands.**

This impact analysis corresponds to significance criterion c) as set forth in Section 3.2.2 and addresses wetlands. In the context of Impact 4.4-8 (page 4.4-41 et seq.), the 2012 EIR concluded that the proposed creek restoration activities within the PCRA, including ground disturbance and revegetation adjacent to wetlands along the creek, could increase erosion into wetlands and waters. To reduce this impact to a less-than-significant level, the 2012 EIR identified Mitigation Measure 4.4-8a, Wetland Identification and Avoidance, and Mitigation Measure 4.4-8b, Wetland Monitoring Plan. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion c). The new restoration area would similarly have potential to impact wetlands and waters of Permanente Creek. The area of impact may be larger, as the PCRP implementation area extends farther downstream along Permanente Creek than the PCRA. The impacts on wetlands and waters along the creek would be temporary during construction; ultimately, restoration would improve conditions along the creek and allow for the creation of natural wetlands (see Appendices G1 and G3). As part of the baseline condition, the implementation of Mitigation Measure 4.4-8a would continue to require an updated wetland

delineation and permitting, which would avoid jurisdictional wetlands and waters when possible, while Mitigation Measure 4.4-8b would require monitoring and mitigation in accordance with permits, for areas where impacts could not be avoided. With the ongoing implementation of these measures, impacts on wetlands and waters of the PCRP would be less than significant.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measures 4.4-8a and 4.4-8b. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.2-4: The Project may have a substantial adverse effect on oak woodland habitat.**

This impact analysis corresponds to significance criterion d) as set forth in Section 3.2.2 and addresses oak woodlands. In the context of Impact 4.4-7 (page 4.4-39 et seq.), the 2012 EIR concluded that ground disturbance, equipment use, and other reclamation activities within the PCRA could impact oak woodland habitat, and that this would result in a less-than-significant impact after replanting. Additional oak woodland habitat would be removed to implement the PCRP outside the existing Reclamation Plan boundary; however, the oak woodland habitat would be replanted and so the conclusion is the same as was reached in the 2012 EIR: less than significant after replanting. The 2012 EIR also noted that oak woodlands could be indirectly impacted by introduction of pathogens such as Sudden Oak Death (*Phytophthora ramorum*). To ensure that this impact would remain less than significant, the 2012 EIR required the implementation of Mitigation Measure 4.4-7, Sudden Oak Death Minimization Measures. With the continued implementation of the mitigation measure identified in the 2012 EIR and APM BIO-7 identified in Section 2.5.9.2 of Chapter 2, *Project Description*, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion d). The new restoration area similarly would temporarily impact oak woodland habitat during restoration activities, and have potential to spread pathogens from human and vehicle traffic during construction. With implementation of the APM and mitigation measures, impacts on oak woodlands would be less than significant.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.4-7, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

**Impact 3.2-5: The Project may conflict with the provisions of an adopted habitat conservation plan.**

As discussed in the 2012 EIR (page 4.4-32) the Project site is not within the boundaries of the Santa Clara Valley Habitat Conservation Plan. The Lehigh Permanente Site Operation and Maintenance Habitat Conservation Plan (LEHCP) was adopted in 2022 and includes portions of PCRP Reaches 8–12. The LEHCP provides measures for avoiding, monitoring, minimizing, and mitigating adverse effects on the CRLF from activities including stormwater capture/

sedimentation basin operation and maintenance, erosion control, material transport, vehicle and equipment operation, and road and vegetation maintenance. Monarch butterfly host plant and nectar plant surveys are also required. The LEHCP provides measures for the protection of CRLF, including relocation, in coordination with USFWS, to suitable on-site habitat outside the work area. The PCRP would adhere to all provisions of the LEHCP; thus, there would be no conflict with habitat conservation plan provisions, and no impact under this criterion. Accordingly, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR regarding conflict with the provisions of an adopted habitat conservation plan.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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## 3.2.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.4, *Biological Resources* (page 6-17 et seq.), concluding that the Reclamation Plan Amendment, including creek restoration within the PCRA, would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context than was disclosed in the 2012 EIR.

With the implementation of the APMs and mitigation measures identified in this SEIR and the 2012 EIR (which would be independently enforceable obligations of the 2012 approvals and any future Project approvals), short-term and long-term impacts of the PCRP on biological resources would be less than significant or beneficial. Once reclamation is completed, woodland, grassland, and riparian areas would be increased in size, and aquatic habitat conditions would be improved as a result of the restoration of Permanente Creek, which would improve habitat for special-status species temporarily impacted by the Project.

The federal threatened CRLF is present within the new and expanded restoration area, and vegetation removal and grading would temporarily impact aquatic and upland habitat, and permanently remove suitable aquatic habitat at Pond 13. This represents a minor change in the impact analyzed in the cumulative context in the 2012 EIR. However, the implementation of new Mitigation Measure 3.2-1 would require Lehigh to obtain incidental take coverage for this species, while implementing conservation and avoidance measures for its protection. Given these measures and given the expansion of restored habitats that would support CRLF compared with the prior analysis, cumulative impacts on CRLF would remain less than significant. Following implementation of the Project, habitat restoration in the PCRP area would have beneficial effects for this species.

The cumulative projects listed for this SEIR (Table 3.0-2) include transportation demand management from the Midpeninsula Open Space District; this group of projects is projected but does not have a start date. Four additional projects in Mountain View include two trail

enhancements and a new bridge on Permanente Creek, and a baseball park/stormwater detention basin. These projects have the potential to contribute to cumulative impacts on CRLF, nesting birds, roosting bats, San Francisco dusky-footed woodrat, and aquatic organisms during Project construction/active restoration. As indicated in Section 3.2.3.1, *Methodology*, requisite compliance with applicable federal, state, and local laws and regulations would be mandatory for projects included in the cumulative scenario, and the application of associated protective measures (such as BMPs, monitoring and reporting plans, and the application of corrective actions) would be non-discretionary and shown to minimize and/or avoid significant impacts on biological resources. Further, as noted in the 2012 EIR Section 4.41.7 (pages 4.4-17 through -26), federal and state regulatory agencies with technical jurisdiction and authority for oversight of biological resources, such as the USACE for jurisdictional wetlands and waters and the USFWS for threatened and endangered species, would require adherence to regulatory requirements as a condition of their approval for the cumulative projects. In this regulatory environment, no significant cumulative effect is anticipated, and the PCRP's incremental impacts on affected resources would cause **no new significant impact** and **no more significant impact** in the cumulative environment than was disclosed in the 2012 EIR.

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## 3.2.5 References

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Golder. 2022. Water Quality Evaluation, Permanente Creek Restoration Project, Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. Permanente Quarry, Cupertino, CA. August 26.

U.S. Fish and Wildlife Service (USFWS), 2014. Programmatic Biological Opinion for Issuance of Permits under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, including Authorizations under the 22 Nationwide Permits for Projects that May Affect the Threatened California Red-Legged Frog in Nine San Francisco Bay Area Counties, California (Service file number 0SESMF00-2014-F-0389).

USFWS, 2022a. Email from Joseph D. Terry to Pat Angell, consultant to the County Planning Department regarding Lehigh Permanente Quarry - Revised Plans for Permanente Creek Restoration Project. November 15, 2022.

USFWS, 2022b. Formal Consultation on the Issuance of a Section 10(a)(1)(B) Incidental Take Permit for the Lehigh Southwest Cement Company's Permanente Site Operation and Maintenance Project Low-Effect Habitat Conservation Plan, Santa Clara County, California. Sacramento Fish and Wildlife Office, Sacramento, CA.

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# 3.3 Cultural Resources

This section evaluates cultural resources issues to determine whether the Permanente Creek Restoration Plan (PCRP), including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR.

To do this, as explained in Section 2.3, *Focus of the Supplemental EIR*, and as summarized in Table 2-4, *Specific Areas of Focus for the Supplemental EIR*, this analysis focuses on PCRP areas in two locations: (1) outside of the existing Reclamation Plan boundary (for which Grading Approval would be required); and (2) within the Reclamation Plan boundary and the 120.2-acre Permanente Creek Restoration Area (PCRA), but outside of the PCRA's 49.2-acre disturbance area. In addition, more generally, the analysis evaluates whether the PCRP proposes work at greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. This analysis is based in part on information contained in the *Cultural Resources Inventory and Evaluation Report for the Permanente Creek Restoration Project* (GEI Consultants, Inc. and AECOM 2016) on Lehigh's behalf. Unauthorized public disclosure of this report could result in a significant invasion of privacy, damage to a historic property, or impede the use of a traditional religious site by practitioners. County staff members and preparers of this Draft SEIR who have the appropriate credentials to review the report have done so and have independently determined that it is suitable to be relied upon, in combination with other materials included in the formal record, in the preparation of this Draft SEIR.

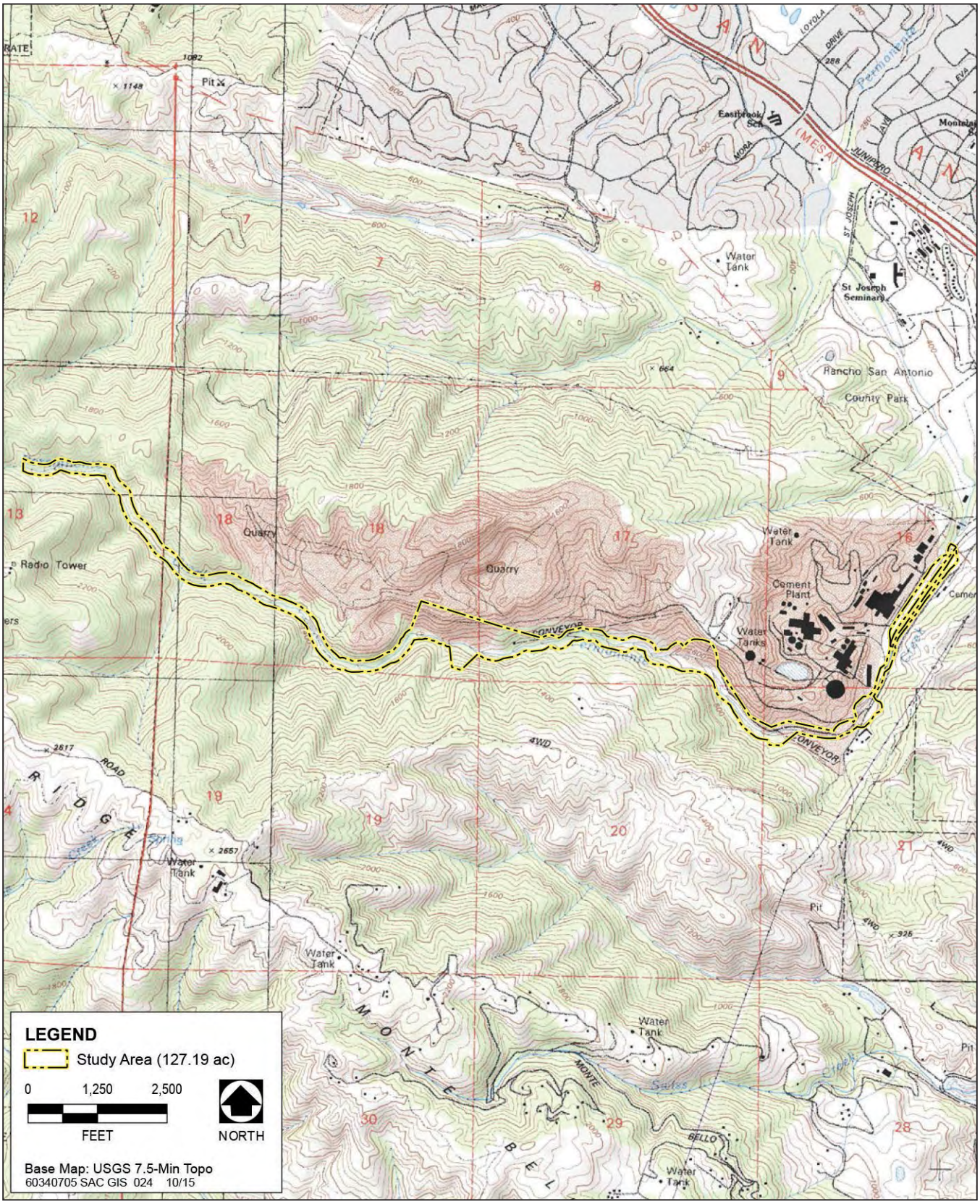
The County received scoping comments regarding cultural resources from the Native American Heritage Commission (Letter B), the Midpeninsula Regional Open Space District (Letter F), and a private citizen (Letter E). A copy of each letter is provided in **Appendix A**, *Scoping Report*. These comments are addressed in the following analysis.

## 3.3.1 Setting

### 3.3.1.1 Study Area

The study area for this analysis of potential impacts on cultural resources includes the 127.19-acre area outlined with a dashed yellow line on **Figure 3.3-1**, *Study Area*.

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, which correlates the restoration activities described and analyzed in the 2012 EIR with those described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.




SOURCE: AECOM, 2016

Permanente Creek Restoration Plan Supplemental Environmental Impact Report

**Figure 3.3-1**
Study Area

ESA

### 3.3.1.2 Environmental Setting

Section 4.5.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of cultural resources: the prehistoric setting (page 4.5-3 et seq.), ethnographic setting (page 4.5-4), and historic setting (page 4.5-4 et seq.). A summary of research was also provided (page 4.5-12 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP, except as supplemented below.

In May 2015, AECOM cultural resources specialists conducted a records search at the California Historical Resources Information System's Northwest Information Center in Rohnert Park. The records search included the entire study area and a 0.5-mile-wide buffer around the outside boundary of the study area. The materials reviewed included Northwest Information Center base maps indicating previous investigations and previously reported cultural resources; historic maps and literature pertaining to Santa Clara County; and national and state cultural resource inventories.

The records search identified six cultural resources within the study area, all of which date to the historic era and are related to either agriculture or the Kaiser Permanente Quarry (now known as the Permanente Quarry); no prehistoric archaeological resources have been identified in the study area. AECOM conducted a cultural resources pedestrian survey of the study area on May 10–12, 2015. Survey transects were spaced 15–50 feet apart, depending on terrain. Much of the study area could not be surveyed because detritus on steep slopes made conditions too dangerous for prolonged walking, although all exposed bedrock was inspected. Visibility in surveyed areas varied greatly; some areas had excellent visibility while vegetation or quarry debris effectively obscured the entire surface in other areas. Overall visibility was fair to good, with surface visibility of approximately 40–50 percent.

#### *Archaeological Resources*

The records search identified one previously recorded historic-era archaeological resource in the study area, Henry J. Kaiser's Cabin and Accessory Structure (P-43-0001869). The pedestrian survey did not identify any prehistoric archaeological resources or any new historic-era archaeological resources.

##### Kaiser's Cabin and Accessory Structure (P-43-001869)

This archaeological resource consists of Kaiser's Cabin and Accessory Structure. The structure may have been built as early as the 1860s, but the build date is not definitely known. Henry J. Kaiser rebuilt the structure in 1939 and it was used as a speakeasy during the Prohibition era. The structure is dilapidated and overgrown with vegetation. The resource was first recorded by Jurich and Grady (2007) and subsequently updated by Maggi et al. (2011).

Maggi et al. (2011) performed additional archival research; they did not revisit all of the site's associated structures, but they confirmed Jurich and Grady's description of the resource as being in an advanced state of dilapidation. The resource was revisited in May 2015 during the AECOM investigation (AECOM 2016) and found to be in the same condition as described in the first two visits. Only the walls of Kaiser's Cabin and a chimney are left standing and a great amount of

debris is present within the walls, mostly wooden planks. The two outbuildings are likewise dilapidated. No evidence of a subsurface deposit (e.g., outhouse, privy pit) was noted, but visibility in the area was extremely poor because of vegetation and cabin debris.

P-43-0001869 has not been formally evaluated for being eligible for listing in the National Register of Historic Places (National Register) or the California Register of Historical Resources (California Register); however, Jurich and Grady (2007) state that if it were evaluated, the site would likely be found eligible under Criterion B/2 for its association with Henry J. Kaiser. For purposes of this analysis, the resource is considered eligible for listing in the National Register and California Register.

## *Built-Environment Resources*

Six historic-age built-environment resources are located in the study area. These resources consist of the Kaiser Permanente Quarry Mining District and five contributing resources: the Permanente Quarry Conveyor System, Permanente Road, the railroad segment, the railroad maintenance shed building, and the Permanente Creek Bridge. These resources are discussed below.

### Kaiser Permanente Quarry Mining District (P-43-001867)

The Kaiser Permanente Quarry Mining District contains seven contributing buildings and structures, rural landscape features, a historic-era archaeological site (Henry J. Kaiser's Cabin and Accessory Structure [P-43-001869]), and one noncontributing structure, the Permanente Quarry Pump House. The contributing built-environment resources identified as part of previous cultural resources studies were the quarry's main pit, a storage area, a cement plant, a crusher, the quarry conveyor system, Permanente Road, and a railroad segment. Also included as rural landscape features were the foothills along Permanente Creek, and intact vegetation communities such as oak woodland, oak savanna, woodland/chaparral, and chaparral.

Three previously identified contributing built-environment resources are present within the study area. Two additional contributing resources, a railroad maintenance shed and a bridge, were identified within the study area during AECOM's May 2015 survey. Below is a discussion of their current conditions and recommended contribution to the eligibility of the Kaiser Permanente Quarry Mining District.

#### Permanente Quarry Conveyor System (P-43-002690) and Crusher—Contributor

The Permanente Quarry Conveyor System extends for approximately 2 miles and has a 48-inch belt on the conveyor. Other parts of this system include the remnants of a 1940s-era crusher near Permanente Creek and a 560-foot-long tunnel. The conveyor system is mostly elevated and is approximately 30 feet high in some areas.

Construction of the Permanente Quarry Conveyor System began in 1939. By 1943, the conveyor system had been expanded westward through a 560-foot tunnel to the southwest, originating from a crusher near Permanente Creek near the Lower Quarry. The conveyor system branched out northward from this location and ultimately extended for 2 miles. The 48-inch belt on the conveyor system initially was claimed to be capable of moving 1,000 tons of material in an hour.

It was an important part of the quarry operations and was used as an efficient way to transport material.

The remnant of the crusher near Permanente Creek is located near what was once the Lower Quarry. The crusher was located at the upper terminus of the conveyor belt. Limestone rock was crushed here before traveling on the conveyor belt to the processing plant. The conveyor branched out northward from this location to two other crushers, between the two quarry locations, and ultimately extended for 2 miles. The upper terminus and crusher located near Permanente Creek remain today in ruins, with only some structural members remaining. A new larger crusher has been installed east of this terminus.

As part of this Project, AECOM revisited portions of the conveyor system within the study area to assess their condition. No changes were noted and the system continues to appear to contribute to the Kaiser Permanente Quarry Mining District.

### Permanente Road (P-43-001868)—Contributor

Permanente Road starts within the quarry, extends down to and across Permanente Creek to the south, and continues alongside the creek. Sections of the road have been widened and regraded in some areas. The road varies in width, but generally is approximately 8 feet wide.

Permanente Road was constructed in the 1890s as a wagon road. The road was used as part of mining operations in the quarry and to access Kaiser's cabin. As part of this Project, AECOM revisited portions of the road within the study area to assess its condition. No changes were noted. Permanente Road continues to appear to contribute to the Kaiser Permanente Quarry Mining District.

### Permanente Railroad Segment (CA-SCL-892H [P-43-001833])—Contributor

The railroad segment is approximately 0.5 mile long and consists of two steel tracks with wood ties. Several sections of track are missing ties and have been overgrown by vegetation. The line travels in a northeast-southwest direction. The segment within the study area begins just east of the Permanente Creek Bridge and terminates at the railroad maintenance shed.

The Permanente Railroad was built circa 1940 and consisted of a network of 10 tracks inside what was then known as the Kaiser Permanente Cement Plant. As part of this Project, AECOM revisited portions of the railroad within the study area to assess its condition. No changes were noted. The railroad segment continues to appear to contribute to the Kaiser Permanente Quarry Mining District.

### Permanente Railroad Maintenance Shed—Contributor

Associated with the railroad segment is a maintenance shed. This is a wood-frame building with a rectangular plan, a concrete slab foundation, and a front gable roof. The building is entirely sheathed in corrugated metal siding. It is open on its east elevation with a smaller opening on its west elevation. Railroad tracks lead into the building and there is a large concrete-lined trench in the center of the foundation. Surrounding the building are mature trees, shrubs, and gravel roads.

As part of their analysis, Maggi et al. (2011) identified the shed building, but they did not describe the building in detail, nor did they discuss it as part of the evaluation of the railroad. AECOM (2016) reassessed the resource for this Project. The shed was constructed circa 1948 during the post–World War II boom, a time of peak performance for the quarry. The shed building was constructed out of necessity to service the plant's two locomotives; it contributes to the significance of the Kaiser Permanente Quarry Mining District under National Register/California Register Criterion A/1 because the maintenance shed played an important role in the operation of the railroad system used by the quarry. Material from the quarry was transported by the plant's locomotives and transferred to the Southern Pacific Railroad tracks just outside the quarry facility. The materials were then distributed to various destinations. The maintenance shed was used to keep the quarry's locomotives in working condition, thereby contributing to the significance of the railroad and the Kaiser Permanente Quarry Mining District.

#### Permanente Creek Bridge—Contributor

The Permanente Creek Bridge is a steel and concrete bridge that carries the two-lane Permanente Road over Permanente Creek. The bridge is approximately 200 feet long and 25 feet wide and features curved closed concrete railings. A date stamp reading "1941" is located on the north railing's northeast corner.

This bridge appears to contribute to the Kaiser Permanente Quarry Mining District. According to historic maps, no road existed in this area before 1941, the date of the bridge's date stamp. The Permanente Creek Bridge was likely constructed during this period of the quarry's expansion. As quarry operations increased during World War II, it became increasingly imperative to build a reliable road to access the facility. That also required a bridge to cross Permanente Creek. The bridge served a functional yet important purpose to the daily operations of the quarry facility.

### District Evaluation

The Kaiser Permanente Quarry was constructed between 1939 and 1967. The Kaiser Permanente Quarry Mining District was evaluated in 2007 by Jurich and Grady and recommended as eligible for the National Register under Criterion A for its association with the development of Shasta Dam and the rebuilding of Pearl Harbor during World War II, and under Criterion B for its association with Henry J. Kaiser. Its period of significance extends from 1939, the beginning of the quarry operations, to 1969, the year when Kaiser died.

Maggi et al. (2011) revisited the Kaiser Permanente Quarry Mining District and reassessed the site for National Register/California Register eligibility as part of the Permanente Quarry Facility Comprehensive Reclamation Plan Project. They recommended the district as eligible under National Register/California Register Criterion A/1, as representing an important local development pattern that significantly reflects how the contemporary industrial base of the County of Santa Clara and California evolved from the end of the Great Depression through the periods during and after World War II.

In addition, Maggi et al. (2011) recommended that the Kaiser Permanente Quarry Mining District appears eligible under National Register/California Register Criterion C/3, because it represents a distinctive creative act in the field of engineering. As part of that evaluation, the district's

boundary was modified to include the railroad line and its associated shed, the hillside above the easterly terminus of the conveyor system and powerhouse, and the greater area of the cabin, which includes the road, the Lower Quarry, and the crusher and historic landscape features. The boundary change includes portions of the study area for this Project. The areas surveyed by AECOM in 2015 for this Project remain unchanged, and the eligibility recommendations made by Jurich and Grady (2007) and Maggi et al. (2011) for the District remain valid.

#### 3.3.1.3 Regulatory Setting

Section 4.5.1.6 of the Draft 2012 EIR (page 4.5-19 et seq.) described the regulatory setting for the analysis of potential impacts on cultural resources. The regulatory setting discussed federal, state, and local laws, regulations, plans, and policies applicable to the analysis of the proposed creek restoration and other Project components considered in the 2012 EIR. The section summarized provisions related to the National Register; the California Office of Historic Preservation, California Register, and CEQA (specifically regarding historical resources); and the County's Historic Preservation Ordinance. These descriptions remain accurate for purposes of this analysis of the PCRP.

### 3.3.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.5 of the 2012 EIR determined that the proposed 2012 Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

(a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines, or the County's Historic Preservation Ordinance (Section 17 of the County Ordinance Code)—i.e., relocation, alterations, or demolition of historical resources;

(b) Cause a substantial adverse change in the significance of an archaeological resource as defined in Section 15064.5 of the CEQA Guidelines;

(c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature (now addressed in Section 3.5, *Geology and Soils*);

(d) Disturb any human remains, including those interred outside of formal cemeteries; or

(e) If within the New Almaden Historic area, conflict with Santa Clara County General Plan policies of this designated special policy area.

### 3.3.3 Direct and Indirect Effects

#### 3.3.3.1 Methodology

Based on independent review of the technical reports noted above and included in the County's formal record for this Project, the preparers of this SEIR evaluated activities proposed as part of the PCRP to determine whether related impacts would cause any new significant impact or any

substantial increase in the severity of a significant impact on cultural resources relative to the impacts disclosed in the 2012 EIR.

### 3.3.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed to exist. Therefore, the baseline used here to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein.

Thus, for purposes of this analysis of potential impacts on cultural resources, the baseline includes removal of the Permanente Quarry Conveyor System, including the related tunnel, and partial removal of remnants of the 1940s-era crusher (the "old crusher foundation") as part of the 2012 Reclamation Plan Amendment. These actions were analyzed and found to result in a significant and unavoidable impact on historical resources (Impact 4.5-1, 2012 EIR). Three mitigation measures address this impact:

- Mitigation Measure 4.5-1a: Documentation
- Mitigation Measure 4.5-1b: Salvage and Relocation
- Mitigation Measure 4.5-1c: Public Education and Interpretation

These mitigation measures would be implemented as part of the baseline condition for the PCRP because they are independently enforceable obligations of the 2012 approvals.

### 3.3.3.3 Discussion of Criteria with No Cultural Resources Impact

Criterion (e) as set forth in Section 3.3.2 was eliminated from more detailed consideration in the 2012 EIR for the reasons explained on Draft 2012 EIR page 4.5-24. For the reasons explained there, this criterion also would not be affected by the PCRP and is not considered in this SEIR.

### 3.3.3.4 Direct and Indirect Effects of the Project

The following analysis evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to the baseline condition; compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration; and then determines whether implementing the PCRP would cause one or more new significant impacts or a substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR. For the reasons discussed below, implementing the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact relative to the impacts disclosed in the 2012 EIR.

**Impact 3.3-1: Project activities could cause an adverse change in the significance of a historical resource pursuant to Section 15064.5 of the CEQA Guidelines and the County's Historic Preservation Ordinance.**

Five contributing built-environment resources—the Permanente Quarry Conveyor System, Permanente Road, the Permanente Railroad segment, the Permanente Railroad maintenance shed, and the Permanente Creek Bridge—are a part of the Kaiser Permanente Quarry Mining District located within the study area. No stream restoration work for the Project would affect the Permanente Railroad segment, the Permanente Railroad maintenance shed, or the Permanente Creek Bridge. These resources would remain and would continue to display their character-defining features and historical significance.

Portions of the Permanente Quarry Conveyor System include foundations associated with a 1940s-era rock crusher that would be partially removed per the Amended Consent Decree as part of the Project. The removal of these features was analyzed as part of the 2012 EIR, which identified a significant and unavoidable impact on historical resources. Thus, the removal of these features (which has been carried forward as part of the PCRP) would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR with respect to these resources or the Kaiser Permanente Quarry Mining District.

Removing rock material would reduce the width of Permanente Road within Reaches 8–12. However, the road's character-defining features, including the gravel and dirt, and its circulation pattern would not be altered. The road would retain integrity of location, setting, feeling, and association. Its integrity of design, material, and workmanship would be slightly altered, but it would retain sufficient integrity to convey its significance as a contributor to the Kaiser Permanente Quarry Mining District. The district as a whole also would retain integrity, and the proposed stream restoration would not affect most of its contributing features, including the main pit, storage area, cement plant, conveyor system, quarry, and railroad, and the remains of Kaiser's cabin. The Kaiser Permanente Quarry Mining District would retain sufficient contributors to communicate its significance as an industrial base (National Register/California Register Criterion A/1), for its association with Kaiser (National Register/California Register Criterion B/2), and as an engineering accomplishment (National Register/California Register Criterion C/3). Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR with respect to changes in the width of Permanente Road.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.5-1a, Mitigation Measure 4.5-1b, and Mitigation Measure 4.5-1c. The full text of each measure is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.3-2: Project activities could cause an adverse change in the significance of an archaeological resource as defined in Section 15064.5 of the CEQA Guidelines.**

Site P-43-0001869 has not been formally evaluated as eligible for listing in the National Register or California Register, although Jurich and Grady (2007) state that if evaluated, the site would likely be found eligible under Criterion B/2 for its association with Henry J. Kaiser. For purposes of this analysis, the resource is considered eligible for listing in the National Register and California Register. The resource is located in a portion of the study area where little ground disturbance would occur; contractors would enter the area on foot and manually remove vegetation and replant native species. No impact on the resource would occur; therefore, implementation of the Project would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR related to the eligibility of Site P-43-0001869 for listing in the National Register and California Register.

No additional historic-era or prehistoric archaeological resources were identified in the study area during the 2015 survey or previous survey efforts. Although there is no indication that the study area contains unrecorded archaeological resources, the possibility of accidentally uncovering undocumented archaeological resources cannot be discounted entirely. Accidental damage to or destruction of a previously unrecorded and unique archaeological resource would be a potentially significant impact. In the unlikely event that archaeological materials are discovered during project activities, implementation of Mitigation Measure 4.5-2 from the 2012 EIR would ensure that work would cease in the immediate area and a qualified archaeologist would be hired to document the find, assess its significance, and recommend further treatment. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.5-2. The full text of this measure is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.3-3: Project activities could disturb human remains, including those interred outside of formal cemeteries.**

Although there is no indication that the study area has been used for human burials, the possibility cannot be discounted entirely. In the unlikely event that human remains are discovered during Project activities, implementation of Mitigation Measure 4.5-4 from the 2012 EIR would ensure that work would cease in the immediate area and the County Coroner would be contacted to assess the find. The measure would ensure that any discoveries would be handled in accordance with state law and would reduce the significance of this impact. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

**Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.5-4. The full text of this measure is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.

**Additional Mitigation:** None required.

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## 3.3.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.5, *Cultural and Paleontological Resources* (page 6-18 et seq.), concluding that the creek restoration work within the PCRA (as a component of the Reclamation Plan Amendment) "would have no impact to cultural resources" and therefore could not cause or contribute to any significant adverse cumulative effect. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context relative to the impacts disclosed in the 2012 EIR.

The 2012 EIR analyzed cumulative impacts on historic resources, including the loss of the Permanente Quarry Conveyor System and crusher, and concluded that its loss would not considerably contribute to a significant cumulative impact on Kaiser-associated resources in the Bay Area. The current Project would alter the width of Permanente Road, a contributing feature within the Kaiser Permanente Quarry Mining District. However, this alteration would not result in a cumulatively considerable contribution to a significant cumulative impact.

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## 3.3.5 Confidential References

GEI Consultants, Inc. and AECOM. 2016. *Cultural Resources Inventory and Evaluation Report for the Permanente Creek Restoration Project, Santa Clara County, California*. Prepared for Leigh Hanson. March 2016.

Jurich, D., and A. Grady. 2007. *Archaeological and Historic Properties Survey Report for the Hanson Permanente Cement Reclamation Plan*. Prepared by PBS&J. Prepared for the County of Santa Clara.

Maggi, F., S. Winder, and J. Kusz. 2011. *Historic Resource Evaluation, Permanente Quarry Facility Comprehensive Reclamation Plan Project, Lehigh Southwest Cement Company, 24001 Stevens Creek Blvd., Cupertino, Santa Clara County, California.* Prepared by Archives & Architecture. Prepared for County of Santa Clara.

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# 3.4 Energy

This section identifies and evaluates issues related to energy to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. To do this, as explained in Section ES.1, *Introduction*, and in Section 2.3, *Focus of the Supplemental EIR*, including as summarized in Table 2-1, *Specific Areas of Focus for the Supplemental EIR*, this analysis focuses on three things: (1) PCRP areas that are outside of the existing Reclamation Plan boundary (for which Grading Approval would be required); (2) PCRP areas within the Reclamation Plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP would include work at a greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section identifies and evaluates issues related to energy in the context of the Project. It includes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment. This analysis is based in part on the Air Quality and Greenhouse Gas Emissions Technical Report provided in **Appendix D**, *Air Quality and Greenhouse Gas Emissions.* The technical report provided in Appendix D was prepared on the County's behalf. No scoping comments were received regarding energy (**Appendix A**, *Scoping Report*).

## 3.4.1 Setting

### 3.4.1.1 Study Area

The study area for this analysis of potential impacts related to energy consists of Santa Clara County, as well as statewide.

### 3.4.1.2 Environmental Setting

Section 4.6.1.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of energy conservation, including information about energy production and distribution in California and local energy production and distribution (page 4.6-1 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below. However, the energy resources associated with the PCRP would be limited to construction and transportation fuels (i.e., diesel fuel and gasoline). Therefore, these specific energy resources are the focus of this analysis.

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a cross reference between the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.

### *California Fuel Use*

California's energy system includes electricity, natural gas, and petroleum. According to the California Energy Commission (CEC), California's energy system generated 72 percent of the electricity, 48 percent of the natural gas, and less than 1 percent of the petroleum consumed or used in the state in 2019. The rest of the state's energy is imported and includes petroleum crude oil imported from Alaska and foreign sources (CEC 2021a, 2021b). Construction of the Project would require the use of construction and transportation fuels in the form of gasoline and diesel.

#### Gasoline

Gasoline is by far the largest transportation fuel by volume used in California. Nearly all the gasoline used in California is obtained through the retail market. In 2020, approximately 12.5 billion gallons of gasoline were sold in California's retail market, which was a 19 percent drop compared to gallons sold in 2019 (CDTFA 2021a). The drop in 2020 gasoline sales could be related to reduced economic activity associated with the Covid-19 pandemic.

#### Diesel

Diesel fuel is the second largest transportation fuel by volume used in California behind gasoline. According to the U.S. Department of Energy's Energy Information Administration, nearly all semi-trucks, delivery vehicles, buses, trains, ships, boats and barges, farm, construction, and military vehicles and equipment have diesel engines. In 2020, 3.0 billion gallons of diesel were sold in California, which was a 3 percent drop compared to gallons sold in 2019 (CDTFA 2021b). The drop in 2020 diesel sales could be related to reduced economic activity associated with the Covid-19 pandemic.

### *Santa Clara County Fuel Use*

Regular unleaded gasoline is primarily used to fuel passenger cars and small trucks. Diesel fuel is primarily used in large trucks and construction equipment. Both are widely used within and across all parts of Santa Clara County. It is estimated that there were 397 fuel stations in Santa Clara County in 2020, which is a drop of seven fuel stations in the county relative to 2019 (CEC 2021d). The CEC estimates that in 2020 the total sales of gasoline and diesel in Santa Clara County were 511 million gallons and 71 million gallons, respectively. These gasoline and diesel fuel use amounts represent decreases of approximately 18 percent and 17 percent, respectively, relative to the estimated fuel use amounts for 2019 (CEC 2021d). Similar to as mentioned above for statewide fuel use, the countywide drop in 2020 fuel sales could be related to reduced economic activity associated with the Covid-19 pandemic.

## 3.4.1.3 Regulatory Setting

Section 4.6.1.2 of the Draft 2012 EIR (page 4.6-3 et seq.) described the regulatory setting for the analysis of potential impacts related to energy conservation, including federal, state, and local laws, regulations, plans, and policies applicable to the analysis of the proposed creek restoration; and other Project components that were considered in the 2012 EIR. The section summarized the federal Energy Policy and Conservation Act and the Energy Policy Act of 2005, as well as the State of California Integrated Energy Policy and the County of Santa Clara General Plan. The description

of the regulatory setting remains accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below.

## *Federal*

### National Energy Conservation Policy Act

The National Energy Conservation Policy Act (NECPA) serves as the underlying authority for federal energy management goals and requirements. Signed into law in 1978, it has been regularly updated and amended by subsequent laws and regulations. This act is the foundation of most federal energy requirements. NECPA established energy-efficiency standards for consumer projects and includes a residential program for low-income weatherization assistance, grants, and loan guarantees for energy conservation in schools and hospitals, and energy-efficiency standards for new construction. Furthermore, the NECPA established fuel economy standards for on-road motor vehicles in the United States. The National Highway Traffic and Safety Administration (NHTSA), which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and revising existing standards under the NECPA. The USDOT is authorized to assess penalties for noncompliance. This regulatory program has resulted in improved fuel economy throughout the United States' vehicle fleet (NHTSA 2014, 2018).

## *State*

### California Integrated Energy Policy

In 2002, the Legislature passed Senate Bill 1389, which required the CEC to develop an integrated energy plan every 2 years for electricity, natural gas, and transportation fuels, for the California Energy Policy Report. The plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for zero emissions vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The CEC has adopted the latest update, 2019 Integrated Energy Policy Report, which assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety. The 2019 Integrated Energy Policy Report covers a broad range of topics, including energy efficiency, building energy efficiency standards, achieving 60 percent renewables by 2030, and the California Energy Demand Forecast (CEC 2021c).

### Construction Equipment Idling

The California Air Resources Board also has adopted a regulation for the use of off-road diesel vehicles that is designed to reduce emissions from diesel-powered construction vehicles by imposing idling limitations on owners, operators, renters, or lessees of off-road diesel vehicles. The regulation requires an operator of applicable off-road vehicles (self-propelled diesel-fueled

vehicles 25 horsepower and up that were not designed to be driven on-road) to limit idling to no more than 5 minutes.

#### Advanced Clean Truck Regulation

The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of zero-emissions medium-and heavy-duty vehicles from Class 2b to Class 8. The regulation requires manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines to sell zero-emissions trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emissions truck/chassis sales would need to be 55 percent of Class 2b to 3 truck sales, 75 percent of Class 4 to 8 straight truck sales, and 40 percent of truck tractor sales. When compared to diesel vehicles, zero-emissions vehicles are two to five times more energy efficient, reduce dependence on petroleum, and reduce greenhouse gas (GHG) emissions substantially (CARB 2021).

### *Local*

#### *Santa Clara County General Plan*

Part 2, *Countywide Issues & Policies*, and Part 3, *Rural Unincorporated Area Issues & Policies*, of the Santa Clara County General Plan include the following policy, which is relevant to the Project (County of Santa Clara 1994).

> ***Policy C-RC 78*[2]:** The objectives of the state energy plan should be implemented at the local and regional level through an overall strategy consisting of:
>
> a. reducing transportation energy demand and oil-dependency;
>
> b. conserving energy in residential, commercial, agricultural, and industrial sectors; and
>
> c. increasing consumer and general public awareness through education.

## 3.4.2 Significance Criteria

Consistent with CEQA, Section 4.6.3 of the 2012 EIR explained that it is appropriate to evaluate the potential energy impacts of proposed projects with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy, and accordingly, determined that the Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Fail to include means for avoiding or reducing wasteful and/or unnecessary consumption of energy; or

b) Not comply with existing energy standards, including standards for energy conservation.

[2] The 2012 EIR mistakenly referred to Policy C-RC 78 as Policy C-RC 77.

Updates to the CEQA Guidelines Appendix G Environmental Checklist that were finalized in December 2018 added for the first time the energy significance criteria noted below. Implementation of the Project would have a significant impact on energy if it were to:

- Result in wasteful, inefficient, or unnecessary consumption of energy resources during Project construction or operation; or
- Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

These new criteria are consistent with those used in the 2012 EIR, which focus on wasteful and/or unnecessary consumption of energy and compliance with existing energy standards, including standards for energy conservation. Accordingly, the criteria used in the 2012 EIR remain relevant to this SEIR's consideration of whether the PCRP would cause any new significant impact or a substantial increase in the severity of a significant impact than disclosed in the 2012 EIR.

## 3.4.3 Direct and Indirect Effects

### 3.4.3.1 Methodology

The 2012 EIR analyzed fuel consumption-related impacts of the restoration activities proposed to occur within the PCRA. Given the similarity in restoration activities analyzed within the PCRA and proposed to occur as a result of the PCRP, fuel consumption impacts have not been reanalyzed in the areas of overlap as part of this assessment.

This impact analysis evaluates the potential for the Project to result in a substantial increase in energy demand and/or wasteful use of energy. The impact analysis is informed by Appendix F of the CEQA Guidelines. The potential impacts are analyzed based on an evaluation of whether construction energy use estimates for the PCRP would be considered excessive, wasteful, or inefficient in a way that would cause a new significant impact or a substantial increase in the severity of a significant energy-related impact than was identified in the 2012 EIR.

This fuel use analysis incorporates the assumptions identified in the Air Quality and Greenhouse Gas Emissions Technical Report provided in Appendix D, *Air Quality and Greenhouse Gas Emissions*. Because the California Emissions Estimator Model (CalEEMod) program used for the air quality and GHG emissions technical analysis does not display the amount and fuel type for construction-related sources, additional calculations were conducted and are summarized below and provided in **Appendix F**, *Energy: Fuel Use Calculations*. Off-road equipment inventories and construction activity assumptions were used to estimate the amounts of fuel that would be consumed by off-road equipment during construction of the PCRP. Fuel consumption factors for off-road equipment were derived from equipment inventory data using the California Air Resources Board (CARB) off-road emissions inventory database. Average off-road equipment inventories and construction activity assumptions identified in the calculations of air pollutant and GHG emissions (see Appendix D) were used to estimate the amounts of fuel that would be consumed by off-road equipment during construction of the PCRP.

Fuel use associated with commuting workers and truck hauling during construction of the PCRP were also estimated, using trip data projected for the PCRP and relevant information about vehicle fuel economy (see Appendix F for all fuel consumption factors and assumptions). As with the criteria pollutants and GHG emissions, the modeled fuel use for each construction phase was multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable fuel use (see *Emissions Applicability Factors* in Section 3.1.3.1, *Methodology*, and Appendix D, Exhibit A). Calculated fuel uses then were summed, averaged over the6-year PCRP construction period, and added to the baseline emissions (see Section 3.4.3.2, *Baseline*) to determine if the PCRP would have the potential for new significant direct, indirect, and/or cumulative environmental effects compared with the creek restoration project previously analyzed in the 2012 EIR. For information about the 2012 Reclamation Plan Amendment fuel use estimates, see Section 3.4.3.2, below, and 2012 Draft EIR Section 4.6. Detailed fuel use assumptions and summaries for the PCRP, including the fuel consumption factors, are included in Appendix F.

## 3.4.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that, in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed to have been implemented. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein. For purposes of this analysis of potential impacts related to energy, the baseline is described below.

### *2012 EIR Baseline and Reclamation Plan Amendment Fuel Use*

The baseline fuel use identified in the 2012 EIR analysis is based on averages derived from fuel purchases over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. Baseline and maximum annual 2012 Reclamation Plan Amendment fuel use estimates are summarized in **Table 3.4-1**. As shown in Table 3.4-1, the 2012 Reclamation Plan Amendment Phase 1 was found to result in a net increase in diesel use of 183 percent, and a net decrease in gasoline use of 37 percent.

**TABLE 3.4-1**
**2012 RECLAMATION PLAN AMENDMENT ANNUAL FUEL USE (GALLONS/YEAR)**

| Scenario | Diesel | Gasoline |
|---|---|---|
| Baseline Fuel Use | 822,554 | 12,615 |
| Reclamation Plan Amendment Phase 1 Fuel Use | 2,327,866 | 7,933 |
| Maximum Annual Incremental Change | 1,505,312 | (4,682) |
| Percent Incremental Change | 183% | (37%) |

The 2012 EIR found that since the 2012 Reclamation Plan Amendment included a means for avoiding or reducing wasteful and/or unnecessary consumption of fossil fuels by installing a conveyor system that can be powered in part with energy generated by renewable sources, which would result in energy efficiency, it would cause a less-than-significant impact. No mitigation measures were required.

### 3.4.3.3 Discussion of Criteria with No Energy Impact

Criterion b) as set forth in Section 3.4.2 was eliminated from more detailed consideration in the 2012 EIR for the reasons explained on Draft 2012 EIR pages 4.6-5 and 4.6-6. For similar reasons as explained there, the PCRP would not have the potential to cause a significant impact related to this criterion, and there are no changes to the compliance with existing energy standards discussion of criterion b).

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### 3.4.3.4 Direct and Indirect Effects of the Project

The analysis in this section evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.4-1: The Project would not result in wasteful, inefficient, or unnecessary consumption of energy resources, during Project construction.**

This impact analysis corresponds to 2012 EIR significance criterion a) as set forth in Section 3.4.2 and addresses whether the Project, including the restoration activities proposed within the PCRA, would result in the wasteful consumption of energy resources. In the context of Impact 4.6-1 (page 4.6-6 et seq.), the 2012 EIR concluded that interim reclamation activities, including those within the PCRA, would result in a less-than-significant impact with regard to gasoline and diesel use. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** related to significance criterion a).

As presented in Section 3.4.3.1, *Methodology*, the fuel use associated with the PCRP would be short term and periodic in nature and would occur during the dry seasons of 2024 through 2029. Below is a summary of the PCRP fuel use estimate results in terms of applicable PCRP fuel use compared to the CEQA baseline. For summaries of the total PCRP fuel use estimates by phase prior to and after the use of applicability factors to remove the fuel use considered to have already been evaluated in the 2012 EIR, see Appendix F.

### PCRP Fuel Use Estimates Compared to CEQA Baseline

**Table 3.4-2** presents the PCRP fuel use amounts that were not evaluated in the 2012 EIR, the 2012 Reclamation Plan Amendment annual incremental fuel use change disclosed in 2012 EIR (see Section 3.4.3.2 for details), and the net change associated with the combined two fuel use amounts. As shown in the table, the PCRP annual fuel use volumes reflect 3 percent and 19 percent increases in net diesel fuel and gasoline consumption, respectively, compared to the annual incremental change in fuel use disclosed in the 2012 EIR. Most of the fuel that would be consumed associated with the PCRP would be from the use of trucks and automobiles. It should be noted that current and future vehicle fleets will operate more efficiently and consume less fuel due to federal and statewide regulatory programs compared to those that were in place in 2012.

PCRP fuel use would represent a short-term increase of less than 0.06 percent of diesel and less than 0.0002 percent of gasoline sold in Santa Clara County in 2020 (CEC 2021d). Construction activities and the corresponding fuel energy consumption would be temporary, localized, and necessary. In addition, as described in Section 3.6, *Greenhouse Gas Emissions*, the continued implementation of 2012 EIR Mitigation Measure 4.8-1b to reduce the GHG emissions impact to a less-than-significant level would require reclamation-related replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid, which would also reduce PCRP vehicle and equipment fuel use. Therefore, construction-related fuel consumption by the PCRP would not result in inefficient, wasteful, or unnecessary energy use, and implementation of the PCRP would result in **no new significant impact** and **no substantial increase in the severity of a significant impact** regarding the wasteful or inefficient use of energy than was disclosed in the 2012 EIR., The impact that was disclosed in the 2012 EIR would remain less than significant even taking into account the additional fuel use for the PCRP.

**TABLE 3.4-2**
**2012 RECLAMATION PLAN AMENDMENT ANNUAL FUEL USE (GALLONS/YEAR)**

| Scenario | Diesel | Gasoline |
|---|---|---|
| Reclamation Plan Amendment Incremental Change Disclosed in 2012 EIR[a] | 1,505,312 | (4,682) |
| PCRP Fuel Use not Evaluated in the 2012 EIR | 38,077 | 898 |
| Net Fuel Use | 1,543,389 | (3,784) |
| Percent Incremental Increase | 3% | 19% |

NOTES:
a Values in (parentheses) are net reductions for Reclamation Plan Amendment presented in the 2012 EIR minus baseline emissions.

SOURCE: Draft 2012 EIR Section 4.6.5; Appendix F.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

## 3.4.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.6, *Energy Conservation* (pages 6-20 and 6-21), and concluded that the Reclamation Plan Amendment, including creek restoration within the PCRA, would not have a cumulatively significant impact on energy resources. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a previously identified significant impact** in the cumulative context.

As discussed above, there would be no impact with respect to compliance with existing energy standards, including standards for energy conservation. Therefore, the PCRP could not cause or contribute to any potential significant cumulative impact in this regard. The potential for the PCRP to cause or contribute to a potential significant cumulative impact with respect to the remaining energy-related consideration is evaluated below.

The geographic context for potential cumulative impacts related to equipment and vehicle fuel use is within the Project's construction equipment and truck trip delivery radius and workers' average travel radius because these are the areas within which energy resources would be demanded and supplied for the PCRP. The PCRP would use energy resources during construction; therefore, it could contribute to potential cumulative impacts during this phase.

Regarding the efficiency of fuel use, there is no existing significant adverse condition (such as a shortage) that would be worsened or intensified by the PCRP. Past, present, and reasonably foreseeable future projects in proximity of the PCRP site could require gasoline or diesel but would not combine with the fuel demands of the PCRP to cause a significant adverse cumulative impact relating to the wasteful, inefficient, or unnecessary consumption or use of fuel. In the event of a future shortage, higher prices at the pump would curtail unnecessary trips that could be termed "wasteful" and would moderate choices regarding vehicles, equipment, and fuel efficiency. Under these conditions, the PCRP's less-than-significant impact identified in Section 3.4.3, *Direct and Indirect Effects*, for Impact 3.4-1 relating to wasteful, inefficient, or unnecessary consumption or use of fuel would not be cumulatively considerable.

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## 3.4.5 References

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# 3.5 Geology, Soils, Seismicity, and Paleontology

This section identifies and evaluates issues related to geology, soils, seismicity, and paleontology to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. To do this, this analysis focuses on three things: (1) PCRP areas that are outside of the existing Reclamation Plan boundary (for which Grading Approval would be required); (2) PCRP areas within the Reclamation Plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP would propose work at greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. This analysis is based in part on information contained in the following documents:

- The Geologic and Geomorphic Assessment of Permanente Creek prepared by Golder Associates (Golder), dated October 31, 2019 (**Appendix G1**).
- The report prepared by Golder for its slope stability analysis completed in July 2021 (**Appendix G2**).
- An additional slope stability analysis conducted by Stantec Consulting Services Inc. (Stantec) in August 2022 (**Appendix G6**).
- The *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* prepared by Waterways Consulting, Inc., dated August 26, 2022 (**Appendix C**).

The preparers of this Draft SEIR independently reviewed these and other materials prepared by or on behalf of Lehigh and determined that those materials could be relied on (in combination with other materials included in the formal record) in the preparation of this Draft SEIR.

The County received no scoping comments regarding geology, soils, seismicity, or paleontology in response to the Notice of Preparation (**Appendix A**, *Scoping Report*).

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a crosswalk between the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.

# 3.5.1 Setting

## 3.5.1.1 Study Area

The "study area" for this analysis of potential impacts related to geology, soils, seismicity, and paleontology consists of the Project site described in Section 2.3.2 of the Project Description and shown in **Figure 2-3**.

## 3.5.1.2 Environmental Setting

Section 4.7.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of geology, soils, and seismicity, including site geology and soils (Section 4.7.1.1, page 4.7-1 et seq.); naturally occurring asbestos, crystalline silica, and trace metal concentrations (Section 4.7.1.2, page 4.7-8 et seq.); regional faulting and seismicity (Section 4.7.1.3, page 4.7-11 et seq.); geologic hazards (Section 4.7.1.4, page 4.7-17 et seq.); and seismic hazards (Section 4.7.1.5, page 4.7-21 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP except as supplemented below.

### *Site Geology and Soils*

The areas of the PCRP that are outside the Reclamation Plan boundary and thus were not covered in the 2012 EIR are the concrete channel area (Reach 6) and Reaches 7–11. Reaches 6 and 7–9 are underlain primarily by the Santa Clara Formation (described in detail in Section 4.7.1.1 of the Draft 2012 EIR, page 4.7-5), which was formed by prehistoric stream deposits composed of loose to slightly consolidated conglomerate, sandstone, siltstone, and claystone. Similar to the surficial materials within the Reclamation Plan boundary, the overlying surficial materials in Reaches 6–9 contain disturbed mixtures of alluvium, colluvium, and overburden material with minor (if present) native, intact soil horizons. The surficial materials and native soils have low shrink-swell behavior and thus are considered non-expansive. Reach 10 is underlain by graywacke sandstone (Ks) and Reach 11 is underlain by metabasalts (KV) (i.e., altered igneous rocks), which could include greenstone. (Bedrock underlying Reaches 10 and 11 is described in Section 4.7.1.1 of the Draft 2012 EIR, page 4.7-2.) Surficial materials in Reaches 10 and 11 are similar to those in Reaches 6–9, as described above. The Berrocal Fault (described in detail in Section 4.7.1.3 of the Draft 2012 EIR, page 4.7-17) crosses Reach 9 at about the halfway point of the reach. As discussed in the 2012 EIR, some of the slope failures observed on the Project site may be associated with zones of weakness and sheared rock located along strands of the Berrocal Fault.

### *Paleontological Resources*

Paleontological resources setting information was included in Section 4.5, *Cultural and Paleontological Resources,* in the 2012 EIR. The descriptions presented in the environmental setting for paleontological resources in that section remain accurate for purposes of this analysis of the PCRP.

## 3.5.1.3 Regulatory Setting

Section 4.7.1.6 of the Draft 2012 EIR (page 4.7-23 et seq.) described the regulatory setting for the analysis of potential impacts related to geology, soils, and seismicity, including federal, state, and local laws, regulations, plans, and policies applicable to the analysis of the proposed creek restoration and other Project components considered in the 2012 EIR. The section summarized provisions of the Federal Mine Safety and Health Act of 1977 administered by the Mine Safety and Health Administration, the Surface Mining and Reclamation Act, the California Building Code, and County ordinances, local plans, and policies. The description of the regulatory setting remains accurate for purposes of this analysis of the PCRP except as supplemented below.

### *Santa Clara County General Plan*

The Santa Clara County General Plan (1994) recognizes paleontological sites as having scientific value and the potential to increase knowledge of the natural world, and includes a goal (Goal 5.1) to protect and preserve paleontological resources. Policies C-RC 49 and R-RC 81 state that heritage resources, which include paleontological resources, in Santa Clara County and rural unincorporated areas should be preserved. Policies C-RC 50 and R-RC 82 provide a countywide general approach to heritage resource protection, which involves (1) inventory and evaluation of heritage resources, (2) prevention or minimization of adverse impacts on heritage, and (3) restoration, enhancement, and commemoration of resources as appropriate. Additional policies and recommendations set guidance for implementing the general approach. The following policies are relevant to the evaluation of the potential paleontological resources impacts of the Project:

> ***Policy R-RC 85****:* No heritage resource shall knowingly be allowed to be destroyed or lost through a discretionary action (zoning, subdivision site approval, Grading Approval, building permit, etc.) of the County of Santa Clara unless:
>
> a. The site or resource has been reviewed by experts and the County Historic Heritage Commission and has been found to be of insignificant value; or
>
> b. There is an overriding public benefit from the project and compensating mitigation to offset the loss is made part of the project.
>
> ***Policy R-RC 86****:* Projects in areas found to have heritage resources shall be conditioned and designed to avoid loss or degradation of the resources. Where conflict with the resource is unavoidable, mitigation measures that offset the impact may be imposed.
>
> ***Policy R-RC 88****:* For projects receiving environmental assessment, expert opinions and field reconnaissance may be required if needed at the applicant's expense to determine the presence, extent, and condition of suspected heritage resources and the likely impact of the project upon the resources.
>
> ***Policy R-RC 92****:* The participation of concerned citizens and professionals dealing with heritage resources in the identification of sites and the review and conditioning of projects by its boards and commissions shall be encouraged by the County.

## 3.5.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.7 of the 2012 EIR determined that the proposed 2012 Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Expose people or structures to potential substantial adverse effects, including risk of loss, injury, or death involving:

   i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;

   ii. Strong seismic ground shaking;

   iii. Seismic-related ground failure, including liquefaction; and/or

   iv. Landslides;

b) Result in substantial soil erosion or the loss of topsoil;

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse;

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property;

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater;

f) Cause substantial compaction or over-covering of soil either on-site or off-site;

g) Cause substantial change in topography or unstable soil conditions from excavation, grading, or fill; or

h) Directly or indirectly destroy a unique paleontological resource or site or unique geological feature.

Updates to the CEQA Guidelines Appendix G Environmental Checklist that were finalized in December 2018 made only non-substantive revisions to these significance criteria. Specifically, the resource topic areas addressing paleontological resources and unique geological features were removed as a cultural resources criterion and were added to the significance criteria considered in the geology, soils, and seismicity analysis. As a result, potential impacts of the PCRP on paleontological resources and unique geological features are analyzed in this section. Accordingly, these criteria remain relevant to this SEIR's consideration of whether the PCRP would cause any new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR.

## 3.5.3 Direct and Indirect Effects

### 3.5.3.1 Methodology

The evaluation of environmental impacts associated with geology, soils, seismicity, and paleontology was supported by the technical reports completed by Golder and, more recently, by Stantec. Golder provided geotechnical support to Waterways Consulting, Inc., during the completion of the 70% Design Submittal (Golder 2017), and Stantec contributed to the refinements reflected in the Updated 90% Design Memo (Appendix G6, Appendix C) after significant recent additional geotechnical investigation (Golder 2012, 2017, 2018, see also Appendix G1 and Appendix G2). The Stantec memorandum (Appendix G6) characterizes the most recent understanding of Project site geology, seismic setting, and slope stability conditions, and provides the basis of the analysis for geologic conditions, slope stability, and other geotechnical aspects of the PCRP. This collective analysis provides an adequate technical understanding of the geologic and seismic conditions and the potential for slope instability during and after the PCRP's restoration activities. The impact analyses determine whether and to what degree the PCRP would affect slope stability, the existing regional and local seismic regimes, erosion potential, and paleontological resources. Based on this, the analysis determined whether the PCRP would cause a new significant impact or a substantial increase in the severity of a significant impact than identified in the 2012 EIR. The severity of an impact is determined based on the significance criteria identified in Section 3.5.2.

CEQA does not generally require lead agencies to consider how existing hazards or conditions might affect a project's users or residents, except where the project would significantly exacerbate an existing environmental hazard.[2] Accordingly, hazards resulting from a project that places development in an existing seismic hazard area or an area with unstable soils are not considered impacts under CEQA unless the project would significantly exacerbate the seismic hazard or unstable soil conditions. Thus, the following analysis evaluates whether the Project would exacerbate future slope instability, seismic hazards, or erosion potential, and result in a substantial risk of loss, injury, or death.

### 3.5.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein. For purposes of this analysis of potential impacts related to geology, soils, seismicity, and paleontology, this means that the baseline includes the existing earthquake, fault rupture, and landslide potential at the Project site and the erosion potential as mitigated in accordance with the 2012 EIR and 2012 Reclamation Plan Amendment approvals. The baseline also includes the existing physical conditions of Permanente Creek and its adjacent riparian area (including the potential for previously unidentified paleontological resources to be present) in the PCRP implementation area outside the 2012 Reclamation Plan boundary, inside

[2] *California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal.4th 369.

the 2012 Reclamation Plan boundary but outside the approved disturbance envelope for the PCRA.

### 3.5.3.3 Discussion of Criteria with No Impact on Geology, Soils, Seismicity or Paleontology

Criteria d) and e) as set forth in Section 3.5.2 were eliminated from more detailed consideration in the 2012 EIR for the reasons explained on Draft 2012 EIR pages 4.7-28 and 4.7-29. For the reasons explained there, these criteria also are not considered in this SEIR.

In addition, criterion f) has been eliminated from further discussion because the PCRP would not cause substantial compaction or over-covering of soil either on-site or off-site. The Project involves creek restoration where, depending on the specific reach, a substantial amount of fill material (overburden, native landslide deposits, sediment) would be removed from areas adjacent to and within the existing stream channel. Following removal, these materials would be characterized, transported, and placed at an alternate, suitable location on Lehigh's property, within the 2012 Reclamation Plan boundary. Characterization and placement of these materials would be in accordance with Best Management Practice (BMP)-6 (see Section 2.5.9.1, *Best Management Practices*). These sediment materials would not cause substantial compaction or over-covering of soil horizons on or off the Project site because most of the Project site is overlain by rock or overburden and previous site disturbance has removed the native topsoil.

### 3.5.3.4 Direct and Indirect Effects of the Project

The analysis in this section evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to baseline conditions, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.5-1: Restoration activities proposed under the PCRP could cause slope instability and failure if restoration components are not properly engineered and constructed.**

This impact analysis corresponds to significance criteria a.iv), c), and g) as set forth in Section 3.5.2 and addresses slope instability under static and seismic conditions. In the context of Impact 4.7-1 (page 4.7-36 et seq.), the 2012 EIR concluded that, upon final reclamation, restoration with respect to slope stability would be similar or improved as a result of the restoration efforts; however, it further concluded that interim activities associated with PCRA improvements could result in further slumping or shallow sliding of overburden materials farther downslope. Mitigation Measure 4.7-1 was prescribed to increase the stability of slopes during slope grading activities to prevent overburden or native materials from moving downslope or into Permanente Creek. Mitigation Measure 4.7-1 reduced this impact to a less-than-significant level. The PCRP would involve the same or substantially similar restoration activities compared to

those originally proposed in the PCRA, and Mitigation Measure 4.7-1 would be implemented as part of the baseline condition for the interim activities (i.e., road grading, material removal) associated with PCRP improvements. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criteria a.iv), c), and g).

Slope instability could occur in channel reaches where PCRP restoration activities increase slope steepness, remove slope toe[3] support, or otherwise alter slope configuration. This is especially the case in the Rock Pile Area (Reach 11) and the Material Removal Area (Reaches 17 and 18), where the efforts to remove overburden and establish the channel on bedrock could require deep excavations with slopes that could become unstable if over-steepened. APM-GEO-1 (as set forth in Section 2.5.9.2 in Chapter 2, *Project Description*) would require the Project Geotechnical Engineer and/or Project Engineering Geologist to inspect all interim and final cut slopes as the Project progresses so that any potential areas of concern can be identified early in the process and remedial measures developed, if required. Geotechnical remedial measures could include the removal of additional material, slope laybacks and benching, engineered drainage controls, or slope buttresses consisting of compacted rockfill. Ongoing geotechnical inspection of interim alluvial/overburden slopes or final bedrock slopes by registered geotechnical engineers and/or certified engineering geologists would ensure that unstable slope conditions would be identified and corrected.

In addition to APM-GEO-1, the PCRP has incorporated as part of the Project Stantec's recommendations for rock and soil/fill slopes (Appendix G6):

> **Rock Slopes**: For planning purposes, slopes greater than 20 feet in height in greenstone[4] should not exceed slope angles of 2:1 (H:V).[5] Slopes less than 20 feet should perform adequately at 1.5:1.0; however, localized areas of instability may be encountered. Cut slopes in limestone and sandstone greater than 20 feet in height should not exceed 1:1 and slopes less than 20 feet should be limited to no steeper than 3/4:1.
>
> **Fill or Soil Slopes:** For planning purposes, permanent slopes comprised of mining overburden, alluvium, colluvium, or other site derived fill should not exceed 2:1 (H:V).

The section below discusses potential slope instability in each key channel reach of the PCRP.

[3] The "toe" refers to the lowest part of a slope or cliff. Removal or excavation into a slope toe can reduce the stable equilibrium of a slope and lead to failure.

[4] Greenstone is basalt that has undergone alteration.

[5] Slope steepness is expressed as H:V, which means Horizontal (H) to Vertical (V). For example, a slope of 2:1 (H:V) is a slope that extends horizontally 2 feet for every 1 foot of height gain and has an angle of 26.6 degrees, also referred to as a 50 percent slope.

### Potential Slope Instability in Key Reaches

#### Reach 6

Reach 6 is identified as the "Concrete Channel Area" and is shown on Sheet L1 in Appendix C. There are no slope instability concerns in Reach 6 because the restoration activities do not require native or engineered slopes to be altered or reengineered.

#### Reaches 8–10

Reaches 8–10 are within the area referred to as the "Channel Widening Area" and are shown on Sheets C11, C12, C13, C14, C15, C16, C17, and C18 in Appendix C. Culvert 8 would be removed from Reach 9 (Sediment Removal Area) and the area would be restored with a floodplain bench incorporated along the northern bank. Restoration in Reach 9 involves minor grading to achieve the recommended 2:1 slopes, but the proposed grading would not require slope stabilization.

Biomechanical bank stabilization treatments, including vegetated rock slope protection, would be installed to provide channel stability in Reach 8 along the southern bank to support the toe of the hillslope where Culvert 7 would be removed and in Reach 10 where Culvert 9 would be removed. Vegetated rock slope protection would be constructed using boulders of specified sizes with live plant (typically willow) cuttings (stakes)[6] placed within the rock matrix during installation. Vegetated rock slope protection would be used where the south bank would be left in an over-steepened condition after culvert removal. Slope protection would not be necessary where Culvert 9 is removed if bedrock is exposed during excavation. The proposed biomechanical slope stabilization would be adequate to protect interim and final slopes in Reaches 8–10. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a previously identified significant impact** associated with unstable slopes.

#### Reach 11 (Rockpile Area)

Reach 11 is within the area referred to as the "Rock Pile Area" and is shown on Sheet C19 in Appendix C. Substantial excavation is required to remove the Rock Pile, which is an existing, large stockpile of aggregate material consisting primarily of mining overburden, artificial fills, and some natural landslide deposits overlying a native bedrock slope. Excavation and removal of the Rock Pile fills could cause instability and failure on the north slope of this reach if the material destabilizes during excavation, or if the native bedrock slope exposed after removal becomes unstable.

Stantec performed two-dimensional, limited equilibrium slope stability analysis to support the environmental review and subsequent permitting processes for the Project based on the Updated 90% Design Memo (Appendix G6). Stantec evaluated the stability of proposed slopes at the Rock Pile Area and the Material Removal Area (discussed below) under both static and pseudo-static (earthquake) conditions. The minimum acceptable Factors of Safety (FOS)[7] for the analyses were

6 Cuttings are capable of regenerating into mature plants.

7 The Factor of Safety (FOS) is found by dividing the forces that resist movement in the slope (such as cohesion in clays) by the forces that cause movement (i.e., gravity or water). A slope that is stable would have a FOS of 1.0 or greater, while slopes below 1.0 would have the potential to fail as a landslide or slump. For example, the less steep a slope is, the higher its FOS, as it is less prone to failure.

1.3 for static conditions and 1.0 for pseudo-static conditions based on mining industry standards (Appendix G6). Analysis of pseudo-static model conditions applied a horizontal seismic coefficient of 0.15 times the force of gravity (*g*) to the static condition models to be consistent with previous studies and to evaluate stability for earthquakes with magnitudes up to 8.25. Slope stability analyses conducted by Stantec focused on the areas with the greatest excavation depths including the Rock Pile removal area (Cross-section A; see Appendix C, Sheet C19) and the 1250 Pond area, discussed below (Cross-sections C and E; see Appendix C, Sheet C24). Stantec adjusted the limits of the analyses to evaluate both the global slope stability and the stability in the area immediately adjacent to the PCRP grading. The slope configurations analyzed by Stantec for the Rockpile Area exceed the minimum acceptable FOS.

APM-GEO-1 would require Lehigh's Project Geotechnical Engineer and/or Project Engineering Geologist to inspect and evaluate the nature and stability of the Rock Pile overburden material during excavation and the exposed native bedrock slope after excavation. If the inspection identifies existing or potential slope instability hazards, the engineer and/or geologist would recommend strategies to increase stability and avoid failure. In addition, Stantec's recommendations for final slope inclinations (listed above) have been incorporated as part of the Project, and the geotechnical inspection required under APM-GEO-1 would ensure that these slope angles are achieved.

The proposed design for the Rock Pile Area would improve the overall stability of the slope as compared to existing conditions. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a previously identified significant impact** associated with unstable slopes in Reach 11.

### Reach 13

Reach 13 is within the area referred to as the "Rock Pile Area" and is shown on Sheet C19 in Appendix C. Restoration activities in Reach 13 include removal of the dam infrastructure, construction of a restored channel through the abandoned Pond 13, removal of sediments, and installation of native vegetation. Restoration in this area would not rework existing slopes or create new slopes; thus, slope stabilization is not required.

### Reaches 17 and 18

Reaches 17 and 18 are within the area referred to as the "Material Removal Area" as shown on Sheets C23 and C24 in Appendix C. Within Appendix C, see also Appendix L, *Material Removal Area Lower Limit of Potential Finished Grade Figures*. Reaches 17 and 18 include the Material Removal Area and the old concrete crusher foundation. Proposed restoration activities in Reaches 17 and 18 are the same as or substantially similar to those analyzed in the 2012 EIR and would include removing fill and overburden materials to form a more uniform profile gradient. Excavations at depths of 15–40 feet could be encountered in certain areas, but bedrock is expected to be close to the surface throughout Reaches 17 and 18. Areas requiring excavation could have interim instability, and although the reaches would be stable after restoration, implementation of Mitigation Measure 4.7-1 as identified in the 2012 EIR (which would be implemented under baseline conditions) would ensure that interim grading activities associated with the PCRP would not cause temporary, localized slope failure. Removing the relic concrete

structures and cutting back the old concrete crusher foundation could cause temporary instability within the channel if these structures contribute to the channel stability in these reaches.

Material removal in Reaches 17 and 18 could threaten foundation support for the Upper Water Treatment System, Pond 1250, and associated infrastructure (Appendix G1, page 13), which are located along the top of the creek bank and access road to Permanente Creek. These facilities are currently needed for ongoing quarry operations. If it is determined that these facilities are essential for post-PCRP activities associated with quarry dewatering and reclamation, they would be removed from their current location and relocated. Relocation would eliminate the need for embankment and foundation support structures in the channel to buttress the north toe of slope. The final slope following facility relocation would be graded at 2:1 (H:V), adhering to Stantec's recommendation for final slope inclinations.

Stantec (Appendix G6) analyzed the stability of slope cross sections in the Pond 1250 area (Cross-sections C and E; see Appendix C, Sheet C24) to evaluate the stability under different proposed slope configurations and excavation depths. The cross sections used in the analysis extend to the top of the surrounding slopes to evaluate the impacts of grading on global stability. The results of the analysis indicated that the proposed slope configurations exceed the minimum acceptable FOS (Appendix G6).

Restoration work in Reaches 17 and 18 would require the removal of sediment material and relic structures that could lead to localized slope instability. Lehigh would continue to be required to adhere to Mitigation Measure 4.7-1 (stabilization of interim slopes), which is an independently enforceable obligation of the 2012 Reclamation Plan Amendment approval; and APM-GEO-1 (Project Engineer inspections), which would minimize the potential for slope instability. Thus, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a previously identified significant impact** associated with unstable slopes in Reaches 17 and 18.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.7-1, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.5-2: Seismic ground shaking and associated ground failures could disrupt or damage restoration elements of the PCRP.**

This impact analysis corresponds to significance criteria a.i), a.ii), a.iii), and c) as set forth in Section 3.5.2 and addresses hazards associated with seismic ground shaking and related ground failures such as surface fault rupture and liquefaction. In the context of Impact 4.7-2 (page 4.7-37 et seq.), the 2012 EIR concluded that the proposed reclamation activities, including creek restoration activities proposed within the PCRA, would result in a less-than-significant impact with respect to seismic ground shaking from a major earthquake. Seismic ground shaking could

result in injury to site workers or damage to equipment and structures, or could trigger slope failures. In addition, Impact 4.7-2 determined that a large earthquake on the San Andreas Fault could result in minor ground deformation along traces of the Berrocal or Monte Vista fault zones. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criteria a.i), a.ii), a.iii), and c).

The regional seismic setting has not changed since the publication of the 2012 EIR. No new active faults have been identified within the Project site and the probability of a regional earthquake has not increased since publication of the 2012 EIR. Restoration activities would occur only on the surface and would not require activities that could trigger minor or micro-earthquakes such as deep excavations, tunneling, deep borings, or blasting. The PCRP would improve slope stability by exposing native bedrock slopes and by removing overburden on steep slopes, thereby reducing the potential for seismically induced slope failure. Soils along Permanente Creek have the potential to liquefy under seismic loading (2012 EIR, page 4.7-22 et seq.); however, the PCRP improvements would not be adversely affected by liquefaction or its associated ground failures because liquefiable soils material (e.g., saturated coarse-grained overburden material or saturated fill) would be removed and replaced with engineered streambed material (ESM).

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.5-3: Earthmoving, excavation, and other ground disturbance associated with the restoration could temporarily promote accelerated erosion and soil loss.**

This impact analysis corresponds to significance criterion b) as set forth in Section 3.5.2 and addresses accelerated erosion and soil loss. In the context of Impact 4.7-3 (page 4.7-39 et seq.), the 2012 EIR concluded that earthmoving and other ground disturbance associated with the phased reclamation of the site, including within the PCRA, could temporarily promote accelerated erosion and soil loss, and that this would result in a less-than-significant impact. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion b).

There are areas of accumulated overburden materials within the PCRP restoration area that could be susceptible to accelerated erosion. However, the potential for soil loss within the PCRP restoration area is low because there are limited areas containing developed soil horizons. The PCRP proposes to remove the overburden from the Permanente Creek channel, which would in turn remove materials susceptible to accelerated erosion. Additionally, the stream channel would be reconstructed with ESM, which would further stabilize the channel and reduce the potential for excessive erosion.

As described in detail in the analysis of Impact 3.7-2 within Section 3.7, *Hydrology and Water Quality*, surface treatments and grade control elements have been incorporated into the PCRP design to minimize and/or avoid episodic or chronic releases of sediments to the creek. In addition to ESM, these elements include floodplain armor to protect newly developed floodplains, vegetated rock slope protection, border sills and weirs, rapidly growing vegetation, and BMPs. In particular, BMP-7 outlines the methods Lehigh must use to minimize erosion (see Section 2.5.9.1, *Best Management Practices*).

The PCRP would be an overall improvement to the hydrologic regime along Permanente Creek and would reduce erosion and sediment transport, improve water quality, create greater long-term slope stability, and minimize sediment sources. Consequently, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR regarding accelerated erosion and soil loss.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.5-4: Project activities could directly or indirectly destroy a unique paleontological resource or site.**

This impact analysis corresponds to significance criterion h) as set forth in Section 3.5.2 and addresses hazards associated with destruction of a paleontological resource or unique geological feature. In the context of Impact 4.5-2 (page 4.5-28 et seq.), the 2012 EIR concluded that the PCRA would cause no adverse effect on a known unique geological feature, and that although there is no indication that the Reclamation Plan area—including the PCRA—contains unique or significant fossils or that paleontologically sensitive rock formations would be disturbed, the possibility of encountering fossils in the course of earthmoving operations cannot be discounted entirely, especially considering the scale of earthmoving operations proposed under the 2012 Reclamation Plan Amendment. Should a fossil be identified during the Reclamation Plan Amendment activities approved in 2012, Mitigation Measure 4.5-3 would require Lehigh to cease all activity within 100 feet of the fossil until it was evaluated by a qualified paleontologist. Mitigation Measure 4.5-3 reduced this impact to a less-than-significant level and would be implemented as part of the baseline condition during implementation of restoration activities for the PCRP. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion h).

Similar to the PCRA, the PCRP area does not contain known unique geological features that would be destroyed or lost by the Project. The probability of encountering a fossil during PCRP restoration activities is lower than it would be during the reclamation activities analyzed in the 2012 EIR because the PCRP restoration would occur within a smaller footprint and the underlying Franciscan mélange, containing greenstone, chert, and limestone, is generally consistent throughout the PCRP area. Fossil remains typically are not found in the Franciscan

mélange because these rocks were formed in a subduction zone, are altered or metamorphosed,[8] and are highly deformed. The possibility of identifying intact fossils is remote. The overburden material could contain fossils, given that it is reworked limestone; however, the probability is low that a fully intact fossil would be identified within the overburden material.

**Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.5-3, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.

**Additional Mitigation:** None required.

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## 3.5.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.7, *Geology, Soils and Seismicity* (page 6-21), concluding that the 2012 Reclamation Plan Amendment, including creek restoration within the PCRA, would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context than was disclosed in the 2012 EIR.

The PCRP would improve slope stability within the study area by removing unstable overburden and requiring 2:1 (H:V) final slopes. Further, Lehigh would implement Mitigation Measure 4.7-1 from the 2012 EIR to address potential interim instability of construction slopes. The PCRP would not contribute to a cumulative impact on local or regional slope stability, because the Project's slope stability improvements would be localized conditions within the Reclamation Plan boundary within the PCRP project site and would not affect slope stability elsewhere in the reclamation area or off-site. Further, the Project would not exacerbate existing or future seismic hazards, including seismically induced slope failure and ground collapse, that would otherwise not occur or be present without the Project. The Project would not contribute to a cumulative loss of paleontological resources because the potential for recovering intact, scientifically significant fossil remains within the PCRP is extremely low. However, if a fossil is identified, then the implementation of Mitigation Measure 4.5-3 as part of the baseline condition (because it is an ongoing, independently enforceable obligation of the 2012 approval) would require that it be evaluated and recovered before work in the area could continue.

**Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.7-1 and Mitigation Measure 4.5-3. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment.*

**Additional Mitigation:** None required.

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[8] Sedimentary rocks and igneous rocks that are changed through pressure and heat.

## 3.5.5 References

Golder Associates Inc. (Golder), 2017. *Geotechnical Plan Review—Permanente Creek Restoration Plan, 70% Design Submittal, Lehigh Permanente Quarry*. Technical memorandum from Ken Haskell and William Fowler (Golder) to Erika Guerra and Talia Flagan (Lehigh). October 27, 2017.

Golder, 2018. *Geotechnical Plan Review—Permanente Creek Restoration Plan, 90% Design Submittal, Lehigh Permanente Quarry.* Technical memorandum from William Fowler (Golder) to Erika Guerra and Talia Flagan (Lehigh). November 15, 2017.

Golder, 2021. Response to Permanente Creek Restoration Plan Supplemental EIR: Data Request 3, Prepared by ESA, Dated June 25, 2021. Letter. Prepared by George Wegmann and William Fowler (Golder) for Erika Guerra (Lehigh). July 23, 2021.

# 3.6 Greenhouse Gas Emissions

This section identifies and evaluates issues related to greenhouse gas (GHG) emissions to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than was disclosed in the 2012 EIR. To do this, as explained in Section ES.1, *Introduction*, and in Section 2.3, *Focus of the Supplemental EIR*, including as summarized in Table 2-1, *Specific Areas of Focus for the Supplemental EIR*, this analysis focuses on three things: (1) PCRP areas that are outside of the existing reclamation plan boundary (for which Grading Approval would be required); (2) PCRP areas within the reclamation plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP would include work at a greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. This analysis is based in part on the Air Quality and Greenhouse Gas Emissions Technical Report (a copy of which is provided in **Appendix D**), which was prepared on the County's behalf. The County received no scoping comments pertaining to GHG emissions (**Appendix A**, *Scoping Report*).

## 3.6.1 Setting

### 3.6.1.1 Study Area

The study area for this analysis of potential impacts related to GHG emissions consists of the San Francisco Bay Area Air Basin (SFBAAB), which encompasses all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo and Santa Clara counties, and the southern portions of Solano and Sonoma counties, as well as statewide.

### 3.6.1.2 Environmental Setting

Section 4.8.1.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of GHG emissions, including information about the effects of climate change and sources of GHG emissions (page 4.8-1 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below.

#### *Climate Change*

There is general scientific consensus that climate change is occurring and is almost certainly attributed to human activities. Man-made emissions of GHGs, if not sufficiently curtailed, will

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, for a cross reference between the restoration activities described and analyzed in the 2012 EIR and the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.

likely contribute further to continued increases in global temperatures. Strong scientific evidence documents that the climate is changing and that its impacts are widespread and occurring now. In California, this evidence includes increases in extreme heat, wildfires, extreme storms, coastal flooding and erosion, and reductions in Sierra Nevada springtime snowpack and threats to water availability (California Air Resources Board [CARB] 2014). Globally, climate change has the potential to adversely affect numerous environmental resources through potential, although uncertain, impacts related to future air and water temperatures, precipitation patterns, and an array of other factors. According to the Intergovernmental Panel on Climate Change (IPCC), human activities affect all the major climate system components, including (IPCC 2021):

- Changing global surface temperatures.
- Reduction in arctic sea ice area.
- Decreased ocean surface pH (a measure of acidity).
- Increased global mean sea level change.

Also, many secondary effects are projected to result from global warming, including impacts on agriculture, changes in disease vectors, changes in habitat suitability, and potential for reduction of biodiversity. While the possible outcomes and feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term are great.

### *Greenhouse Gases*

State-regulated GHG emissions that result from human activities primarily include carbon dioxide ($CO_2$), with much smaller amounts of nitrous oxide ($N_2O$), methane ($CH_4$, often from unburned natural gas), sulfur hexafluoride ($SF_6$) from high-voltage power equipment, nitrogen trifluoride ($NF_3$) from microelectronics and semi-conductor manufacturing, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and $CO_2$ is the most common reference gas for climate change, GHG emissions are often quantified and reported as $CO_2$-equivalent ($CO_2e$) emissions. For example, while $SF_6$ represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 22,800 times the global warming potential of $CO_2$. Therefore, an emission of 1 metric ton of $SF_6$ would be reported as 22,800 metric tons $CO_2e$. The global warming potential of $CH_4$ and $N_2O$ are 25 times and 298 times that of $CO_2$, respectively (CARB 2016).

In 2019, the United States emitted about 6.56 billion tons of $CO_2e$, representing a 1.7 percent decrease from 2018. This decrease was driven largely by a decrease in emissions from fossil fuel combustion resulting from a decrease in total energy use in 2019 compared to 2018 and a continued shift from coal to natural gas and renewables in the electric power sector. Of the five major sectors nationwide (residential and commercial, industry, agriculture, transportation, and electricity), transportation accounts for the highest fraction of GHG emissions (approximately 29 percent), followed closely by the electric power industry (approximately 25 percent) and general industry (approximately 23 percent) (U.S. EPA 2021).

Statewide emissions of GHG from relevant source categories for 2014 through 2020 are summarized in **Table 3.6-1**. Specific contributions from individual air basins, such as the SFBAAB, which encompasses the Project site, are included in the emissions inventory but are not itemized by air basin. In 2020, California produced 369.1 million gross metric tons of $CO_2e$ emissions, which was a 9 percent drop in emissions compared to 2019 driven by the Covid-19 pandemic-related shutdown. Transportation was the source of 37 percent of the state's GHG emissions, followed by industrial at 20 percent, electricity generation at 16 percent, commercial and residential sources at 11 percent, agriculture at 9 percent, high global warming potential[2] at 6 percent, and recycling and waste comprising the remaining 2 percent (CARB 2022a).

**TABLE 3.6-1**
**CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS $CO_2E$)**

| Emissions Inventory Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
|---|---|---|---|---|---|---|---|---|
| Transportation | 157.7 | 161.5 | 165.2 | 166.6 | 165.3 | 162.4 | 135.8 | 36.8% |
| Electric Power | 89.8 | 86.0 | 70.4 | 64.2 | 65.0 | 60.2 | 59.5 | 16.1% |
| Industrial | 85.2 | 83.2 | 81.6 | 81.7 | 81.9 | 80.4 | 73.3 | 19.9% |
| Commercial & Residential | 35.6 | 36.3 | 37.2 | 37.6 | 37.4 | 40.5 | 38.7 | 10.5% |
| Agriculture | 33.9 | 32.6 | 32.2 | 31.7 | 32.2 | 31.4 | 31.6 | 8.6% |
| High Global Warming Potential | 17.7 | 18.6 | 19.4 | 20.1 | 20.5 | 20.7 | 21.3 | 5.8% |
| Recycling and Waste | 8.3 | 8.4 | 8.5 | 8.6 | 8.7 | 8.8 | 8.9 | 2.4% |
| **Total Gross Emissions** | **428.2** | **426.6** | **414.5** | **410.5** | **411.0** | **404.4** | **369.1** | **100.0%** |

SOURCE: CARB 2022a.

### 3.6.1.3 Regulatory Setting

Section 4.8.1.2 of the Draft 2012 EIR (page 4.8-2 et seq.) described the regulatory setting for the analysis of potential impacts related to GHG emissions, including federal, state, and local laws, regulations, plans, and policies applicable to the analysis of the proposed creek restoration and other Project components that were considered in the 2012 EIR. The section summarized the federal Clean Air Act requirements for GHG emissions, the U.S. Environmental Protection Agency's (U.S. EPA) GHG Reporting Rule, California Executive Order S-3-05, Assembly Bill (AB) 32, the Climate Change Scoping Plan, revisions to the CEQA Guidelines, mandatory and voluntary carbon credits, the Climate Registry, the Bay Area Air Quality Management District's (BAAQMD) Bay Area 2010 Clean Air Plan, and the *County of Santa Clara Climate Action Plan for Operations and Facilities*. The description of the regulatory setting remains accurate for purposes of this analysis of the PCRP, except as supplemented or emphasized below.

[2] The California GHG inventory category High Global Warming Potential includes gas emissions from releases of ozone depleting substance substitutes, $SF_6$ emissions from electricity transmission and distribution systems, and gases that are emitted in semiconductor manufacturing processes.

## *Federal*

### U.S. Environmental Protection Agency (U.S. EPA)

GHGs are air pollutants covered by the Clean Air Act (*Massachusetts v. U.S. EPA* (2007) 549 U.S. 497). Accordingly, the U.S. EPA prescribes (and from time-to-time revises) standards applicable to the emissions of GHGs from new motor vehicles or new motor vehicle engines. The 2012 EIR considered the U.S. EPA's finding that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations, and that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a).

Pursuant to 40 Code of Federal Regulations (CFR) Part 52, Proposed Prevention of Significant Deterioration, and Title V Greenhouse Gas Tailoring Rule, U.S. EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source $CO_2e$ emissions exceed 100,000 tons per year (U.S. EPA 2019).

### U.S. Supreme Court Decision in Utility Air Regulatory Group v. U.S. EPA

In *Utility Air Regulatory Group v. U.S. EPA* (2014) 573 U.S. 302, the U.S. Supreme Court held that U.S. EPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of best available control technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in *Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency* (2012) 684 F.3d 102, which vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed U.S. EPA to consider whether any further revisions to its regulations are appropriate and, if so, to undertake to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, the U.S. EPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules (U.S. EPA 2019).

## *State*

A variety of statewide rules and regulations have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Under CEQA, analysis and mitigation of GHG emissions and climate change in relation to a proposed project is required where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere. State regulations identified in the 2012 EIR are supplemented with the following information.

### Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emissions reduction target will make it possible for California to reach its ultimate goal of reducing emissions

80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the state's Five-Year Infrastructure Plan.
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change.
- Factor climate change into state agencies' planning and investment decisions.
- Implement measures under existing agency and departmental authority to reduce GHG emissions (OGB 2015).

Executive Order B-30-15 required CARB to update the AB 32 Climate Change Scoping Plan to incorporate the state's target from 2020 to 2030. CARB adopted the 2017 Scoping Plan for achieving the 2030 target, which takes into account the key programs associated with implementation of the AB 32 Scoping Plan—such as GHG reduction programs for cars, trucks, fuels, industry, and electrical generation—and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the state using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the state's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the energy, transportation, industry, water, waste management, agriculture, and natural and working lands sectors (CARB 2017). The 2017 Scoping Plan does not address construction or restoration projects such as the PCRP.

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045. The actions and outcomes in the plan are intended to significantly reduce fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon. The 2022 Scoping Plan identities a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045 (CARB 2022b).

### Senate Bill 32 and Assembly Bill 197

On August 23, 2016, the California Assembly passed Senate Bill (SB) 32, legislation that would extend California's landmark climate change legislation to require that California reduce its emissions to 40 percent below 1990 levels by 2030, an extension of AB 32's goal to reduce emissions to 1990 levels. SB 32 became fully enacted the next day when AB 197 was passed, as an amendment to SB 32 stated that it would only become operative if AB 197 was enacted. AB 197's key components are the following:

- Direct CARB to incorporate environmental justice and social costs when designing climate change regulations.
- Create a new entity called the Joint Legislative Committee on Climate Change Policies, authorized to do fact-finding and make recommendations to the Legislature regarding the state's climate change programs.
- Make substantial changes to how CARB functions, including increasing the board member size, adjusting the terms of service, and strengthening the board member service disqualification process.
- Decrease CARB's reliance on cap-and-trade to achieve reductions and instead direct CARB to prioritize direct emissions reductions at large stationary sources.

### Executive Order B-55-18

In September 2018, Governor Edmund G. Brown Jr. issued Executive Order B-55-18 directing the achievement of carbon neutrality as soon as possible and no later than 2045. Achieving this ambitious goal requires both significant reductions in GHG emissions and removal of $CO_2$ from the atmosphere, including sequestration in forests, soils, and other natural landscapes. Reaching carbon neutrality requires working across all sectors. Executive Order B-55-18 ordered:

1. A new statewide goal to be established to achieve carbon neutrality as soon as possible, and no later than 2045, and achieve and maintain net negative emissions thereafter.
2. CARB to work with relevant state agencies to develop a framework for implementation and accounting that tracks progress toward this goal.
3. CARB to work with relevant state agencies to ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal.
4. The California Natural Resources Agency, the California Environmental Protection Agency, CARB, and the California Department of Food and Agriculture to include sequestration targets in the Natural and Working Lands Climate Change Implementation Plan consistent with the carbon neutrality goal.
5. All policies and programs undertaken to achieve carbon neutrality to seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities.
6. All policies and programs undertaken to achieve carbon neutrality to be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals.
7. State agencies to engage the support, participation, and partnership of universities, businesses, investors, and communities, as appropriate, to achieve the goals contained in this order.

### Advanced Clean Truck Regulation

The Advanced Clean Truck Regulation is part of a holistic approach to accelerate a large-scale transition of zero-emissions medium-and heavy-duty vehicles from Class 2b to Class 8. The regulation has two components including a manufacturer sales requirement and a reporting requirement (CARB 2021):

- **Zero-emissions truck sales**: Manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines would be required to sell zero-emissions trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, zero-emissions truck/chassis sales would need to be 55 percent of Class 2b to 3 truck sales, 75 percent of Class 4 to 8 straight truck sales, and 40 percent of truck tractor sales.
- **Company and fleet reporting:** Large employers including retailers, manufacturers, brokers, and others are required to report information about shipments and shuttle services. Fleet owners with 50 or more trucks are required to report about their existing fleet operations. This information will help identify future strategies to ensure that fleets purchase available zero-emissions trucks and place them in service where suitable to meet their needs.

### *Local*

#### Bay Area Air Quality Management District

The BAAQMD lays the groundwork for GHG emissions reductions through the 2017 Clean Air Plan (2017 CAP). The 2017 CAP provides a long-term vision of how the Bay Area could function in a year 2050 post-carbon economy and describes a control strategy to be implemented by BAAQMD. The 2017 CAP also includes measures to reduce GHG emissions; however, the measures do not address construction or restoration projects such as the PCRP (BAAQMD 2017a).

#### County of Santa Clara

In September 2009, the County released its *County of Santa Clara Climate Action Plan for Operations and Facilities* (County of Santa Clara 2009). This plan presented several solutions and policies that focus on County operations, facilities, and employee actions to reduce GHG emissions associated with energy and water consumption, solid waste, and fuel consumption. Since the plan focuses primarily on steps needed to reach the 10 percent reduction (13,346 metric tons) goal by 2015, it is now outdated. In addition, this plan applies to County government operations and facilities only, and thus it would not pertain to the PCRP.

On December 18, 2018, the Board of Supervisors of the County of Santa Clara adopted Resolution BOS-2018-145 to reaffirm and augment the County's GHG emissions reduction targets and establish a 100 percent carbon neutral by 2045 commitment for County of Santa Clara operations (County of Santa Clara 2018). The resolution applies to County government operations and facilities only; it would not pertain to the PCRP.

## 3.6.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.8 of the 2012 EIR determined that the Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

Updates to the CEQA Guidelines Appendix G Environmental Checklist that were finalized in December 2018 made no revisions to these significance criteria. Accordingly, these criteria remain relevant to this SEIR's consideration of whether the PCRP would cause any new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR.

## 3.6.3 Direct and Indirect Effects

### 3.6.3.1 Methodology

#### *Greenhouse Gas Emissions*

##### Significance Thresholds

The 2012 EIR relied on the methods and significance threshold identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After adoption of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in *California Building Industry Association v. BAAQMD* (2015) 62 Cal.4th 369, regarding analysis of exposure of new sensitive receptors to toxic air pollution and odors. However, the methods and GHG emissions significance criteria were not updated—the methods and significance criteria identified in the 2017 BAAQMD CEQA Guidelines for GHG emissions are the same as those identified in the 2010 BAAQMD CEQA Air Quality Guidelines (BAAQMD 2010) and used in the 2012 EIR.

In accordance with the BAAQMD CEQA Air Quality Guidelines, the 2012 EIR considered implementation of the Reclamation Plan Amendment to have a significant impact if it would emit GHG emissions greater than the BAAQMD's significance threshold of 1,100 metric tons per year $CO_2e$ from operational sources other than permitted stationary sources.[3] The 1,100 metric tons $CO_2e$ per year significance threshold was designed for the BAAQMD to meet the AB 32 goal of reducing GHG emissions to 1990 levels by 2020 by accounting for the Bay Area's share of land use sector GHG emissions reductions beyond the amount determined to be achievable at the state level. It is based on the AB 32 GHG reduction goals and a "gap analysis" that attributes an appropriate share of GHG emissions reductions to new land use development projects in the BAAQMD's jurisdiction. In 2022, the BAAQMD adopted CEQA Thresholds for Evaluating the Significance of Climate Impacts due to operations of Land Use Projects and Plans; however, those thresholds focus on residential and commercial projects, and do not address construction emissions such as those that would be generated by the PCRP. The BAAQMD has not yet developed a corresponding mass emissions threshold that extends beyond 2020 to be aligned with the SB 32 target for 2030. Although use of the 1,100 metric tons $CO_2e$ significance threshold was appropriate at the time of the 2012 EIR certification, that threshold is no longer appropriate for

[3] The 2012 Reclamation Plan Amendment did not propose any new or expanded stationary sources that emit GHGs.

analyzing the long-term GHG emissions of post-2020 proposed projects without an adjustment to be consistent with SB 32.

The PCRP would not involve long-term operational emissions, and short-term construction emissions would cease in 2027. AB 32 includes a statewide GHG reduction target to achieve 1990 levels by the year 2020, while SB 32 extends the statewide target to a reduction of 40 percent below 1990 levels by 2030. An appropriate threshold for PCRP is one that is adjusted to account for the SB 32 target, recognizing that important state initiatives (most notably, the vehicle fuel efficiency standards and the Renewables Portfolio Standard) are scheduled to reduce emissions substantially as the decade progresses. The most conservative approach would be to use a threshold based on the 2030 target, which would be consistent with a 2016 white paper by the Association of Environmental Professionals (AEP) Climate Change Committee recommendation that when a project is built out before the next milestone target year adopted by the state, the milestone year should be used as the basis for the project-level threshold (AEP 2016). Note that the AEP white paper is advisory only and is not binding guidance or an adopted set of CEQA thresholds.

Because BAAQMD has not adopted GHG-related CEQA significance thresholds for the SB 32 horizon year of 2030 that are relevant to the Project, and the County does not currently have a "qualified" GHG reduction strategy available, a specific Project-level threshold has been identified consistent with CEQA Guidelines Section 15064.4.[4] The 2020 mass emissions threshold is adjusted downward by 40 percent to be consistent with the 2030 SB 32 horizon year target, as shown below. Nevertheless, because the significance threshold used in the 2012 EIR was appropriate at the time of its certification, the total 2012 Reclamation Plan Amendment emissions, as revised to include the proposed PCRP emissions, are evaluated in this analysis using the 1,100 metric tons $CO_2e$ significance threshold. For informational purposes, the proposed PCRP incremental emissions beyond the emissions estimated for the 2012 Reclamation Plan Amendment in the 2012 EIR are also compared to the adjusted 2030 emissions threshold that is 40 percent below the 2020 mass emissions threshold of 1,100 metric tons $CO_2e$ per year, which is equivalent to 660 metric tons $CO_2e$ per year.

The significance thresholds discussed above are designed for long-term operational emissions. Because the PCRP would result in short-term activities to restore and modify approximately 9,000 linear feet of Permanente Creek and would not involve long-term operations, its total short-term emissions were amortized over the 20-year life of the 2012 Reclamation Plan Amendment (see 2012 EIR Section 2.1) before comparison to the significance thresholds.

### Emissions Estimates

Project-related GHG emissions typically fall into two categories: short-term emissions due to construction, and long-term emissions due to project operations; however, for the PCRP, GHG emissions would be generated on a short-term basis during construction over a period of

[4] A qualified GHG reduction plan is a previously adopted plan or mitigation program that a lead agency may use to determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project complies with the requirements of the plan and the plan was prepared pursuant to the requirements of CEQA Guidelines Section 15183.5.

approximately 6 years, and there would be no long-term sustained operational emissions. The PCRP would generate GHG exhaust emissions from construction equipment and vehicles. The construction-related scheduling, equipment, and trips assumptions and methods used to estimate GHG emissions associated with the PCRP are generally the same as those described for the air quality analysis in Section 3.1 (see *Criteria Pollutants Emissions* in Section 3.1.3.1, *Methodology*, and Appendix D, Exhibit A). To estimate $CO_2e$ emissions, global warming potentials from the IPCC Fourth Assessment Report (AR4) were applied to the $CH_4$ and $N_2O$ emissions.

As with the criteria pollutants, the modeled GHG emissions for each construction phase were multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable emissions (see *Emissions Applicability Factors* in Section 3.1.3.1, *Methodology*, and Appendix D, Exhibit A). Calculated emissions then were summed, amortized over the 20-year life of the 2012 Reclamation Plan Amendment, and added to the baseline emissions (see Section 3.6.3.2, *Baseline*) for comparison to BAAQMD's regional significance threshold to determine if the PCRP would have the potential for new significant direct, indirect, and/or cumulative environmental effects compared with the 2011 Creek Restoration Plan previously analyzed in the 2012 EIR. The incremental amortized PCRP emissions also are compared to the adjusted emissions threshold (refer to *Significance Thresholds* discussion above). Detailed emissions assumptions and summaries, including the California Emissions Estimator Model (CalEEMod) and EMFAC2021 assumptions and output, are included in Appendix D, Exhibit A.

### *Conflicts with Applicable Plans, Policies, or Regulations*

The BAAQMD CEQA Guidelines state that a project or plan that is consistent with an adopted GHG reduction strategy would be considered to have a less-than-significant impact. As noted above in Section 3.6.1.3, *Regulatory Setting*, the state has adopted the 2017 Scoping Plan and the 2022 Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not applicable to emissions generated by projects such as the PCRP.

Regarding SB 32, California's climate change legislation updated to require California to reduce its emissions to 40 percent below 1990 levels by 2030, PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 metric tons $CO_2e$ (see *Significance Thresholds*, above).

## 3.6.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that, in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein, as well as the approved 2012 EIR mitigation measures

that are conditions of the 2012 Reclamation Plan Amendment approval. For purposes of this analysis of potential impacts related to GHG emissions, the baseline is described below.

### *2012 EIR Baseline*

The baseline for the 2012 EIR reflects the same physical environmental conditions in the vicinity of the PCRP as identified in Section 3.1.3.2 for the air quality analysis. The baseline GHG emissions identified in the 2012 EIR analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The annual 2012 EIR baseline GHG emissions are shown in **Table 3.6-2**.

**TABLE 3.6-2**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL GHG EMISSIONS (METRIC TONS/YEAR)**

| Scenario | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|
| Baseline Emissions | 15,707 | <1 | <1 | 15,842 |
| 2012 Reclamation Plan Amendment Emissions | 20,587 | 1 | <1 | 20,762 |
| Maximum Annual Incremental Change | 4,880 | <1 | <1 | 4,920 |
| BAAQMD Threshold | -- | -- | -- | 1,100 |
| Significant Impact (Yes or No)? | -- | -- | -- | Yes |

SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2.

### *2012 Emissions and Analysis*

Baseline and maximum annual 2012 Reclamation Plan Amendment GHG emissions are summarized in Table 3.6-2, and the net change is compared to the BAAQMD annual significance threshold. As shown in Table 3.6-2, the 2012 Reclamation Plan Amendment was found to result in net GHG emissions that would exceed the significance threshold, and therefore was disclosed to result in a significant impact.

## 3.6.3.3 Direct and Indirect Effects of the Project

The analysis in this section evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to the baseline condition, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.6-1: The PCRP could result in an increase in greenhouse gas emissions and contribute to climate change.**

This impact analysis corresponds to significance criterion a) as set forth in Section 3.6.2 and addresses PCRP-generated GHG emissions that could contribute to climate change. In the context of Impact 4.8-1 (page 4.8-11 et seq.), the 2012 EIR concluded that interim reclamation activities, including those proposed within the PCRA, would result in net GHG emissions that would exceed the 1,100 metric tons per year threshold established by BAAQMD and would be significant; however, the significant impact was found to be reduced to a less-than-significant level with implementation of Mitigation Measures 4.8-1a and 4.8-1b. Mitigation Measure 4.8-1a required the preparation of an annual GHG emissions inventory for the 2012 Reclamation Plan Amendment, and Mitigation Measure 4.8-1b required the preparation and implementation of a GHG Emissions Reduction Plan containing quantifiable strategies to ensure that the 2012 Reclamation Plan Amendment-related incremental increase of GHG emissions do not exceed 1,100 metric tons $CO_2e$ per year. For the reasons discussed below, the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact related to significance criterion a).

As presented in the *Emissions Estimates* discussion in Section 3.6.3.1, *Methodology*, the GHG emissions that would be generated by the PCRP would be short term and periodic in nature and would occur during the dry seasons of 2024 through 2029. Below are summaries of the PCRP GHG emissions estimate results in terms of applicable PCRP emissions estimates compared to the CEQA baseline. For summaries of the total PCRP emissions estimates by phase prior to and after the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR, refer to Appendix D. It should be noted that current equipment and vehicle fleets operate more efficiently and generate fewer GHG emissions than those that were in place in 2012.

### PCRP Emissions Compared to CEQA Baseline

**Table 3.6-3** presents the net annual PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP amortized emissions would not be substantial in comparison to the maximum annual emissions disclosed in the 2012 EIR—the PCRP amortized emissions would slightly increase the net total maximum annual emissions by approximately 9 percent.

**TABLE 3.6-3**
**MAXIMUM ANNUAL NET GHG EMISSIONS (METRIC TONS/YEAR)**

| Scenario | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|
| 2012 Reclamation Plan Amendment Maximum Annual Incremental Change Disclosed in 2012 EIR* | 1,060 | <1 | <1 | 1,100 |
| PCRP Amortized Emissions not Evaluated in the 2012 EIR | 87.94 | <1 | <1 | 90.14 |
| Net Emissions | 1,148 | <1 | <1 | 1,190 |
| Net Emissions with Incorporation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b | --- | --- | --- | 1,100 |
| BAAQMD Threshold | --- | --- | --- | 1,100 |
| Significant Impact (Yes or No)? | | | | No |

NOTES:
* 2012 Reclamation Plan Amendment emissions reflect implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b.
SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2, and Appendix D, Exhibit A.

### Impact Conclusion

With the continued implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b pursuant to baseline conditions, implementation of the PCRP would result in revised 2012 Reclamation Plan Amendment emissions that would not exceed the BAAQMD's annual operational significance threshold of 1,100 metric tons $CO_2e$ per year, and the impact would be less than significant (see Table 3.6-3). In addition, the proposed PCRP incremental amortized emissions would be substantially less than the adjusted significance threshold of 660 metric tons $CO_2e$ per year, indicating that the proposed PCRP would be aligned with the SB 32 emissions reduction target for 2030 Accordingly, no new mitigation measures are merited or recommended. Further, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measures 4.8-1a and 4.8-1b. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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### Impact 3.6-2: The PCRP would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

As noted above in Section 3.6.1.3, *Regulatory Setting*, the state has adopted the 2017 Climate Change Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not applicable or have limited applicability to emissions generated by projects such as the PCRP. Regarding SB 32, the PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 metric tons $CO_2e$ per year.

Also, the 2017 Climate Change Scoping Plan includes a mobile source strategy that relies on the implementation of the federal phase 2 standards for medium- and heavy-duty vehicles and deploying increasing numbers of zero-emissions trucks primarily for classes 3 through 7 last-mile delivery trucks. While these strategies are not applied at a project-level, truck fleets would be subject to regulations adopted pursuant to these strategies including those truck fleets used to transport materials to and from the Project site.

In addition, the 2022 Scoping Plan identifies a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045. A similar commitment is not proposed for the PCRP-related construction equipment. However, the PCRP would be completed prior to the 2030 compliance date associated with the construction equipment sector action; therefore, it would not be directly applicable to the PCRP.

In summary, the PCRP would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, no impact would result and implementation of the PCRP would result in **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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## 3.6.4 Cumulative Analysis

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.8, *Greenhouse Gas Emissions* (page 6-22), concluding that the 2012 Reclamation Plan Amendment, including creek restoration within the PCRA, would not result in a cumulatively considerable contribution to any significant cumulative effect with implementation of Mitigation Measures 4.8-1a and 4.8-1b. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context than was disclosed in the 2012 EIR.

GHG emissions-related impacts are by their nature exclusively cumulative impacts; there are no non-cumulative GHG emissions impacts from a climate change perspective. Thus, the analysis and conclusions provided in Section 3.6.3, *Direct and Indirect Effects*, for Impacts 3.6-1 and 3.6-2 also are the cumulative effects analysis of GHG emissions. In summary, PCRP emissions of GHGs would be less than significant with the ongoing implementation of the 2012 EIR mitigation measures (see Impact 3.6-1), and the Project would not conflict with any plans, policies, or regulations to reduce GHGs (see Impact 3.6-2). Thus, the PCRP would not result in a cumulatively considerable contribution to a cumulative GHG emissions impact.

**Baseline Mitigation from 2012 EIR:** Mitigation Measures 4.8-1a and 4.8-1b. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.

**Additional Mitigation:** None required.

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## 3.6.5 References

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# 3.7 Hydrology and Water Quality

This section identifies and evaluates issues related to surface water and groundwater hydrology, water quality, and flood hazards to determine whether the PCRP, including its revisions to the 2011 Creek Restoration Plan that are a component of the 2012 Reclamation Plan Amendment, would cause one or more new significant impacts or a substantial increase in the severity of one or more significant impacts previously disclosed and evaluated in the 2012 EIR. To do this, this analysis focuses on three things: (1) PCRP areas that are outside of the existing Reclamation Plan boundary (for which Grading Approval would be required); (2) PCRP areas within the Reclamation Plan boundary and within the 120-acre PCRA but outside of the PCRA's 49.2-acre disturbance area; and (3) more generally, whether the PCRP proposes work at greater intensity than previously considered in the 2012 EIR. As a result, Reaches 6–13 and Reaches 17 and 18 are key areas for evaluation.[1]

This section describes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment relative to the 2012 EIR. This analysis is based in part on information contained in the following technical reports prepared on behalf of Lehigh:

- Waterways Consulting, Inc., 2022. Permanente Creek Restoration Plan: Updated 90% Level Submittal, Design Basis Technical Memorandum, August 2022 (**Appendix C**).
- GEI Consultants, Inc., 2021. Aquatic Resources Report, Preliminary Delineation of Waters of the United States, Including Wetlands, November 2021 (**Appendix E2**).

The preparers of this Draft SEIR independently reviewed these reports and other materials prepared by or on behalf of Lehigh and determined that they can be relied on (in combination with other materials included in the formal record) in the preparation of this Draft SEIR. Public comments received by the County on the Notice of Preparation (**Appendix A**, *Scoping Report*) that are relevant to water resources included concerns that implementing the PCRP could degrade surface water quality by depositing sediment and other pollutants into Permanente Creek; result in altered streamflows in surface waters downgradient of the Project site, causing flood hazard risks; and contribute overburden or sediments from erosion on haul roads and spoil piles to surface waters. These considerations are addressed in this section.

## 3.7.1 Setting

### 3.7.1.1 Study Area

The "study area" for this analysis of potential impacts related to surface water and groundwater hydrology, water quality, and flood-related hazards consists of the Project site described in Section 2.3.2 of the Project Description and shown in **Figure 2-3**. It also includes Permanente

[1] See Section 2.4, *Correlation between 2012 EIR PCRA and the PCRP*, which correlates the restoration activities described and analyzed in the 2012 EIR with the restoration activities described in the PCRP and analyzed in this SEIR. Section 2.5, *Permanente Creek Restoration Plan*, details the PCRP's proposed activities on a reach-by-reach basis.

Creek downgradient of the Project site in the lower portions of the Permanente Creek watershed, as described in the environmental setting for the 2012 EIR's consideration of hydrology and water quality (Draft 2012 EIR Section 4.10.1.2, page 4.10-1 et seq.).

## 3.7.1.2 Environmental Setting

Section 4.10.1 of the Draft 2012 EIR described the environmental setting for the 2012 EIR's consideration of hydrology and water quality, including climate and precipitation (Section 4.10.1.1, page 4.10-1 et seq.); surface water hydrology, drainage, water quality, and flooding (Section 4.10.1.2, page 4.10-1 et seq.); and groundwater hydrology and groundwater quality (Section 4.10.1.3, page 4.10-17 et seq.). These descriptions remain accurate for purposes of this analysis of the PCRP except as supplemented below.

### *Boulder Removal*

The County's conditions of approval (COAs) of the 2012 Reclamation Plan Amendment (see Appendix H to this SEIR) included COAs 38–41, which address water quality, reclamation, and restoration of Permanente Creek within the PCRA. COA 39 required the identification and removal of limestone boulders within the PCRA that previously dispersed into Permanente Creek as a result of mining operations, unless it is demonstrated that the boulders are not a significant source of selenium, and that removing the boulders would result in impacts on Permanente Creek habitat by destabilizing the creek channel or increasing the mobilization of sediment in surface waters. If all such circumstances were identified, the boulders would be allowed to remain in place, consistent with the "Best Management Practice for Removal of Limestone Boulders from Permanente Creek" defined in the 2012 Reclamation Plan Amendment (County of Santa Clara 2013).

In 2012, consistent with COA 39, the Permanente Quarry submitted a detailed survey that provided the County a detailed description of the location, size, and condition of boulders in the Permanente Creek corridor; documentation of the associated impacts on the creek that would result from removal of the boulders; and a water quality analysis that assessed the potential for the boulders to leach selenium into the waters of Permanente Creek (County of Santa Clara 2013). These submitted materials identified that removing the boulders would likely result in substantial stability impacts on the creek channel and that the boulders are not a significant source of selenium. These materials were peer reviewed by an independent third-party geologist and other technical consultants retained by the County, who concurred with these conclusions. After the evaluation of boulder removal associated with COA 39, it was determined that the identified boulders would remain in place. All other 2012 Reclamation Plan Amendment conditions of approval regarding creek restoration still apply (see Appendix H).

In 2013, the Permanente Quarry entered into a settlement agreement with the Sierra Club that extends beyond the 2012 Reclamation Plan Amendment COA. The settlement agreement was amended in 2016 to reflect the Project being considered here. The Amended Consent Decree (Appendix B) included provisions that boulders sourced from limestone-containing mine wastes or overburden not to be used as part of the PCRP. The boulders identified in the detailed survey

reside in the Material Removal Area; Lehigh would evaluate which boulders to use or remove as part of the PCRP in accordance with the provisions of the Amended Consent Decree.

### *Quarry Drainage and Surface Water Quality*

The Draft 2012 EIR describes drainage patterns and water quality associated with the quarry area (Section 4.10.1.2, page 4.10-3 et seq.). At the time the Draft 2012 EIR was being written, water that drained to the quarry pit, including the majority of runoff from the West Material Storage Area, was pumped out of the pit and discharged directly to Permanente Creek. As described in the Draft 2012 EIR under "Surface Water Quality" (Section 4.10.1.2, page 4.10-4), an important characteristic of the Project area with respect to water quality is the leachability of various constituents, particularly selenium, from rocks at the site. In the vicinity of the quarry, previous investigations documented that the existing concentrations of total dissolved solids (TDS), sulfate, some metals including selenium and mercury, and suspended sediments are relatively high in stormwater and in Permanente Creek. Subsequent study has confirmed that mercury is not a concern.[2]

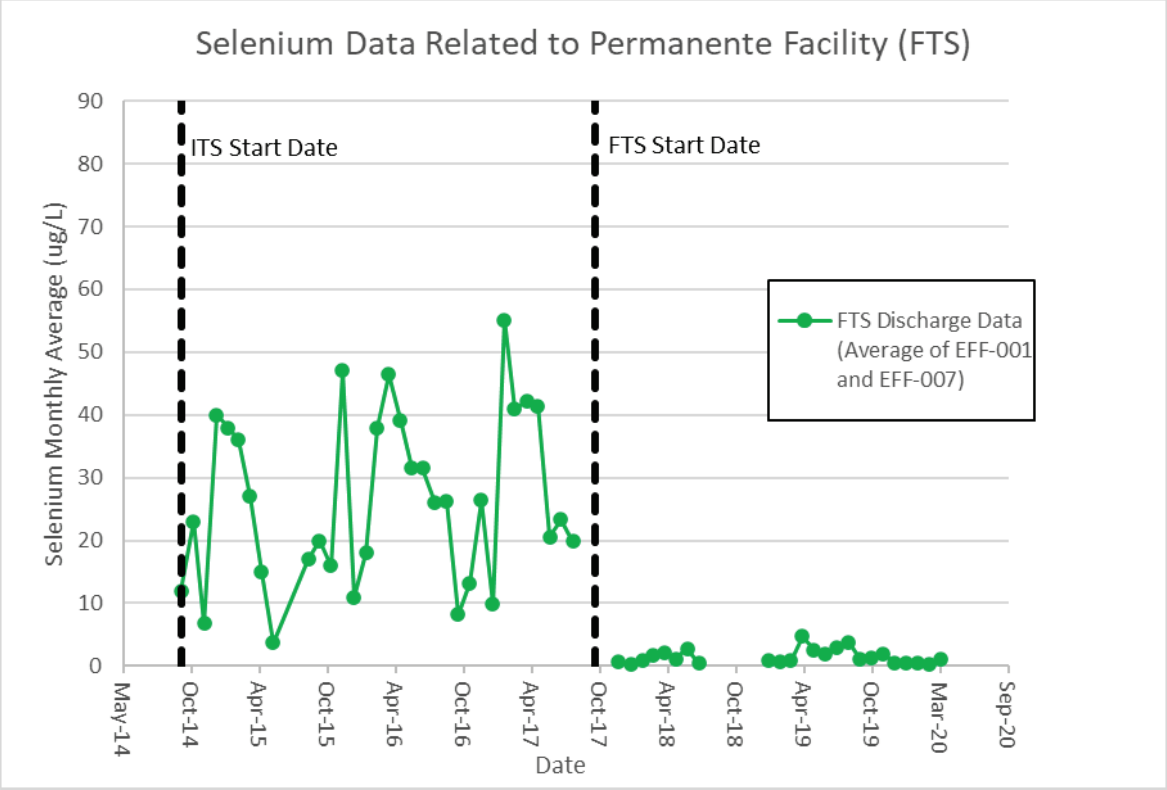
Permanente Creek is listed as impaired for diazinon, selenium, trash, and water toxicity on the 303(d) list of impaired water bodies for the waters within the region of the San Francisco Bay Regional Water Quality Control Board (RWQCB) (U.S. EPA 2021). Additionally, the upper Permanente Creek watershed has been documented as having a generally high sediment yield, in part because of historical activities associated with the quarry and the management of overburden storage. Current regulatory requirements and on-site controls largely control current inputs. Pursuant to the terms of the facility's National Pollutant Discharge Elimination System (NPDES) permit (Order No. R2-2019-0024, NPDES Permit No. CA0030210), the listed impairments, to the extent applicable to the upper Permanente Creek watershed (selenium and water toxicity), are being addressed via the discharge requirements contained therein (San Francisco Bay Regional Water Quality Control Board, 2019)

Since the County's certification of the 2012 EIR, and to comply with the requirements of the facility's NPDES permit and the associated Cease and Desist Order R2-2014-0011 as amended by the San Francisco Bay RWQCB through Order No. R2-2017-0031, Lehigh implemented significant infrastructure improvements to treat and control process and stormwater flows at the facility (process and/or stormwater flows related to the quarry, West Material Storage Area, East Material Storage Area, and cement plant) to reduce discharges containing selenium and other pollutants to Permanente Creek.

The facility's process water treatment system, called the Final Treatment System (FTS; an Upper FTS and Lower FTS location exist), treats all process and commingled stormwater flows at the facility and is effective at reducing pollutants, including selenium and other metals, to below numeric limits required by the quarry's NPDES permit. Before the FTS was installed, Lehigh

[2] Evaluation by the San Francisco Bay Regional Water Quality Control Board of discharge and receiving water samples as part of Lehigh's most recent National Pollutant Discharge Elimination System permit/waste discharge requirements (Regional Water Board Order No. R2-2019-0024) concluded that Lehigh needed no restrictions (e.g., discharge or other limits) on mercury, as all the levels (discharge and ambient background conditions) were below regulatory criteria.

installed an Interim Treatment System to provide partial treatment of quarry pit flows while optimizing the design for the FTS. Lehigh has also made improvements to drainage swales and enhanced stormwater controls on-site for the remaining stormwater discharge not sent to the FTS (e.g., the Pond 20 drainage area) (Lehigh 2018). Additionally, areas within the East Material Storage Area were covered with non-limestone materials and hydroseeded in 2015. Ongoing surface water quality monitoring at the quarry (Golder 2020a) demonstrates that, in general, on-site selenium concentrations in the stormwater runoff and slope-toe seeps have been decreasing since these other improvements (Sutro 2018). Baseline water quality at the facility and in Permanente Creek, especially downstream of Discharge Points EFF-001 (Upper FTS) and EFF-007 (Lower FTS) to Permanente Creek, are significantly improved overall (Figure 3.7-1) as compared to the description presented in the Draft 2012 EIR under "Surface Water Quality" (Section 4.10.1.2, page 4.10-4 et seq.).




NOTE: Any gaps in the data represent periods of no discharge. Routine water quality monitoring at National Pollutant Discharge Elimination System (NPDES) Discharge Points EFF-001 and EFF-007 have documented monthly average selenium concentrations ranging from less than 1 microgram per liter (µg/L) to Non-Detect, below the NPDES effluent limitation of 3.7 µg/L, from April 2018 to the most recently reported monitoring period in November 2021. The facility has not discharged from either of these locations since March 2020.

SOURCES: U.S. EPA 2022; Lehigh 2018.

**Figure 3.7-1**
Monthly Average Selenium Concentration in Quarry Discharges to Permanente Creek

## 3.7.1.3 Regulatory Setting

Section 4.10.1.4 of the Draft 2012 EIR (page 4.10-17 et seq.) described the regulatory setting for the analysis of potential impacts on hydrology and water quality, including federal, state, and local laws, regulations, plans and policies applicable to the analysis of the proposed creek restoration and other Project components that were considered in the 2012 EIR. The section summarized provisions of the Federal Emergency Management Agency (FEMA); the Clean Water Act, including the NPDES Program (Clean Water Act Section 402); the Porter-Cologne Water Quality Control Act; the Surface Mining and Reclamation Act; and County ordinances and other local plans, and policies. The description of the regulatory setting remains accurate for purposes of this analysis of the PCRP except as supplemented below.

### *State*

#### NPDES Construction General Permit

The State of California adopted an NPDES construction general permit on September 2, 2009 (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit). The Construction General Permit regulates stormwater management at construction sites. Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, must obtain coverage under the general permit for discharges of stormwater associated with construction activity. The Project would be required to comply with the permit requirements to control stormwater discharges from the sites where Project elements are being constructed or implemented. Construction activity subject to the Construction General Permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation. Portions of the Project may fall under the Type 1 Linear Underground/Overhead Projects (or "LUP") category, which covers construction activities associated with the installation of underground linear facilities (such as pipelines and substructures), if the following conditions are met:

(1) Construction occurs on unpaved improved roads, including their shoulders or land adjacent to them.

(2) The areas disturbed during a single construction day are returned to their preconstruction condition, or to an equivalent condition (i.e., disturbed soils such as those from trench excavation are hauled away, backfilled into the trench, and/or placed in spoils piles and covered with plastic), at the end of that same day.

(3) Vegetated areas disturbed by construction activities are stabilized and revegetated at the end of the construction period.

(4) When required, adequate temporary soil stabilization best management practices (BMPs) are installed and maintained until vegetation has reestablished to meet the permit's minimum cover requirements for final stabilization.

In the study area, the Construction General Permit is implemented and enforced by the San Francisco Bay RWQCB, which administers the stormwater permitting program. To obtain coverage under this permit, project operators must electronically file permit registration

documents, which include a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other compliance-related documents. An appropriate permit fee must also be mailed to the State Water Resources Control Board (SWRCB).

The SWPPP identifies BMPs that must be implemented to reduce construction effects on receiving water quality based on potential pollutants. The BMPs identified are directed at implementing both sediment and erosion control measures and other measures to control potential chemical contaminants. In addition, the SWPPP must contain a visual monitoring program and a sediment monitoring plan if the site discharges directly to a water body listed on the Clean Water Act Section 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing, and fueling. The SWPPP also describes the BMPs for reducing pollutants in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs). Dischargers are responsible for notifying the RWQCB of violations or incidents of non-compliance, and for submitting annual reports identifying deficiencies of the BMPs and explaining how the deficiencies were corrected.

The Construction General Permit requires a site-specific risk-level assessment,[3] an active stormwater effluent monitoring and reporting program during construction (for Risk Level 2 and 3 sites), rain event action plans for certain higher risk sites,[4] and numeric effluent limitations for pH and turbidity. It also includes requirements for qualified professionals who prepare and implement the plan: The risk assessment and SWPPP must be prepared by a state-certified Qualified SWPPP Developer and SWPPP implementation must be overseen by a state-certified Qualified SWPPP Practitioner.

### Individual NPDES Permit

Subsequent to the 2012 EIR, the facility obtained an individual facility-wide NPDES permit, NPDES Permit Number CA0030210, currently embodied in RWQCB Order Number R2-2019-0024 (Individual NPDES Permit). The facility has an updated SWPPP and Municipal Regional NPDES Stormwater Permit (Golder 2020b) that conform to the requirements in the Individual NPDES Permit. The SWPPP is intended to achieve two purposes:

(1) Identify and evaluate sources of pollution associated with industrial activities that could affect the quality of stormwater and authorized non-stormwater discharged from the facility.

(2) Identify site-specific BMPs that the facility must implement to minimize or prevent discharge of pollutants associated with industrial activities that may be in stormwater.

[3] The Construction General Permit defines three levels of risk that may be assessed for a construction site: Risk Levels 1, 2, and 3. Risk is calculated based on the "project sediment risk," which determines the relative amount of sediment that can be discharged given the project and location details, and the "receiving water risk" (the risk that sediment discharges pose to the receiving waters).

[4] Those sites that have a high potential for mobilizing sediment in stormwater and drain to a sediment-sensitive water body.

The SWPPP addresses elimination of non-stormwater discharges, pollutant sources and associated BMPs, stormwater management, sedimentation and erosion control practices, preventative maintenance and good housekeeping practices, spill prevention and response, inspections, recordkeeping, and employee training.

### Anti-Degradation Policy

The SWRCB's Anti-Degradation Policy, known as the Statement of Policy with Respect to Maintaining High Quality Water in California (SWRCB Resolution No. 68-16), restricts degradation of surface water and groundwaters in circumstances specified by Resolution 68-16. Specifically, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses and requires that existing high quality be maintained to the maximum extent possible.

Under the Anti-Degradation Policy, any actions that can adversely affect water quality in high-quality surface waters and groundwaters must: (1) be consistent with maximum benefit to the people of California; (2) not unreasonably affect present and anticipated beneficial uses of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters of the United States are also subject to the federal Anti-Degradation Policy (Code of Federal Regulations Title 40, Section 131.12) developed under the Clean Water Act. Discharges from the Project that could affect surface water quality would be required to comply with both the state and federal anti-degradation policies, included as part of the NPDES permit requirements for point discharges.

### California Fish and Game Code

The California Department of Fish and Wildlife (CDFW) is authorized, under Fish and Game Code Sections 1600–1616, to regulate activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes. CDFW's jurisdictional limits are defined in Fish and Game Code Section 1602 as the "bed, channel, or bank of any river, stream, or lake."

In practice, CDFW may exert authority over activities that would adversely affect any fish and wildlife resources associated with such features. The Fish and Game Code prohibits activities that would "deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake," or that would obstruct the flow or alter the bed, channel, or bank of a river or stream (including intermittent and ephemeral streams) where there may be substantial adverse effects on a fish or wildlife resource, unless the applicant provides a notification of lake or streambed alteration and enters into a Lake and Streambed Alteration Agreement (LSAA) with CDFW that includes measures to protect fish and wildlife resources.

## 3.7.2 Significance Criteria

Consistent with the County of Santa Clara Environmental Checklist and the version of the CEQA Guidelines Appendix G Environmental Checklist that was in effect at the time, Section 4.10 of

the 2012 EIR determined that the proposed 2012 Reclamation Plan Amendment, including creek restoration work within the PCRA, would have a significant impact if it would:

a) Violate any water quality standards or waste discharge requirements;

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);

c) Substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or sedimentation on- or off-site;

d) Substantially alter the existing drainage pattern of a site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

f) Otherwise substantially degrade water quality;

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam; or inundation by seiche, tsunami, or mudflow;

j) Be located in an area of special water quality concern (e.g., the Los Gatos or Guadalupe watershed);

k) Be located in an area known to have high levels of nitrates in well water;

l) Result in a septic field being constructed on soil where a high water table extends close to the natural land surface;

m) Result in a septic field being located within 50 feet of a drainage swale, 100 feet of any well, water course or water body, or 200 feet of a reservoir at capacity; or

n) Conflict with the *Water Collaborative Guidelines and Standards for Land Uses Near Streams* (Water Collaborative Guidelines).

Updates to the CEQA Guidelines Appendix G Environmental Checklist that were finalized in December 2018 made only non-substantive revisions to these significance criteria. Specifically, the criteria were revised to include a consideration of whether project inundation by floodwaters would result in the release of pollutants and whether implementation of a project would conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Accordingly, these criteria remain relevant to this SEIR's consideration of

whether the PCRP would cause any new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR.

## 3.7.3 Direct and Indirect Effects

### 3.7.3.1 Methodology

The impacts of implementing the PCRP are evaluated for surface water hydrology and water quality impacts that may occur during Project construction and after the completion of the proposed restoration activities. Direct and indirect impacts on surface water hydrology and water quality could occur during on-land or in-water construction activities or after the completion of restoration activities, due to long-term effects related to the alteration of the Permanente Creek channel, bed, banks, and floodplain. The impact analyses determine whether and to what degree the Project could change the existing hydrology, water quality, and flooding conditions described in Section 3.7.1 and identify whether the Project would cause a new significant impact or a substantial increase in the severity of a significant impact than identified in the 2012 EIR. The severity of an impact is determined based on the significance criteria identified in Section 3.7.2.

Compliance with applicable federal, state, and local laws and regulations is incorporated into the analysis of impacts because such compliance is mandatory and the application of the associated protective measures (such as BMPs, monitoring and reporting plans, and corrective actions) is proven to minimize and/or avoid impacts on hydrology or water quality. Further, regulatory agencies with technical jurisdiction and authority for oversight would require adherence to regulatory requirements as a condition of Project or permit approval and would continue to enforce applicable requirements throughout the Project's construction and operation phases.

The analysis considers whether compliance with regulatory requirements designed to protect water resources would be adequate such that the Project would not cause a new significant impact or a substantial increase in the severity of a significant impact than identified in the 2012 EIR related to hydrology and water quality.

### 3.7.3.2 Baseline

Section 3.0.1, *Environmental Baseline*, explains that in the context of an SEIR, the CEQA baseline is adjusted such that the originally approved project is assumed. Therefore, the baseline used in this analysis to evaluate the impacts of the PCRP and alternatives consists of existing environmental conditions plus the 2012 Reclamation Plan Amendment and 2012 EIR, and the creek restoration plans evaluated therein.

For purposes of this analysis of potential impacts on hydrology and water quality, the baseline includes the area of existing surface mining disturbance and the approved extent of disturbance and reclamation, including mitigation measures and COAs imposed as part of the 2012 EIR and 2012 Reclamation Plan Amendment. This includes restoration of Permanente Creek within the 49.2-acre disturbance area identified within the PCRA. The baseline also includes the existing physical conditions of Permanente Creek, its adjacent riparian area, and drainage patterns within

the PCRA but outside the approved disturbance envelope, and existing physical conditions within the PCRP implementation area but outside the existing Reclamation Plan boundary.

### 3.7.3.3 Discussion of Criteria with No Impact on Hydrology or Water Quality

As set forth in Section 4.10.4 of the Draft 2012 EIR, criteria b), g), i), k), l), m), and n) were eliminated from more detailed consideration in the 2012 EIR for the reasons explained on Draft 2012 EIR pages 4.10-27 to 4.10-29. For the reasons explained there, and as supplemented below, these criteria also are not analyzed further in this SEIR.

Related to criterion n), although the PCRP includes new and additional work in and adjacent to Permanente Creek compared to that described in the 2012 EIR within the PCRA, implementation of the PCRP would not conflict with the *Water Collaborative Guidelines and Standards for Land Uses Near Streams* (County of Santa Clara 2007). The Water Collaborative Guidelines were developed collaboratively among the participating jurisdictions and stakeholders and do not represent a substantial departure from existing County policies and practices. Rather, they supplement, clarify, and provide information to the Water Collaborative Guidelines' users, such as the County, but do not impose any new regulatory requirements relevant to the PCRP.

Existing County policies, standards, discretionary permit requirements, and review procedures, including those under CEQA, are substantially consistent with the Water Collaborative Guidelines. Therefore, other than the issues addressed below in the context of the County's Environmental Checklist and the version of the Environmental Checklist that was in effect at the time of the 2012 EIR, no other aspects of the PCRP would conflict with the Water Collaborative Guidelines, and this issue is not discussed further.

### 3.7.3.4 Direct and Indirect Effects of the Project

The analysis in this section evaluates the potential significance of the change in the physical environment that would be caused by implementation of the PCRP relative to baseline conditions, compares that impact conclusion with the impact conclusion reached in the 2012 EIR regarding the same consideration, and then makes a determination as to whether the implementation of the PCRP would cause one or more new significant impacts or a substantial increase in the severity of significant impacts than were disclosed in the 2012 EIR. For the reasons discussed below, implementation of the PCRP would not cause a new significant impact or a substantial increase in the severity of a significant impact than was disclosed in the 2012 EIR.

**Impact 3.7-1: Construction of the PCRP would not violate water quality standards, waste discharge requirements, or otherwise substantially degrade water quality.**

This impact analysis corresponds to significance criteria a) and f) as set forth in Section 3.7.2 and addresses whether implementation of the PCRP would violate any water quality standards or waste discharge requirements, or otherwise substantially degrade surface water or groundwater quality such that a new significant impact, or a substantial increase in the severity of a significant impact than identified in the 2012 EIR, would occur. In the context of Impact 4.10-2 (page 4.10-

42 et seq.), the 2012 EIR concluded that interim activities proposed within the PCRA would involve active ground disturbance by excavation, grading, stockpiling, hauling, and conveyor operation. Such activities have the potential to produce runoff, to be subject to erosion, and to discharge sediment and other pollutants to Permanente Creek. Sediment control BMPs would be implemented as needed in accordance with the drainage plan and SWPPP, but more rigorous control would be necessary to avoid introducing sediment, waterborne selenium, and TDS into the drainage channels, desiltation basins, and Permanente Creek. However, implementation of Mitigation Measures 4.10-2a and 4.10-2b would reduce the impact to a less-than-significant level by requiring the aggressive use of interim BMPs to protect areas that are disturbed, temporarily inactive, and partially reclaimed from stormwater runoff and erosion. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criteria a) and f).

Project construction would include staging of construction equipment and material, earthwork, demolition and removal of existing in-channel features (such as culverts and pond impoundments), channel realignment, placement of fill and gravels, vegetation removal, and riparian planting. Stormwater runoff from disturbed soils associated with construction activities is a common source of pollutants (mainly sediment) introduced to receiving waters. Earthwork can render soil and sediments more susceptible to erosion from stormwater runoff, causing these materials to migrate in stormwater runoff to downgradient water bodies. In addition, Project construction could involve the use of various materials typically associated with construction activities, such as solvents, oil and grease, and petroleum hydrocarbons. If handled in a manner inconsistent with manufacturer recommendations or safety recommendations and requirements, these materials could be inadvertently released, mobilized, and transported off-site by stormwater runoff.

As described in Section 2.5.6, *Vegetation and Erosion Protection*, and Section 2.5.9, *Best Management Practices and Applicant-Proposed Measures*, BMPs and applicant-proposed measures (APMs) would help avoid or minimize impacts related to water quality. Additionally, because the PCRP exceeds 1 acre in size, Lehigh would be required to comply with the Construction General Permit and to prepare a SWPPP describing the BMPs it must implement to control potential water quality pollutants and prevent or minimize erosion and sedimentation. The BMPs are designed to prevent pollutants from contacting stormwater, to contain erosion, and prevent stormwater pollutants generated during construction on-site from entering off-site receiving waters.

Typical BMPs include the placement of fiber rolls or gravel barriers to detain small amounts of sediment from disturbed areas, and temporary or permanent covering of stockpiles to prevent rainfall from contacting the stockpiled material. In addition to erosion control BMPs, SWPPPs include BMPs for preventing the discharge of pollutants other than sediment (e.g., paint, solvents, concrete, petroleum products) to downstream waters. BMPs for pollutants include conducting routine inspections of equipment for leaks, maintaining and managing material containers to ensure that they are intact and clearly labeled, and ensuring that construction materials are disposed of in accordance with applicable regulations. Under the provisions of the Construction General Permit,

the state-certified QSD is responsible for determining the site's risk level for sediment transport, developing the SWPPP, and managing its implementation. Compliance with the Construction General Permit is required by law and has proven effective in protecting water quality at construction sites.

Further, the Project would be required to obtain a Clean Water Act Section 404 permit from the U.S. Army Corps of Engineers, a Clean Water Act Section 401 water quality certification from the San Francisco Bay RWQCB, and a Fish and Game Code Section 1600 LSAA from CDFW before initiating any construction activities. These permits require targeted avoidance and minimization measures, performance standards, and implementation of BMPs that are specific to construction within and adjacent to stream channels, floodplains, and the riparian zone. Typical requirements include minimizing vegetation removal, using hand tools to reduce soil disturbance for earthwork on or near steep slopes, restricting vehicle refueling or maintenance within stream channels, implementing erosion and control measures, diverting runoff from steep erodible areas to stable locations, and implementing seasonal work windows to avoid construction within flowing waters.

### Summary

Compliance with the requirements of the Construction General Permit, Section 404 Clean Water Act permit, Section 401 water quality certification, and Section 1600 LSAA, in addition to implementation of the BMPs and APMs proposed as part of the Project, would avoid or minimize the discharge of pollutants to surface waters or groundwater, and would minimize or eliminate potential degradation of surface water or groundwater quality during construction of the Project. For example, consistent with the recommendation made in the *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* (90% Design Memo) (Appendix C) and as stated in BMP-8 in Section 2.5.9.1, of Chapter 2, *Project Description*, Lehigh would conduct construction activities only during the summer months when Permanente Creek flow and precipitation is typically at a seasonal low, reducing the potential for storm runoff–based erosion and the transport of sediment to downstream waters. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR related to the violation of water quality standards, waste discharge requirements, or the degradation of water quality.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measures 4.10-1a: and 4.10-1b. The text of each is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.7-2: The PCRP would not substantially alter existing drainage patterns, including through the alteration of Permanente Creek, in a manner that would result in substantial erosion, sedimentation, or additional sources of polluted runoff.**

This impact analysis corresponds to significance criteria c) and e) as set forth in Section 3.7.2 and addresses whether alterations to Permanente Creek, including the bed, banks, channel alignment, floodplain, riparian zone, and adjacent slopes and access roads, would alter the hydrologic regime along Permanente Creek such that substantial erosion and/or sedimentation occurs, including as a result of slope instability. In the context of Impact 4.10-3 (page 4.10-47 et seq.), the 2012 EIR analysis determined that the actions proposed for the PCRA would result in a less-than-significant impact because they would stabilize slopes adjacent to the creek; remove active sources of sediment, selenium (i.e., removal of limestone boulders), and TDS; revegetate eroded soil areas; remove instream structures; and regrade and restore the creek within several reaches. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criteria c) and e).

After the completion of the PCRP, the improved and restored channel of Permanente Creek would cause the creek to follow a new course. Depending on the change in the water surface slope, the geometry of the altered channel bed and banks, and the establishment of floodplain areas, an increase in flow depth within Permanente Creek could translate to an increase in flow velocity and a subsequent increase in the channel's capacity to erode and mobilize bed and bank sediments (hydromodification). Understanding sediment transport and the conditions under which sediment is deposited or eroded from altered streams is important to understanding and managing hydromodification, erosion, and sedimentation. The 90% Design Memo (Appendix C) describes in detail the model analyses conducted to inform the design of the PCRP such that hydromodification-related impacts are avoided, as summarized in the following discussion.

The PCRP has been designed to ensure channel stability and maintain the continuity of natural sediment transport within the improved and restored channel it would establish in Permanente Creek. Also, floodplain areas constructed as part of the PCRP would create depositional zones for sediment to reduce sediment transport and improve water quality as compared to the baseline.

Pre- and post-Project channel hydraulics were modeled as part of Project design development to ensure channel stability (Appendix C), including during the years immediately after construction while vegetation is becoming established and exposed soils have a greater potential for erosion. Channel hydraulics were modeled using Hydrologic Engineering Center River Analysis System (HEC-RAS) 5.0.4 river analysis software[5] under a range of flow regimes (1.5-year, 10-year, and 100-year flows). HEC-RAS results confirmed that appropriate bankfull channel dimensions were incorporated into PCRP designs based on drainage areas and watershed characteristics. Model results were also used to evaluate the sizing of streambed gravels (e.g., engineered streambed material), and channel stability and erosion protection. Based on the HEC-RAS modeling, surface treatments and grade control elements have been incorporated into the PCRP design to minimize

[5] HEC-RAS river analysis software was developed by the U.S. Army Corps of Engineers and is a standard model used for such assessments.

and/or avoid episodic or chronic releases of sediments to the creek during Project implementation. A full description of the design elements is presented in Appendix C; those relevant to erosion, sedimentation, and water quality are summarized below:

(1) **Use of engineered streambed material[6] (ESM) as channel substrate where the bed is reconstructed, consistent with CDFW design guidelines.** ESM would be mixed based on engineering requirements incorporated into the Project design and placed in appropriate locations to look and behave like a natural streambed (see Appendix C, Sheet C36). The ESM material has been designed to remain stable during the 100-year recurrence interval flow, with only minor adjustments to channel shape in reaches with bed slopes less than approximately 6–8 percent. In steeper reaches, the ESM is designed to adjust as occurs naturally in streams to form new pools and altered step geometry in response to flood flows.

(2) **Use of floodplain armor to protect newly constructed floodplain surfaces.** The floodplain armor has been sized similarly to ESM, using CDFW design guidelines, and is designed to be stable under design flood flows while providing appropriately sized material to enhance constructed floodplain habitats. Sufficient fine material has been included to ensure that vegetation can establish. As with the ESM, the floodplain armor has been designed to remain stable during a 100-year flood event.

(3) **Use of vegetated rock slope protection, including boulders of a specified gradation with live stakes[7] to protect newly constructed streambanks that are steeper than 2:1 horizontal:vertical (H:V)**. Rock slope protection is proposed to provide channel stability at the removal areas for Culverts #7 and #9, where the south bank would be left in an over-steepened condition after culvert removal, and where the floodplain bench conforms to the inlet of Culvert #6 at the downstream end of the Channel Widening Area.

(4) **Use of boulder sills.** Boulder sills would periodically extend across the proposed floodplains to serve as grade control if significant erosion were to occur along floodplain areas.

(5) **Use of boulder weirs**. Weirs would be incorporated into the ESM and keyed into the floodplain armor to provide grade control at locations of energy dissipation where channel flow plunges into pools.

(6) **Rapidly establishing vegetation.** In disturbed work areas, vegetation that can rapidly establish roots would be used to stabilize soils and reestablish a dense riparian canopy. Vegetation, including live stakes, container plants, and seeding, would be established to provide rooting strength to help reinforce substrate along the channel, at floodplain and riparian areas, and on newly constructed creek banks. Revegetation would also be the primary means of erosion control on slopes above the limits of floodplain armor (i.e., 10-year water surface). These areas would be seeded and planted.

(7) **Erosion control BMPs.** Although revegetation would be the primary means of erosion control, mulch, erosion control fabric and fiber rolls, and sediment barrier fencing would also be used while vegetation becomes established and/or as appropriate, pending constructed geometry and on slopes over 2.5:1 (H:V).

6 ESM refers to a well-graded mixture of boulders, cobble, gravel, sand, and fines, proportioned in a way that is stable under design flood flows and still meets habitat enhancement goals.

7 "Live stakes" are live plant cuttings, typically taken from willows, capable of regenerating into mature plants.

Further, although the PCRP ultimately would reduce erosion and sedimentation, some minor erosion of fine sediment would occur in the first year as vegetation becomes established. PCRP implementation would be phased (see Section 2.5.7, *Construction Sequencing*), so the area of potential short-term erosion would be limited in any given year.

In 2022, Golder Associates (Golder) assessed the potential for PCRP implementation to result in water quality impacts from polluted runoff caused by the leaching of selenium, molybdenum, and other metals after the use of on-site materials as backfill and the exposure of natural bedrock[8] as part of channel restoration (see Appendix G3). Sampling and geochemical analysis of the materials proposed for use as fill indicates that they have a low potential to leach selenium and other metals at levels above surface water or groundwater quality standards, and that such materials are therefore suitable for use as fill material and would not cause water quality to exceed regulatory standards or waste discharge requirements. Further, the results of Golder's water quality analysis (Appendix G3) determined that the removal of overlying material and the exposure of existing bedrock (primarily greenstone and Santa Clara Formation deposits) for the restored creek channel would not contribute to an increase of instream concentrations of constituents of concern (i.e., selenium and metals). Additionally, the primary area where limestone would naturally remain, e.g., Reach 18, would consist of non-disturbed bedrock, which, as demonstrated by upstream conditions, is not expected to contribute metals to the water column. Therefore, significant changes in the natural system would not occur and new source material would not be exposed to potentially undergo oxidation and mobilization of selenium based on the limestone bedrock present.

Although the creation of floodplain benches would allow for significant sediment storage within the PCRP reaches, sediment mobilized from Project areas or areas outside the influence of the Project may accumulate in unanticipated locations within the reconstructed channel segments. Such an accumulation could lead to on- or off-site erosion or sedimentation. To address this, Lehigh would evaluate areas of significant aggradation[9] as part of the monitoring and adaptive management program (see Section 2.5.8, *Monitoring and Adaptive Management*). In addition, corrective measures would be proposed to ensure that sediment and/or debris does not accumulate at locations that could affect Project stability. Lehigh would inspect each PCRP reach during the first year after construction following storms that deliver 1.5 inches or more of rainfall. If erosion or sedimentation does occur, the cause would be evaluated and adaptive management practices would be developed to help stabilize the area. The default approach at areas of erosion would be the installation of additional vegetation.

The 2012 EIR concluded that reclamation activities proposed within the PCRA would be an overall improvement to the hydrologic regime along Permanente Creek and would reduce erosion and sediment transport, improve water quality, and create greater long-term slope stability, thereby minimizing sediment sources. The 2012 EIR stated that the PCRP would remove soils,

8 Natural bedrock consists of limestone, greenstone, graywacke, Santa Clara Formation, and undisturbed soil/colluvium. See Section 3.5, *Geology and Soils*.

9 Aggradation is the process by which sediment is built up over time in a river system due to the deposition of sediment in areas in which the supply of sediment is greater than the amount of material that the system is able to transport.

rock, and overburden that may contain limestone from the creek channel, and posited that the removal activities might be a major source of selenium within Permanente Creek. Given the Project controls discussed in other sections of this SEIR, removal activities are not expected to be a significant source of selenium. Further, removal of the material from the creek channel could result in a slight improvement to receiving water quality in Permanente Creek. Consequently, the PCRP is not expected to be a significant source of selenium within Permanente Creek. Further, the PCRP would result in reduced erosion and sediment transport, reducing the exposure of selenium-bearing soils eroded and transported under low- and high-flow (i.e., flood flow) scenarios.

Based on the Project-proposed specific design elements and construction techniques described above, implementation of the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR relating to the alteration of drainage patterns in a manner which would result in substantial erosion, sedimentation, or additional sources of polluted runoff.

**Baseline Mitigation from 2012 EIR:** None required.

**Additional Mitigation:** None required.

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**Impact 3.7-3: The PCRP would not substantially alter existing drainage patterns, including through the alteration of Permanente Creek, such that conveyance capacity is exceeded and flooding on- or off-site occurs.**

This impact analysis corresponds to significance criteria d) and e) as set forth in Section 3.7.2 and addresses whether alterations to the Permanente Creek bed, banks, channel alignment, floodplain, riparian zone, and adjacent slopes and access roads would alter the hydrologic regime along Permanente Creek to such a degree that flooding occurs on- or off-site. In the context of Impact 4.10-4 (page 4.10-48 et seq.), the 2012 EIR analysis determined that the actions proposed for the PCRA would not increase 100-year flows in Permanente Creek. Further, Mitigation Measure 4.10-4 in the 2012 EIR requires Lehigh to design and construct detention facilities that would manage increased runoff, reduce excessive discharges to Permanente Creek, and develop the capacity to detain and release the 100-year flow, using on-site detention ponds to ensure that off-site, downstream flows do not cause an increased flooding risk or result in hydromodification. Lehigh remains subject to Mitigation Measure 4.10-4 and the PCRP would not conflict with the implementation of Mitigation Measure 4.10-4.

Under existing conditions, the quarry pit captures drainage from 361.5 acres. Pit water can be pumped to Permanente Creek via the Upper and Lower FTS at an approved maximum discharge of 6.2 cubic feet per second pursuant to the current NPDES permit (Order No. R2-2019-0024, Permit No. CA0030210). This condition is proposed to continue through Phase 1 of the 2012 Reclamation Plan Amendment, including the implementation of restoration activities in the PCRA. As described in Section 4.10.1.4 of the Draft 2012 EIR (page 4.10-17 et seq.), with respect to conveyance capacities, the *Santa Clara County California Drainage Manual* (Drainage

Manual) (see Draft 2012 EIR, page 4.10-26) requires that new stormwater drainage systems and channels be designed to convey the 10-year storm without surcharge, and to safely convey the 100-year flow. The Drainage Manual identifies multiple design standards, methods of analyses, and engineering tools required for the planning and design of stormwater drainage systems and flood control facilities within the county. The hydrologic analyses presented in the 2012 EIR are consistent with the Drainage Manual. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criteria d) and e).

The PCRP was designed with the HEC-RAS 5.0.4 river analysis hydrologic model to verify that channel dimensions are appropriately sized to convey flood flows and remain stable under a range of flow regimes (1.5-year, 10-year, and 100-year flows), and to confirm that bankfull channel dimensions are adequate so that infrastructure and access roads remain stable in 100-year flood flows. The results of hydrologic modeling are presented in the 90% Design Memo (Appendix C). Based on the model analysis and design, the PCRP would benefit Permanente Creek by increasing hydraulic capacity. Construction of broader and more functional floodplains and the removal of culverts and other instream structures would increase hydraulic capacity, provide additional storage of extreme flood flows, and increase the sediment storage capacity and attenuate the downstream transport of sediment during extreme flood events. The proposed design would not significantly alter depth or velocities in downstream reaches. There would be no substantial change in runoff flow rates because neither the drainage pattern of the tributary area nor the volume of flows within the channel would be altered. Therefore, there would be no substantial increase in the rate or volume of surface runoff or instream flows as compared to that disclosed in the 2012 EIR. For these reasons, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** related to the alteration of drainage that could cause on- or off-site flooding.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.10-4, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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**Impact 3.7-4: The PCRP would not place structures that would impede or redirect flood flows within a 100-year flood hazard area.**

This impact analysis corresponds to significance criterion h) as set forth in Section 3.7.2 and addresses whether implementing the PCRP would impede or redirect flood flows associated with a 100-year flood event. In the context of Impact 4.10-4 (Final 2012 EIR, page 3.1-43 et seq.), the 2012 EIR concluded that interim reclamation activities proposed within the PCRA would not increase 100-year flood flows or increase flood risks related to the 100-year flood event as compared to the baseline level through Phase 1 of the 2012 Reclamation Plan Amendment. For the reasons discussed below, the implementation of restoration activities as described in the

PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR for significance criterion h).

As described in the Draft 2012 EIR (Section 4.10.1.2, page 4.10-16), FEMA is responsible for mapping areas subject to flooding during a 100-year flood event (i.e., a flood event that has a 1 percent chance of occurring in a given year). According to FEMA, and as described in the Draft 2012 EIR, the 100-year flood hazard zone for Permanente Creek extends upstream to, and includes, Reach 6 and Reach 7 (the "Concrete Channel Area") (Draft 2012 EIR Figure 4.10-1, page 4.10-2). Within and near Reaches 6 and 7, the 100-year flood hazard zone for Permanente Creek is relatively narrow, extending 200–300 feet across. As described in Section 2.5.1, within Reaches 6 and 7, Lehigh would plant native riparian vegetation and trees on the southern bank along the concrete channelized portion of Permanente Creek to improve shading and reduce vegetation growth within the channel to improve sediment transport and enhance fish passage. The development of a mature riparian canopy along the southern bank of the creek in the upland slopes above the concrete channel is proposed to shade the concrete channel, and thus to reduce solar heat gain on instream flow and discourage the establishment of cattails. Accordingly, implementation of the PCRP would not include the placement of structures within a 100-year flood hazard area. Additionally, the reduction of vegetation, such as cattails, within the Permanente Creek channel would improve flood conveyance capacity. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** than was disclosed in the 2012 EIR related to redirecting flood flows associated with a 100-year flood hazard area.

> **Baseline Mitigation from 2012 EIR:** Mitigation Measure 4.10-4, the text of which is provided in Draft SEIR Table H1, *Impacts and Mitigation Measures for the 2012 Permanente Quarry Reclamation Plan Amendment*.
>
> **Additional Mitigation:** None required.

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## 3.7.4 Cumulative Effects

The Draft 2012 EIR analyzed potential cumulative effects in Section 6.2.10, *Hydrology and Water Quality* (page 6-23 et seq.). Revisions to the analysis presented in the Final 2012 EIR in Section 4.2.7 (pages 4-22 and 4-23) concluded that the 2012 Reclamation Plan Amendment, including creek restoration within the PCRA, would not result in a cumulatively considerable contribution to any significant cumulative effect. For the reasons discussed below, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** in the cumulative context than was disclosed in the 2012 EIR.

As described in the 2012 EIR, the two primary impacts relevant to cumulative impacts from PCRP implementation are water quality and changes to drainage patterns that cause hydromodification and/or on- and off-site flooding.

Project construction activities would be consistent with the Construction General Permit; compliance is required by law, and the provisions of the permit and BMPs for the construction and post-construction phases have proven effective in protecting water quality at construction sites and downgradient receiving waters. NPDES general permits are designed to establish the regulatory requirements for a broad range of construction activities under differing site conditions with similar discharge characteristics (SWRCB 2012). A standard set of permit requirements prescribed via the Construction General Permit provides effective protection of water resources and ensures compliance with water quality standards for discharges of stormwater from construction sites with common receiving waters.

In this way, the Construction General Permit addresses cumulative discharges and/or pollutants arising from construction sites throughout the state. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not combine to cause any cumulatively considerable contribution to any significant cumulative effect.

After construction, the PCRP would result in an overall improvement to the hydrologic regime along Permanente Creek and in a reduction of erosion and sediment transport, water quality improvements, and greater long-term slope stability, which would reduce sediment sources. The PCRP additionally would benefit Permanente Creek by increasing hydraulic capacity. Construction of broader, more functional floodplains and the removal of culverts and other instream structures would increase hydraulic capacity, provide additional storage of extreme flood flows, increase sediment storage capacity, and attenuate the downstream transport of sediment during extreme flood events. The proposed design would not significantly alter depth or velocities in downstream reaches and would reduce the potential for on- or off-site flooding as compared to existing conditions. Through the implementation of BMPs, surface treatments, PCRP design elements, and monitoring and adaptive management (described in Sections 2.5.6 through 2.5.9), the Project's incremental contribution to sedimentation, hydromodification, flooding, and flood hazards would not be cumulatively significant.

For these reasons, implementation of the PCRP would not create any new significant impact or a substantial increase in the severity of a significant cumulative impact to hydrology or water quality than was disclosed and evaluated in the 2012 EIR.

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## 3.7.5 References

County of Santa Clara, 2007. *A Resolution of the Board of Supervisors of the County of Santa Clara Regarding the Use of the Guidelines and Standards for Land Uses Near Streams Developed by the Santa Clara Valley Water Resources Protection Collaborative.* May 2007.

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U.S. EPA, 2022. NPDES Monitoring Data for Facility CA0030210 from January 2012 to January 2022. Available: https://echo.epa.gov/trends/loading-tool/get-data/monitoring-data-download. Accessed January 25, 2022.

# 3.8 Project Consistency with 2012 EIR

## 3.8.1 Introduction

The County prepared the 2012 EIR pursuant to the provisions of CEQA (Public Resources Code Section 21000 et seq.) and the CEQA Guidelines (California Code of Regulations Title 14, Section 15000 et seq.) that were current at the time. Since then, the Environmental Checklist Form in CEQA Guidelines Appendix G has been revised to address the analysis and mitigation of potential significant impacts on tribal cultural resources (September 27, 2016) and to reflect a comprehensive update to the CEQA Guidelines (December 28, 2018) that addressed legislative changes to CEQA, clarified certain portions of the existing CEQA Guidelines, and updated the CEQA Guidelines to be consistent with more recent court decisions. The thresholds and analyses in this SEIR reflect the latest CEQA Guidelines, current as of the publication of this SEIR.

The following sections discuss the consistency of the Permanente Creek Restoration Plan (PCRP) with the 2012 EIR for the resources that are not otherwise discussed in this SEIR. The analysis reflects the current criteria and thresholds in CEQA Guidelines Appendix G; lists the significance determination for each resource area based on the analysis in the 2012 EIR, where applicable; and determines whether further analysis is required or whether the analysis from the 2012 EIR is sufficient. Further analysis would be required if substantial evidence in the record presents new significant effects or a substantial increase in the severity of significant effects disclosed in the prior EIR (Public Resources Code Section 21166; CEQA Guidelines Section 152162[a]). This could be true, for example, if newly proposed activities would occur outside the boundary of an area previously analyzed or at a greater intensity than previously evaluated. By comparison, a prior EIR is sufficient where changes to a project, changes in circumstances, or new information of substantial importance would not result in a new significant effect or a substantial increase in the severity of a significant effect relative to the impacts disclosed in the prior EIR.

For this Project, changes are reflected in the PCRP, which updates Lehigh's March 2011 draft 2011 Creek Restoration Plan to propose creek restoration activities outside of the existing Reclamation Plan boundary (i.e., in Reaches 6–8) and within the restoration area referred to in the 2012 EIR as the Permanente Creek Restoration Area (PCRA) but located outside of the PCRA's disturbance area. See Section ES.2.2, *Focus of This SEIR*, for details. The County has determined, based on the detailed analysis in Sections 3.1 through 3.7 and as summarized below, that no additional changes to the 2012 EIR are needed for it to provide sufficient documentation of the environmental impacts of the PCRP.[1]

[1] Informed by the scoping process (summarized in **Appendix A**, *Scoping Report*), the County Planning Department initially determined that there was a potential for the PCRP to result in a new significant impact or a substantial increase in the severity of a significant impact relative to the impacts disclosed in 2012 EIR in seven resource areas: air quality; biological resources; cultural resources; energy; geology, soils, seismicity, and paleontology; greenhouse gas emissions; and hydrology and water quality. This is why these topics are analyzed in greater detail in this SEIR than the topics described below, although the conclusions ultimately are the same for all topics: No additional changes to the 2012 EIR are needed for it to provide sufficient documentation of the environmental impacts of the PCRP.

# 3.8.2 Aesthetics, Visual Quality, and Light and Glare

| *Issues (and Supporting Information Sources):* | | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|---|
| **I.** | **AESTHETICS —** Except as provided in Public Resources Code Section 21099, would the project: | | | |
| a) | Have a substantial adverse effect on a scenic vista? | Significant and Unavoidable | ☒ | ☐ |
| b) | Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway? | Significant and Unavoidable | ☒ | ☐ |
| c) | In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality? | Significant and Unavoidable | ☒ | ☐ |
| d) | Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area? | Less than Significant with Mitigation | ☒ | ☐ |
| e) | If subject to Architecture and Site Approval (ASA), be generally in non-compliance with the Guidelines for ASA. | No Impact | ☒ | ☐ |
| f) | If within a Design Review Zoning District for purposes of viewshed protection (d, -d1, -d2), conflict with applicable General Plan Policies or Zoning Ordinance provisions. | No Impact | ☒ | ☐ |

## 3.8.2.1 Discussion of Aesthetics

a, b, c) The 2012 EIR concluded that the 2012 Reclamation Plan Amendment, including the proposed restoration activities within the PCRA, would result in significant and unavoidable impacts on scenic vistas, scenic resources within a state scenic highway, and the visual character or quality of public views of the site. However, as noted in the 2012 EIR (page 4.1-23), the PCRA is not visible because of the site's topography and public inaccessibility. Therefore, activities occurring in the PCRA would not contribute to the significant and unavoidable impact determination for these criteria. PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre portion within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where work would occur pursuant to the PCRP. As shown in Figure 2-3 in Chapter 2, *Project Description*, both of these areas are located in the immediate vicinity of Permanente Creek and would not be visible for the same reasons as described above. Therefore, the PCRP would similarly not contribute to the visual and aesthetic impacts described in the 2012 EIR. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impacts disclosed in the 2012 EIR for these significance criteria.

d) The 2012 EIR concluded that new sources of light or glare could adversely affect day or nighttime views in the PCRA, but that implementing Mitigation Measure 4.1-7 would reduce the potential impact to a less-than-significant level. This mitigation measure

pertains to night lighting of the East Materials Storage Area and would not have any interaction with activities proposed in the PCRA or the PCRP. No night lighting is expected to occur with proposed PCRP activities. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

e) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding compliance with the Guidelines for ASA because the criterion applies to the construction or major modification of buildings and development projects. The PCRP would similarly not result in development subject to ASA. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

f) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding a conflict with applicable Santa Clara County General Plan (General Plan) policies or zoning ordinance provisions. This criterion applies to the construction or major modification of buildings and structures. The PCRP does not propose to construct any buildings; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.2.2 Consistency Conclusion for Aesthetics

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to aesthetics.

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## 3.8.3 Agriculture and Forestry Resources

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **II. AGRICULTURE AND FORESTRY RESOURCES —** In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project: | | | |
| a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use? | No Impact | ☒ | ☐ |
| b) Conflict with existing zoning for agricultural use, or a Williamson Act contract? | No Impact | ☒ | ☐ |

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))? | No Impact | ☒ | ☐ |
| d) Result in the loss of forest land or conversion of forest land to non-forest use; | No Impact | ☒ | ☐ |
| e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. | No Impact | ☒ | ☐ |

### 3.8.3.1 Discussion of Agriculture and Forestry Resources

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding the conversion of Farmland to non-agricultural use because the Farmland Mapping and Monitoring Program classifies the PCRA as "Other Land." The 2012 EIR also concluded that the Project would not convert any farmland classified by the *Soils of Santa Clara County* report as prime to non-agricultural use. PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre portion within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where work would occur pursuant to the PCRP. These areas are classified as "Other Land," with a small portion classified as "Urban and Built-Up Land" (DOC 2021). PCRP activities would occur on some of the same soils as described in the 2012 EIR: "Pits, mine" and "Mouser-Maymen complex," neither of which is classified as prime in the *Soils of Santa Clara County* report (see 2012 EIR page 4.2-7, Figure 4.2-1, *Soil Types in the Project Area*). Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not conflict with existing zoning for agricultural use and that the Project area is not subject to a Williamson Act contract. PCRP activities would occur in the same area as the PCRA, with the exception of the areas described above under criterion a). A portion of the PCRP area is zoned Exclusive Agriculture (see 2012 EIR page 4.11-5, Figure 4.11-1, *Santa Clara County Zoning Designations*). As discussed in the 2012 EIR, the General Plan envisioned lands within this zoning district as areas for agricultural and open space uses. The PCRP is designed to reclaim lands for future open space uses; therefore, PCRP activities would not conflict with the underlying zoning designation. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

c, d) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not conflict with existing zoning for, or cause rezoning of, forest land or timberland; and that they would not result in the loss of forest land or convert forest land to non-forest use. It also concluded that no trees would be removed in the PCRA as a result of the 2012 project. Instead, as with the PCRP, reclamation would result in revegetation and maintenance of revegetated areas. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impacts disclosed in the 2012 EIR for these significance criteria.

e) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not involve other changes in the environment that could result in conversion of farmland to non-agricultural use or conversion of forest land to non-forest use. As with the 2012 project, there is no active farmland in the PCRP or on adjacent parcels, and the PCRP would not convert forest land to non-forest use. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.3.2 Consistency Conclusion for Agriculture and Forestry Resources

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to agriculture and forestry resources.

## 3.8.4 Hazards and Hazardous Materials

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **IX. HAZARDS AND HAZARDOUS MATERIALS —** Would the project: | | | |
| a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials? | Less than Significant | ☒ | ☐ |
| b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment? | Less than Significant | ☒ | ☐ |
| c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school? | No Impact | ☒ | ☐ |
| d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment? | No Impact | ☒ | ☐ |

| *Issues (and Supporting Information Sources):* | | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|---|
| e) | For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area? | No Impact | ☒ | ☐ |
| f) | Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? | No Impact | ☒ | ☐ |
| g) | Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires? | No Impact | ☒ | ☐ |
| h) | Provide breeding grounds for vectors; | Less than Significant | ☒ | ☐ |
| i) | Result in a safety hazard due to proposed site plan (i.e., parking layout, access, closed community, etc.) | No Impact | ☒ | ☐ |
| j) | Involve construction of a building, road or septic system on a slope of 30% or greater | No Impact | ☒ | ☐ |
| k) | Involve construction of a roadway greater than 20% slope for a distance of 300 feet or more. | No Impact | ☒ | ☐ |

### 3.8.4.1 Discussion of Hazards and Hazardous Materials

a) The 2012 EIR concluded that required compliance with laws and regulations governing the transport, use, and disposal of hazardous materials would be sufficient to ensure that the impacts associated with the potential to create a significant hazard to the public or the environment during PCRA reclamation and restoration activities would be less than significant. The PCRP activities would be implemented using construction methods and equipment similar to those described for the PCRA and would be subject to the same compliance with required hazardous materials laws and regulations for the transport, use, and disposal of hazardous materials. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) As discussed under criterion a), above, the PCRP activities would be implemented using construction methods and equipment similar to those described for the PCRA in the 2012 EIR and would be subject to the same required compliance with laws and regulations governing the transport, use, and disposal of hazardous materials. Accidents or mechanical failure involving heavy equipment or leaks and spills from storage tanks could result in the accidental release of small quantities of fuel, lubricants, hydraulic fluid, or other hazardous substances; however, any such spills would be readily cleaned up in compliance with regulatory requirements and would not create a significant hazard to the public or the environment. Further, as described in Section 3.7, *Hydrology and Water Quality*, impacts associated with the potential for an upset or accident to create a significant hazard to the public or the environment would be less than significant as a result of compliance with National Pollutant Discharge Elimination System requirements (including implementation of a storm water pollution prevention plan and associated best management practices during Project construction activities. The PCRP would cause **no**

**new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

c) The 2012 EIR concluded that although hazardous materials and wastes have been and continue to be present in the 2012 project area, the proposed reclamation and restoration activities within the PCRA would cause no impact related to criterion c) because no schools are located within 0.25 mile of the proposed activities. Impacts related to potential hazardous emissions are analyzed in Section 3.1, *Air Quality*. The PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre area within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where work would occur pursuant to the PCRP. These areas are located along a narrow strip of land along Permanente Creek that also would not be located within 0.25 mile of a school. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

d) The 2012 EIR concluded that the 2012 project area for the proposed reclamation and restoration activities within the PCRA is not listed on any regulatory agency's list of hazardous materials sites. As with the 2012 project, the 2.5-acre PCRP area outside the Reclamation Plan boundary is not listed on any regulatory agency's list of hazardous materials sites. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

e) The 2012 EIR concluded that the PCRA is not located in an area covered by an airport land use plan or a public airport land use plan, or within the vicinity of a private airstrip, and that therefore, no airport-related safety hazard for people residing or working in the PCRA would result. Also, based on the intended future open space use of the PCRA, it is not expected that anyone would reside or work within the PCRA once reclamation is complete. As with the 2012 project, the 2.5-acre PCRP area outside the Reclamation Plan boundary is not located in an area covered by an airport land use plan or a public airport land use plan, or within the vicinity of a private airstrip, and it is not expected that anyone would reside or work within the PCRP area outside the Reclamation Plan boundary once the PCRP is complete. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

f) The 2012 EIR concluded that the PCRA would not impair implementation of or physically interfere with the County Emergency Operations Plan or result in the complete or partial closure of public roadways, interfere with any identified evacuation route, restrict access for emergency response vehicles, or restrict access to critical facilities such as hospitals or fire stations, because the PCRA is located entirely on private property. As with the PCRA, the 2.5-acre PCRP area outside the Reclamation Plan boundary would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The PCRP would cause **no new significant impact**

and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

g) Reclamation-related activities conducted as part of the PCRA would be substantially similar to existing quarry operations, and the types of equipment used to conduct existing mining operations would continue to be used to implement PCRA reclamation activities. Existing regulations governing the use of construction equipment in fire-prone areas would continue to apply. These regulations restrict the use of equipment that may produce a spark, flame, or fire; require the use of spark arrestors on construction equipment that has an internal combustion engine; specify requirements for the safe use of gasoline-powered tools in fire hazard areas; and specify fire suppression equipment that must be provided on-site for various types of work in fire-prone areas. Because there would be no change in the exposure of people or structures to risks involving wildland fires relative to baseline conditions, the 2012 EIR concluded that the PCRA would cause no impact related to criterion g). The PCRP would be implemented using construction methods and equipment similar to those described for the PCRA reclamation activities. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion. See Section 3.8.14, *Wildfire*, for additional discussion of wildfire-related considerations.

h) The 2012 EIR stated that the sedimentation basins proposed in the PCRA would be managed with inspection and vegetation removal to avoid attracting mosquitoes, and that the basins would not provide breeding grounds that would promote mosquito population growth because they would be designed to drain completely after storm events. As a result, the 2012 EIR concluded that the PCRA would not provide a source of standing water that could provide breeding grounds for mosquitoes, which can be vectors for disease transmission. No new sedimentation basins are proposed as part of the PCRP. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

i) Implementation of the PCRP would consist of backfilling, grading, slope stability work, revegetation, and other reclamation activities similar to those described in the 2012 EIR for the PCRA. As described in the 2012 EIR, the PCRP does not include a "site plan" as such, and safety hazards related to the placement and stability of backfill material are addressed in Section 3.5, *Geology, Soils, Seismicity, and Paleontology*. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

j, k) As described in the 2012 EIR for the PCRA, the PCRP would not involve construction of any buildings, roads, or septic systems on a slope of 30 percent or greater or a roadway greater than 20 percent slope for a distance of 300 feet or more. Safety hazards related to slope stability and the placement and stability of backfill material are addressed in

Section 3.5, *Geology, Soils, Seismicity, and Paleontology*. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.4.2 Consistency Conclusion for Hazards and Hazardous Materials

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to hazards and hazardous materials.

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## 3.8.5 Land Use and Planning

| *Issues (and Supporting Information Sources):* | | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|---|
| **XI.** | **LAND USE AND PLANNING —** Would the project: | | | |
| a) | Physically divide an established community? | No Impact | ☒ | ☐ |
| b) | Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect? | No Impact | ☒ | ☐ |
| c) | Conflict with the West Valley Hillsides Preservation Area? | No Impact | ☒ | ☐ |
| d) | Be incompatible with adjacent land uses? | Less than Significant | ☒ | ☐ |

### 3.8.5.1 Discussion of Land Use and Planning

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not physically divide an established community. PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre portion within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where work would occur pursuant to the PCRP. PCRP activities similarly would not propose any structures, facilities, or land use changes that would create a physical barrier within any community. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. PCRP activities would be similar to the restoration activities analyzed in the 2012 EIR. For example, creek restoration on the Project site pursuant to the PCRP would further General Plan Policy R-LU 197, which recommends that the "natural beauty of the West Valley hillsides area… be maintained for its contribution to the overall quality of life of current and future generations" (Draft 2012 EIR, page 4.11-4), and restoration of the Project site would be

consistent with the General Plan, zoning, and land use and planning policies. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

c) The 2012 EIR concluded that the only special planning area applicable to the project site is the West Valley Hillsides Preservation Area. The proposed reclamation and restoration activities within the PCRA would be consistent with the policies for this area as it would reclaim existing land disturbance to conform to the surrounding topography in contour and vegetation and make the reclaimed lands suitable for future open space uses. The 2012 project would not require alterations to land use designations, nor would it introduce new urban uses to the PCRA. PCRP activities would be similar to those analyzed in the 2012 EIR; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

d) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in a less than significant impact regarding compatibility with adjacent uses. The 2012 project would have adverse effects on adjacent recreational, open space, and residential land uses due to visual impacts, air pollutant emissions, noise, and traffic. Those effects were evaluated and mitigation measures recommended as appropriate in the applicable resource analysis sections of the 2012 EIR. Upon the completion of restoration activities, the compatibility of the PCRA with adjacent land uses would be improved. PCRP activities would be similar to those analyzed in the 2012 EIR; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.5.2 Consistency Conclusion for Land Use and Planning

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to land use and planning.

## 3.8.6 Mineral Resources

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XII. MINERAL RESOURCES —** Would the project: | | | |
| a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state? | Less than Significant | ☒ | ☐ |
| b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan? | Less than Significant | ☒ | ☐ |

### 3.8.6.1 Discussion of Mineral Resources

a, b) As described in the 2012 EIR, the existing Permanente Quarry pit has been the source of mineral extraction at the site for more than 100 years, and the reserves of limestone that feasibly can be extracted are approaching their limits. For these reasons, the 2012 EIR concluded that the quarry pit likely no longer meets the criteria for designation of lands containing significant mineral deposits and would be eligible for the termination of its designated status. Lehigh would retain the property, which contains other areas designated as significant mineral resources, and would retain its ability to process those areas. Therefore, the impact of implementing reclamation activities, including as described for the PCRA, on mineral resources of regional and local significance would be less than significant. For these reasons, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion, including within the 2.5-acre PCRP area outside the Reclamation Plan boundary.

### 3.8.6.2 Consistency Conclusion for Mineral Resources

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to mineral resources.

## 3.8.7 Noise

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XIII. NOISE —** Would the project result in: | | | |
| a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? | Less than Significant with Mitigation | ☒ | ☐ |
| b) Generation of excessive groundborne vibration or groundborne noise levels? | No Impact | ☒ | ☐ |
| c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels? | No Impact | ☒ | ☐ |

### 3.8.7.1 Discussion of Noise

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would exceed County noise standards and increase ambient noise levels at noise-sensitive uses in the vicinity of the 2012 project. However, implementation of Mitigation Measures 4.13-1a and 4.13-1b would reduce the impact to a less-than-significant level. These mitigation measures pertain to the restriction of heavy equipment

operations in the northeastern portion of the East Materials Storage Area. The only PCRP activity that would occur near the East Materials Storage Area would be the installation of vegetation along the concrete channel area, which would not involve operation of heavy equipment. Noise generated by other PCRP activities would not result in impacts on sensitive receptors, given the distances to such receptors and intervening site topography. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Like the 2012 project, the PCRP would employ conventional earthmoving activities, and the equipment and techniques used would not cause excessive groundborne vibration. No blasting would occur as part of the PCRP. The distance to the closest sensitive receptor from on-site Project equipment would be greater than under the 2012 project; therefore, the PCRP activities would likewise not be perceivable. Thus, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

c) The 2012 EIR concluded that the PCRA is not located in an area covered by an airport land use plan or a public airport land use plan, or within the vicinity of a private airstrip. Therefore, the 2012 EIR concluded that no airport-related safety hazards for people residing or working in the project area would result. For the same reasons, PCRP activities would not result in exposure of residents or workers to excessive noise levels. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.7.2 Consistency Conclusion for Noise

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to noise.

## 3.8.8 Population and Housing

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XIV. POPULATION AND HOUSING —** Would the project: | | | |
| a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)? | No Impact | ☒ | ☐ |

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere? | No Impact | ☒ | ☐ |

### 3.8.8.1 Discussion of Population and Housing

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding the direct or indirect inducement of substantial population growth in the vicinity of the PCRA. Up to 14 additional employees would be required to implement restoration within the PCRA. Given the small number of additional staff members, the 2012 EIR anticipated that the temporary positions would be filled from the local labor pool available in Santa Clara County, with workers expected to commute to the site rather than moving to the project area. As a result, the additional employees would not directly induce population growth in the project vicinity. Worker levels for implementation of restoration activities described in the PCRP would be similar to PCRA staffing; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not displace substantial numbers of existing housing or people, necessitating the construction of replacement housing elsewhere. As with the 2012 project, no housing exists and no people are living within the PCRP area. Therefore, no existing housing or people would be displaced. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.8.2 Consistency Conclusion for Population and Housing

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to population and housing.

# 3.8.9 Public Services

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XV. PUBLIC SERVICES —** | | | |
| a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services: | | | |
| i) Fire protection? | No Impact | ☒ | ☐ |
| ii) Police protection? | No Impact | ☒ | ☐ |
| iii) Schools? | No Impact | ☒ | ☐ |
| iv) Parks? | No Impact | ☒ | ☐ |
| v) Other public facilities? | No Impact | ☒ | ☐ |

## 3.8.9.1 Discussion of Public Services

a.i–v) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding public services. Implementation of the 2012 project would not result in the construction of new facilities or expansion of existing government facilities for public services. Up to 14 additional employees would be required for the implementation of restoration activities within the PCRA. Worker levels for implementation of the PCRP would be similar to PCRA staffing. Given the small number of additional staff members, it is anticipated that the temporary positions would be filled from the local labor pool available in Santa Clara County, with workers expected to commute to the site rather than moving. Because the staff increase would come from the local labor pool, these workers are considered part of the existing demand for fire protection services, police protection, school facilities, parks, and other public facilities such as libraries or medical facilities. Therefore, the PCRP would not cause an increased demand or need for school facilities, parks, or other public facilities. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

## 3.8.9.2 Consistency Conclusion for Public Services

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to public services.

# 3.8.10 Recreation

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XVI. RECREATION —** | | | |
| a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? | No Impact | ☒ | ☐ |
| b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment? | No Impact | ☒ | ☐ |
| c) Be on, within or near a public or private park, wildlife reserve, or trail or affect existing or future recreational opportunities? | Less than Significant | ☒ | ☐ |
| d) Result in loss of open space rated as high priority for acquisition in the "Preservation 2020" report? | No Impact | ☒ | ☐ |

## 3.8.10.1 Discussion of Recreation

a, b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding the deterioration of parks and recreational facilities, nor would the project include the construction or expansion of such facilities. PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre portion within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where restoration work would occur pursuant to the PCRP. As discussed above in Section 3.8.8, *Population and Housing*, the number of workers required for PCRP activities would be similar to the number needed to implement restoration in the PCRA as analyzed in the 2012 EIR. Consistent with the assumptions underlying the analysis in the 2012 EIR, workers for the PCRP are anticipated to come from the local labor pool and thus are considered part of the existing demand for parks and recreational facilities. Therefore, the PCRP would not cause an increased demand or need for such facilities. Like the 2012 project, the PCRP would not include the construction of any new recreation-related facilities. The PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impacts disclosed in the 2012 EIR for these significance criteria.

c) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding effects on existing or future recreational opportunities within a public or private park or trail, or a wildlife reserve. The 2012 project would have a less-than-significant impact regarding indirect effects on the quality of recreational opportunities at existing parks, open space preserves, and trails surrounding the project area. Effects identified during construction included degradation of views from the increased presence of construction equipment and increased levels of dust and noise in the project vicinity. These effects were primarily related to reclamation activities in the East Materials Storage Area that were considered above the baseline for quarry operations. PCRP activities would occur in the same general area as the PCRA along

Permanente Creek. PCRP activities would be similar to activities under the 2012 project; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

d) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding the loss of open space as described in the "Preservation 2020" report. The Permanente Creek area was rated as a high priority for acquisition in the "Preservation 2020" report because of its watershed, viewshed, and urban buffer quality. The proposed restoration of the PCRA and PCRP activities would make these lands suitable for future open space uses. The 2012 project and the PCRP would restore open space acres set aside to provide physical separation of on-site operations from surrounding off-site uses. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.10.2 Consistency Conclusion for Recreation

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to recreation.

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## 3.8.11 Transportation

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XVII. TRANSPORTATION —** Would the project: | | | |
| a) Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities? | Less than Significant | ☒ | ☐ |
| b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)? | Not evaluated in 2012 EIR | ☐ | ☒ |
| c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)? | Less than Significant | ☒ | ☐ |
| d) Result in inadequate emergency access? | No Impact | ☒ | ☐ |
| e) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks | No Impact | ☒ | ☐ |
| f) Cause substantial damage or wear of public roadways by increased movement of heavy vehicles | Less than Significant | ☒ | ☐ |

### 3.8.11.1 Discussion of Transportation

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding a conflict with the Santa Clara Valley

Transportation Authority's Congestion Management Program or a conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. The 2012 project would have a less-than-significant impact regarding increases in traffic volumes on area roadways, but would not conflict with measures of effectiveness for the performance of the circulation system. As discussed above in Section 3.8.8, *Population and Housing,* the number of workers required for PCRP activities would be similar to the number analyzed in the 2012 EIR. The number of worker trips and truck trips for PCRP activities would be similar and spread throughout the day. In addition, the PCRP would not affect transit or alternative transportation facilities, nor would it conflict with policies, plans, or programs addressing the circulation system. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) Because the impact relative to significance criterion b) was not analyzed in the 2012 EIR, the checklist above indicates "further analysis required." As analyzed below, the Project would cause a less-than-significant impact related to a conflict or inconsistency with CEQA Guidelines Section 15064.3(b).

CEQA Guidelines Section 15064.3(a) states that vehicle miles traveled (VMT) is generally the most appropriate measure of transportation impacts. As discussed in Section 15064.3(a), VMT in this context refers to the amount and distance of *automobile* [emphasis added] travel attributable to a project. Increased VMT exceeding an applicable threshold could constitute a significant impact. For construction traffic, a qualitative analysis of VMT impacts is often appropriate (CEQA Guidelines Section 15064.3[b][3]).

According to technical guidance by the Governor's Office of Planning and Research, absent substantial evidence indicating that a project would generate a potentially significant level of VMT or be inconsistent with a sustainable communities strategy or general plan, projects that generate fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact (OPR 2018).

As discussed above in Section 3.8.8, *Population and Housing,* and in Section 3.1, *Air Quality*, the number of workers required for PCRP activities would be similar to the number analyzed in the 2012 EIR. The PCRP would not require operational worker trips. Well under 110 construction-generated trips per day would occur during the peak construction traffic period. For these reasons, the impact of VMT generated by PCRP activities would be **less than significant**, and the Project would not conflict with or be inconsistent with CEQA Guidelines Section 15064.3(b).

c) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would have a less-than-significant impact regarding hazardous design features. PCRP activities would have effects on local roadways similar to those of the 2012 project. PCRP operations and associated vehicle trips would not cause any significant impacts on local traffic conditions; therefore, the PCRP would cause **no new significant**

**impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

d) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would have no impact regarding inadequate emergency access. As under the 2012 project, emergency access under the PCRP would be limited to Permanente Road. However, PCRP activities would be similar to those under the 2012 project and would not contribute to any adverse consequences caused by the lack of a secondary access point. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

e) The Project site is about 6 miles from the nearest airport, and does not (and would not under PCRP activities) place any object within the flight path for airplanes in the area. The PCRP would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that would result in substantial safety risks. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

f) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would have a less-than-significant impact regarding substantial damage to or wear of public roadways. PCRP activities would be similar to those under the 2012 project; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.11.2 Consistency Conclusion for Transportation

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to transportation.

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## 3.8.12 Tribal Cultural Resources

Assembly Bill (AB) 52 substantially amended CEQA in 2014 by creating a separate category of cultural resources, "tribal cultural resources," and by establishing that a project that may cause a substantial adverse change in the significance of a tribal cultural resource is one that may have a significant effect on the environment (Public Resources Code Sections 21074 and 21084.2). AB 52 applies to any project for which a notice of preparation is filed on or after July 1, 2015.

The 2012 EIR evaluated potential impacts on tribal cultural resources solely as impacts on archaeological resources because it was prepared before the provisions of AB 52 and related amendments to the CEQA Guidelines pertaining to tribal cultural resources took effect. Potential

impacts on known significant archaeological sites located in the vicinity of the proposed project were evaluated in Draft 2012 EIR Section 4.5, *Cultural Resources* (page 4.5-1 et seq.). Consistent with AB 52 and Public Resources Code Section 21084.3(a), the County Planning Department, when feasible, avoids damaging effects on any tribal cultural resources, which could include sites, features, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe. The County Planning Department initiated consultation by letter to Quirina Luna Geary, Chairwoman of the Tamien Nation, dated December 21, 2021 (County of Santa Clara Department of Planning and Development 2021a), with the goal of avoiding inadvertent discoveries of Native American human remains and to protect tribal cultural resources, the locations of which may be known only to the Tribe or its members. The County did not receive a reply to the letter.

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XVIII. TRIBAL CULTURAL RESOURCES —** | | | |
| a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is: | | | |
| i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources. Code Section 5020.1(k), or | Not evaluated in 2012 EIR | ☐ | ☒ |
| ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe. | Not evaluated in 2012 EIR | ☐ | ☒ |

## 3.8.12.1 Discussion of Tribal Cultural Resources

a.i, a.ii) Because the 2012 EIR did not analyze impacts relative to significance criteria a.i) and a.ii), the checklist above indicates "further analysis required." As analyzed below, the Project would result in a less-than-significant impact with implementation of Mitigation Measure 4.1-7, described in the 2012 EIR, related to a substantial adverse change in the significance of a tribal cultural resource that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k); or that is determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in Public Resources Code Section 5024.1(c).

As discussed in Section 3.3, *Cultural Resources*, there are no known archaeological sites within the study area and no indication that the study area contains unrecorded archaeological resources (which could also encompass tribal cultural resources). Though unlikely, the possibility of accidentally uncovering undocumented archaeological resources

cannot be entirely eliminated. Accidental damage to or destruction of a previously unrecorded and unique archaeological resource that could also be considered a tribal cultural resource would be a potentially significant impact. In the unlikely event that tribal cultural resource materials are discovered during Project activities, implementation of Mitigation Measure 4.5-2 from the 2012 EIR would ensure that work would cease in the immediate area and that a qualified archaeologist would be hired to document the find, assess its significance, and recommend further treatment, and thereby would reduce the impact to a less-than-significant level. The Project would result in impacts on tribal cultural resources that would be **less than significant with mitigation incorporated**.

### 3.8.12.2 Consistency Conclusion for Tribal Cultural Resources

Implementation of the PCRP would result in potential impacts on tribal cultural resources that were not analyzed in the 2012 EIR. Based on the analysis above, these impacts would be **less than significant with mitigation incorporated**. Because the implementation of Mitigation Measure 4.5-2 is required by the 2012 EIR, no new mitigation measures are required. In summary, the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR.

## 3.8.13 Utilities and Service Systems

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XIX. UTILITIES AND SERVICE SYSTEMS —** Would the project: | | | |
| a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects? | Less than Significant | ☒ | ☐ |
| b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years? | No Impact | ☒ | ☐ |
| c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments? | No Impact | ☒ | ☐ |
| d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals? | Less than Significant | ☒ | ☐ |
| e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste? | No Impact | ☒ | ☐ |

### 3.8.13.1 Discussion of Utilities and Service Systems

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding the construction or expansion of new water or wastewater treatment facilities. There would be a temporary increase in water use for dust suppression and revegetation activities for the 2012 project, as would also occur with the PCRP, but no new facilities would be necessary. Wastewater would continue to be handled by an existing septic system and portable toilets. The 2012 project and PCRP activities would improve stormwater conveyance by restoring the creek to a more natural condition, but no specific stormwater facilities are proposed. No new electric power, natural gas, or telecommunication facilities would be constructed by the PCRP. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would have sufficient water supplies to serve the project. As discussed above under criterion a), there would be a temporary increase in water for dust suppression and revegetation activities to implement the PCRP. Although revegetation and associated water demand would occur in some areas not contemplated in the PCRA (e.g., concrete channel area), the amount of additional water would be within the overall water demand for the 2012 project. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

c) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding wastewater because no such service is available in the project area. Existing wastewater needs are handled by a septic system and portable toilets. No change to wastewater services would result from implementation of the PCRP; therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

d) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not exceed solid waste reduction standards or the capacity of facilities that would serve the project. The number of workers necessary for PCRP activities would be within a similar range as those required for the 2012 project. The PCRP activities that would generate solid waste would likewise be relatively similar to those conducted for the PCRA. The volume of solid waste for PCRP activities would represent a similarly minor portion of the overall solid waste that would be generated by non-PCRA reclamation activities under the 2012 project, and would be accommodated by existing area landfills. Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

e) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would result in no impact regarding with compliance with federal, state, and local management and reduction statutes and regulations related to solid waste. As under the 2012 project, Lehigh would continue to adhere to all applicable laws and regulations pertaining to solid waste disposal, including the Surface Mining and Reclamation Act performance standards. Construction and demolition debris generated by reclamation activities, including from the Permanente Quarry Conveyor System, concrete road segments, discarded tractor tires, and the "old concrete crusher foundation" would be sent to a recycling facility certified to divert more than 65 percent of solid waste from landfills (County of Santa Clara Department of Planning and Development 2021b; CalRecycle 2021). Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

### 3.8.13.2 Consistency Conclusion for Utilities and Service Systems

Consistent with the findings of the 2012 EIR, implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR related to utilities and service systems.

## 3.8.14 Wildfire

| *Issues (and Supporting Information Sources):* | *2012 EIR Determination* | *2012 EIR Sufficient* | *Further Analysis Required* |
|---|---|---|---|
| **XX. WILDFIRE —** If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project: | | | |
| a) Substantially impair an adopted emergency response plan or emergency evacuation plan? | No Impact | ☒ | ☐ |
| b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire? | Not evaluated in 2012 EIR | ☐ | ☒ |
| c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment? | Not evaluated in 2012 EIR | ☐ | ☒ |
| d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes? | Not evaluated in 2012 | ☐ | ☒ |

### 3.8.14.1 Discussion of Wildfire

The PCRP is located in Moderate and High fire hazard severity zones within a State Responsibility Area, according to fire hazard mapping prepared by the California Department of Forestry and Fire Protection (CAL FIRE 2007). Specific criteria pertaining to potential wildfire-related impacts are discussed below.

a) The 2012 EIR concluded that the proposed reclamation and restoration activities within the PCRA would not impair implementation of or physically interfere with the County Emergency Operations Plan existing at that time (2008) (see Section 4.9, *Hazards and Hazardous Materials*, criterion f), page 4.9-13). The proposed reclamation activities would not result in the complete or partial closure of public roadways, interfere with any identified evacuation route, restrict access for emergency response vehicles, or restrict access to critical facilities such as hospitals or fire stations. The PCRP would similarly not result in impacts regarding the current plan (County of Santa Clara Office of Emergency Services 2017, 2019). Therefore, the PCRP would cause **no new significant impact** and **no substantial increase in the severity of a significant impact** relative to the impact disclosed in the 2012 EIR for this significance criterion.

b) Because the 2012 EIR did not analyze an impact relative to significance criterion b), the checklist above indicates "further analysis required." As analyzed below, the Project would result in a less-than-significant impact related to the exacerbation of wildfire risks, and associated exposure of Project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.

As discussed in the 2012 EIR, the reclamation and restoration activities proposed as part of the 2012 project would be substantially similar to existing operations at the quarry, including materials movement by haul truck, grading, and revegetation. Although the use of fuels and construction equipment could produce a spark or flame near areas of high wildland fire risk, this is the same risk that exists under baseline conditions. PCRP activities would occur in the same area as the PCRA, with the exception of a 12.9-acre portion within the existing Reclamation Plan boundary where creek restoration activities were not analyzed in the 2012 EIR, and an additional 2.5-acre area outside the Reclamation Plan boundary where work would occur pursuant to the PCRP. PCRP activities would be similar to those under the 2012 project. Existing regulations governing the use of construction equipment in fire-prone areas would continue to apply. Specifically, the California Public Resources Code includes fire safety requirements that: restrict the use of equipment that may produce a spark, flame, or fire near flammable materials on days when a burning permit is required (Section 4427); require the use of spark arrestors on construction equipment that use an internal combustion engine (Section 4442); specify requirements for the safe use of gasoline-powered tools in fire hazard areas (Section 4431); and specify fire suppression equipment that must be provided on-site for various types of work during the highest fire danger period (Section 4428). Construction would be temporary and no operational impacts would result upon the conclusion of restoration activities. Therefore, PCRP activities would not significantly exacerbate wildfire risks, and the impact would be **less than significant**.

c) Because the 2012 EIR did not analyze an impact relative to significance criterion c), the checklist above indicates "further analysis required." As analyzed below, the Project would result in a less-than-significant impact related to the installation or maintenance of infrastructure that may exacerbate fire risk or that may result in temporary or ongoing impacts on the environment.

PCRP activities would not require the installation of fuel breaks, emergency water sources, power lines, or other utilities that would exacerbate fire risks. In the channel widening area, an existing concrete access road would be partially reduced in width. A new dirt access road would be constructed for maintenance of Pond 13 near the Rock Pile. To ensure the geotechnical stability of the slope exposed below the Rock Pile and the proposed access road, Lehigh proposes to have these areas inspected by the geotechnical engineer or Project geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary. Road improvements would allow for emergency access and would not exacerbate wildfire risks. The impact would be **less than significant**.

d) Because the 2012 EIR did not analyze an impact relative to significance criterion d), the checklist above indicates "further analysis required." As analyzed below, the Project would result in a less-than-significant impact related to the exposure of people or structures to significant risks as a result of runoff, post-fire slope instability, or drainage changes.

As discussed in detail in Section 3.7, *Hydrology and Water Quality*, implementation of the PCRP would result in an improved and restored channel segment of Permanente Creek. The PCRP has been designed to ensure channel stability through the use of engineered streambed material, floodplain armor, vegetated rock slope protection, rapidly establishing vegetation, and erosion control best management practices. The proposed design would not significantly alter creek depth or velocities downstream. Runoff flow rates would not change substantially because neither the drainage pattern of the tributary area nor the volume of flows within the channel would be altered. Therefore, there would be no substantial increase in the rate or volume of surface runoff that could result in downslope or downstream flooding, or landslides. The impact would be **less than significant**.

### 3.8.14.2 Consistency Conclusion for Wildfire

Implementation of the PCRP would result in **no new significant impacts** and **no substantial increase in the severity of significant impacts** relative to the impacts disclosed in the 2012 EIR, and **less-than-significant** impacts for wildfire criteria that were not analyzed in the 2012 EIR.

## 3.8.15 References

California Department of Conservation (DOC), 2021. California Important Farmland Finder.

California Department of Forestry and Fire Protection (CAL FIRE), 2007. Santa Clara County Fire Hazard Severity Zones in State Responsibility Area Map. Scale 1:100,000. Adopted November 7, 2007.

California Department of Resources Recycling and Recovery (CalRecycle), 2021. CALGreen Construction Waste Management Requirements. Available: https://www.calrecycle.ca.gov/lgcentral/library/canddmodel/instruction/newstructures.

County of Santa Clara County Department of Planning and Development, 2021a. Letter of Robert Salisbury, Senior Planner, to the Honorable Quirina Luna Geary, Chairwoman of the Tamien Nation, dated December 21, 2021.

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County of Santa Clara Office of Emergency Services, 2017. *County of Santa Clara Emergency Operations Plan.* Approved January 10, 2017.

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Governor's Office of Planning and Research (OPR), 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA.* December 2018.

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# CHAPTER 4
# Alternatives

CEQA requires a lead agency to analyze a reasonable range of alternatives to a proposed project that could feasibly attain most of the basic objectives of the project while substantially reducing or eliminating its significant environmental effects. CEQA also requires an EIR to evaluate a "no project" alternative to allow decision-makers to compare the impacts of approving a project with the impacts of not approving it. Other than the requirement to analyze a "no project alternative," no ironclad rule governs the nature or scope of the alternatives to be discussed other than the rule of reason, which demands that an EIR set forth only those alternatives necessary to permit a reasoned choice and examine in detail only the alternatives that the lead agency determines could feasibly attain most of the project's basic objectives. The range of feasible alternatives is selected and discussed in a manner to foster meaningful public participation and informed decision making (California Code of Regulations [Cal. Code Regs.] Title 14, Section 15126.6).

Consistent with these tenets of CEQA, this chapter describes the key considerations used to identify and screen potential alternatives for the Permanente Creek Restoration Plan (PCRP), explains why potential alternatives were eliminated from further consideration, and describes the alternatives that were carried forward for more detailed analysis.

## 4.1 Potential Alternatives Screening Process

The following factors were considered in determining whether to carry potential alternatives to the PCRP forward for more detailed consideration in this SEIR:

(1) Whether the potential alternative would meet most of the basic Project objectives. The Project objectives are identified in Section IV.A.33 of the amended consent decree between the Sierra Club and Lehigh/Hanson Permanente Cement, Inc., dated May 11, 2016 (Amended Consent Decree) (see **Appendix B**); in Section 1.2 of the *Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum* (see **Appendix C**); and in Section 2.2, *Project Objectives.* They are repeated below for ease of reference. Lehigh's objectives for the PCRP are as follows:

   (a) Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity (e.g., cascade and step channeling, floodplain roughness with floodplain logs, boulders, planting pockets, live stake trench packs), increased channel cover, and by fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless California Department of Fish and Wildlife (CDFW) California Salmonid Stream Habitat Restoration Manual (CDFW

Restoration Manual) hydraulic design criteria cannot be met due to: (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist.

(b) Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function.

(c) Remove mining-related fill and sediments in the bed, banks, and adjacent slopes.

(d) Remove or alter man-made structures so as to improve riparian habitat.

(e) Lay back creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek.

(f) Require restoration that is no less stringent than any restoration that is approved or required by any agency,[1] including but not limited to the County of Santa Clara Department of Planning and Development (County Planning Department), CDFW, and the Regional Water Quality Control Board (RWQCB), and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the County Planning Department, CDFW, and the RWQCB.

(2) Whether it would be "feasible," where feasible means capable of being accomplished in a successful manner within a reasonable period of time, considering economic, environmental, legal, social, and technological factors (Public Resources Code Section 21061.1; 14 Cal. Code Regs. Sections 15126.6 and 15364). Among the factors that may be considered when addressing the feasibility of alternatives are environmental impacts, site suitability, economic viability, social and political acceptability, technological capacity, availability of infrastructure, general plan consistency, regulatory limitations, jurisdictional boundaries, and whether the proponent could reasonably acquire, control, or otherwise have access to an alternative site (14 Cal. Code Regs. Section 15126.6[f]).

(3) Whether it would be able to avoid or substantially lessen any of the potentially significant impacts of the Project.

(4) Whether its implementation is remote or speculative.

Any potential alternative determined to be infeasible, to not avoid or substantially lessen a potential significant impact of the PCRP, or to be remote or speculative was not carried forward for more detailed review.

## 4.2 Potential Alternatives Initially Considered but Not Carried Forward for Detailed Review

In light of the facts of this Project and direction in CEQA and the CEQA Guidelines that an EIR consider "only those alternatives necessary to permit a reasoned choice," the County Planning Department, as lead agency, has determined that there are no suitable alternatives to the PCRP. Accordingly, the agency has determined that it is appropriate to analyze three alternatives in detail: the PCRP (i.e., the Project) and two no project alternatives, the No Grading Approval/No Project

[1] For purposes of the analysis, this SEIR understands "restoration that is no less stringent than any restoration that is approved or required by any agency" to mean that the creek restoration activities can be no less stringent than as set forth in permits or other approvals issued by regulatory agencies for the proposed Project.

Alternative and the No Approvals/No Project Alternative. Each no project alternative is described later in this chapter; the rationale for the County Planning Department's determination is summarized below.

To satisfy the first screening criterion, a potential alternative must have the capacity to feasibly attain "most of the basic objectives of the project [and] avoid or substantially lessen any of the significant effects of the project. . . ." (CEQA Guidelines Section 15126.6[a]). The potential alternative must also have the capacity to attain the "underlying fundamental purpose" of the project, which in this case is to restore the approximately 9,000 linear feet of Permanente Creek (135.6 acres) for the beneficial purposes of aquatic and riparian habitat and other related conditions specified in the objectives listed above.[2] No such alternative was identified.

Regarding feasibility, the second screening criterion, the County Planning Department determined two factors to be particularly limiting: legal feasibility and environmental feasibility. Authorization of the requested Grading Approval would result in the restoration of a specific segment of Permanente Creek in accordance with the provisions of an amended consent decree resolving a lawsuit (Appendix B). Thus, to be legally feasible, any potential alternative would have to comply with the creek restoration requirements set forth in the Amended Consent Decree. Accordingly, a "no project" alternative that would not include any creek restoration was initially considered, because it could marginally reduce air pollutant emissions and greenhouse gas emissions by resulting in reduced truck traffic. However, such an alternative was not carried forward because it would be legally infeasible because of its inconsistency with a federal consent decree (*Tiburon Open Space Committee v. County of Marin* (2022) 78 Cal.App.5th 700).

To be environmentally feasible, any potential alternative must also be capable of avoiding or substantially lessening a significant effect of the project. Under the circumstances of this Project, no site outside the geographic scope considered in the Amended Consent Decree would be suitable or capable of avoiding or substantially lessening a significant impact of the Project. Instead, off-site alternatives or alternatives that limit the restoration would either raise new significant impacts or fail to achieve the Project's legally required conditions. No such potential alternative was identified.

Regarding the third screening criterion, the County Planning Department notes that, with mitigation incorporated and in considering the long-term beneficial effects of creek restoration, the PCRP would cause no new significant impact and no substantial increase in the severity of a significant impact already analyzed and disclosed in the 2012 EIR. This is supported by the analysis documented in Chapter 3, *Project Impacts and Mitigation Measures*. To satisfy Screening Criterion 3, any potential alternative would have to be at least equally beneficial.

The final screening criterion restricts detailed analysis of potential impacts that would be either remote or speculative. One potential alternative—a restoration design focus alternative—that would have provided for sustainable passage of anadromous fish through the Project site and

[2] See *In re Bay-Delta* (2008) 43 Cal.4th 1143, 1165. ("An EIR need not study in detail an alternative that is infeasible or that the lead agency has reasonably determined cannot achieve the project's underlying fundamental purpose.")

year-round habitat within it was initially considered (Lehigh Southwest Cement Company 2021). However, this potential alternative was determined to be remote or speculative because Permanente Creek is not an anadromous fish stream and was determined not to be able to support anadromy. Thus, the restoration design focus alternative was not carried forward for more detailed review in the SEIR.

The County Planning Department requested input about potential alternatives from agencies and members of the public during the scoping period, but no potential alternatives were suggested in response. The notice of preparation (NOP) expressly invited input to assist the County in identifying and evaluating potential alternatives. See page 5 of the NOP, a copy of which is included as Exhibit A to **Appendix A**, *Scoping Report.* The County's identification of potential alternatives as a special area of focus also was discussed during the agency and public scoping meeting. See, e.g., slides 17 and 18 of the public scoping meeting presentation (Exhibit D to Appendix A). One entity, the Sierra Club, responded to these specific requests, noting that a more expensive restoration option would be enforceable if it fit within the cost escalation values in the Amended Consent Decree; however, neither this scoping letter nor any other offered details or suggestions as to what such an option might look like. A copy of the Sierra Club letter is provided in Exhibit E to Appendix A of this SEIR.

# 4.3 Alternative A—No Grading Approval Alternative

## 4.3.1 Characteristics

Under Alternative A, the Project site would be restored in accordance with the PCRP, except in areas outside the existing Reclamation Plan boundary (where Grading Approval would be required), because inside that boundary, no further discretionary authorization would be required from the County Planning Department and because other agencies with jurisdiction over resources in and adjacent to Permanente Creek reasonably could be expected to authorize the proposed restoration. Thus, under Alternative A, the proposed restoration activities would proceed as proposed in all areas of the Project site except Reaches 6–8. See Table 2-1, *Specific Areas of Focus for the Supplemental EIR*, for a summary of the activities and locations of the restoration work that would occur in Reaches 1–5 and 9–22 under the No Grading Approval Alternative.

## 4.3.2 Screening

There is a question about whether the No Grading Approval Alternative would be legally feasible because it would result in less restoration than is described and required by the Amended Consent Decree.[3] Nonetheless, this alternative has been carried forward for consideration for consistency with CEQA Guidelines Section 15126.6(e). Otherwise, the No Grading Approval Alternative would meet most of the basic Project objectives: increasing the quantity and quality of resident

[3] Because it is not a party to the Amended Consent Decree, the County of Santa Clara is not bound to require restoration of the creek to occur as set forth in the Amended Consent Decree. Despite not being bound by the Amended Consent Decree, the County is not mandated to evaluate alternatives that are inconsistent with a stipulated judgment—here, the Amended Consent Decree in *Sierra Club v. Hanson Permanente Cement, Inc., et al*. (See, e.g., *Tiburon Open Space Committee v. County of Marin* (2022) 78 Cal.App.5th 700 [evaluation of reduced-project alternative not required where it would be inconsistent with federal stipulated judgments].)

rainbow trout habitat; improving riparian habitat (including by removing or altering man-made structures); removing mining-related fill and sediments; stabilizing slopes to prevent fill from entering the creek; and resulting in restoration consistent with the agencies' permits. No economic, environmental, social, or technological factors have been identified that would eliminate the No Grading Approval Alternative from consideration, and its implementation would be neither remote nor speculative. However, because this alternative would result in a lesser amount of restoration than would result from the PCRP, its implementation would result in a reduced overall restoration benefit compared to the Project as proposed.

### 4.3.3 Impacts

Impacts of the No Grading Approval Alternative would be the same as those of the Project except in Reaches 6–8, where all impacts and all benefits of the Project would be avoided. The No Grading Approval Alternative would cause no new significant impact, and no more severe an impact than was analyzed and disclosed in the 2012 EIR. The environmental conditions that would result are described in the following environmental setting sections of this SEIR:

- *Air Quality:* Section 3.1.1.2
- *Biological Resources:* Section 3.2.1.2
- *Cultural Resources:* Section 3.3.1.2
- *Energy:* Section 3.4.1.2
- *Geology, Soils, Seismicity, and Paleontology:* Section 3.5.1.2
- *Greenhouse Gas Emissions:* Section 3.6.1.2
- *Hydrology and Water Quality:* Section 3.7.1.2

Other impacts of the No Grading Approval Alternative have been analyzed and documented on a resource-by-resource basis in the 2012 EIR and are not repeated here.

## 4.4 Alternative B—No Project Alternative

### 4.4.1 Characteristics

CEQA Guidelines Section 15126.6(e) requires consideration of a no project alternative. This analysis discusses the conditions that existed on or about April 13, 2021—the date that the County Planning Department published the NOP to issue notice of its intention to prepare this SEIR—and what reasonably would be expected to occur in the foreseeable future if neither the lead agency nor any of the responsible or trustee agencies approved necessary authorizations to implement the PCRP.

Should the No Project Alternative be implemented, the Project site would be restored in accordance with the creek restoration identified in the 2012 EIR. None of the revisions included as part of the PCRP would be implemented within the existing Reclamation Plan boundary.

### 4.4.2 Screening

There is a question about whether the No Project Alternative would be legally feasible because it would result in less restoration than is described and required by the Amended Consent Decree. Nonetheless, this alternative has been carried forward for consistency with CEQA Guidelines Section 15126.6(e). The No Project Alternative would meet most of the basic Project objectives to a lesser extent than the Project as proposed: increasing the quantity and quality of resident rainbow trout habitat; improving riparian habitat (including by removing or altering man-made structures); removing mining-related fill and sediments; stabilizing slopes to prevent fill from entering the creek; and resulting in restoration consistent with agencies' permits in accordance with the restoration activities described in the 2012 EIR. No economic, environmental, social, or technological factors have been identified that would eliminate the No Project Alternative from consideration, and its implementation would be neither remote nor speculative. However, because this alternative would result in a lesser amount of restoration than would result from the PCRP, its implementation would result in a reduced overall restoration benefit compared to the Project as proposed.

### 4.4.3 Impacts

Impacts of the No Project Alternative would result in no change to the baseline condition because restoration activities would be conducted in accordance with the creek restoration analyzed in the 2012 EIR. No restoration would occur outside the existing Reclamation Plan boundary. The No Project Alternative would cause no new significant impact, and no more severe an impact than was analyzed and disclosed in the 2012 EIR. The environmental conditions that would result are described in the 2012 EIR and are not repeated here.

## 4.5 Environmentally Superior Alternative

The CEQA Guidelines define the environmentally superior alternative as that alternative with the least adverse impacts on the project area and its surrounding environment. In the case of a restoration project, the County considers the environmentally superior alternative to be that alternative with the greatest long-term benefit to the physical environment of the project area and its surroundings. For this Project, the PCRP is considered the environmentally superior alternative for CEQA purposes because it would cause no new or more significant impacts relative to the Project analyzed in the 2012 EIR and because it would result in the restoration and related long-term benefits to acres outside the existing Reclamation Plan boundary.

---

## 4.6 References

Lehigh Southwest Cement Company. 2021. 2013 Consent Decree and 2016 Amended Consent Decree Comparison. September 7, 2021.

# CHAPTER 5
# Report Preparation

## 5.1 Lead Agency

### County of Santa Clara Department of Planning and Development

County Government Center
70 West Hedding Street, 7th Floor, East Wing
San Jose, CA 95110

Robert Salisbury, Senior Planner
Leza Mikhail, Planning Services Manager
Jacqueline Onciano, Director of Planning and Development

### Ascent Environmental, Inc.

Planning consultant to the County
1111 Broadway, Suite 600
Oakland, CA 94607

Saba Asghary, Project Manager
Pat Angell, Project Director

## 5.2 Consultants

### Environmental Science Associates

787 The Alameda, Suite 250
San Jose, California 95126

| | |
|---|---|
| Brian Boxer, AICP | Principal in Charge |
| Janna Scott, J.D. | Project Manager; Overall Quality Assurance/Quality Control; Introduction, Project Description, Alternatives, Introduction to Environmental Analysis, Comparison of Alternatives |
| Matthew Fagundes | Deputy Project Manager; Executive Summary, Project Description; Resource Lead for Air Quality, Greenhouse Gas Emissions, Energy |
| Liza Ryan, M.S. | Biological Resources |
| Cheri Velzy | Air Quality |
| Brian Pittman, M.S., CWB | Resource Lead for Biological Resources |
| Heidi Koenig, RPA | Resource Lead for Cultural and Tribal Cultural Resources |
| Michelle Le | Energy |

### Sutro Science LLC

3030 Bridgeway Blvd., Suite 229
Sausalito, CA 94965

| | |
|---|---|
| Peter B. Hudson, P.G., CEG | Geology, Soils, Seismicity, and Paleontology; Hydrology and Water Quality; Hazards and Hazardous Materials; Mineral Resources |
| Justin Taplin, M.S. | Geology, Soils, Seismicity, and Paleontology; Hydrology and Water Quality; Hazards and Hazardous Materials; Mineral Resources |

## 5.3 Agencies Consulted

The County of Santa Clara submitted a copy of the Notice of Preparation to the following state and local agencies:

### State Agencies

California Air Resources Board
California Department of Conservation
California Department of Fish and Wildlife, Bay Delta Region 3
California Department of Forestry and Fire Protection
California Department of Parks and Recreation
California Department of Toxic Substances Control
California Department of Transportation, District 4
California Department of Transportation, Division of Aeronautics
California Department of Transportation, Division of Transportation Planning
California Department of Water Resources
California Fish and Game Commission
California Highway Patrol
California Native American Heritage Commission
California Natural Resources Agency
California Office of Historic Preservation
California Regional Water Quality Control Board, San Francisco Bay Region 2
State Water Resources Control Board, Division of Drinking Water

### Local Agencies

Bay Area Air Quality Management District
City of Los Altos Hills
Midpeninsula Regional Open Space District
Santa Clara Valley Water District

# Appendix A
## **Scoping Report**

# PERMANENTE CREEK RESTORATION PROJECT

## Scoping Report

File No. PLN17-2250

Prepared for
County of Santa Clara
Department of Planning and
Development

July 2021

# PERMANENTE CREEK RESTORATION PROJECT

## Scoping Report

File No. PLN17-2250

Prepared for
County of Santa Clara
Department of Planning and
Development

July 2021

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# SCOPING REPORT
# Permanente Creek Restoration Project

## 1. Introduction

This report provides an overview of the comments received by the Santa Clara County Planning Department (County) during the public scoping period for the Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR that the County is preparing for the Permanente Creek Restoration Plan (PCRP), File No PLN17-2250.[1]

CEQA Guidelines Section 15083 provides that a "Lead Agency may…consult directly with any person… it believes will be concerned with the environmental effects of the project." Scoping is the process of early consultation with affected agencies and the public prior to completion of a Draft EIR. Section 15083(a) states that scoping can be "helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important." Scoping is an effective way to bring together and consider the concerns of affected State, regional, and local agencies, the project proponent, and other interested persons (CEQA Guidelines §15083(b)). Scoping is not conducted to resolve differences concerning the merits of a project or to anticipate the ultimate decision on a proposal. Rather, the purpose of scoping is to determine the scope of information and analysis to be included in an EIR and, thereby, to ensure that an appropriately comprehensive and focused EIR will be prepared that provides a firm basis for informed decision-making. Comments not within the scope of CEQA will not be addressed through the CEQA process.

This report is intended for use by the County in preparing the SEIR as formal documentation of initial input received from governmental agencies, the public, and other stakeholders regarding the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the SEIR. It also provides access for other agencies and members of the public to review comments received during the scoping period.

[1] The County of Santa Clara Planning Office is the lead agency pursuant to the California Environmental Quality Act (CEQA) for the preparation of an SEIR for the Project.

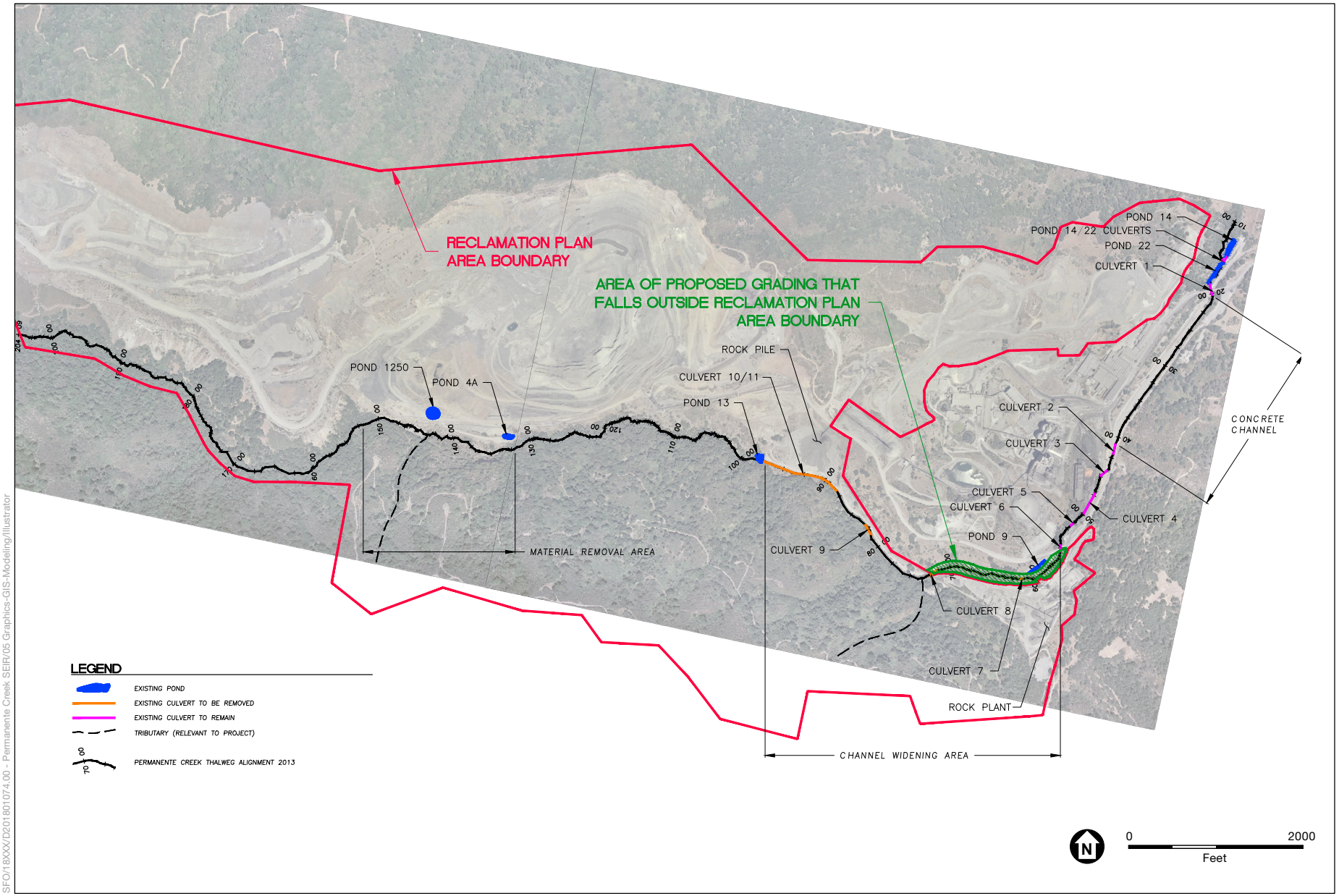
# 2. Description of the Project

## Project Summary

The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. In accordance with a Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (RWQCB Order No. 99-018), RWQCB and Lehigh spent a number of years developing the scope of a Permanente Creek restoration plan. Ultimately, the agreed upon terms of the Permanente Creek restoration plan were included in an Amended Consent Decree (Consent Decree) between the Sierra Club and Lehigh, entered by the U.S. District Court, Northern District, on May 11, 2016. The Consent Decree identified reach-specific and site-specific restoration recommendations, identified optional restoration design alternatives, contained implementation schedules, and updated prior reports submitted to the RWQCB based on more recent field reconnaissance. It focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the Consent Decree overlapped with the activities analyzed in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR; others would occur outside the existing reclamation plan boundary.

## Project Location

The Lehigh Southwest Cement Company (Lehigh) owns and operates two adjacent facilities located in the Santa Clara County foothills west of the City of Cupertino in an unincorporated area of Santa Clara County: Permanente Quarry and the Lehigh Cement Plant. These facilities are located along the east branch of Permanente Creek within the Permanente Creek watershed (**Figure 1**). Permanente Creek's main channel is approximately 13.1 miles long, with its headwaters rising on the southeast side of Black Mountain approximately 0.6-mile west of the western boundary of Lehigh's property. Approximately 4.2 miles of Permanente Creek traverse Lehigh's property, and includes portions of the creek that have been re-aligned into a straight channel or placed in underground culverts through the cities of Los Altos and Mountain View and discharges into the San Francisco Bay through the Mountain View Slough or Stevens Creek and the Whisman Slough via the Permanente Creek Diversion Channel. The area evaluated in the 2012 EIR included a 49.2-acre area of disturbance along Permanente Creek and the adjacent hillsides that had been affected by mining activities, erosion events, and activities to control erosion in that area. The PCRP would restore the streambed, banks, and floodplain along an approximately 3.7-mile extent of the portion of Permanente Creek within Lehigh's ownership, partly within and partly outside of the area analyzed in the 2012 EIR.




SFO/18XXX/D2018010174.00 - Permanente Creek SEIR/05 Graphics-GIS-Modeling/Illustrator

SOURCE: Waterways Consulting, Inc., Permanente Creek Restoration Plan 90% Level Submittal Design Basis Technical Memorandum, October 31, 2019.

Permanente Creek Restoration Project Grading Approval Notice of Preparation

**Figure 1**
Project Overview

ESA

# 3. Opportunities for Public Comment

## Notification

On April 13, 2021, the County published and distributed a Notice of Preparation (NOP) to advise interested local, regional, state, and federal agencies, as well as the public, that an SEIR would be prepared for the project. The NOP also was emailed to recipients on the "Lehigh interested parties" list. The NOP, a copy of the email notification, and the email list are provided in **Exhibit A**, *Notice of Preparation*.

Additionally, an electronic copy of the NOP was posted on the County's website at: https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx. The NOP solicited comments on the scope and content of the SEIR. Agencies and members of the public were encouraged to submit their comments to the County by U.S. mail or e-mail. Screenshots of the County's website showing the NOP are provided in **Exhibit B**, *Electronic Access*.

In addition to the NOP, the County notified the public about the public scoping meeting through a newspaper legal advertisement published in the Cupertino Courier on April 23, 2021. The legal notice is provided in **Exhibit C**, *Newspaper Notification*. The notification provided basic project information, the date, time, and participation information for a virtual public scoping meeting, and a brief explanation of the public scoping process.

## Public Scoping Meeting

The County conducted a virtual public scoping meeting on Thursday, April 29, 2021, that was scheduled from 6 p.m. to 8 p.m. The presentation (**Exhibit D**) included an overview of the project, the environmental review process, and public participation instructions.

A total of 24 people participated in or attended the scoping meeting. Panelists included: Robert Salisbury and Manira Sandhir of Santa Clara County Department of Planning and Development; Claudia Garcia of Ascent Environmental, planning consultant to the County; and Janna Scott of Environmental Science Associates (ESA), CEQA consultant to the County. Erika Guerra of Lehigh Southwest Cement Company presented an overview of the project. Three members of the public and a representative from the Midpeninsula Regional Open Space District spoke at the scoping meeting. A summary of the comments and related discussion is included in Exhibit D. Briefly, commenters had questions regarding the interaction of the proposed project with the Yaeger Yard area; biological resources relating to changes since the 2012 EIR; and the potential for air quality and associated health impacts.

# 4. Summary of Scoping Comments

All scoping comments received on or before end of the scoping period are documented in this Scoping Report and will be considered in the SEIR. Nine comment letters were received during the scoping period. Table 1 lists the names of commenting parties in the order in which the comments were received. The County has reviewed and relied upon the full text of the comment letters in preparing the SEIR; summaries of the environmental issues raised are provided below for ease in review by other agencies and members of the public. The letters are provided in **Exhibit E**, *Scoping Letters*.

**TABLE 1**
**PARTIES SUBMITTING COMMENTS DURING**
**THE PERMANENTE CREEK RESTORATION PROJECT SEIR SCOPING PROCESS**

| Name | Organization/Affiliation | Letter ID | Date |
|---|---|---|---|
| **Written Comments** | | | |
| Susan Murphy | None | A | April 13, 2021 |
| Nancy Gonzalez-Lopez, Cultural Resources Analyst | Native American Heritage Commission | B | April 14, 2021 |
| Jeremy Loh, Assistant Planner | Town of Los Altos Hills | C | May 6, 2021 |
| Carol E. Atkins, Manager, Environmental Services Unit | California Department of Conservation, Division of Mine Reclamation | D | May 7, 2021 |
| Libby Lucas | None | E | May 10, 2021 |
| Aaron Hebert, Senior Resource Management Specialist | Midpeninsula Regional Open Space District | F | May 10, 2021 |
| Katja Irvin | Sierra Club | G | May 10, 2021 |
| Gregg Erickson, Regional Manager, Bay Delta Region | California Department of Fish and Wildlife | H | May 13, 2021 |
| Shree Dharasker, Associate Engineer | Santa Clara Valley Water District | I | May 14, 2021 |

Scoping input received by the County identifies potential impacts in the areas summarized below:

## Air Quality

Input regarding the project's potential impact on air quality was submitted by the Town of Los Altos Hills (Letter C) and by a member of the public (Letter A). Emissions from both trucks serving the project site and the facility itself were described as contributing to asthma and other health concerns, especially for children.

## Biological Resources

Letter H, from the California Department of Fish and Wildlife (CDFW), states that CDFW engineering staff provided comments on the revised 90% engineering designs and determined that implementation of the project could potentially result in post-construction instability of the creek bed and bank, which could result in impacts to the sensitive riparian community and special-

status species habitat. A long-term post-construction monitoring and adaptive management plan should be developed and described in the SEIR.

CDFW recommends that analysis of riparian vegetation impacts include trees less than 12-inches in diameter, or based on area calculations for seedlings, saplings, and understory vegetation, as smaller trees are important to riparian vegetation structural complexity and habitat succession. Removal of approximately 30 larger trees as indicated in the 90% design plans also could impact special-status and sensitive bat species (e.g., Pallid bat and Hoary bat).

Other input provided suggests that the SEIR should discuss design modifications or alternate outfall sites (specifically in regard to Pond 1250) to ensure the project does not adversely impact aquatic and riparian habitats or special-status species (e.g., California giant salamander and California red-legged frog) resulting from direct or indirect changes in the creek hydrology.

CDFW recommends the SEIR should include focused species and nesting bird surveys; nest buffers; and avoidance, minimization, and mitigation measures, to reduce potential impacts to special-status species to less-than-significant levels. In order to avoid impacts to rare plant species, CDFW recommends the SEIR include a special-status plant habitat assessment, focused plant surveys, and plant avoidance measures.

The Midpeninsula Regional Open Space District (Letter F) notes that the 2012 EIR relied on the inclusion of Applicant Proposed Measures in the Final EIR or the Project Description to reduce impacts to California red-legged frog and other species to less-than-significant levels, which may conflict with the subsequent decision in Lotus v. Department of Transportation (2014). The letter further indicates that new information regarding California red-legged frog (and other species such as mountain lions) that was not available at publication of the 2012 FEIR should be incorporated into the SEIR analyses. The District noted that special-status plant surveys should be updated from the 2012 EIR and that mitigation should include periodic surveys to address potential for plant establishment over the duration of the project. The District also suggests the SEIR should consider potential impacts to any Sensitive Natural Communities as defined by NatureServe's Heritage Methodology, which is the same system used to assign global and state rarity ranks for plant and animal species in the California Natural Diversity Database.

A member of the public (Letter E) suggests the SEIR include establishment of a native plant nursery that only uses plants from the watershed, and prohibition of the use of chemicals for weed suppression. The commenter questions whether current protocols are being followed regarding the gathering of seeds of oaks and other preferred trees in preparation for initiation of the Permanente Creek Restoration Plan.

## Cultural and Tribal Cultural Resources

The Native American Heritage Commission (NAHC) (Letter B) references the CEQA Guidelines sections that are applicable to potential impacts to historical resources as well as the requirements of Assembly Bill 52 (AB 52) and Senate Bill 18 (SB 18) pertaining to tribal cultural resources. The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the proposed project as early as possible in order to

avoid inadvertent discoveries of Native American human remains and to best protect tribal cultural resources. Summaries of the requirements of AB 52 and SB 18 are provided as well as NAHC recommendations for cultural resources assessments.

The Midpeninsula Regional Open Space District (Letter F) states that a qualified archaeologist should review the excavation work through the Phase II analysis and discuss findings with the State Historic Preservation Officer (SHPO). If an archaeologist and SHPO has already been consulted pursuant to Section 106, then the appropriate measures can be borrowed.

A letter from a private citizen (Letter E) indicates that an Ohlone Indian village has been unearthed just downstream by the Santa Clara Valley Water District. Therefore, the species of wetlands vegetation selected for reaches of Permanente Creek should reflect Native American-era plants conducive to supporting resident trout and California red-legged frog. Specifically, the establishment of tule in Reach #6 should be encouraged. A special pallet of wetlands vegetation could be temporarily grown in ponds adjacent to reaches of the creek where they could be used for restoration efforts. The commenter stressed the importance of a restoration plan reflecting Ohlone Indian occupation of Upper Permanente Creek for centuries, including a trail that Ohlone used to reach Monte Bello Ridge and the Pacific Ocean.

## Hydrology and Water Quality

The Town of Los Altos Hills (Letter C) states that the SEIR should include detailed and specific mitigation measures for the restoration and demolition activities so that pollutants and sediments are not released into the creek, and that the activities be limited to dry months to further reduce potential impacts on water quality. Potential impacts beyond the Reclamation Plan Area should be identified, with particular focus on potential downstream impacts.

Letter I from the Santa Clara Valley Water District states that any changes to the hydrology/hydraulics of the proposed restored channel should not result in impacts to the Permanente Flood Protection Project, particularly as it pertains to the functioning of the San Antonio detention basins. Furthermore, any increase in the 100-year flows and volumes due to the proposed improvements must be mitigated to pre-improvement conditions.

A member of the public (Letter E) expressed concern with haul roads and impacts on the creek and the Yeager Yard landslide. Concern also was expressed regarding the stability of mining waste and potential effects on the watershed.

## Mineral Resources

The California Department of Conservation, Division of Mine Reclamation (Letter D), stated that its primary focus is on active surface mining operations, but the Division also addresses issues related to abandoned legacy mines and has review responsibilities associated with lead agency implementation of the Surface Mining and Reclamation Act of 1975 (SMARA). Staff had no specific comments on the proposed project at this time.

# Other Topics

## Project Description

CDFW (Letter H) states that the project description in the NOP does not discuss the nexus of the proposed project to the proposed amendments to the Lehigh Permanente Quarry Reclamation Plan dated May 2019. CDFW recommends that the SEIR discuss the association between the project and the Reclamation Plan and explain whether the project will be further described and analyzed in any future CEQA documentation for the Reclamation Plan.

The Sierra Club (Letter G) states that the NOP project description should be revised to indicate that the provisions of the 2016 Amended Consent Decree, particularly paragraphs 33 through 42, reflect mandatory, minimum restoration duties imposed on Lehigh and are therefore necessary minimum elements of any "Project Description" applicable to the SEIR. For each activity in the Project Description, the SEIR should describe in detail and by reach which actions and impacts are covered in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR and identify sections and page numbers for easy reference. Trees should only be removed if necessary to secure the long-term restoration of the creek, and to the extent native trees are removed, they should be replaced with 15-gallon trees at appropriate ratios rather than 24-inch box trees.

## Alternatives

The Sierra Club states that alternatives to the restoration requirements in the Consent Decree that entail additional costs are still enforceable as restoration requirements if they fit within the cost escalation values in Decree paragraph 49.

# EXHIBIT A

## Notice of Preparation and Mailing List

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**County of Santa Clara**
**Department of Planning and Development**
County Government Center, East Wing
70 West Hedding Street, 7th Floor
San Jose, California 95110

# NOTICE OF PREPARATION OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE PERMANENTE CREEK RESTORATION PROJECT

**Project Applicant:** Lehigh Southwest Cement Company and Hanson Permanente Cement Inc.
**File Number:** PLN17-2250
**Application For:** Grading Approval

The County of Santa Clara ("County") will be the Lead Agency and will prepare a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("PCRP" or "project"). The County requests your input on the scope and content of the environmental information to be included in the SEIR that is germane to your agency's statutory responsibilities in connection with the proposed project. A brief description of the project, its site boundary, and a summary of the potential environmental effects are provided on the following pages. Approval of the project will require actions by the County of Santa Clara, including the preparation and certification of an SEIR and a Grading Approval. The SEIR also may be used by your agency when considering approvals for the project.

A Public Scoping/Community Meeting to solicit comments for the Notice of Preparation will be held virtually via Zoom (https://sccgov-org.zoom.us/j/92372836537) on **Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m**. The deadline for your response is Monday, May 10, 2021 at 5:00 p.m.; however, an earlier response, if possible, would be appreciated. Please send your response to:

County of Santa Clara Planning Office
**Attention: Robert Salisbury**
County Government Center
70 West Hedding, 7th Floor, East Wing, San Jose CA 95110
E-mail: Robert.Salisbury@pln.sccgov.org

**Prepared by:**
Robert Salisbury, Senior Planner

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***Signature***

April 12, 2021
***Date***

**Approved by:**
Manira Sandhir
Principal Planner, AICP

DocuSigned by: Manira Sandhir 6BD23CC8C7554B3...
***Signature***

April 12, 2021
***Date***

**Board of Supervisors**: Mike Wasserman, Cindy Chavez, Dave Cortese, Ken Yeager, S. Joseph Simitian
**County Executive**: Jeffrey V. Smith

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# Introduction

As the lead agency, the County plans to analyze the potential environmental impacts associated with a Grading Approval application submitted by Lehigh Southwest Cement Company (Lehigh) for the PCRP pursuant to the California Environmental Quality Act (CEQA) (Public Resources Code §21000 et seq.) and its implementing regulations, the CEQA Guidelines (14 Cal. Code Regs. Section 15000 et seq.). The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The entirety of the project will be evaluated in the SEIR.

A lead agency may choose to prepare a supplement to an existing environmental impact report (EIR) if any of the conditions described in CEQA Guidelines Section 15162 would require the preparation of a subsequent EIR, and if only minor additions or changes would be necessary to make the previous EIR adequately apply to the project in the changed situation. The County evaluated the impacts of the PCRP within seven subareas collectively identified as the Permanente Creek Restoration Area (PCRA) in the 2012 EIR. Lehigh now proposes to implement the PCRP with the modifications described below relative to the original description of the work as provided in the 2012 EIR.

# Project Location

Hanson Permanente Cement, Inc. owns, and Lehigh Southwest Cement Company operates (hereinafter, jointly, referred to as "Lehigh") the Permanente Quarry in the County foothills west of the City of Cupertino. The Quarry is located along the East Branch of Permanente Creek within the Permanente Creek watershed (**Figure 1**). Permanente Creek's main channel is approximately 13.1 miles long. Its headwaters rise on the southeast side of Black Mountain. Approximately 4.2 miles of Permanente Creek traverse Lehigh's property before flowing through the cities of Los Altos and Mountain View and discharging into the South San Francisco Bay through the Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel. The area evaluated in the 2012 EIR included a 25.9-acre area of disturbance along Permanente Creek and the adjacent hillsides referred to in the EIR as the PCRA. The PCRA had been affected by mining activities, erosion events, and activities to control erosion in that area. The PCRP would restore the streambed, banks, and floodplain along an approximately 3.7-mile extent of the portion of Permanente Creek within Lehigh's ownership.

# Project Description

In accordance with a Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (RWQCB Order No. 99-018), RWQCB and Lehigh staffs spent a number of years developing the scope of a Permanente Creek restoration plan. Ultimately, the agreed upon terms of the Permanente Creek restoration plan were included in an Amended Consent Decree (Decree) between the Sierra Club and Lehigh, entered by the U.S. District Court, Northern District, on May 11, 2016 (with an updated Exhibit D entered on May 18, 2016) (2016 Creek Restoration Plan). The 2016 Creek Restoration Plan identified reach-specific and site-specific restoration recommendations, identified optional restoration design alternatives, contained implementation schedules, and updated prior reports submitted to the RWQCB based on more recent field reconnaissance. It focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the 2016 Creek Restoration Plan overlapped with the activities analyzed in the 2012 EIR. Where that was true, the 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project under consideration. Where there was no overlap, the 2012 EIR described and analyzed the impacts of the Creek Restoration Plan as part of the cumulative scenario.

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The proposed creek restoration activities are reflected in the current PCRP, including the following major project components:

**Concrete Channel (Reach 6)**

- Encourage development of mature riparian canopy along the southern bank to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules;
- Preservation of existing native vegetation;
- Removal of non-native species and suppression of weeds around existing native seedlings and smaller native plants to encourage their establishment; and
- Installation of native vegetation.

**Channel Widening Area (Reaches 8-10)**

- Removal of concrete road segments;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Removal of 260 linear feet of culverts, including a road crossing, and daylighting the creek to improve fish passage conditions and ecological complexity;
- Installation of large woody debris (LWD) at the Culvert 7 and Culvert 8 removal sites.
- Removal of old tractor tires along streambanks at a culvert removal site;
- Removal of imported sediment from the bed and banks of a tributary reach;
- Select removal of rock slope protection (RSP) and concrete rubble bank protection at an area that now has adequate mature riparian vegetation that is providing root reinforcement to bank soils;
- Removal of the idled Rock Plant conveyor system and associated infrastructure; and
- Installation of native vegetation.

**Rock Pile Area (Reaches 11 through 13)**

- Removal of concrete road segment and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that would help improve fish passage conditions and ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity;
- Removal of Rock Pile and idled Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam infrastructure;
- Construction of a restored channel through abandoned Pond 13; and
- Installation of native vegetation.

**“Old Crusher Foundation” (Reach 17)**

- Cutting back the concrete block that is projecting into the channel to better conform to the natural creek bank.

**Material Removal Area (Reaches 17 and 18)**

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward, in accordance with the Decree, to retain Pond 4A in its current location;
- Construction of a new channel with floodplain bench areas with habitat elements that would help improve fish passage conditions and ecological complexity, and
- Installation of native vegetation.

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## Required Project Approvals

In addition to County certification of an SEIR and issuance of Grading Approval, the project would require authorizations from the RWQCB, including Clean Water Act Section 401 certification and waste discharge requirements; the California Department of Fish and Wildlife ("CDFW"), including a Fish & Game Code Section 1602 Streambed Alteration Agreement; U.S. Fish and Wildlife Service ("USFWS"), including Endangered Species Act Section 7 consultation regarding the California red legged frog or other relevant species; and the U.S. Army Corps of Engineers (the "Corps"), including a nationwide Section 404 permit.

## Potential Environmental Effects of the Project

An electronic copy of the 2012 EIR is available online: https://www.sccgov.org/sites/dpd/DocsForms/Documents/Lehigh_DEIR_201112.pdf. The 2012 EIR retains informational value, and only minor additions or changes would be necessary to make the 2012 EIR adequately apply to the PCRP as modified. Therefore, the County will prepare a supplement to the 2012 EIR (SEIR).

Pursuant to CEQA Guidelines Section 15163, the SEIR need only contain the information necessary to analyze the project modifications, changed circumstances, or new information that triggered the need for additional environmental review. The purpose of an SEIR is to explore environmental impacts that were not considered in the original environmental document. That the project has changed is not an occasion to revisit environmental concerns addressed in the original analysis - only the changed circumstances are at issue. Therefore, the SEIR will evaluate only those geographic areas that were not analyzed as part of the 2012 EIR and those environmental resource areas in which modifications to the PCRP could cause new or more severe significant impacts relative to those analyzed in the 2012 EIR. Aspects of the PCRP that were known at the time of the 2012 EIR are not subject to reconsideration, and the SEIR will not reconsider impacts that were approved as part of the certification of the 2012 EIR.[1]

Although all of the environmental considerations in the CEQA Guidelines Appendix G checklist will be considered, the SEIR is expected to focus on the following specific environmental topics:

- **Air Quality –** The air quality analysis presented in the SEIR will present applicable air quality conditions and air-pollutant sensitive land uses or activities in the vicinity of the project area and determine whether the PCRP, as revised, has the potential to result in a new or more significant air quality impact than disclosed in the 2012 EIR. The County will prepare an Air Quality and Greenhouse Gas Emissions Technical Study and will seek input from the Bay Area Air Quality Management District (BAAQMD) as part of the SEIR process.
- **Biological Resources –** The SEIR will present information on applicable biological resources in the project area, including special-status wildlife and plant species, natural communities, and wetlands; describe impact conclusions of the 2012 EIR; and evaluate potential for the PCRP, as modified, to result in a new or more significant impact to biological resources than disclosed in the 2012 EIR. The County will seek input from CDFW and USFWS as part of this effort.
- **Cultural Resources –** The SEIR will present relevant cultural resources information, including data from a cultural resources inventory and evaluation report, and will assess the potential for the PCRP, as revised, to result in a new or more significant impact to historical resources, archaeological and unique

[1] Focusing the scope of the SEIR in this way is consistent with CEQA. See, for example, *City of Irvine v. County of Orange* (2015) 238 Cal.App.4th 526, 539, and the California Supreme court's decision in *Friends of the College of San Mateo Gardens v. San Mateo County Community College District* (2016) 1 Cal.5th 937, 949.

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paleontological resources, tribal cultural resources, or potential disturbance of human remains than disclosed in the 2012 EIR.

- **Energy Conservation –** The SEIR will evaluate the potential energy impacts of operation, construction, and transportation of the PCRP, as revised, to determine whether they could result in a new or more significant impact to energy than disclosed in the 2012 EIR.
- **Geology and Soils –** The SEIR will present relevant information on the geology and geomorphology of Permanente Creek and will evaluate the potential for the PCRP, as revised, to result in a new or more significant impact to geology and soils than disclosed in the 2012 EIR.
- **Greenhouse Gas Emissions –** The SEIR will report greenhouse gas (GHG) emissions associated with the PCRP, as revised, and will assess whether changes in the project that have been made since the 2012 EIR could cause a new or more significant impact relating to GHG emissions. The County will prepare an Air Quality and Greenhouse Gas Emissions Technical Study and will seek input from BAAQMD as part of the SEIR process.
- **Hydrology and Water Quality –** The SEIR will generally describe hydrology and water quality conditions in and around Permanente Creek in the project area and will evaluate the potential for the PCRP, as revised, to result in a new or more significant impact to hydrology and water quality than disclosed in the 2012 EIR. The County will seek input from the RWQCB, the Corps, and the Santa Clara Valley Water District as part of this effort.
- **Cumulative Impacts –** To the extent the SEIR identifies any new or more significant impact than disclosed in the 2012 EIR, the SEIR will evaluate, on an issue-by-issue basis, the potential for the incremental change caused by the PCRP, as revised, to cause or contribute to new or more significant cumulative effects.
- **Alternatives.** CEQA requires an EIR to describe a range of reasonable alternatives to a project (or project location) that would feasibly attain most of the objectives and that could avoid or reduce at least one significant environmental impact (see CEQA Guidelines §15126.6). The SEIR will evaluate a No Project Alternative and will consider any new or more significant impact caused by the PCRP, as modified, in considering other potential alternatives.

The County welcomes all input on the scope and content of the SEIR in response to this Notice of Preparation, and especially welcomes responses that will assist the County in:

1. Identifying significant environmental issues raised by the proposed modifications to the PCRP as its activities were described in the 2012 EIR;
2. Identifying and evaluating potential alternatives to the proposed modifications or mitigation measures that could avoid or reduce new or more significant impacts of the proposed creek restoration activities than disclosed in the 2012 EIR; and
3. Confirming which agencies will be a responsible and/or trustee agency for this project and providing information germane to these agencies' statutory responsibilities as they relate to the County's analysis of potential effects of the PCRP, as revised.

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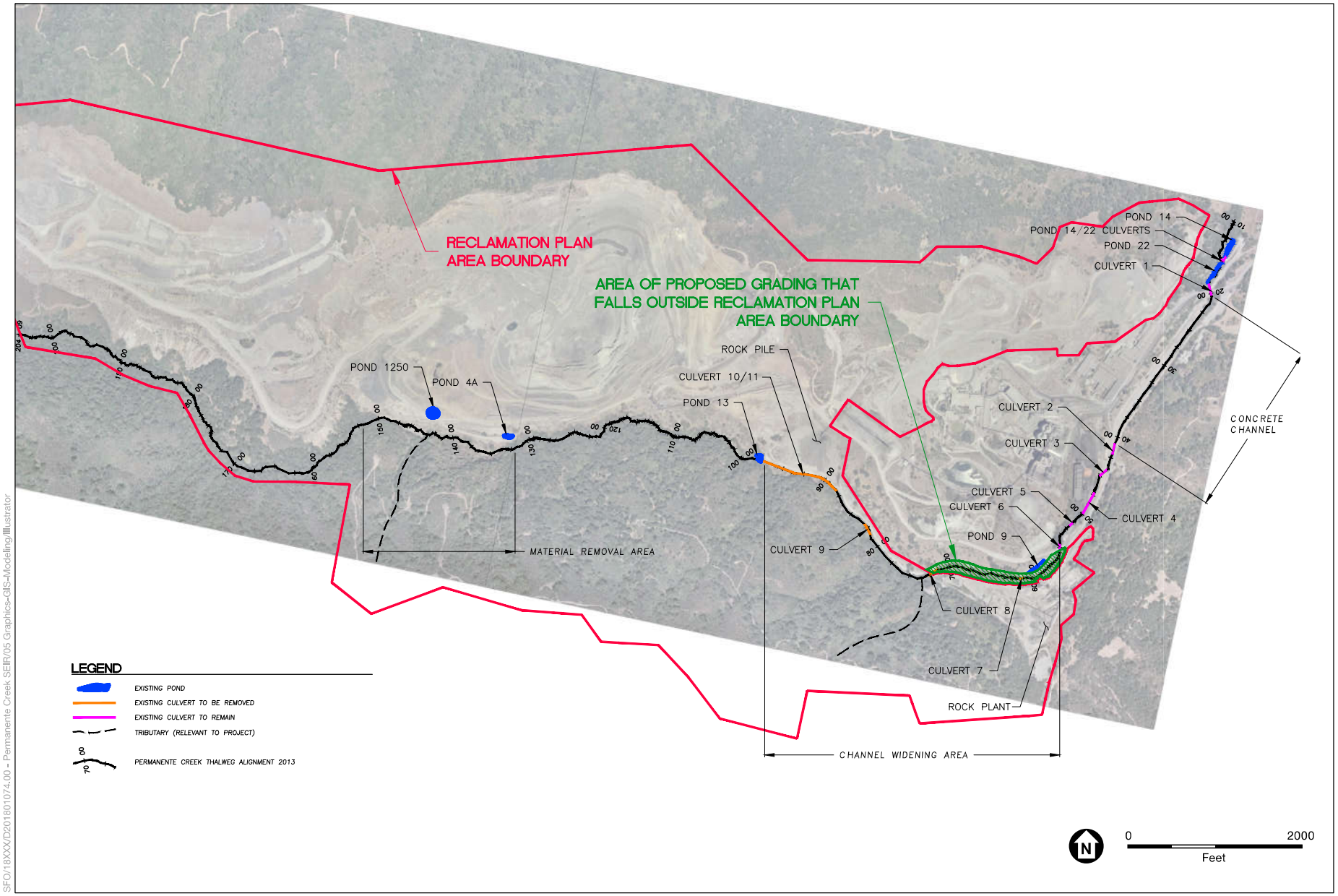


SFO/18XXX/D201801074.00 - Permanente Creek SEIR/05 Graphics-GIS-Modeling/Illustrator

SOURCE: Waterways Consulting, Inc., Permanente Creek Restoration Plan 90% Level Submittal Design Basis Technical Memorandum, October 31, 2019.

Permanente Creek Restoration Project Grading Approval Notice of Preparation

**Figure 1**
Project Overview

ESA

[redacted]

**From:** Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
**Sent:** Tuesday, April 13, 2021 2:20 PM
**Subject:** Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report
**Attachments:** FINAL_PCRP_NOP_with_Figure_1 (signed).pdf

To all Lehigh interested parties:

The County Santa Clara Department of Planning and Development is commencing work on a Supplemental Environmental Impact Report ("SEIR") for the Permanente Creek Restoration Project. The County has scheduled an EIR scoping meeting/community meeting on Thursday, April 29 from 6 – 8 PM.

**Please be aware that this SEIR is for the Permanente Creek Restoration Project (PLN17-2250) only, not for Lehigh's proposed Reclamation Plan Amendment (PLN19-0106) that the County is also processing.**

The Notice of Preparation for the SEIR describing the project and providing details and a Zoom link for the scoping meeting is attached to this email. We look forward to your comments and hope you all will consider attending the scoping meeting on April 29.

Kind regards,

Robert Salisbury, Senior Planner
County of Santa Clara Planning Office
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San Jose, CA 95110
email: Robert.Salisbury@pln.sccgov.org
Phone: (408) 299-5785

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# EXHIBIT B

## Electronic Access

# Permanente Creek Restoration Project (File PLN17-2250)

## Project Description:

Lehigh submitted a Grading Approval application for the Permanente Creek Restoration Project (PCRP) on November 2, 2017. The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing Reclamation Plan boundary for Lehigh Permanente Quarry. The proposed PCRP includes the following significant modifications:

- Removal of non-native species, installation of native vegetation, and preservation of existing native vegetation;
- Removal of concrete road segments, tractor tires, imported sediment, 260 linear feet of culverts in the channel widening area, 960 linear feet of culverts in the Rock Pile Area, and retired Rock Plant conveyor system;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Construction of new channel with floodplain bench areas;
- Removal of overburden/fill, and a relic concrete structure;
- Re-alignment of the centerline of Permanente Creek to the north, which will push the toe of the restored streambank approximately 25 feet northward, except near Pond 4A where it will move 16 feet northward.

## Project Status

Lehigh's proposed PCRP is currently undergoing environmental review through the preparation of a Supplemental Environmental Impact Report (SEIR). The County is currently in the process of finalizing the scope and bid of the SEIR. Once the scope and bid have been finalized, the County will prepare and circulate a Notice of Preparation (NOP) and post the NOP to the project website. The County provides periodic updates to interested members of the community. If you are interested in receiving information from the County about this project, please consider signing up to be added to the Lehigh Interested parties list.

## Project Materials

- Complete Letter
- Resubmittal
  - Cover Letter
  - Permanente Creek Restoration Plan 90% Level Submittal - Design Basis Technical Memorandum and Grading Plan
  - Geologic and Geomorphic Assessment (Golder Technical Memorandum)
- Superseded - Plans
- Superseded - Design Basis Technical Memorandum
  - Appendices
- Response Letter to March 5, 2018 Incomplete Letter
- Response Letter to February 14, 2019 Grading Application Incomplete Letter
- Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

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# EXHIBIT C

## Newspaper Notification

Newspaper : Cupertino Courier
Issue Date : 04/23/2021
Advertiser : COUNTY OF SANTA CLARA PLANNING
Ad Number : 6568812



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Dave Wetzel
President and CEO,
MLSListings

# Will the Real Estate Market Still Have Seasonality in 2021?

MLS LISTINGS

California is well-renowned for our delightful, temperate year-round climate. While other regions of the country suffer from harsh winters and muggy summers each year, we have subtle, yet beautiful California seasons. Now we are starting to see signs of spring in the air, which typically signal the start of the peak real estate season. Many are asking if COVID-19 has impacted the traditional real estate cycle, and if spring will remain the traditional peak of sales activity in 2021.

"With COVID-19 in 2020, that traditional spike in spring real estate activity got pushed into the summer and fall. The disruption in seasonality stemmed from the seismic shift of children going to school online and adults working from home. Without summer camps, summer vacations, and the typical start of a school year, families had more leeway in terms of timing to purchase a home. Suddenly, it could hinge on finding just the right one or waiting until when it was most convenient, rather than everything being dictated by the calendar. But now, with vaccines being deployed, schedules will come into play again. School and sports will resume more normal patterns, and more typical seasonality including traditional real estate cycles will return," said MLSListings partner economist Elliot Eisenberg in a recent episode of MLSListings Live.

"The 2021 real estate market may benefit from a number of additional positive factors," remarked Karl Lee, Chair of the MLSListings Board of Directors. "Millennials are getting married, having babies, and buying homes. Low interest rates are also a huge driver. Many have been amassing savings during the pandemic and those funds could be unleashed as part of the release of pent-up demand."

Local tech companies are thriving and have benefited from the increased need for technology for work, school, telehealth, entertainment, socializing, and shopping. With almost every aspect of daily life shifting online, these companies have become more important than ever in our lives. With the tech industry as a major local employer, our region's economy is able to benefit from this significant economic driver and contributor.

Housing supply and demand is also a factor as the greater Bay Area and Monterey Bay region benefit from a finite supply of homes to choose from in the area. There is also a greater appreciation for houses due to the pandemic. Suddenly we know what it's like to spend a lot more time in our homes. The concept of a house is fundamentally more valuable than it was before COVID.

As our new world slowly inches toward normalcy and real estate seasonality gradually makes it return, one thing becomes clear: now is a good time to buy or sell a home here. Remember that your Realtor® is a guiding star. Armed with MLSListings data, your Realtor® can point the way forward in 2021.

**County of Santa Clara**
Department of Planning and Development
County Government Center, East Wing
70 West Hedding Street, 7th Floor
San Jose, California 95110-1770
Telephone (408) 299-5770
Facsimile (408) 288-9198

## NOTICE OF ENVIRONMENTAL IMPACT REPORT SCOPING MEETING

## ***BY VIRTUAL TELECONFERENCE ONLY***

(https://sccgov-org.zoom.us/j/92372836537)

## Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m.

**NOTICE IS HEREBY GIVEN** that the County of Santa Clara ("County") Department of Planning and Development has scheduled a public scoping meeting to request input and comments on the scope and content of the environmental information to be included in the Supplemental Environmental Impact Report for the Permanente Creek Restoration Project (PCRP). The County will be the Lead Agency for this project and will prepare a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project.

The Public Scoping Meeting to solicit comments for the Notice of Preparation (NOP) will be held virtually via Zoom (https://sccgov-org.zoom.us/j/92372836537) on **Thursday, April 29, 2021, from 6:00 p.m. to 8:00 p.m.**

The public review period for the Notice of Preparation for the PCRP SEIR closes on **May 14, 2021**, however, an earlier response, if possible, would be appreciated. Written comments on the PCRP SEIR NOP should be addressed to Robert Salisbury at robert.salisbury@pln.sccgov.org and Claudia Garcia at Claudia.Garcia@ascentenvironmental.com.

Project documents are currently available online at: https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx

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# EXHIBIT D

## Public Scoping Meeting Presentation

# Permanente Creek Restoration Project Scoping Meeting

County File No. PLN17-2250

VIRTUAL MEETING

APRIL 29, 2021 - 6:00 TO 8:00 PM

ROBERT SALISBURY, SENIOR PLANNER

# Meeting Agenda

1. Introductions
2. Project Overview
3. CEQA Process Overview
4. Public Participation
5. Virtual Meeting Logistics
6. Public Comments on Scope of Supplemental Environmental Impact Report

# Introductions

## Roles and Responsibilities

- Lead Agency – County of Santa Clara
- Responsible Agencies and agency permits
  - Regional Water Quality Control Board
  - California Department of Fish and Wildlife
  - U.S. Army Corps of Engineers
- Trustee Agencies
  - California Department of Fish and Wildlife

# Project Overview

Lehigh Hanson
HEIDELBERGCEMENT Group

# Notice of Preparation

## SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT

## PERMANENTE CREEK RESTORATION PROJECT.

# Project Setting

## Project Setting

- East Branch of Permanente Creek within the Permanente Creek watershed
- The Permanente Creek Restoration Project (PCRP) will restore specified areas of streambed, banks, and floodplain along an approximately 3.7-mile portion of Permanente Creek adjacent to Lehigh's Permanente facility

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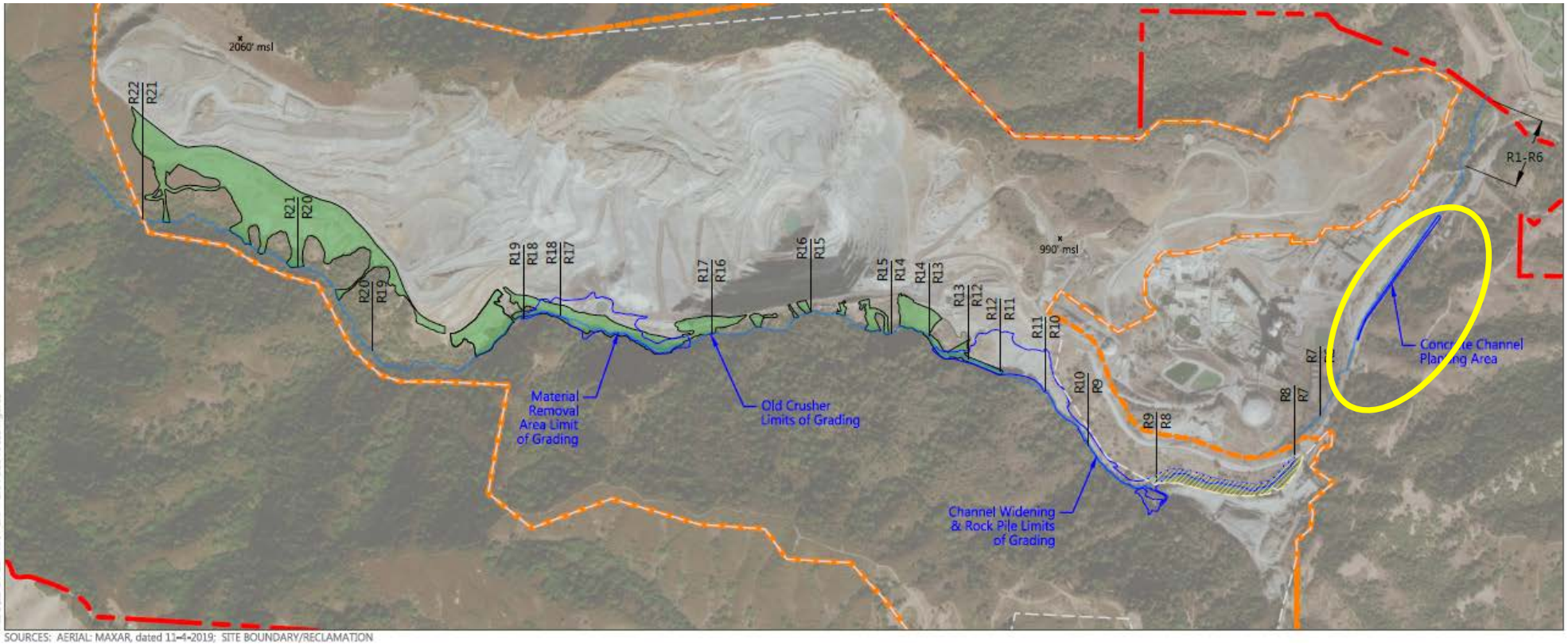
# Project Development

## Project Development

- PCRP developed after several years of discussion with:
  - Regional Water Quality Control Board
  - California Department of Fish & Wildlife
  - United States Fish & Wildlife Service
  - Sierra Club
- Memorialized in May 2016 agreement
- Watershed improvement project
  - Removes outdated flood control features
  - Lessens roads to reduce operational intensity near creek
  - Widens natural creek channel, restores habitat and removes legacy materials

# Project Elements



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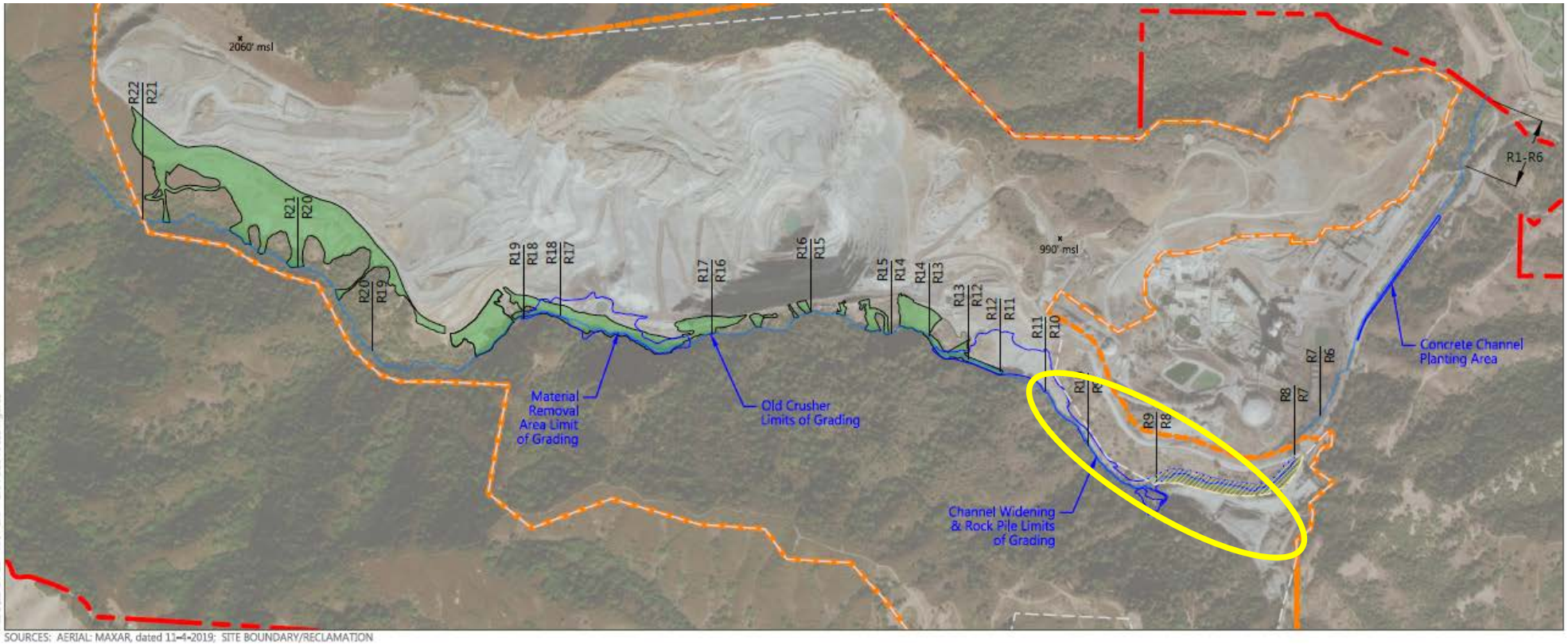
# Project Elements




SOURCES: AERIAL: MAXAR, dated 11-4-2019; SITE BOUNDARY/RECLAMATION



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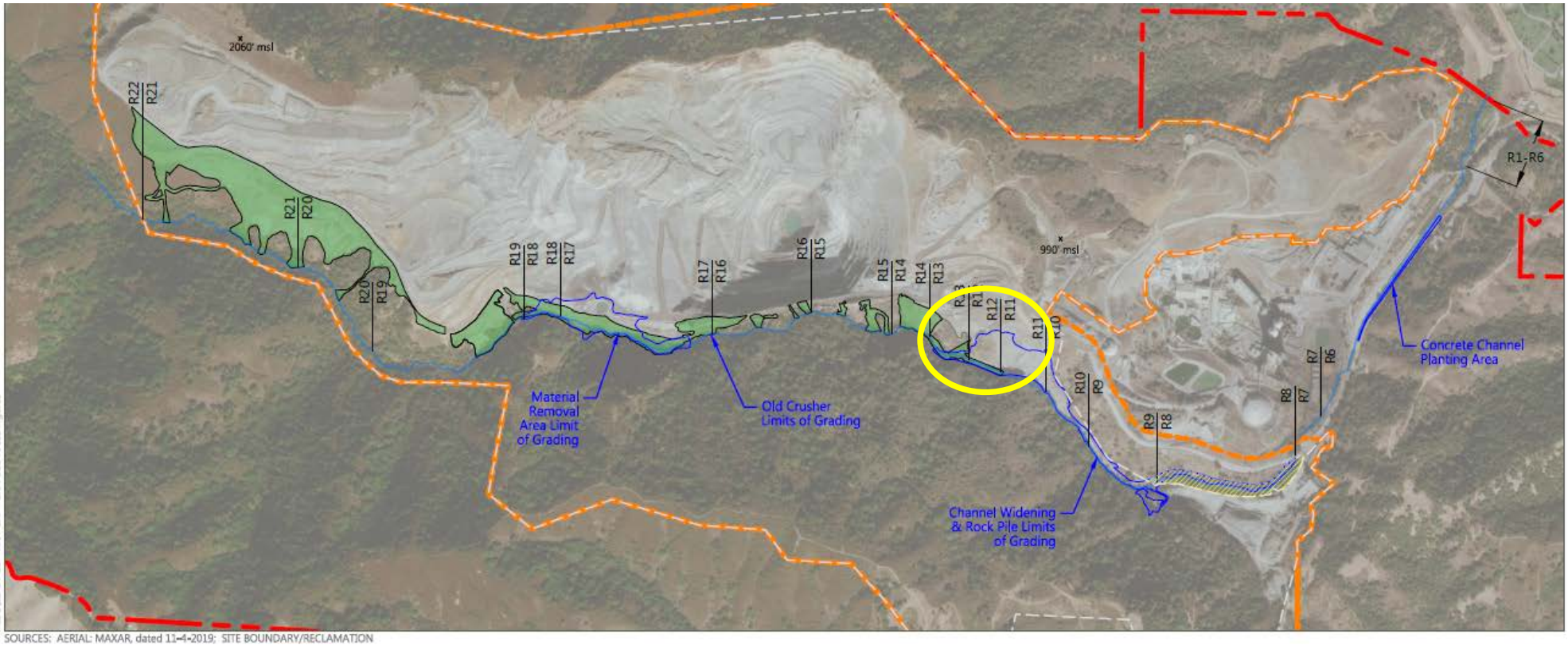
# Project Elements

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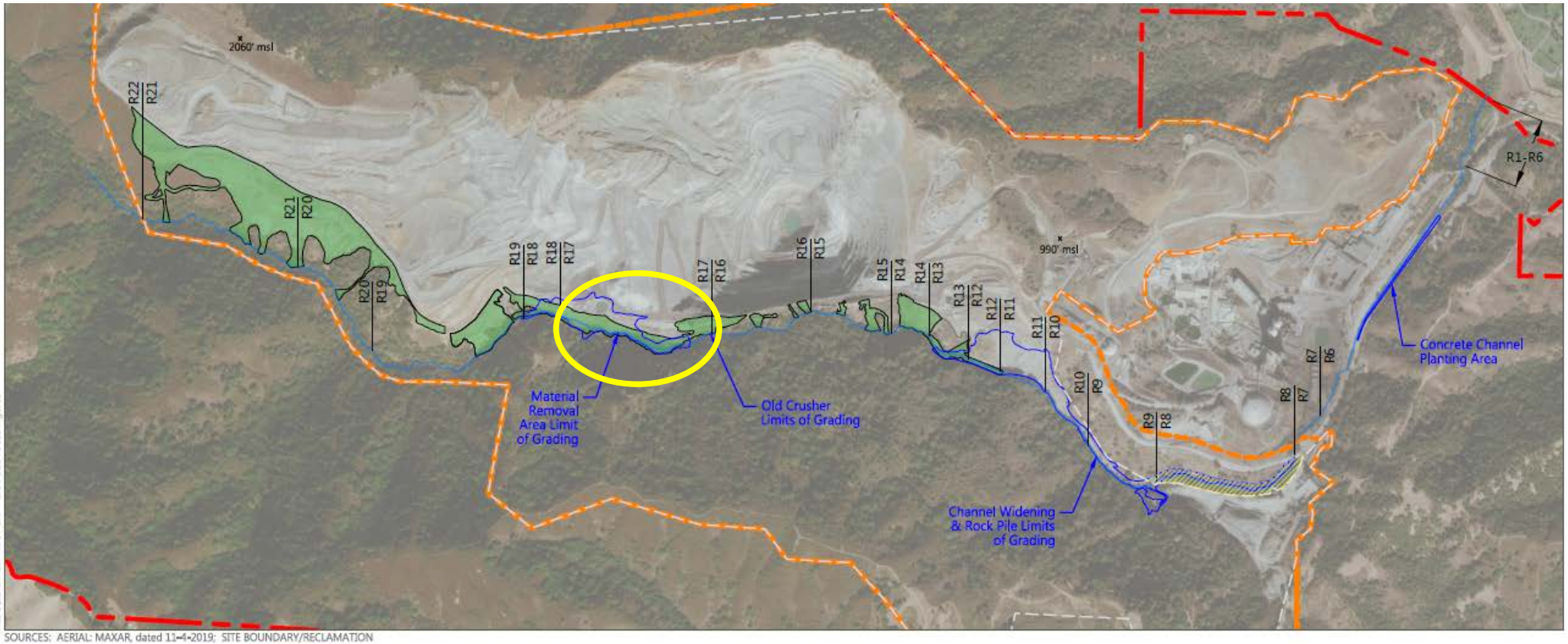
# Project Elements



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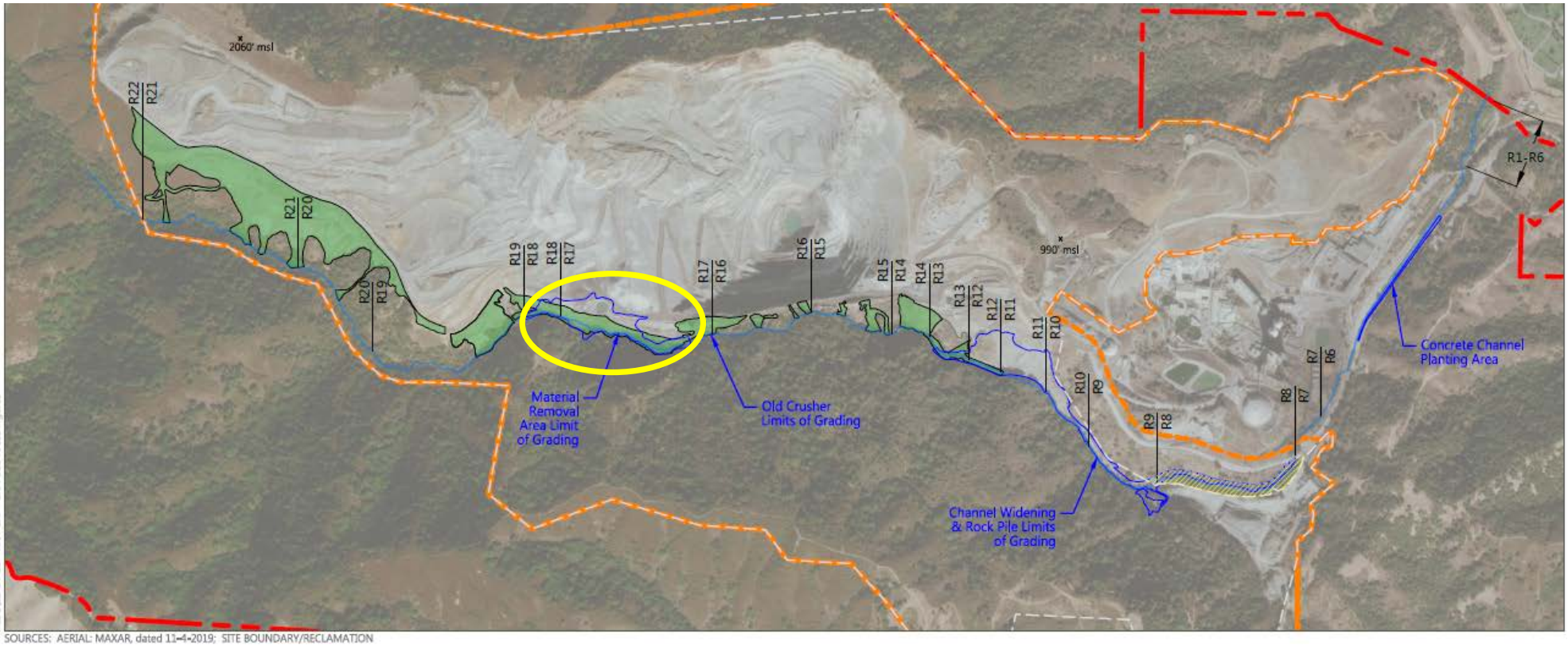
# Project Elements



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# Project Schedule/Purpose of Supplemental EIR

## Project Schedule

- Five (5) consecutive construction seasons after environmental review complete and all permits issued

## Purpose of Supplemental EIR

- Early creek restoration project was considered in 2012 Reclamation Plan EIR
- Supplemental EIR needed to address additions or changes to conform to the PCRP as modified.

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# CEQA Process Overview

## 2012 Reclamation Plan Amendment Environmental Impact Report

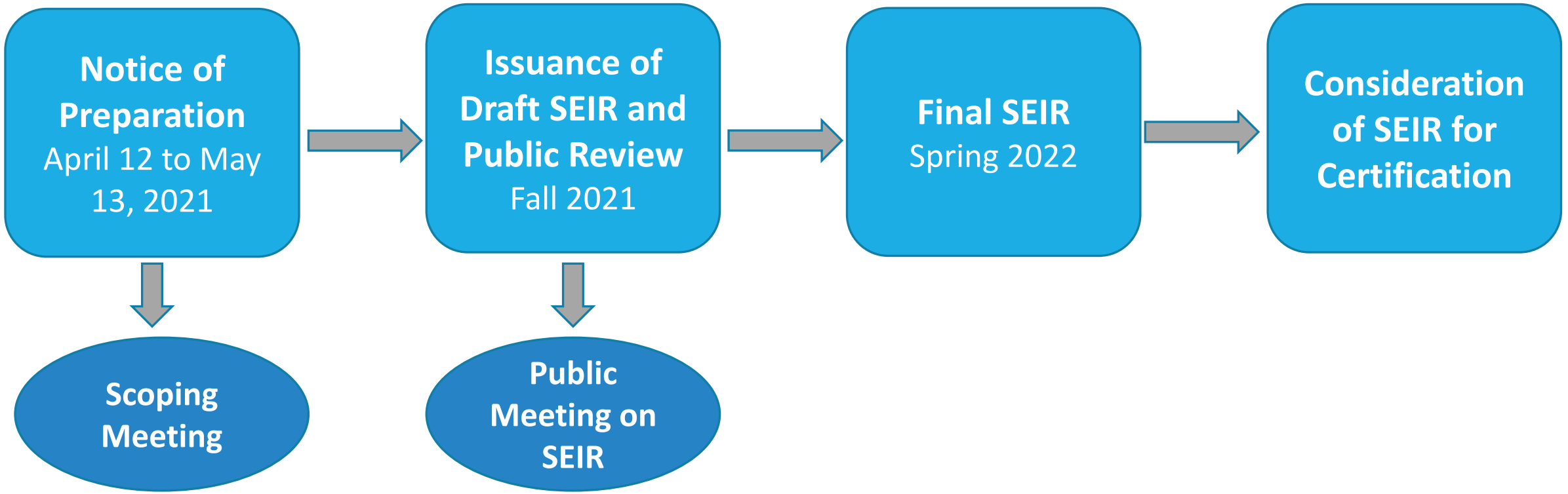
- Evaluated the impacts of the Permanente Creek Restoration Project (PCRP) within the Permanente Creek Restoration Area

## Supplemental Environmental Impact Report (SEIR)

- An SEIR contains only the information necessary to make an EIR adequate for the project as revised if only minor additions or changes are necessary to make the original EIR adequate
- Will focus on the changes proposed within and immediately adjacent to the PCRA
- Will inform the County's decision-making about the potential environmental consequences of the PCRP

# CEQA Process Overview

## SEIR Schedule



# CEQA Process Overview

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

# Anticipated Focus Areas

- Air Quality
- Biological Resources
- Cultural Resources
- Energy Conservation
- Geology and Soils
- Greenhouse Gas Emissions
- Hydrology and Water Quality
- Cumulative Impacts
- Project Alternatives

# CEQA Process Overview

## Project Alternatives

- CEQA requires the lead agency to evaluate a reasonable range of alternatives to the project that attain most basic objectives and avoid or lessen significant impacts

## Potential PCRP Alternatives

- No Project Alternative required by CEQA - will assume continued use of the project site in accordance with the reclamation plan

- Additional Project Alternatives may include design variations to avoid or reduce potential impacts

# Public Participation

## Participation at Scoping Meeting

- Provide comment during tonight's scoping meeting

## Written Scoping Comments

- Submit written comments via email to: Robert.Salisbury@pln.sccgov.org
- Or mail to:

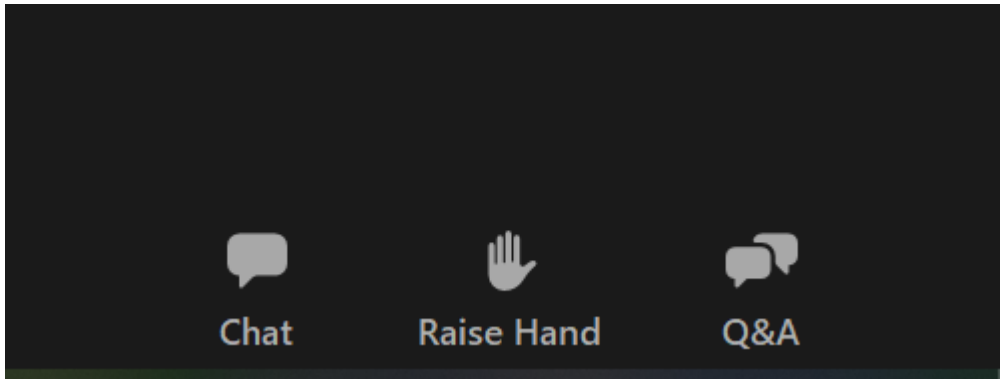
  County of Santa Clara Planning Division
  Attention: Robert Salisbury
  70 West Hedding Street, 7th Floor, East Wing
  San Jose CA 95110

## Provide Comment on Draft SEIR

- During the 45-day public review period of Draft SEIR (Fall 2021)
- Comments on the completed environmental analysis

# Virtual Meeting Logistics

- Press *9 or use the “Raise Hand” button to be placed in the comment queue
- Comments will be heard live following the presentation
- The Q&A and chat functions have been disabled for this meeting
- This meeting is being recorded



# Thank you!

## Stay Informed

- Status updates on the PCRP are available on the County website https://www.sccgov.org/sites/dpd/Programs/SMARA/PermanenteQuarry/Pages/PermanenteCreekRestoration.aspx

Robert Salisbury, Senior Planner
Robert.Salisbury@pln.sccgov.org

ESA

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San Jose, CA 95126
408.660.4000 phone
408.660.4001 fax

esassoc.com

# public scoping meeting notes

| | | | |
|---|---|---|---|
| project | Permanente Creek Restoration Project | project no. | PLN17-2250 |
| date | April 29, 2021 | time | 6 p.m. |
| present | (Identified below) | route to | File |
| subject | Scoping Meeting: Summary of Public Input Received | | |

Four people provided oral input at the April 29, 2021, public scoping meeting regarding the Permanente Creek Restoration Project Supplemental Environmental Impact Report (SEIR). Input and related discussion is summarized below:

1. Rhoda Fry:
    a. The Yaeger yard landslide, which is moving toward Permanente Creek, has been determined to be a health and safety risk to homes downstream. When will it be fixed? Rob Salisbury responded on behalf of the County that the County is continuing to monitor the Yaeger Yard, including the area where sediment occurred, and that Lehigh has installed equipment to monitor the speed at which the mass is moving. Current data showed significant movement at one brief time, but not outside what is considered "geologically normal" outside that time.
    b. How project being changed and why?
    c. What information is available now that was not available in 2012? Erika Guerra responded on behalf of Lehigh that, chronologically, information developed in 2016 and otherwise since the 2012 EIR are now available.
    d. How long is a "construction season"?
    e. The 90% plan available on the County's website seems most comprehensive thing posted there. Will there be a 100% plan?
    f. Will the Draft SEIR incorporate the elements of the 2012 plan so members of the public can easily see the comparison?

2. Aaron Hebert (Midpeninsula Regional Open Space District):
    a. Are you intending to reanalyze some of biological resources in the context of the SEIR? Rob Salisbury responded on behalf of the County that biological resources definitely will be a focus of the SEIR with a focus on impacts arising due to the change relative to the 2012 design.

3. Katja Irvin:
    a. Is the original EIR available anywhere? And the reclamation plan? Rob Salisbury responded on behalf of the County that both the 2012 EIR and the existing reclamation plan are available on County's website.
    b. Who is the deciding body for the grading permit? Rob Salisbury responded on behalf of the County that this an interesting project. Usually EIRs are associated with a Planning Commission or Board of Supervisors approval. However, here the County is only issuing a grading authorization and permit, which is a staff level approval, so certification of the SEIR also would be done at the staff level. Manira Sandhir confirmed on behalf of the County that the requested grading approval decision-maker would be Department staff, and that such a decision could be appealed to Planning Commission and then to the Board of Supervisors.

4. Caroline Kim
    a. What is the general timeframe in which decisions will be made? Ms. Kim lives close to the quarry and is starting to realize and become concerned about potential health impacts. Cars etc. constantly are covered in limestone dust. How much does resident feedback weigh in on decisions? Rob Salisbury responded on behalf of the County that Lehigh has a vested right to quarry, but that the Project that being discussed in this meeting is a creek restoration project unrelated to the broader quarrying operation. Lehigh has a reclamation plan amendment in process at the County that anticipates changes to the current plan; however, we are not at the EIR process for that. When we get there, the County will have a scoping meeting for that project much like this meeting for this project.

# EXHIBIT E

## Public Scoping Comment Letters

# Comment Letter A

[redacted]

**Subject:** FW: [EXTERNAL] Re: Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report

**From:** Susan Murphy <somurphy@earthlink.net>
**Sent:** Tuesday, April 13, 2021 4:22 PM
**To:** Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
**Subject:** [EXTERNAL] Re: Notice of Preparation for Permanente Creek Supplemental Environmental Impact Report

Dear Robert,

Since 1971, I have been a resident down-wind from the cement quarry. Over the years, I have witnessed hundreds of trucks coming down from the quarry and cement plant, spewing polluting emissions; and have inhaled polluted air from the quarry/cement plant itself which have contributed to years of asthma and compromised lung function in my family. I am not interested in having these kinds of detrimental health conditions continue, especially since they affect quality of life and life expectancy in both children and adults. Recently, there has been a significant number of new families with very young children moving into this neighborhood. I would not want them to have to experience them health effects that my family has experienced from this cement business over 50 years.

Please describe how the plans in this report will reduce the environmental pollution for those who live down-wind from the quarry. If there is someone else with whom I should communicate to stop the spread of pollutants from this business, please give me the information so I can communicate with them directly.

Dr. Susan Murphy
somurphy@earthlink.net
2043 El Sereno Avenue
Los Altos, CA 94024

On Apr 13, 2021, at 2:20 PM, Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG> wrote:

To all Lehigh interested parties:

The County Santa Clara Department of Planning and Development is commencing work on a Supplemental Environmental Impact Report ("SEIR") for the Permanente Creek Restoration Project. The County has scheduled an EIR scoping meeting/community meeting on Thursday, April 29 from 6 – 8 PM.

**Please be aware that this SEIR is for the Permanente Creek Restoration Project (PLN17-2250) only, not for Lehigh's proposed Reclamation Plan Amendment (PLN19-0106) that the County is also processing.**

The Notice of Preparation for the SEIR describing the project and providing details and a Zoom link for the scoping meeting is attached to this email. We look forward to your comments and hope you all will consider attending the scoping meeting on April 29.

Kind regards,

Robert Salisbury, Senior Planner
County of Santa Clara Planning Office

70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110
email: Robert.Salisbury@pln.sccgov.org
Phone: (408) 299-5785

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InSite, our new digital permit system is now operational. What to expect: customers will be able to initiate request or apply for a permit online or on site; check the status of your project, submit digital documents, and make payments online or on site; get better customer service through smooth & efficient internal routing. To register for an InSite account, click here.

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STATE OF CALIFORNIA — Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

RECEIVED
APR 19 2021

April 14, 2021

Robert Salisbury
County of Santa Clara, Department of Planning and Development
70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110

**Re: 2021040331, Permanente Creek Restoration Project, Santa Clara County**

Dear Mr. Salisbury:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements.** If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

**Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

CHAIRPERSON
**Laura Miranda**
*Luiseño*

VICE CHAIRPERSON
**Reginald Pagaling**
*Chumash*

SECRETARY
**Merri Lopez-Keifer**
*Luiseño*

PARLIAMENTARIAN
**Russell Attebery**
*Karuk*

COMMISSIONER
**William Mungary**
*Paiute/White Mountain Apache*

COMMISSIONER
**Julie Tumamait-Stenslie**
*Chumash*

COMMISSIONER
**[Vacant]**

COMMISSIONER
**[Vacant]**

COMMISSIONER
**[Vacant]**

EXECUTIVE SECRETARY
**Christina Snider**
*Pomo*

**NAHC HEADQUARTERS**
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

**1.** Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

**a.** A brief description of the project.

**b.** The lead agency contact information.

**c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).

**d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

**2.** Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

**a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

**3.** Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

**a.** Alternatives to the project.

**b.** Recommended mitigation measures.

**c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

**4.** Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

**a.** Type of environmental review necessary.

**b.** Significance of the tribal cultural resources.

**c.** Significance of the project's impacts on tribal cultural resources.

**d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

**5.** Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

**6.** Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

**a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.

**b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

**7.** Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

**a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or

**b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

**8.** Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

**9.** Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

**10.** Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

**a.** Avoidance and preservation of the resources in place, including, but not limited to:

**i.** Planning and construction to avoid the resources and protect the cultural and natural context.

**ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

**b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

**i.** Protecting the cultural character and integrity of the resource.

**ii.** Protecting the traditional use of the resource.

**iii.** Protecting the confidentiality of the resource.

**c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

**d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).

**e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).

**f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

**11.** Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

**a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.

**b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.

**c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
   a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
   b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
   a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
   b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
   c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Nancy.Gonzalez-Lopez@nahc.ca.gov.

Sincerely,

Nancy Gonzalez-Lopez
Cultural Resources Analyst

cc: State Clearinghouse

LOS ALTOS HILLS
CALIFORNIA

May 6, 2021

County of Santa Clara Planning Office
Attention: Robert Salisbury
70 West Hedding Street, 7th floor, east wing
San Jose, CA 95110

**RE: Notice of Preparation of Supplemental Environmental Impact Report for Permanente Creek Restoration Project**

Dear Mr. Salisbury:

The Town of Los Altos Hills has reviewed the Notice of Preparation (NOP) for a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("Project") and has the following comments:

1. The SEIR should consider the impacts of the proposed creek restoration activities with regards to all environmental considerations in CEQA Guidelines Appendix G, with special attention being paid to water quality, air quality, and biological resources.

2. While the restoration activities will improve the health of the riparian corridor, the SEIR should include detailed and specific mitigation measures for the restoration and demolition activities so that pollutants and sediments are not released into the creek or air. Specifically, the SEIR should require that the restoration and demolition activities be limited to dry months to further reduce potential impacts on water quality.

3. The SEIR should assess potential impacts beyond the area identified as the Reclamation Plan Area, with particular focus on potential downstream impacts.

Beyond the SEIR, the County should ensure that all listed authorizations and approvals are obtained for the Project; with no approvals deferred or any exceptions granted. Finally, the Town requests that the County continue to closely monitor the activities of the Lehigh Quarry and Cement Plant operations to ensure compliance with all Regional, State, and Federal regulations.

The support and ongoing work of regulatory agencies and County Planning Staff on this Project is greatly appreciated. If you have any questions, please contact me at (650) 947-2544 or by email at jloh@losaltoshills.ca.gov.

Sincerely,

Jeremy Loh
Assistant Planner

CC: Carl Cahill, City Manger
Zachary Dahl, Planning and Building Director

Gavin Newsom, Governor
David Shabazian, Director

California
**Department of Conservation**
Division of Mine Reclamation

May 7, 2021

Robert Salisbury
County of Santa Clara Planning Office
County Government Center
70 West Hedding, 7th Floor, East Wing
San Jose, CA 95110

Copy sent via email: Robert.Salisbury@pln.sccgov.org

SUBJECT: PREPARATION OF A SUPPLEMENTAL ENVIRONMENTAL IMPACT REPORT FOR THE PERMANENTE CREEK RESTORATION PROJECT – STATE CLEARINGHOUSE NUMBER 202104331

Dear Mr. Salisbury:

Thank you for including the Department of Conservation's Division of Mine Reclamation (Division) in the environmental review process for the preparation of the Supplemental Environmental Impact Report (SEIR) for the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project (Proposed Project) Notice of Preparation (NOP). The NOP indicates that the County of Santa Clara (County), as lead agency under the California Environmental Quality Act (CEQA), will prepare a Supplemental Environmental Impact Report (SEIR) for the Proposed Project.

As described in the NOP, the SEIR will analyze the potential environmental impacts associated with a grading approval application submitted by Lehigh Southwest Cement Company (Lehigh) for the Proposed Project. The Proposed Project makes modifications to a previously considered restoration project that would restore specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The County evaluated the impacts of the Proposed Project within seven subareas collectively identified as the Permanente Creek Restoration Area (PRCA) in the 2012 EIR. Lehigh is proposing modifications that are in accordance with the Cleanup and Abatement Order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB; RWQCB Order No. 99-018) and an Amended Consent Decree entered by the U.S. District Court, Northern District on May 11, 2016 (with an updated Exhibit D entered on May 18, 2016) between the Sierra Club and Lehigh. The SEIR will evaluate only those geographic areas that were not analyzed as part of the 2012 EIR and those environmental resource

areas in which modifications to the Proposed Project would cause new or more severe significant impacts relative to those analyzed in the 2012 EIR.

The Division's primary focus is on active surface mining operations; however, the Division also addresses issues related to abandoned (pre-1976) legacy mines. Additionally, the Division has review responsibilities associated with lead agency implementation of the Surface Mining and Reclamation Act of 1975 (SMARA). SMARA provides a comprehensive surface mining and reclamation policy to assure that:

- Adverse environmental effects of surface mining operations are prevented or minimized and mined lands are reclaimed to a usable condition which is readily adaptable for alternative land uses.
- Production and conservation of minerals are encouraged, while considering values relating to recreation, watershed, wildlife, range and forage, and aesthetic enjoyment.
- Residual hazards to the public health and safety are eliminated.

Division staff has reviewed the subject NOP pursuant to the CEQA statutes and Guidelines and offers no comments at this time. The Division will provide comments, as warranted, on documents prepared and submitted in accordance with SMARA.

The Division requests to be included on the distribution list for this Proposed Project. Additionally, the Division requests that any subsequent project documents (e.g., the Draft SEIR, hearing notices for the Draft and Final SEIRs, and any supplemental environmental documents), as well as a copy of the certified Final SEIR, be sent to the Division at DMR-Submittals@conservation.ca.gov or the mailing address on the bottom of page 1 of this letter. If you have any questions, please contact me at (916) 323-9198.

Sincerely,

DocuSigned by:
Carol E.Atkins
73ECCB6738194DA...

Carol E. Atkins
Manager
Environmental Services Unit

ec: State Clearinghouse, state.clearinghouse@opr.ca.gov
Department of Conservation, Office of Legislative and Regulatory Affairs, OLRA@conservation.ca.gov

## Janna Scott

**Subject:** FW: [EXTERNAL] Supplemental Environmental Impact Report for Permanente Creek Restoration Project PLN17-2250

**From:** Jack Lucas <jlucas1099@aol.com>
**Sent:** Monday, May 10, 2021 4:11 PM
**To:** Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
**Subject:** [EXTERNAL] Supplemental Environmental Impact Report for Permanente Creek Restoration Project PLN17-2250

County of Santa Clara Planning Office May 10, 2021
Attention: Robert Salisbury, County Government Center
70 West Hedding, 7th Floor, East Wing San Jose, CA 95110

Dear Robert Salisbury,

In regards the NOP of a Supplemental Environmental Impact Report for Permanente Creek Restoration Project there appear to be areas in the plan which need to more fully address recent environmental issues.

First, would hope this SEIR mandates establishment of a native plant nursery that uses only species from this watershed, and includes a directive to avoid chemicals in weed suppression.

In consideration of a sizable Ohlone Indian village which has been unearthed just downstream by Valley Water refocus needs to be made on species of wetlands vegetation selected for reaches of Permanente Creek that reflect historical Indian era plants ideal to support resident trout and colony of red-legged frog. (Believe these species were husbanded by Ohlone for food source).

In reach #6 this would mean efforts should be made to 'encourage' establishment of tules not discourage them. It could also indicate that a special pallet of wetlands vegetation could be temporarily grown in ponds adjacent to reaches of creek where they will be used for restoration of riparian corridor canopy and wetlands.. An on site nursery would hasten restoration efforts and provide verisimilitude of elevation and soils of ultimate habitat.

As according to present protocols are seeds of oaks and preferred trees of this watershed being gathered and grown in a contractor's nursery in preparation for initiation of the Permanente Creek Restoration Plan? What timeline will this SEIR envision?

Wish to stress the importance of a restoration plan reflecting Ohlone Indian occupation of Upper Permanente Creek for centuries. This would include trail that Ohlone used to reach Monte Bello Ridge and Pacific Ocean..
This was old County road alignment..

The recent creation of rather massive haul road needs to be added to this environmental review for all reaches of Permanente Creek that it effects. It appears to cross from the Yeager Yard to Pond 4A to existing road that parallels creek and then across creek again to rock pile near culverts #6 and #8. Have no confidence in this analysis of trajectory but would expect SEIR to make adjustment to environmental impacts to these reaches in clear maps and descriptions in text.

Yeager Yard landslide needs to be mentioned with mitigation measures and preventive structures.

Lastly would like to request that further consideration be given to removal of rock pile conveyor system What was its historical use and can it still be considered in alternative measures for plant operation? Is avoidance of mention of the existence or usability of the rail line that runs to heart of operations another lost alternative use?

In consideration of global warming projections of an increase in storm intensities and in review of rainfall data which cites 7 inches in a 48 hour period in February of 1998 for this slope of Black Mountain which is underlain by the Berrocal Fault, I continue to have grave misgivings about stability of WMSA and EMSA in Permanente Creek's watershed. If these rather toxic masses of mining waste are not to be shipped elsewhere by rail and recycled for some beneficial use then think retaining walls need be included as an alternative in this SEIR.

Thank you for consideration of these concerns relative to proposed SEIR for Permaanente Creek Restoration.

Libby Lucas, 174 Yerba Santa Ave., Los Altos, CA 94022

Rob,

I am glad to see the restoration work on the creek moving forward. Please accept the following comments to guide the County and its consultants in evaluating the prior EIR's mitigations, per the NOP notice:

"2. Identifying and evaluating potential alternatives to the proposed modifications or **mitigation measures that could avoid or reduce new or more significant impacts of the proposed creek restoration activities than disclosed in the 2012 EIR"**

In summary, in order to avoid and reduce potentially significant impacts, the County should modify its mitigations under the biological resources section.

California red-legged frog

First, I'd like to note the prior analysis on the federally threatened California red-legged frog (CRLF). The draft EIR asserted that CRLF are "not expected within the project area" and therefore the project would have less-than-significant impacts. So no mitigation for the species was developed. The Final EIR was revised, after a number of comments raised this concern, to include "three Applicant Proposed Measures" for the Basin40A stormwater pond, including limiting grading between May 1 and October 15th, pre-construction surveys prior to construction, and to limit work to daylight hours and outside of rain events. The County determined that these Applicant Proposed Measures, in addition to a stormwater mitigation measures, provided "sufficient protection for CRLF in the Project Area and this impact is considered less than significant." Later, the County's Conditions of Approval from the Planning Commission included similar measures for the Permanente Creek Restoration subareas 4-7.

The prior analysis relies on the incorporation of Applicant Proposed Measures in lieu of mitigation in order to make a finding of a less-than-significant impact. Rather than analyzing a potential impact of the project and creating an appropriate mitigation, the FEIR incorporated those measures into the analysis. The analysis is not the project description.

The 2014 Lotus v. Department of Transportation case (which occurred after adoption of the 2012 EIR) examined a scenario where CEQA lead agencies circumvent the standard process of (1) defining the project, (2) analyzing the project, and (3) developing appropriate mitigation minimize impacts resulting from activities identified in the project description. In that case, DOT incorporated an "environmental protection feature" into the project description and thus concluded that no mitigation was necessary, because that feature was part of the project. The courts determined that "an environmental protection feature must be credible as a true component of the project plan or design, rather than a mitigating action that is . . . responsive to the project's impacts" (borrowing from Ascent's white paper on the topic). The Applicant Proposed Measures included in the prior FEIR were developed for the sole purpose of responding to the project's impacts and were not part of the project.

By committing to those measures in the FEIR analysis and not the project description or via mitigation measures, what is the mechanism for ensuring compliance? How can the public be sure the Applicant Proposed Measures will be applied? By not incorporating these measures as mitigation measure, the County's oversight was also removed. The County's annual monitoring

reports indicate the Conditions of Approval related to CRLF mitigation near the Permanente Creek Restoration Area was monitored, whereas the Applicant Proposed Measure in the analysis appear not to have been.

The other tenet of the analysis was that CRLF stay close to their breeding ponds, so the potential for them to be elsewhere in the project area was limited ("While CRLF movement and habitat use would be limited through most of the Project Area, frogs could move into vegetated upland areas directly surrounding Pond 13."). That conclusion was, respectfully, incorrect at the time. Peer reviewed literature has demonstrated red-legged frogs move many miles overland between breeding areas and as far as 1,600 feet from water (see Bulger et al 2002 or Fellers and Kleeman 2007).[1] The FEIR analysis notes that frogs move overland after rain events. This is consistent with Midpen's monitoring experience: the odds of observing a CRLF in the relatively drier uplands increases dramatically in response to rain. After rains, frogs could be in many parts of the project area.

The EIR also concluded that CRLF would only be present in select ponds and not the creek itself. Adult CRLF may move between isolated pools in intermittent or ephemeral streams. CRLF adults and sub-adults are often observed in Midpen's streams. Case in point, a CRLF was observed in the project area in 2017 in the stream. The addition of the Conditions of Approval from the Planning Commission related to CRLF in subareas of the Creek Restoration adds to this conclusion. CRLF could be present in the creek during their larval stage, depending on the water year and creek conditions, and a typical work window to avoid potential disruption of the larval stage is August 15 to Oct 15. Additionally, the new flood-detention basin downstream created an ideal breeding habitat for the species and dozens of CRLF were relocated as part of that project. The idea that CRLF are not present in these creeks is not accurate, that they stay solely within the areas they've been observed is not based on the best available information and is inconsistent with permits issued in the region. CRLF are increasingly present in the area and the prior analysis did not have this information at the time of the 2012 FEIR.

US Fish and Wildlife Service issued a permit for the flood detention project using a mitigation that required a biological monitor during ground-disturbing activities and they correctly describe "riparian" areas as frog-sensitive areas. Temporary and permanent impacts to their habitat need to be accounted for.

That the 2012 FEIR concluded the Permanente Creek restoration work would not have a potential impact on frogs is not consistent with the available science or biological opinions in the area (and the County's Conditions of Approval). As you know, take (including adverse modification of habitat) of a federally listed species would be a significant impact under CEQA. Therefore, a mitigation to avoid potential impacts or take is required. I understand USFWS provided information to the applicant regarding the Permanente Creek Restoration Project and determined the project is "likely to adversely affect the California red-legged frog." That seems inconsistent with the determination used in the FEIR. The expansion of scope in a sensitive habitat (as defined by USFWS) adds to the potential impact that the County needs to consider in

[1] A number of peer reviewed papers are available here, including those mentioned: http://www.elkhornsloughctp.org/training/show_train_detail.php?TRAIN_ID=EcUZQK3

its analysis. Please add an appropriate mitigation for frogs using the US Fish and Wildlife Service permit for the flood basin project, or, if the permit for creek restoration project has them, to use those.

Other Wildlife

A similar approach was used for migratory birds and San Francisco dusky footed woodrat, but in this case incorporated the Applicant Proposed Measure in the Project Description (as in the Lotus case); please create mitigation measures instead. Protected bat species were mitigated through a blend of Applicant Proposed Measures in the project description and additional mitigation measures; please add the Application Proposed measures into those the mitigation measures. Riparian areas are more likely to have migratory birds, bats, and woodrats. The expansion of scope adds to the potential impact.

Last year, Mountain Lions were listed as a candidate species by CDFW, requiring analysis under CEQA. The 2012 EIR did not consider mountain lions, as they were not a candidate species at the time. Rancho San Antonio Open Space has been monitoring mountain lions with wildlife cameras and through a research project with the Puma Lab at UC Santa Cruz. There are several hundred observations and many lions that regularly use Rancho San Antonio. You can see tracking data on the Puma Project's website showing lions moving within the Lehigh property. Mountain lions are present in the project area and qualified biologists should develop appropriate mitigation(s).

Special Status Plants and Plant Communities

The prior EIR determined that 81 special status plants were potentially present but surveys determined they did not occur in the project area and no mitigation was required. Industry protocol is that botanical surveys are good for approximately 5 years due to changing ecological conditions over time; the prior analysis is now outdated. For example, there are 28 occurrences of western leatherwood in Rancho San Antonio, just north of the Lehigh quarry. Qualified biologists should resurvey the project area for special status species. Given the lengthy time associated with these plans, it seems appropriate to include mitigations that include periodic re-surveys as conditions naturally change over time. The FEIR's conclusion that no special status plants could ever occur during a 30-year period of operation does not reflect the biology of plants. An appropriate mitigation measure should include the periodic survey for special status plants. I'd also note that plants can establish within the 5-year period of the construction activities and that ground disturbance can often generate plant establishment that would not otherwise occur.

Another emerging area of CEQA practice in the biological resources section are consideration of Natural Communities. Natural Communities are evaluated using NatureServe's Heritage Methodology, the same system used to assign global and state rarity ranks for plant and animal species in the California Natural Diversity Database. VegCAMP has been ranking California Natural Communities by their rarity and threat since the inception of the program. However, since 2012 the ranking methodology has become more transparent and defensible through the

advent of a rank calculator.[2] VegCAMP and the California Native Plant Society's Vegetation Program now use this calculator to rank Natural Communities; rankings are reviewed by both programs..

Natural Communities with ranks of S1-S3 are considered Sensitive Natural Communities to be addressed in the environmental review processes of CEQA and its equivalents. The analysis in the SEIR should identify all Natural Communities within the project footprint using the best means possible, for example, keying them out in the Manual of California, Second Edition (Sawyer et al. 2009) or in classification or mapping reports from the region, available on VegCAMP's Reports and Maps page. Refer to the current standard list of Natural Communities to determine if any of these types are ranked Sensitive (S1-S3 rank); if so, see CEQA Guidelines checklist at IVb. Again, I assume agency permits for the project incorporate some plant survey requirements that come to a different conclusion than the FEIR. The expansion of scope in a sensitive habitat merits additional plant surveys.

Cultural Resources

A qualified archaeologist should review the excavation work through Phase II analysis and discuss their findings with the State Historic Preservation Officer. If an archaeologist and SHPO has already been consulted pursuant to Section 106, then the appropriate measures can be borrowed.

Thank you,

Aaron Hebert, Senior Resource Management Specialist

Midpeninsula Regional Open Space District

[2] https://www.natureserve.org/conservation-tools/conservation-rank-calculator

SIERRA CLUB
LOMA PRIETA CHAPTER

Serving San Mateo, Santa Clara, and San Benito Counties

May 10, 2021

Mr. Robert Salisbury
County of Santa Clara
Department of Planning and Development
70 W. Hedding Street, East Wing, 7th Floor
San Jose, CA 95110

RE: Supplemental Environmental Impact Report for the Permanente Creek Restoration Project, Comments on Notice of Preparation

Dear Mr. Salisbury,

Please take into account the following comments from the Sierra Club Loma Prieta Chapter regarding your Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) to the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR for the Permanente Creek Restoration Project ("PCRP" or "project").

**Project Description:**

First, the Project Description at NOP pp. 2-3 should be revised to state that the provisions of the 2016 Amended Consent Decree (Decree), particularly paragraphs 33 through 42, reflect mandatory, minimum restoration duties imposed on Lehigh and are therefore necessary minimum elements of any "Project Description" applicable to the SEIR. For example, where paragraph 35 of the Decree that states Lehigh "shall layback and re-grade the north overburden slope to provide a stable slope no steeper than 2:1 (50% grade) and shall remove sufficient material to move the north toe of the slope at least 25 feet northward from its current location and elevation," that statement is a minimum requirement, not simply a recommendation. [1 SEP]To the extent any such requirement in the Decree does not obtain legally necessary agency approval(s) after issuance of the SEIR the provisions of Decree paragraph 52 shall apply.

Second, for each activity in the Project Description, please describe in detail and by reach which actions and impacts are covered in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment EIR and identify sections and page numbers for easy reference. Likewise, please identify what new impacts not covered will be evaluated in this SEIR and reference the sections where this analysis is presented.

**Mitigation:**

The creek restoration objectives and activities described in the Decree are themselves mitigation requirements to resolve decades of Lehigh's Clean Water Act violations. Applicable measures to mitigate the impacts of the mitigation itself should be viewed in light of the ultimate restorative objective. That said, adequate mitigation for restoration project impacts is important, especially related to impacts on species and habitats. Trees form the backbone of what is left of the riparian habitat in this section of Permanente Creek and should only be removed if necessary, to secure the long-term restoration of the creek. To the extent native trees are removed, they should be replaced with 15-gallon trees at appropriate ratios, rather than 24-inch box trees. 15-gallon trees adapt better in the long run because they have not lived for as long in a box in the nursery environment.

**Alternatives:**

Alternatives to the restoration requirements in the Decree that entail additional costs are still enforceable as restoration requirements under the Decree if they fit within the cost escalation values in Decree paragraph 49. Moreover, nothing in the Decree limits any agency from imposing additional restoration requirements.

Please contact us with any additional design information about the preferred project and any proposed alternatives as soon as possible so we can respond as needed in relation to the requirements of the Decree.

We continue to urge the Department of Planning and Development to pursue this restoration project with all deliberate speed. Although the Decree was initially signed over eight years ago, not one shovel of mining waste has been removed from the creek and impacts of Lehigh's illegal disposal activities persist unabated.

Thank you for your consideration of these comments.

Sincerely,

Katja Irvin, AICP
Water Committee Co-Chair
Sierra Club Loma Prieta Chapter

cc: Reed Zars, Attorney at Law
James Eggers, Executive Director, Sierra Club, Loma Prieta Chapter

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**Comment Letter H**

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
Bay Delta Region
2825 Cordelia Road, Suite 100
Fairfield, CA 94534
(707) 428-2002
www.wildlife.ca.gov

*GAVIN NEWSOM, Governor*
*CHARLTON H. BONHAM, Director*

May 13, 2021

Mr. Robert Salisbury
County of Santa Clara
70 West Hedding, 7th Floor, East Wing
San Jose CA 95110
Robert.Salisbury@pln.sccgov.org

Subject: Permanente Creek Restoration Project, Notice of Preparation of a Supplemental Draft Environmental Impact Report, SCH No. 2021040331, Santa Clara County

Dear Mr. Salisbury:

The California Department of Fish and Wildlife (CDFW) received the Notice of Preparation (NOP) of a Supplemental Draft Environmental Impact Report (SDEIR) from the County of Santa Clara (County) for the Permanente Creek Restoration Project (Project) pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife resources. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

**CDFW ROLE**

CDFW is a Trustee Agency with responsibility under CEQA §15386 for commenting on projects that could impact fish, plant and wildlife resources. CDFW is also considered a Responsible Agency if a project would require discretionary approval, such as permits issued under the California Endangered Species Act (CESA), the Native Plant Protection Act, the Lake and Streambed Alteration (LSA) Program and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife trust resources. Pursuant to our jurisdiction, CDFW has the following concerns, comments, and recommendations regarding the Project.

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

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## PROJECT DESCRIPTION SUMMARY

**Proponent:** Lehigh Southwest Cement Company

**Objective:** Specific reaches of Permanente Creek within the Project proponents land ownership will be restored. This includes activities such as removal of roads or reduction in the size of roads, removal of culverts, sediment, rock and concrete debris, construction of floodplain, restoration of creek channel, installation of large woody debris, removal of invasive plants, and planting native vegetation.

**Location:** The Project is located at the Permanente Quarry, west of the City of Cupertino, in Santa Clara County. The Assessor's Parcel Numbers are 351-10-038, 351-09-022, 342-64-003, 351-10-033, 351-10-035, 351-10-034, 351-10-008, 351-10-011, 351-11-001.

## COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist the County in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources.

### Project Description

The NOP, on page 2, in the Project Description, does not discuss the nexus of the proposed Project to the proposed amendment to the Lehigh Permanente Quarry Reclamation Plan (Reclamation Plan), currently dated May 2019. CEQA guidelines §15124(d)(1)(C) state that an EIR Project Description should list related environmental review and consultation requirements required by state laws, regulations, or policies, which may apply to this issue. CDFW reviewed and provided comments on the proposed May 2019 Reclamation Plan amendment, however, the proposed Project was not discussed in the amendment. CDFW recommends that the DSEIR for the proposed Project discuss the association between the proposed Project and the Reclamation Plan and explain whether the proposed Project will be further described and analyzed in any future CEQA documentation for the Reclamation Plan.

### Biological Resources, Long-term Impacts to Riparian Sensitive Community

*Stability of Permanente Creek Bed and Bank*

CEQA Guidelines Section 15126.2(a) state that long-term significant effects of a project should be considered and discussed. CDFW engineering staff reviewed and provided comments on the revised 90% engineering designs and supporting documents for the Project. CDFW engineering staff determined that implementation of the Project as designed could potentially result in post-construction instability of the creek bed and

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bank. For example, unstable conditions may occur due to steep 1.5:1 or 1:1 creek bank slopes, lack of in-channel sub-surface geologic investigation, lack of rock weirs in reaches with very steep gradients, and inclusion of large woody debris in reaches where it could become dislodged due to steep gradients. Creek bed and bank instability could result in significant impacts to the sensitive riparian community and special-status species habitat. The SDEIR should therefore include a thorough analysis of the current designs, and any necessary modifications to the designs to prevent adverse effects to the sensitive habitat types. To avoid or reduce potential long-term impacts of the Project to a less-than-significant level, CDFW recommends that a long-term (e.g., 10-year) post-construction monitoring and adaptive management plan be developed and described in the SDEIR. The SDEIR should include monitoring of the creek geomorphology, consultation with CDFW and other resource agencies and identification of corrective and remediation actions in the event that creek bed or bank instability is detected.

*Riparian Vegetation Impacts*

The revised 90% engineering designs appear to indicate that approximately 30 trees will be removed during Project construction. However, only larger trees to be removed were included in the designs (e.g., non-oak trees equal to or greater than 12-inch diameter). Sapling (1-inch to 4-inch diameter) and pole sized (5-inch to 11-inch diameter) trees are important to riparian vegetation structural complexity and habitat succession. Based on the current designs, impacts of the Project to riparian habitat may be underestimated. CDFW recommends that analysis of riparian vegetation impacts include trees less than 12 inches in diameter or based on area calculations for seedlings and saplings and understory vegetation. As discussed in the previous section of this letter, the long-term (e.g., 10-year) post-construction monitoring and adaptive management plan should include monitoring of revegetated areas and include performance standards to ensure establishment or maintenance of riparian habitat.

**Biological Resources, Impacts to Special-Status Species**

The revised 90% engineering designs appear to indicate that the treated water outfall located at Pond 1250 may be moved to a different location, however, the alternate location was not described in the NOP. Changing the outfall location could potentially result in significant hydrological impacts to stream reaches that would no longer receive water, and consequently adversely impact riparian vegetation or aquatic special-status species (e.g., California giant salamander (*Dicamptodon ensatus,* State Species of Special Concern) and California red-legged frog [CRLF, *Rana draytonii*, Federally Threatened and State Species of Special Concern)]. CDFW recommends that the SDEIR clearly demarcate the proposed new outfall location on a map and discuss the significance of the treated water contribution from the outfall to this stream reach, and any potential effects on riparian habitat and special-status species resulting from relocation of the outfall. The SDEIR should discuss design modifications or alternate

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outfall sites to ensure the Project results in less-than-significant impacts to aquatic and riparian habitats from either direct or indirect changes in creek hydrology.

The NOP does not discuss potential occurrences of special-status and sensitive bat species within the Project area. As discussed in the *Riparian Vegetation Impacts* section above, the revised 90% engineering designs did appear to indicate the removal of approximately 30 trees. Removal of trees could impact special-status and sensitive bat species such as Pallid bat (*Antrozous pallidus*, State Species of Special Concern) and Hoary bat (*Lasiurus cinereus*) that may roost in woodland and riparian habitats.

The California Natural Diversity Database (CDFW 2021) shows occurrences of CRLF, California giant salamander, and Santa Cruz black salamander (*Aneides niger,* State Species of Special Concern) within the Project area. There may also be potential presence of San Francisco dusky-footed woodrat (SFDWR, *Neotoma fuscipes annectens*, State Species of Special Concern).

To reduce impacts to less-than-significant levels, CDFW recommends the measures below be included in the SDEIR.

1. Focused Surveys: The Project location and tree removal locations should be surveyed for Species of Special Concern and sensitive bat species by a qualified biologist following protocol-level surveys. In the absence of protocol-level surveys being performed, focused surveys for Species of Special Concern presence or indicators of presence (e.g., bat guano and acoustic surveys) should be conducted.

2. Avoidance, Minimization, and Mitigation: If Species of Special Concern or sensitive bat species are found within or adjacent to the Project site, the qualified biologist should establish a no-disturbance buffer appropriate for the species and conduct on-site monitoring during all Project-related activities. The SDEIR should include additional minimization and mitigation measures for each species that could be potentially impacted by Project activities.

**Biological Resources, Bird Nest Measures**

The NOP does not include a discussion of wildlife that may be present within the Permanente Creek riparian area. However, in CDFW review of aerials, there is a potential for avian species to nest within the riparian area. In order to avoid significant impacts to nesting avian species, CDFW recommends that the following protective measures be included in the SDEIR:

1. Nesting Bird Surveys: If Project-related work is scheduled during the nesting season (typically February 15 to August 30 for small bird species such as passerines; January 15 to September 15 for owls; and February 15 to September

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15 for other raptors), a qualified biologist will conduct two surveys for active nests of such birds within 14 days prior to the beginning of Project construction, with a final survey conducted within 48 hours prior to construction. Appropriate minimum survey radii surrounding the work area are typically the following: i) 250 feet for passerines; ii) 500 feet for small raptors such as accipiters; and iii) 1,000 feet for larger raptors such as buteos. Surveys will be conducted at the appropriate times of day and during appropriate nesting times.

2. Active Nest Buffers: If the qualified biologist documents active nests within the Project area or in nearby surrounding areas, an appropriate buffer between the nest and active construction will be established. The buffer will be clearly marked and maintained until the young have fledged and are foraging independently. Prior to construction, the qualified biologist will conduct baseline monitoring of the nest to characterize "normal" bird behavior and establish a buffer distance which allows the birds to exhibit normal behavior. The qualified biologist will monitor the nesting birds daily during construction activities and increase the buffer if the birds show signs of unusual or distressed behavior (e.g., defensive flights and vocalizations, standing up from a brooding position, and/or flying away from the nest). If buffer establishment is not possible, the qualified biologist or construction foreman will have the authority to cease all construction work in the area until the young have fledged and the nest is no longer active.

**Biological Resources, Rare Plant Species**

The NOP does not include a discussion of special-status or rare plants that may be present within the impact area. In review of the California Natural Diversity Database (CNDDB, CDFW 2021), there are rare plant species that are located within 2 miles of the Project site, including woodland woollythreads (*Monolopia gracilens*, California Rare Plant Rank 1B.2) and western leatherwood (*Dirca occidentalis,* California Rare Plant Rank 1B.2). In order to avoid significant impacts to rare plant species within the impact area, CDFW recommends that the following protective measures be included in the SDEIR:

1. Special-Status Plant Habitat Assessment: A qualified botanist should conduct an assessment of the plant communities/land cover (e.g., chaparral, cismontane woodland, riparian forest) that provide habitat for these rare plant species.

2. Special-Status Plant Focused Surveys: If plant communities/land cover suitable for rare plants are determined to be present, the Project location should be surveyed for rare plant species by a qualified biologist following protocol-level surveys. Protocol-level surveys, which are intended to maximize detectability, may include identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period.

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3. Special-Status Plant Avoidance: Rare plant species should be avoided through delineation and establishment of a no-disturbance buffer of at least 50 feet from the outer edge of the plant population or specific habitat type required by rare plant species.

**ENVIRONMENTAL DATA**

CEQA requires that information developed in draft environmental impact reports be incorporated into a data base which may be used to make subsequent or supplemental environmental determinations. [Pub. Resources Code, § 21003, subd. (e)]. Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form, online field survey form, and contact information for CNDDB staff can be found at the following link: https://wildlife.ca.gov/data/CNDDB/submitting-data. The types of information reported to CNDDB can be found at the following link: https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals.

**FILING FEES**

CDFW anticipates that the Project will have an impact on fish and/or wildlife, and assessment of filing fees is necessary (Fish and Game Code, § 711.4; Pub. Resources Code, § 21089). Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW.

**CONCLUSION**

CDFW appreciates the opportunity to comment on the NOP to assist the County in identifying and mitigating Project impacts on biological resources. CDFW appreciates the County's past coordination on this Project and offers continued guidance on project design and environmental review.

Questions regarding this letter or further coordination should be directed to Ms. Kristin Garrison, Environmental Scientist, at (707) 944-5534 or by email at Kristin.Garrison@wildlife.ca.gov; or Ms. Brenda Blinn, Senior Environmental Scientist (Supervisory), at (707) 944-5541 or by email at Brenda.Blinn@widlife.ca.gov.

Sincerely,

DocuSigned by:
Gregg Erickson
BE74D4C93C604EA...

Gregg Erickson
Regional Manager
Bay Delta Region

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cc:

Office of Planning and Research, State Clearinghouse, Sacramento
Brian Wines, Regional Water Quality Control Board, brian.wines@waterboards.ca.gov
Joseph Terry, US Fish and Wildlife Service, Joseph_terry@fws.gov

## LITERATURE CITED

California Department of Fish and Wildlife (CDFW). 2021. Biogeographic Information and Observation System (BIOS). https://www.wildlife.ca.gov/Data/BIOS. Accessed May 5, 2021.

[redacted]

**Subject:** FW: Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

**From:** Shree Dharasker <sdharasker@valleywater.org>
**Sent:** Friday, May 14, 2021 4:26 PM
**To:** Salisbury, Robert <Robert.Salisbury@PLN.SCCGOV.ORG>
**Cc:** Usha Chatwani <uchatwani@valleywater.org>
**Subject:** [EXTERNAL] Notice of Preparation of a Supplemental Environmental Impact Report for the Permanente Creek Restoration Project

Hi Robert:

The Santa Clara Valley Water District (Valley Water) has reviewed the Notice of Preparation (NOP) of a Supplemental Environmental Impact Report (SEIR) for the Permanente Creek Restoration Project (PCRP), received on April 13, 2021, and has the following comments:

1) The SEIR must address any changes to the hydrology/hydraulics of the proposed restored channel so it doesn't have any negative impacts on the Permanente Flood Protection Project (Project), particularly as it pertains to the functioning of the San Antonio detention basins. Valley Water would like to ensure that this comment is covered under "Cumulative Impacts" and/or "Hydrology and Water Quality" sections.
2) Any increase in the 100-year flows and volumes due to the proposed improvements must be mitigated to pre-improvement conditions.
3) Valley Water would like to review the SEIR when complete to ensure our concerns have been addressed.

Please contact me if there are any questions.

Shree Dharasker
Associate Engineer-Civil
Community Projects Review Unit
(408)630-3037

[redacted]

# Appendix B
## **Amended Consent Decree**

United States District Court
For the Northern District of California

IN THE UNITED STATES DISTRICT COURT

FOR THE NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

| | |
|---|---|
| SIERRA CLUB,<br><br>Plaintiff,<br><br>v.<br><br>LEHIGH SOUTHWEST CEMENT COMPANY, and HANSON PERMANENTE CEMENT, INC.<br><br>Defendants. | Case No.: 5:11-cv-06392-HRL<br>Case No.: 5:15-cv-01896-HRL<br><br>Judge: Hon. Howard R. Lloyd<br><br>**AMENDED CONSENT DECREE**<br><br>**Date Lodged: February 22, 2016**<br>**Date Entered** May 11, 2016 |

## I. RECITALS

1. On December 19, 2011, Plaintiff Sierra Club ("Plaintiff" or "Sierra Club") filed a Complaint for Declaratory and Injunctive Relief and for Civil Penalties in this federal Clean Water Act case against Defendants Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. ("Defendants") pertaining to Defendants' quarry, cement plant and associated facilities, located in Santa Clara County, California. Sierra Club and Defendants are collectively referred to herein as "Parties," and individually referred to as "Party."

2. The Complaint alleges that Defendants have, and continue to, discharge pollutants from the quarry pit into Permanente Creek without an authorizing national pollutant discharge elimination system ("NPDES") permit and in violation of their storm water discharge permit.

3. The Complaint also alleges that Defendants have caused fill, including but not limited to mining wastes, overburden and sediment, to enter the bed and banks of Permanente Creek, and that such fill degrades, and continues to degrade, the water quality, habitat and natural function of the Creek.

4. Defendants deny all of Plaintiff's allegations and claims in the Complaint.

5. The Parties, through their authorized representatives and without either adjudication of Plaintiff's claims or admission by Defendants of any alleged wrongdoing have

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chosen to resolve in full Plaintiff's Complaint through settlement and avoid the cost and uncertainties of further litigation.

6. The Parties' original Consent Decree was entered by the Court on June 18, 2013 (Docket No. 86). This Amended Consent Decree modifies several of Defendants' creek restoration requirements set forth in the original Consent Decree in response to agency comments. This Amended Consent Decree has been negotiated in good faith, will avoid further litigation among the Parties, and is fair, reasonable and in the public interest.

NOW, THEREFORE, with the consent of the Parties, IT IS HEREBY ADJUDGED, ORDERED AND DECREED as follows:

## II. JURISDICTION AND VENUE

7. This Court has subject matter jurisdiction in this matter pursuant to 33 U.S.C. § 1365(a)(l)(A) (citizen suit provision of the Clean Water Act) and 28 U.S.C. § 1331 (federal question statute). The relief required is authorized pursuant to 28 U.S.C. §§ 2201 and 2202 (declaratory judgment), and 33 U.S.C. §§ 1319 and 1365 (Clean Water Act).

8. Venue in the Northern District of California is proper pursuant to 33 U.S.C. § 1365(c)(1) (Clean Water Act citizen suit provision) because Defendants' discharges are located in this District. Venue also lies in the Northern District of California, pursuant to 28 U.S.C. § 1391(b) and (e), because the property that is the subject of this action is in Santa Clara County, California, and because Defendants' Facility is located in Santa Clara County, California.

9. Plaintiff and Defendants consent to this Court's jurisdiction to enter and enforce this Amended Consent Decree, and consent to venue in this judicial district.

## III. APPLICABILITY

10. The provisions of this Amended Consent Decree apply to and are binding on Plaintiff and Defendants, any of their respective successors and/or assigns, officers, agents, servants, and employees, and any other entities who are in active concert or participation with Plaintiff or Defendants.

11. No transfer of ownership or operation of the Facility shall relieve Defendants of their obligation to comply with the terms of this Amended Consent Decree. Moreover, prior to

any transfer of ownership or operation, the transferee shall provide written confirmation to the Court and Plaintiff acknowledging the terms of the Amended Consent Decree and consenting to be bound by its terms.

12. Defendants shall provide a copy of this Amended Consent Decree to all officers, employees, agents, performance guarantors, consultants and contractors whose duties include the implementation of any provision of this Amended Consent Decree.

## IV. DEFINITIONS

13. Terms used in this Amended Consent Decree that are defined in the federal Clean Water Act, 33 U.S.C. §§ 1251, *et seq*., ("CWA"), or in regulations issued pursuant thereto, shall have the meanings assigned to them therein, unless otherwise provided in this Decree. Whenever the terms set forth below are used in this Amended Consent Decree, the following definitions shall apply:

(a) "Applicable chronic water quality standard for Selenium" means 5 micrograms per liter (µg/l) of total Selenium.

(b) "Complaint" shall mean the Complaint filed by Sierra Club in this action on December 19, 2011.

(c) "Amended Consent Decree" or "Decree" shall mean this Amended Consent Decree and the exhibits attached hereto.

(d) "Creek" shall mean Permanente Creek.

(e) "Day" shall mean a calendar day unless expressly stated to be a business day. In computing any period of time under this Decree, where the last day would fall on a Saturday, Sunday or federal holiday, the period shall run until the close of business of the next business day.

(f) "DFW" shall mean the California Department of Fish and Wildlife.

(g) "DFW Restoration Manual" shall mean the California Department of Fish & Wildlife's California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. One and Two, 2010), attached hereto as Exhibit A.

(h) "Effective Date" shall mean the date this Decree is entered by the Court.

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(i) "Facility" shall mean Defendants' Permanente quarry, cement plant and associated works and property, located in Santa Clara County, California.

(j) "Field Engineering Description" shall mean the Field Engineering Description dated February 2, 2016 and attached hereto as Exhibit B.

(k) "Final treatment system" shall mean a water pollution abatement system and associated flow modulation facilities designed, constructed and operated to achieve continuous compliance with all NPDES permit limits, and all water quality standards applicable to Permanente Creek, for all discharges to Permanente Creek from the Facility, including quarry pit water and process waters currently associated with Pond 4A (quarry pit and primary crusher washdown), Ponds 9 & 11 (cement plant process waters in Pond 11 that flow through Pond 9), and Pond 20 (cement plant truck wash), and only excluding authorized storm water discharges from Pond 9 (after Pond 11 no longer flows to Pond 9), Pond 13, Pond 20 (after truck wash water no longer flows to Pond 20), and Pond 30. To the extent Defendants' future NPDES permit contains an effluent limit for nickel that differs from the water quality standard for nickel, such NPDES nickel effluent limit shall control.

(l) "Interim treatment system" shall mean a water pollution abatement system and associated flow modulation facilities designed, constructed and operated to treat up to 24,000 gallons per hour of the quarry pit water currently associated with Pond 4A (quarry pit and primary crusher washdown) for the primary purpose of substantially reducing Selenium in the quarry pit water prior to discharge. Operation of this interim treatment system is also intended to inform the final design and successful operation of the final treatment system.

(m) "Meet and confer" shall mean to communicate at the same time in person, by phone, or through any video or other virtual electronic method.

(n) "NPDES" shall mean National Pollutant Discharge Elimination System.

(o) "Parties" shall mean Plaintiff and Defendants.

(p) "Quarry pit water" shall mean that surface and ground water that is pumped by Defendants to facilitate quarry mining.

(q) "Reach" shall mean that length of Permanente Creek that has been assigned a

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numerical value from 1 to 22, originally designated as such by URS, as shown in the April 27, 2015 Permanente Creek Restoration Plan, Draft 70% Design drawings, prepared by Waterways Consulting, Inc. ("Restoration Plan Drawings") set forth as Exhibit C.

(r) "Regional Water Board" shall mean the San Francisco Bay Regional Water Quality Control Board.

(s) "Section" shall mean a portion of this Amended Consent Decree identified by a Roman numeral.

(t) "EPA" shall mean the United States Environmental Protection Agency and any of its successor departments or agencies.

(u) "Work", as that term is used in Section X, shall mean all activities necessary to satisfy the Permanente Creek restoration obligations described in Section VI of this Decree, including but not limited to design, contracting, permitting, construction and monitoring activities.

## V. DISCHARGE TREATMENT

14. No later than August 1, 2013, Defendants shall supplement their November 30, 2011 application for an individual NPDES permit for the Facility by submitting an amended Report of Waste Discharge, or procedurally similar document, to the Regional Water Board that includes requirements no less stringent than those set forth in Paragraphs 15 through 32 below.

A. Interim Quarry Pit Water Discharge Compliance

15. No later than August 1, 2013, Defendants shall execute one or more contracts for the engineering, procurement, and construction of the interim treatment system. No later than January 17, 2014, Defendants shall commence construction of the interim treatment system.

16. No later than October 1, 2014, Defendants shall have installed and commenced operation of the interim treatment system.

17. Beginning no later than October 1, 2014, and continuing no later than September 30, 2017, Defendants shall direct all quarry pit water to the interim treatment system. Defendants shall treat no less than 24,000 gallons per hour of quarry pit water with the interim treatment system, except at those times when only flows less than 24,000 gallons per hour are

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available from the flow modulation facilities, in which case Defendants shall treat all lesser flows. Beginning no later than December 1, 2014, Defendants shall either remove, on a continuous basis, at least 50 percent of the total Selenium from the totality of such quarry pit water flow to be treated, or achieve a concentration of no greater than 10 µg/l of total Selenium in such quarry pit water flow to be treated when the concentration of total Selenium in the quarry pit water entering the interim treatment system is 20 µg/l or less, prior to its discharge into Permanente Creek. Notwithstanding the above, Defendants shall operate the treatment system at all times to maximize the reduction of Selenium in the quarry pit discharge.

18. To determine the flow rates described above, Defendants shall use automatic, continuous flow measuring equipment with continuous data logging to monitor the total gallons per hour of quarry pit water entering the interim treatment system. Defendants shall also monitor the total gallons per hour of all quarry pit water treated by the interim treatment system and discharged to Permanente Creek, and the total gallons per hour of any quarry pit water that is not treated by the interim treatment system and discharged to Permanente Creek.

19. Beginning on October 1, 2014, and continuing through September 30, 2017, Defendants shall monitor, on no less than a weekly basis, the total Selenium in the untreated quarry pit water at the inlet to the interim treatment system, and at the outlet from the interim treatment system. The inlet and outlet samples shall be taken at the same time, and shall consist of a composite of twelve equal aliquots collected evenly over a 24-hour period. Data generated from this monitoring shall be used to assess compliance with Paragraph 17 on a weekly basis.

20. No later than March 31, 2015, Defendants shall provide Plaintiff with a report summarizing the performance of the interim treatment system since October 1, 2014, including but not limited to the measured concentration of total Selenium in the water discharged from the interim treatment system to Permanente Creek.

21. No later than June 30, 2015, Defendants shall provide Plaintiff with a report summarizing what additional treatment facilities or operational changes, if any, are necessary to ensure that quarry pit water treated by the interim treatment system will comply with the applicable chronic water quality standard for Selenium. If the water discharged from the interim

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treatment system is in compliance with the applicable chronic water quality standard for Selenium at that time, no additional treatment facilities or operational changes must be identified by Defendants, and in that case, after June 30, 2015 Defendants shall comply with such standard, in lieu of the 50 percent removal requirement set forth in Paragraph 17.

22. No later than December 31, 2015, Defendants shall have installed and shall commence operation of additional treatment facilities, if any, necessary to ensure that quarry pit water treated by the interim treatment system will comply with the applicable chronic water quality standard for Selenium.

23. No later than March 31, 2016, the water discharged from the interim treatment system shall comply with the applicable chronic water quality standard for Selenium, in lieu of the 50 percent removal requirement set forth in Paragraph 17, unless compliance with the applicable chronic water quality standard for Selenium was achieved by June 30, 2015 pursuant to Paragraph 21.

24. No later than September 5, 2014, and continuing no later than September 30, 2017, Defendants shall not discharge process-related waters from Pond 11 into Pond 9, and Defendants shall have installed and commenced operation of treatment facilities for the discharge of water from Pond 11 to Pond 4A and shall attain and maintain compliance with the Regional Water Board's discharge limitations applicable to such discharge.

25. Defendants shall provide to Plaintiff on a quarterly basis, in .pdf electronic format, all monitoring results from the interim treatment facility and Pond 11 discharges to Pond 4A from the previous calendar quarter, within 30 days of the last day of each calendar quarter, including but not limited to the results of all flow and Selenium monitoring.

B. Final Facility Discharge Compliance

26. No later than August 1, 2016, Defendants shall execute contract(s) for engineering, procurement, and construction of the final treatment system. No later than February 1, 2017, Defendants shall commence construction of the final treatment system.

27. Beginning no later than September 30, 2017, Defendants shall have installed and commenced operation of the final treatment system.

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28. Beginning no later than September 30, 2017, Defendants shall not discharge any quarry pit water, or any process water, or stormwater mixed with process water, from the Facility into Permanente Creek unless such discharge is treated by the final treatment system and is in compliance with all applicable NPDES permit effluent limits, and all applicable receiving water quality standards, including but not limited to the applicable chronic Selenium and chronic toxicity standards.

29. Compliance with the chronic toxicity standard shall be determined by EPA's whole effluent toxicity (WET) test, based on: (1) survival and reproduction of Ceriodaphnia (water flea) (EPA/821/R-02/013 (Test Method 1002.0), (2) survival and growth of pimephales promelas (fathead minnow), EPA/821/R-02/013, Test Method 1000.0 (2002), and (3) growth of Selenastrum (algae), EPA/821/R-02/012, Test Method 1003.0 (2002). If Defendants' NPDES permit requires a different method for determining compliance with the chronic toxicity water quality standard, Defendants' compliance with the chronic toxicity water quality standard shall be determined by such method.

30. For the first six months of operation of the final treatment system, compliance sampling and analysis for conventional constituents and metals, including Selenium, shall take place on no less than a weekly basis. To determine compliance with the chronic toxicity standard, sampling and analysis shall take place on no less than a monthly basis consistent with Paragraph 29 immediately above.

31. Beginning on the seventh month of operation of the final treatment system, and continuing thereafter, Defendants' compliance with all applicable water quality standards and effluent limits shall be determined by the monitoring requirements in Defendants' individual Facility NPDES permit.

32. Defendants shall provide to Plaintiff on a quarterly basis, in .pdf electronic format, all monitoring results required by this Decree and Defendants' NPDES permit, from the previous calendar quarter within 30 days of the last day of each calendar quarter.

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## VI. CREEK RESTORATION

A. Permanente Creek Restoration.

33. The Parties agree that the objectives of the Permanente Creek restoration requirements set forth below include the following:

- Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity and cover, and by fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless DFW Restoration Manual hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by the independent geologist;
- Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function;
- Remove mining-related fill and sediments in the bed, banks and adjacent slopes;
- Remove or alter man-made structures so as to improve riparian habitat;
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek;
- Require restoration that is no less stringent than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board, and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board.

34. Reaches 19-20-21. Defendants shall improve holding and rearing habitat for the resident trout population during summer low-flow periods and improve cover during high flows as follows. Defendants shall create four (4) woody debris installations within each Reach (for a total of 12 installations). Wood type, size, location and installation criteria for implementation of each installation shall comply with DFW and Regional Water Board permit or other approval requirements.

35. Reaches 17-18. Defendants shall excavate and permanently export overburden and mining-related sediment from the creek bed, banks, and from upland slopes (to the extent upland slope materials pose a risk of entering the creek), sufficient to establish approximate pre-disturbance creek alignment and slopes, and to facilitate above-grade flows, as generally depicted in the Restoration Plan Drawings. Defendants shall provide for enhanced ecological function and resident trout passage consistent with a geomorphically stable, self-sustaining

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channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described below, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock. Pursuant to the time periods in Paragraph 46, Plaintiff and Defendants shall mutually agree to an independent professional geologist from a list of up to three candidates proposed by each party. If the Parties cannot agree they shall submit the matter to the Court for the Court to select an appropriate independent professional geologist. Prior to the commencement of construction Defendants shall contract with the independent professional geologist to reasonably perform the work described in this Decree, and the costs of such work shall be borne by the Defendants.

In particular, Defendants shall layback and re-grade the north overburden slope to provide a stable slope no steeper than 2:1 (50% grade) and shall remove sufficient material to move the north toe of the slope at least 25 feet northward from its current location and elevation. In the immediate vicinity of Pond 4A and the associated interim and final treatment facilities, Defendants shall move the north toe of the slope at least 16 feet northward from its current location and elevation for a length of no more than 160 feet. Defendants shall establish an enlarged creek channel and flood plain as depicted in the Restoration Plan Drawings, the horizontal dimensions of which shall be determined by the extent of excavation within the "grading envelope." The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or

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overburden. Defendants shall either create a berm along both reaches at the toe of the north slope, parallel to the creek (but set-back above the 100-year flood high water line) or install other structures (*e.g.,* benches along the north slope) to prevent overburden and sediment from entering the Creek.

As depicted in the Restoration Plan Drawings, Defendants shall remove the relic concrete structure, and shall cut back a portion of what is referred to as the "old concrete crusher foundation," that currently resides, in part, within Permanente Creek, to match the natural direction and slope of the Creek, leaving a benign portion of the foundation buried within the Creek bank. Work on the "old concrete crusher foundation" will be performed using reasonable methods and equipment, including but not limited to small equipment with materials and spoils lowered and raised via a Constant Rate Descender or equivalent. Should Defendants encounter an unexpected condition while performing the required work on the "old concrete crusher foundation," which precludes completion of the work prescribed herein, Defendants shall meet and confer with Plaintiff regarding said condition. If the Parties are unable to agree upon the appropriate course of action, Defendants may invoke the dispute resolution provisions of this Decree.

36. Reaches 14-15-16. Defendants shall improve holding and rearing habitat for the resident trout population during summer low-flow periods and improve cover during high flows as follows. Defendants shall create four (4) woody debris installations within each Reach (for a total of 12 installations). Wood type, size, location and installation criteria for implementation of each installation shall comply with DFW and Regional Water Board permit or other approval requirements.

37. Reach 13. Defendants shall remove the dam infrastructure at Pond 13 and the associated impounded fine sediments. Within this area Defendants shall establish a new, enlarged creek channel that includes increased channel complexity and a restored flood plain with restored vegetation as depicted in the Restoration Plan Drawings, the horizontal dimensions of which shall be determined by the extent of excavation within the "grading envelope." Defendants shall provide for enhanced ecological function and resident trout passage consistent

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with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reach, or bedrock grade controls confirmed by the independent geologist, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and incorporated Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock consistent with Paragraph 35 above. The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or overburden. A new, enlarged creek channel upstream of Pond 13 with consistent characteristics will be constructed as necessary to conform to the conditions depicted in the Restoration Plan Drawings.

38. Reaches 11-12. Defendants shall remove the half-culvert immediately downstream of Pond 13, including the removal of all artificial fill and metal structures within the valley floor in this Reach as generally depicted on the Restoration Plan Drawings. Defendants shall also remove the existing aggregate rock pile and associated rock pile infrastructure, all culverts, riprap, and the road on top of the creek (concrete ramp), and set back the road to provide more room for a natural streambed and banks. Defendants shall narrow the road and accompanying vehicle barrier to a reduced total width no greater than 20 feet at any point, measured from the toe of the inside slope to the top of the creek-side vehicle barrier. The vehicle barrier height shall not exceed two (2) feet, and the slope of the creek-side vehicle barrier shall be no steeper than 1.5h to 1v (67% slope). Runoff from the road shall be controlled pursuant to DFW and Regional Water Board requirements. Defendants shall establish an enlarged creek

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channel that contains the features set forth in the Restoration Plan Drawings, the horizontal dimensions of such channel shall be determined by the extent of excavation within the "grading envelope." Defendants shall provide for enhanced ecological function and resident trout passage consistent with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described below, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall reconstruct the channel at a lowered profile and alignment within the "grading envelope" as depicted in the Restoration Plan Drawings and incorporated Field Engineering Description. Defendants shall remove all material to the lower limit of the potential design channel invert shown in the Restoration Plan Drawings, subject to the criteria in the Field Engineering Description. If Defendants assert they have excavated to bedrock prior to reaching the lowest elevation at any location within the "grading envelope," an independent professional geologist will assess Defendants' assertion and make the final determination of the existence and extent of any such bedrock consistent with Paragraph 35 above. The course of the Creek shall follow exposed bedrock, and/or large boulders, cobbles, sands and gravels not sourced from limestone-containing mine wastes or overburden.

39. Reaches 8-9-10. Defendants shall improve channel stability and enhance ecological function throughout reaches 8, 9 and 10 by sufficiently setting back the road and associated slopes to provide more room for a natural streambed and banks as depicted in the Restoration Plan Drawings. Defendants shall narrow the road and accompanying vehicle barrier to a reduced total width no greater than 20 feet at any point, measured from the toe of the inside slope to the top of the creek-side vehicle barrier. The vehicle barrier height shall not exceed two (2) feet, and the slope of the creek-side vehicle barrier shall be no steeper than 1.5h to 1v (67% slope). Runoff from the road shall be controlled by DFW and Regional Water Board requirements. Defendants shall establish an enlarged creek channel that contains the features set forth in the Restoration Plan Drawings. Defendants shall provide for enhanced ecological

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function and resident trout passage through these reaches consistent with a geomorphically stable, self-sustaining channel. Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described herein, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall remove the culverts identified as Culverts 7 and 9 in the Restoration Plan Drawings and restore the area with a naturalized channel as depicted in the Restoration Plan Drawings. With respect to fish passage, Defendants shall follow the hydraulic design criteria in the DFW Restoration Manual unless such criteria cannot be met due to the gradient of the reaches, or bedrock grade controls confirmed by the independent geologist as described herein, in which case the stream simulation criteria in the DFW Restoration Manual, revised as necessary with off-site analogs, shall apply.

Defendants shall remove the alluvial fan of gravel deposited on the floodplain located upstream of the culvert crossing as depicted in the Restoration Plan Drawings. Defendants shall remove the gravel from the channel and banks located in the ephemeral drainage from a storage area as depicted in the Restoration Plan Drawings and take all other necessary measures to prevent further mining-related sediment and material from reaching Permanente Creek in the future from this drainage. Defendants shall revegetate the floodplain and ephemeral channel with native vegetation.

40. Reaches 6-7. Defendants shall plant native riparian vegetation and trees on the southern bank along the concrete channelized portion of Permanente Creek to provide improved shading and reduce vegetation growth within the concrete channel, thereby improving sediment transport and enhancing fish passage.

41. Reaches 2-5. Nothing in this Amended Consent Decree is intended to preclude measures that Defendants may take in Reaches 2 - 5 to improve fish passage or make other Permanente Creek habitat improvements, or that other parties may take downstream therefrom.

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42. After completing the required restoration construction work in each reach, Defendants shall revegetate the Creek banks and disturbed areas with native vegetation including willows, alders, elderberries, blackberries, rushes, and sedges. Defendants shall incorporate willow fascines along the edges of banks and spillways where high bank shear stress is expected.

43. By no later than July 1, 2013, Defendants shall correctly and permanently stake all reach boundaries and stations identified herein at locations adjacent to the Creek that will not be disturbed by the restoration activities. The stakes shall be permanently labeled by applicable number and their location recorded using a professional "sub-foot" GPS. By no later than September 1, 2013, Defendants shall provide to Plaintiff a plan view topographic map (in hard copy and electronic format) showing the professional "sub-foot" GPS locations of all stakes, the current thalweg and bank slope toes of the Creek, and all other current features such as road dimensions and pond and culvert locations referred to in this Decree.

B. Permanente Creek Restoration Permitting and Performance Deadlines.

44. The Parties anticipate that approvals will be required prior to the implementation of the Creek restoration work required above, including but not limited to approvals from:

- U.S. Army Corps of Engineers (Section 404 permit)
- California Regional Water Quality Control Board, San Francisco Region (NPDES permits and Section 401 certification)
- California Department of Fish & Wildlife (Section 1602 Streambed Alteration Agreement, California Endangered Species Act permits, if necessary)
- U.S. Fish & Wildlife Service and National Marine Fisheries Service (Section 7 Endangered Species Act consultation)
- Santa Clara County (Reclamation Plan amendment and grading or other County-required permits)

Applicable environmental review processes (*e.g.*, CEQA and/or NEPA) must also be satisfied prior to proceeding with any creek restoration activities that require permits or approvals. The Parties agree to meet and confer to the extent any material change to a requirement in this Decree needs to be made in the course of the environmental analysis or permitting process. Any change to the Restoration Plan Drawings or associated text required in writing by any agency shall be

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incorporated automatically into this Decree. Any other changes to the Restoration Plan Drawings or associated text shall be not be effective unless approved by both Parties and incorporated into this Decree by stipulation or motion.

45. To ensure a timely permit application and approval process with respect to the creek restoration work required above, Defendants shall complete the tasks below by the following deadlines:

(a) June 1, 2013: Notify all pertinent agencies of all restoration requirements, design and permitting milestones, and anticipated transmittal of Conceptual Restoration Plan (30% design level) by October 7, 2013. Request agency meeting and/or meetings to be calendared in November 2013 through January 2014.

(b) September 10, 2013: Complete Conceptual Restoration Plan, submit to Plaintiff for review and comment.

(c) October 7, 2013: Submit Conceptual Restoration Plan to all pertinent agencies.

(d) November 2013 through January 2014: Participate in agency meetings regarding Conceptual Restoration Plan and permitting. To the extent one or more agency meetings do not take place by January 2014, the Parties shall meet and confer to determine whether subsequent deadlines can and should be modified. If the Parties cannot agree, then Defendants may invoke the dispute resolution provisions of this Decree.

(e) July 30, 2014: Complete Draft Restoration Plan (70% design level) and permit applications, submit to Plaintiff for review and comment.

(f) March 30, 2016: Submit Nationwide Permit Pre-construction Notification to the U.S. Army Corps of Engineers under Section 404 of the federal Clean Water Act (33 U.S.C. § 1344). The Parties understand that the Army Corps of Engineers has confirmed that a Nationwide Permit is appropriate for this restoration project.

(g) April 29, 2016: Submit Notice of Preparation and Initial Study to the County of Santa Clara for environmental review of the restoration project under the California Environmental Quality Act ("CEQA").

(h) Within sixty (60) days of certification of environmental review by the County of

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Santa Clara under CEQA, submit all necessary permit and approval applications to appropriate governmental agencies (*e.g.*, Army Corps of Engineers, Santa Clara County, DFW, California Regional Water Quality Control Board, San Francisco Region). This submission shall include all conditions reasonably calculated to be necessary to secure approval.

46. Defendants shall complete all restoration work within five (5) consecutive construction seasons immediately after receipt of all necessary permits and approvals (*e.g.*, if all permits and approvals are received by December 2017, the work must be completed by December 2022), provided that if any condition of any permit or approval requires a shorter or longer timeframe for completion of all the restoration work, the Parties shall request a modification of the deadline set forth in this paragraph accordingly. Defendants shall notify Plaintiff within seven days of receipt of all such permits and approvals, whereafter the Parties shall have 30 days in which to identify and mutually agree on an independent professional geologist as set forth in Paragraph 35. If on the 30th day the Parties have not reached an agreement, within ten days of such date the Parties shall submit the matter to the Court for the Court to select an appropriate independent professional geologist. In addition, within thirty (30) days of receipt of all such permits and approvals, Defendants shall provide Plaintiff with a schedule that describes the commencement and completion dates for all restoration activities in each Reach for each construction season.

47. This Decree shall not relieve Defendants of their obligation to comply with all applicable federal, state and local laws, regulations and permits. To the extent there is any conflict between any provision in this decree and any other applicable requirement, the most stringent requirement shall apply.

C. Alternative Permanente Creek Restoration.

48. Should any regulatory agency not provide one or more legally necessary approvals to conduct the actions specified in Section VI.A., or place one or more unexpected conditions on the approval of any given action, Paragraphs 49 - 52 shall apply.

49. For purposes of this Section, "unexpected conditions" shall mean: (i) one or more conditions placed by a regulatory agency on the approval to undertake a creek restoration activity

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in addition to the conditions specified in Paragraph 45(h), (ii) such conditions exceed the costs specified in subparagraph (b) below, and (iii) Defendants are unwilling to expend the additional costs of such conditions.

(a) For purposes of this Section, the total estimated cost to Defendants of the Permanente Creek restoration project is approximately ten (10) million dollars in 2013 dollars. This estimated cost shall be adjusted annually consistent with the Engineering News-Record construction cost index for the Bay Area or, if unavailable, an equivalent cost index. The Parties agree that the estimated total cost of the project is projected to be allocated within the Reaches of Permanente Creek as follows:

**Reaches 6 – 7:** Three percent (3%) of total project cost

**Reaches 8 – 13:** Fifty-seven percent (57%) of total project cost

**Reaches 14 - 21:** Forty percent (40%) of total project cost

(b) Unexpected conditions occur if the cost of the conditions of approval exceed the following amounts:[1]

**Reaches 6 – 7:** Conditions cause the cost of creek restoration actions in these reaches to exceed ten percent (10%) of the total project cost, as adjusted.

**Reaches 8 – 13:** Conditions cause the cost of creek restoration actions to exceed the total project cost by twenty percent (20%) of the total estimated cost, as adjusted.

**Reaches 14 – 21:** Conditions cause the value of creek restoration actions to exceed the total project cost by twenty percent (20%) of the total estimated cost, as adjusted.

50. For purposes of this Section, if Defendants believe any unexpected conditions will be or have been placed upon the approval or authorization to undertake one or more Creek restoration activities, Defendants shall notify Plaintiff within thirty (30) days of becoming aware of such unexpected conditions. The Parties shall meet and confer regarding any unexpected conditions.

[1] These percentages were derived by multiplying the allocated percentage by reach group times fifty percent. Thus, for Reaches 8-13, 57% allocation x 50% cost buffer = 28.5% of the total estimated cost of the restoration project.

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51. In the event any unexpected conditions become final, within thirty (30) days of such event, Defendants shall notify Plaintiff and provide Plaintiff with a written demonstration explaining why the conditions are unexpected. The Parties shall meet and confer within fourteen (14) days of such notice. If Plaintiff does not agree that unexpected conditions have been imposed, Defendants may invoke the dispute resolution provisions of this Decree. If Plaintiff agrees unexpected conditions have been imposed, the Parties may stipulate to an alternative method of achieving the purposes of this Decree and present it to the Court for approval. Otherwise, without a stipulated agreement, and in lieu of implementing the relevant Creek restoration actions required by this Decree, for the affected reaches, Defendants shall pay the value of the project cost specified in Paragraph 49(a) above, plus the additional value specified in Paragraph 49(b) above, as follows: Defendants shall pay the funds to the Rose Foundation for Communities and the Environment ("Rose Foundation"), 1970 Broadway, Suite 600, Oakland, California 94612, to be held in a separate Permanente Creek restoration account. Such funds shall be subject to the condition that they only be distributed by the Rose Foundation after a competitive application process, and that such funds, after satisfying any Rose Foundation administrative costs,[2] shall only be used for the purpose of Permanente Creek restoration, unless such restoration activity is unavailable, in which case, the funds shall be used for other local watershed restoration projects, including those on Stevens Creek.

52. In the event any regulatory agency does not provide a legally necessary approval to conduct an action specified in Section VI.A, either by actual notice or constructively through inaction, the Parties shall meet and confer within fourteen (14) days of such event or extended period of inaction. If Plaintiff disagrees that a necessary approval has not been provided, Defendants may invoke the dispute resolution provisions of this Decree. If Plaintiff agrees that a

[2] Rose Foundation administrative costs shall not exceed the following amounts: for funds paid of $500,000 or less, administrative costs shall not exceed ten percent of the total funds paid; for funds greater than $500,000 but no more than $1,500,000, administrative costs shall not exceed eight percent of the total funds paid; for funds greater than $1,500,000 but no more than $3,000,000, administrative costs shall not exceed seven percent of the total funds paid; and for funds greater than $3,000,000, administrative costs shall not exceed six percent of the total funds paid.

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necessary approval has not been provided, the Parties may stipulate to an alternative method of achieving the purposes of this Decree and present it to the Court for approval. Otherwise, without a stipulated agreement, and in lieu of implementing the relevant creek restoration actions required by this Decree, for the affected reaches, Defendants shall pay the value of the project cost specified in Paragraph 49(a) above, plus the additional value specified in Paragraph 49(b) above, to the Rose Foundation in the same manner and for the same purposes as specified in Paragraph 51 above.

## VII. REPORTING REQUIREMENTS

53. All reports shall be submitted to the persons designated in Paragraph 96 of this Decree.

54. The reporting requirements of this Decree do not relieve Defendants of any reporting obligation required by the CWA or its implementing regulations, or by any other federal, state or local law, regulation, permit or other requirement.

55. Any information provided pursuant to this Decree may be used by Plaintiff in any proceeding to enforce the provisions of this Decree and as otherwise permitted by law.

## VIII. SITE INSPECTIONS

56. Defendants shall provide access to Plaintiff to inspect the interim and final treatment systems and related facilities, and to Permanente Creek and adjacent lands, at such intervals and times sufficient for Plaintiff to assess compliance with the terms of this Decree. At a minimum, access shall be provided to Plaintiff to inspect the interim and final treatment systems during construction and within six (6) months of the completion of construction of such systems. At a minimum, access shall also be provided to Plaintiff to inspect any Creek restoration work within five (5) days of the commencement of work in any Reach, at thirty (30) day intervals during restoration work in any Reach, and within six (6) months of the completion of any work in any Reach.

57. Plaintiff shall provide Defendants written notice of the date of any requested inspection at least five (5) days in advance of any inspection, and the requested inspection shall take place on that date unless Defendants propose a different date in which case the Parties shall

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meet and confer to determine the best date for an inspection within a period no greater than fourteen (14) days after Plaintiff's notice.

## IX. STIPULATED PENALTIES

58. In any calendar month in which Defendants violate any provision of this Decree, Defendants shall pay all accrued stipulated penalties to the Rose Foundation as specified in Paragraph 61 below within ten (10) days after the end of such month, without written demand from Plaintiff, except for penalties due under Paragraph 59(d). Stipulated penalties due under Paragraph 59(d) shall be due and payable to the Rose Foundation within 25 months of the violation if mandatory minimum penalties have not been paid to the State of California for the same violation. To the extent Defendants believe their non-compliance is due to a force majeure event, the funds shall be paid into an escrow account until such issue is resolved.

59. Defendants shall pay stipulated penalties for each failure to comply with the interim and final treatment system terms of this Decree as follows:

(a) For each failure to meet the obligation to install and operate the interim treatment system after October 1, 2014, as specified in Section V, Paragraph 16, per violation per day:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(b) For each failure to meet the obligations to install and operate the final treatment system after September 30, 2017, as specified in Section V, Paragraph 27, per violation per day:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(c) For each failure to comply with any interim discharge limit in Paragraph 17, $3,000 per violation per week up to fifteen weeks, and $10,000 per week after the fifteenth week, and for each failure to comply with any interim discharge limit in Paragraph 23 of this Decree, $3,000 per violation per day;

(d) For each failure to comply with any discharge (effluent) limit set forth in the NPDES

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Permit applicable to the final treatment system, $3,000 per violation per day unless mandatory minimum penalties of the same or greater amounts for the same discharge limit are paid by Defendants to the State of California within 24 months of the violation.

60. Defendants shall pay stipulated penalties for each failure to comply with the stream restoration terms of this Decree as follows:

(a) For each day that Defendants fail to submit all necessary permit and approval applications to all appropriate agencies pursuant to Paragraph 45(h).

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

(b) For each day that Defendants fail to complete the restoration work described in Section VI within the time period required by this Amended Decree or in any applicable permit or approval:

(1) 1st through 30th day after deadline - $1,000/day

(2) 31st through 60th day after deadline - $2,000/day

(3) Beyond 60th day - $5,000/day

61. Defendants shall pay the stipulated penalty funds to the Rose Foundation in the same manner and for the same purposes as specified in Paragraph 51 above.

62. During any period of dispute resolution where a stipulated penalty may run, Defendants may request that the Court reduce or eliminate any such penalty that accrued during the dispute resolution period if the Court deems that, although Defendants did not prevail in the dispute, the Defendants pursued the dispute in good faith and not for purposes of delay.

63. Stipulated penalties are not the Plaintiff's exclusive remedy for violations of this Decree. Plaintiff reserves its right to pursue any other remedies to which it is entitled, which may include, but are not limited to, additional injunctive relief or statutory penalties for Defendants' violations of the Decree or the Clean Water Act. The obligation to pay stipulated penalties under this Decree shall not relieve Defendants from any obligation to pay penalties for violations of any term or condition of any permit issued under the Act, including any NPDES

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permit. Any amounts paid by Defendants as stipulated penalties may be asserted by Defendants in response to any action requesting the imposition of additional civil penalties.

## X. PERFORMANCE GUARANTEE

64. In order to ensure the full and final completion of the Work required in Section VI, Defendants shall establish and maintain an irrevocable performance guarantee, initially in the amount of $12 million, to ensure the completion of such Work after issuance of a Work Takeover Notice and determination of Work Takeover as provided for below. The performance guarantee shall state it is for the exclusive benefit of the U.S. District Court, Northern District, to fund the actions required by Section VI of this Decree, immediately upon issuance of Plaintiff's Work Takeover determination.

65. The Parties agree that the irrevocable surety bond set forth in Exhibit D, is an acceptable form of performance guarantee for the Work to be performed as required in Section VI.

66. Within ten (10) days of entry of this Decree, Defendants shall execute or otherwise finalize all instruments and other documents required in order to make the selected performance guarantee(s) legally binding in a form substantially identical to the documents attached hereto as Exhibit D, and such performance guarantee(s) shall thereupon be fully effective.

67. In the event that Plaintiff determines at any time that a performance guarantee provided by Defendants pursuant to this Section is no longer sufficient, whether due to an increase in the estimated cost of completing the Work required in Section VI or for any other reason, or in the event that Defendants become aware of information indicating that the performance guarantee is insufficient, whether due to an increase in the estimated cost of completing the Work required or for any other reason, Defendants, within thirty (30) days after receipt of notice of Plaintiff's determination or, as the case may be, within thirty (30) days after any Defendant becoming aware of such information, shall obtain and present to Plaintiff for approval a proposal for a revised performance guarantee. Within thirty (30) days after receiving Defendants' revised performance guarantee proposal, or within sixty (60) days after Plaintiff's

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insufficiency determination notice, Plaintiff shall provide to Defendants its determination of the additional amount of performance guarantee that is necessary to ensure completion of the Work required by Section VI. Defendants may dispute this determination pursuant to the dispute resolution provisions of this Decree, but only after they have provided the additional amount of performance guarantee consistent with Plaintiff's insufficiency determination.

68. In the event Plaintiff determines that Defendants have (1) ceased implementation of any portion of the Work, or (2) are seriously or repeatedly deficient or late in their performance of the Work, Plaintiff may issue a written notice ("Work Takeover Notice") to Defendants. Any Work Takeover Notice issued by Plaintiff will specify the grounds upon which such notice was issued and will provide Defendants a period of ten (10) days within which to cure the circumstances giving rise to Plaintiff's issuance of such notice. Within five (5) days of receipt of a Work Takeover Notice, Defendants shall establish the Permanente Creek Restoration escrow account to which performance guarantee funds shall be deposited if a Work Takeover is determined as described in Paragraph 69. Funds deposited into the Permanente Creek Restoration escrow account shall be accessible by the Court-appointed trustee described in Paragraph 69.

69. If, after expiration of the ten-day cure period specified above, Defendants have not remedied to Plaintiff's satisfaction the circumstances giving rise to Plaintiff's issuance of the relevant Work Takeover Notice, Plaintiff may at any time thereafter notify the Court, Defendants, and Defendants' Guarantor in writing (which writing may be electronic) that all or any portion(s) of the Work will be completed with performance guarantee funds ("Work Takeover"). Within fourteen (14) days of such notice to the Court, Defendants, and Defendants' Guarantor, Defendants' Guarantor shall convey all funds held as a performance guarantee to the Permanente Creek Restoration escrow account. Plaintiff shall provide to the Court the names of three (3) potential trustees from which the Court may select one trustee to take all necessary measures to complete the unfinished Work required by Section VI of this Decree using the performance guarantee funds deposited in the Permanente Creek Restoration escrow account.

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70. If Plaintiff triggers a Work Takeover, and actions are undertaken to complete the Work required in Section VI, the Defendants fully release Plaintiff, any Court-appointed trustee, any independent contractor, and any of their respective officers, employees, agents, successors, or assigns from any and all claims and demands, either at law or in equity, as to the sufficiency of actions taken to complete the Work required in Section VI.

71. When Defendants believe they have completed all Work required by this Decree, they may notify Plaintiff of their determination, which determination shall include sufficient evidence of such completion. If Defendants receive written notice from Plaintiff that the Work has been fully and finally completed in accordance with the terms of this Consent Decree, Defendants may thereafter release, cancel, or discontinue the performance guarantee. Only after Plaintiff provides such notice may Defendants release, cancel, or discontinue any performance guarantee. In the event of a dispute, Defendants may release, cancel, or discontinue the performance guarantee(s) required hereunder only in accordance with a final judicial decision resolving such dispute pursuant to the dispute resolution provisions of this Decree.

## XI. FORCE MAJEURE

72. For the purposes of this Decree, a "force majeure event" is defined as any event arising from causes beyond the reasonable control of Defendants or any entity controlled by Defendants (including, without limitation, Defendants' contractors and subcontractors, and any entity in active participation or concert with Defendants with respect to the obligations to be undertaken by the Defendants pursuant to this Decree), that delays or prevents or can reasonably be anticipated to delay or prevent compliance with the obligations of this Decree, despite Defendants' best efforts to meet such deadlines. The requirement that Defendants exercise "best efforts" to meet the deadlines includes using best efforts to avoid any force majeure event before it occurs, and to use best efforts to mitigate the effects of any force majeure event as it is occurring, and after it has occurred, such that any delay is minimized to the greatest extent possible.

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73. Without limitation, unanticipated or increased costs or changed financial circumstances shall not constitute a force majeure event. The absence of any regulatory approval shall not constitute a force majeure event, unless Defendants demonstrate that, as appropriate to the approval: (a) they made timely and complete applications for such approval(s) to meet the deadlines set forth in Sections V and VI of this Decree; (b) they reasonably complied with all requirements to obtain such approval(s); (c) they diligently sought such approval, (d) they diligently and timely responded to all requests for additional information, and (e) without such approval, Defendants will be required to act in violation of law to meet one or more of the obligations set forth in this Decree.

74. If any event occurs which causes or may cause a delay by Defendants in meeting any deadline in this Decree, whether or not attributable to a force majeure event, Defendants shall notify Plaintiff in writing within ten (10) days of the time Defendants first knew, or within thirty (30) days of when Defendants reasonably should have known that the event is likely to cause a delay. Defendants shall be deemed to have notice of any circumstance of which its contractors or subcontractors had or reasonably should have had notice, provided that those contractors or subcontractors were retained by Defendants to implement, in whole or in part, the requirements of this Decree. Within fifteen (15) days thereafter, Defendants shall provide in writing to Plaintiff a report containing: (a) an explanation and description of the reasons for the delay; (b) the anticipated length of the delay; (c) a description of the activity(ies) that will be delayed; (d) all actions taken and to be taken to prevent or minimize the delay; (e) a timetable by which those measures will be implemented; and (f) a schedule that fully describes when Defendants propose to meet any deadlines in this Decree which have been or will be affected by the claimed force majeure event. Defendants shall include with any notice their rationale and all available documentation supporting its claim that the delay was or will be attributable to a force majeure event.

75. If Plaintiff agrees that the delay has been or will be caused by a force majeure event, the Parties may stipulate to an extension of the deadline for the affected activity(ies) as is necessary to complete the activity(ies). Plaintiff shall take into consideration, in establishing any

new deadline(s), evidence presented by Defendants relating to weather, outage schedules and remobilization requirements. In the event the Parties cannot agree to the length of the extension, Defendants may invoke the dispute resolution procedures set forth in this Decree. Notwithstanding the foregoing, if Plaintiff finds that a force majeure event may delay Defendants' compliance with the terms of this Decree for more than six (6) months, Plaintiff may seek further relief from the Court to fulfill the purposes of this Decree.

76. If Plaintiff does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, it will notify Defendants in writing of this decision within twenty (20) days after receiving Defendants' report alleging a force majeure event, and will not extend the deadline for any activity identified in this Decree. If Defendants seek review of this decision, the matter shall be resolved through the dispute resolution procedures set forth in this Decree.

77. At all times, Defendants shall have the burden of proving that any delay was caused by a force majeure event (including proving that Defendants had given proper notice and had made "best efforts" to avoid and/or mitigate such event), and of proving the duration and extent of any delay(s) attributable to such event.

78. Failure by Defendants to fulfill in any way the notification and reporting requirements of this Section shall constitute a waiver of any claim of a force majeure event as to which proper notice and reporting was not provided.

79. Any extension of one deadline based on a particular incident does not necessarily constitute an extension of any subsequent deadline(s) unless agreed to by the Parties or directed by this Court.

80. If Defendants fail to perform an activity by a deadline in this Decree due to a force majeure event, Defendants may only be excused from performing that activity or activities, and paying stipulated penalties for such failure, for that period of time excused by the force majeure event.

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## XII. DISPUTE RESOLUTION

81. Plaintiff and Defendants may invoke the dispute resolution procedures of this Section to the extent provided for in this Decree. The dispute resolution procedures of this Section shall be the exclusive mechanism to resolve such disputes with respect to such provisions of this Decree.

82. To invoke dispute resolution, a Party must provide written notice to the other party within thirty (30) days of the occurrence of the disputable event. The notice shall include all reasons the Party has for raising the disputed issue. Within thirty (30) days of receiving written notification, the other Party shall provide a written response and the Parties shall thereafter meet and confer within ten (10) days of such response. Failure of any party to fulfill this notification or response requirement shall constitute a waiver of the Party's right to dispute the issue(s).

83. If the Parties cannot resolve a dispute within fifteen (15) days of the Parties' meet and confer process above, the disputed issue shall be deemed to have been withdrawn unless the Party that raised the dispute files a petition or application with the Court to have the Court resolve the issue. Such petition or application shall include a description of the matter in dispute (but shall only rely on matters previously disclosed in writing in the dispute resolution process, unless information that was unavailable at the time of the filing of the initial dispute has come to light), the efforts made by the Parties to resolve it, the relief requested, and the schedule, if any, within which the dispute must be resolved to ensure orderly implementation of this Decree. The other Party shall have thirty (30) days from receipt of any petition or application to file a response.

84. In judicial proceedings on any dispute under this Section, the disputing Party shall carry the burdens of proof and persuasion.

85. The invocation of dispute resolution procedures under this Section shall not extend, postpone or affect in any way any obligation under this Decree not directly in dispute, unless the other Party or the Court agrees otherwise. Stipulated penalties with respect to the disputed matter shall continue to accrue, but payment shall be stayed pending resolution of the

dispute as provided in this Section. Notwithstanding the stay of payment, stipulated penalties shall accrue from the first day of noncompliance with any applicable provision of this Decree until or unless no violation is established. In the event that the Defendants do not prevail on the disputed issue, stipulated penalties shall be assessed and paid as provided in Section IX.

86. If Defendants' invoke the dispute resolution provisions of this Decree, Defendants shall pay Plaintiff's costs if Plaintiff substantially prevails, including reasonable attorney and expert witness fees, associated with such dispute.

## XIII. FEES AND COSTS

87. Defendants agree that, pursuant to Section 505(d) of the Clean Water Act, 33 U.S.C. §1365(d), Plaintiff is both eligible and entitled to recover its reasonable costs of litigation in this action, including attorney and expert witness fees. Defendants and Plaintiff have resolved payment of Plaintiff's reasonable costs of litigation in this action through August 12, 2013. Plaintiff expressly reserves its right to petition the Court for recovery of additional costs and fees incurred after it signs this Amended Decree, and Defendants reserve their right to oppose any such petition.

## XIV. MUTUAL RELEASE AND COVENANT NOT TO SUE

88. This Decree constitutes a complete and final release of all civil claims for violations alleged in the Complaint through the effective date of this Decree.

89. Nothing in this Decree shall be construed to create any rights in or grant any cause of action to any person not a Party to this Decree. The preceding sentence shall not be construed to waive or nullify any rights that a person not a signatory to this Decree may have under applicable law, including any regulatory agency with jurisdiction over Defendant's activities at the Facility. Plaintiff expressly reserve all rights, defenses, claims, demands, and causes of action that it might have against Defendants with respect to any matter, transaction, or occurrence relating to the Facility that is not addressed in this Decree. Defendants expressly reserve all rights and defenses that they may have to any claim, demand, or cause of action relating to the Facility that is not addressed in this Decree. The Parties expressly reserve all



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rights, defenses, claims, demands, and causes of action which each Party may have against any person not a Party to this Decree with respect to any matter, transaction, or occurrence relating to the Facility. Nothing in this Decree shall be construed as a waiver of any privilege by a Party.

90. For the duration of this Decree, Plaintiff covenants not to sue Defendants, their officers, employees, agents, successors, or assigns for matters alleged in the Complaint. Nothing herein shall prevent Plaintiff from seeking any legal or equitable remedy to enforce the requirements of this Decree. This covenant not to sue does not pertain to any matters not alleged in the Complaint.

91. This Decree shall not be used to establish the liability of Defendants in any action, except to enforce the provisions of this Decree.

## XV. MISCELLANEOUS PROVISIONS

92. **Severability.** In the event that any one of the provisions of this Decree is held by a Court to be unenforceable, the validity of the enforceable provisions shall not be adversely affected.

93. **Construction.** The language in all parts of this Decree, unless otherwise stated, shall be construed according to its plain and ordinary meaning.

94. **Choice of Law.** This Decree shall be governed by the laws of the United States.

95. **Third Party Beneficiary.** This Decree and its attachments are made for the sole benefit of the Parties, and no other person or entity shall have any rights or remedies under or by reason of this Decree unless otherwise expressly provided for therein.

96. **Notices.** Any notices or documents required or provided for by this Decree shall be sent by U.S. Mail, postage prepaid, and addressed as follows or, in the alternative, shall be sent by electronic mail transmission to the email addresses listed below:

**For Plaintiff Sierra Club:**

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Nicole E. Granquist
Downey Brand LLP
621 Capitol Mall, 18th Floor
Sacramento, CA 95814-4601
Tel: 916-444-1000
E-mail: ngranquist@downeybrand.com

Each Party shall promptly notify the other of any change in the above-listed contact information.

97. **Termination of Decree.** This Decree shall remain an enforceable order of the Court until Plaintiff agrees, or the Court determines in response to a petition by Defendants, that (a) Defendants have satisfied in full all requirements of this Decree, (b) Defendants have installed all treatment systems and have demonstrated compliance with all applicable NPDES permit limits for at least twelve (12) consecutive months, (c) Defendants have completed all required creek restoration work, and (d) Defendants have paid any stipulated penalties due under this Decree.

United States District Court
For the Northern District of California

98. **Negotiated Agreement.** This Decree shall be deemed to have been drafted equally by the Parties, and shall not be interpreted for or against any Party on the ground that any such party drafted it.

99. **Full Settlement.** This Decree constitutes a full and final settlement of this matter. The Parties expressly understand and agree that each Party has freely and voluntarily entered into this Decree with and upon advice of counsel.

100. **Integration Clause.** This Decree and the attachments contain all of the final terms and conditions agreed upon by the Parties relating to the matters covered by the Decree, and supersede any and all prior and contemporaneous agreements, negotiations, correspondence, understandings, and communications of the Parties, whether oral or written, respecting the matters covered by this Decree.

101. **Modification.** This Decree may be amended or modified only by a writing signed by the Parties or their authorized representatives, and then by order of the Court.

102. **Counterparts.** The Decree may be executed in one or more counterparts which, taken together, shall be deemed to constitute one and the same document. An executed copy of this Decree shall be valid as an original.

103. **Authority.** The undersigned representatives of Plaintiff and Defendants are authorized to execute this Decree on behalf of the Party or Parties whom he/she represents.

104. **Electronic or Facsimile Signatures.** Telecopy, pdf, and/or facsimile copies of original signatures shall be deemed to be originally executed.

## XVI. NOTICE OF AMENDED DECREE

105. Pursuant to 33 U.S.C. § 1365(c)(3) and 40 C.F.R. § 135.5, this Decree shall be lodged with the Court and simultaneously presented to the United States for review and comment for a period not to exceed forty-five (45) days.

106. After the review period, the Decree may be entered by the Court. If the Decree is not entered by the Court, the Parties shall retain all rights they had in this litigation before the lodging of the Decree.

107. The Parties agree to cooperate in good faith to obtain prompt review of this Decree by the United States and the Court. If the United States or the Court comment on the Decree, and as a consequence the Decree is not entered, the Parties agree to discuss such comments and attempt to make such revisions as necessary to obtain entry of the Decree.

## XVII. FINAL JUDGMENT

108. Upon approval and entry of this Decree by the Court, this Decree shall constitute a final judgment between the Plaintiff and Defendants.

**SO ORDERED, THIS** 11th **DAY OF** May**, 2016.**

**UNITED STATES ~~DISTRICT COURT~~ JUDGE**
MAGISTRATE
HOWARD R. LLOYD

**United States District Court**
For the Northern District of California

**FOR PLAINTIFF:**

Sierra Club Representative

February 9, 2016
Dated

Approved as to form:

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2/9/[redacted]
Dated

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E-mail: georgehays@mindspring.com

2/9/2016
Dated

United States District Court
Northern District of [redacted]

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Lehigh Hanson, Inc.
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Dated

Approved as to form:

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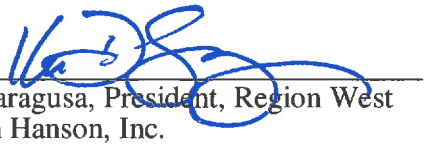
February 19, 2016
Dated

**United States District Court**
For the Northern District of California

**FOR DEFENDANTS:**



February 19th, 2016

Kari Saragusa, President, Region West
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Tel: (925) 244-6500
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Dated

Approved as to form:

Nicole E. Granquist
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621 Capitol Mall, 18th Floor
Sacramento, CA 95814-4601
Tel: 916-444-1000
E-mail: ngranquist@downeybrand.com

Dated

United States District Court
For the Northern District of California

United States District Court
For the Northern District of California

**EXHIBITS To Amended Consent Decree**

*Sierra Club v. Lehigh Southwest Cement*, 5:11-cv-06392-HRL

Exhibit A: California Department of Fish & Wildlife's California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. One and Two, 2010) (cover page and table of contents only attached here, due to size constraints; complete document available on date of lodging at: http://www.dfg.ca.gov/fish/resources/habitatmanual.asp).

Exhibit B: Field Engineering Description dated February 1, 2016.

Exhibit C: Waterways Permanente Creek Restoration Plan, April 27, 2015 Draft 70% Design Submittal drawings.

Exhibit D: Irrevocable surety bond.

Exhibit A

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

***FOURTH EDITION***

**Prepared by:**

**GARY FLOSI, SCOTT DOWNIE, JAMES HOPELAIN,**

**MICHAEL BIRD, ROBERT COEY, and BARRY COLLINS**

**State of California**
**The Resources Agency**
**California Department of Fish and Game**
**Wildlife and Fisheries Division**

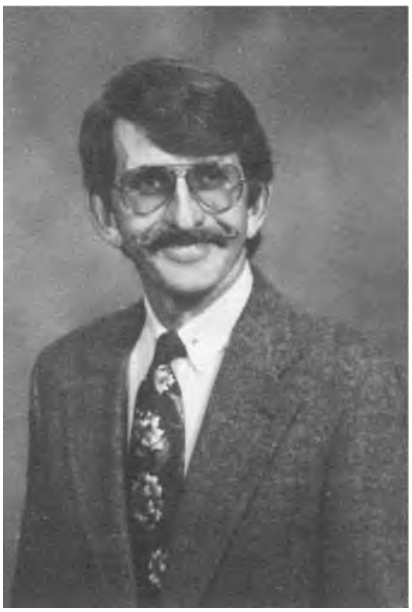
# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

## DEDICATION

***to***

## Tim Curtis

*1944 - 1996*



The authors of the third edition of the ***California Salmonid Stream Habitat Restoration Manual*** wish to dedicate their work to **Tim Curtis**. Tim served with distinction with the California Department of Fish and Game as a fishery biologist, program supervisor, and patient mentor from 1971 to 1996. He was a pioneer in the Department=s modern salmonid habitat restoration program and a contributing author to the second edition of this manual. Tim died much too young at age fifty-one, October 19, 1996, after a courageous battle with brain cancer.

> Tim was a friend and motivational guide to all he came near. Although his life was brief he left his creative, inspirational mark on many. The third edition of this manual is part of his living legacy passed on through the present authors, and as such will continue to help improve the health of a resource he loved: the salmon and steelhead of California.

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

## PREFACE

The first edition of this manual, written by Gary Flosi and Forrest Reynolds, and published in 1991, formally synthesized and described the Department of Fish and Game's approach and technical methods for anadromous salmonid habitat restoration. From 1991 through 1994 the first edition was broadly distributed and used as a "standard methods" text by many habitat restoration and resource inventory workers. As a result, many suggestions for improvement of the manual were received by the authors.

The second edition, by Flosi and Reynolds was supported by a team that included the authors of this third edition, and was published in October of 1994. The second edition included a number of revisions: 1) a reorganization of sections for project planning and project implementation; 2) the just then recently revised stream channel classification system developed by David Rosgen; 3) a new monitoring and evaluation section; 4) a listing of all databases used for resource inventory and analysis as presented in the manual; 5) a protocol for a large woody debris inventory; 6) a description of required environmental review processes and permits; 7) an expanded and updated listing of sensitive species; and 8) numerous editorial changes to text and data forms.

The third edition, like the second, incorporates changes recently developed in the practice of stream habitat inventory and restoration. The authorship list has changed with this edition to more accurately reflect the contributions of the writing team members. The manual is presented in binder form in this edition to more easily and economically incorporate future additions and developments as they evolve.

This fourth edition incorporates all changes, corrections, and revisions of this manual up to July 2010. The manual continues in binder form in this edition to easily and economically incorporate future additions and developments as they evolve.

The authors anticipate the continued widespread distribution and use of this manual will promote the implementation of the restoration techniques discussed. Additionally, in an effort to develop common methods for data collection and data storage of information, the authors encourage all anadromous salmonid resource assessment professionals to utilize protocols and database structures presented in this manual.

Readers should also be aware that computer data entry and data summary programs are available upon request for all data collection protocols presented in this manual. Updates to this manual are available on line at http://www.dfg.ca.gov/fish/Resources/HabitatManual.asp.

Exhibit A

# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL

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# CALIFORNIA SALMONID STREAM HABITAT RESTORATION MANUAL


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Exhibit B

WATERWAYS CONSULTING, INC.

# Field Engineering Description for Permanente Creek Restoration Plan.

February 1, 2016

**1.** General. The Permanente Creek Restoration Plan, Draft 70% Design drawings, ("Drawings") were developed with the goal of creating more natural conditions, while maintaining a relatively uniform profile gradient within the proposed limits of disturbance to improve channel stability and enhance ecological function. The Drawings were prepared without full knowledge of subsurface conditions, including the elevation of underlying bedrock or alluvial materials that would indicate the location of the pre-disturbance channel profile in Reaches 18-17 and 13-11. The design approach will employ field engineering and a field directed construction approach to maximize channel stability, while avoiding excavation into native bedrock. The final constructed geometry will be directed by the engineer in the field, pending subsurface conditions, as described below.

**1.1** The Rock Pile Area (Reaches 13-11) is expected to be constructed prior to the Material Removal Area. Experience gained from the field directed construction approach at the Rock Pile Area will be used to refine the design for the Material Removal Area.

**2.** Profile

**2.1** General. The finished grade elevation of the flowline will generally fall between the upper and lower limits shown on the drawings, defined there as the "grading envelope," except where the location of existing bedrock requires deviation. The lower limit of the envelope is the optimum "straight grade" uniform profile within the proposed limits of work. The upper limit of the envelope is a best-fit line between identified points of bedrock control, as estimated from recent subsurface investigations. The construction will attempt to follow the lower limit of the envelope, subject to the constraints set forth below.

**2.2** Bedrock.

A. General. The qualification of material as "bedrock" will be initially performed by the project geotechnical engineer. If the project geotechnical engineer determines that excavation to bedrock has occurred prior to reaching the lowest elevation at any location within the grading envelope, an independent professional geologist will assess and make the final determination of the existence and extent of any such bedrock. Where bedrock is encountered above the lower limit of the grading envelope, the profile will not be excavated into the bedrock. An inspection trench will be constructed across the channel, within the potential cross section limits (between the adjacent hill slopes), to ensure that bedrock is continuous. The channel alignment will follow the low point of the bedrock, to the extent that this is feasible while maintaining a geomorphically appropriate planform alignment, and while remaining within the lateral limits described below. Upstream of bedrock control points, the lower limit of the profile will be subject to the minimum design profile gradient, as specified below.

B. Minimum Design Profile Gradient. Upstream of bedrock controls, the minimum design profile grade will be set to 4%, to help maintain sediment transport continuity and channel stability.

C. The constructed profile gradient between bedrock outcrops will not exceed 12.0%.

WATERWAYS CONSULTING, INC.

**2.3** Alluvial materials. Where the original "pre-disturbance" streambed is identified by the presence of significant alluvial deposits, the design profile will not be constructed below the elevation of these deposits, provided the specified minimum and maximum profile grade criteria are met. Temporary excavations will not extend below the design profile any more than is necessary to construct the engineered streambed material shown on the design drawings.

**3.** Cross Section geometry

A. Active Channel. The low flow cross section geometry will be informed by regional analogs and refined based on the local profile gradient within each constructed reach. Cross section details will closely resemble the range of typical sections shown on the Drawings, except where influenced by the presence of bedrock as discussed above.

B. Floodplain. The floodplain widths will be maximized within the constraint of maintaining the stability of the adjacent hillside and the need to accommodate roads shown on the Drawings. The stable design slope of the adjacent hillside will be determined by the geotechnical engineer, and will likely vary between 2H:1V and 1.5H:1V, as shown on the Drawings. Exposed bedrock may allow for steeper slopes, subject to approval of the geotechnical engineer. Where the final design profile approaches the lower limit of the grading envelope, the stability of adjacent hillsides will dictate a narrower floodplain width. Slope benching may be incorporated to reduce slope length, control surface runoff and help protect slopes from surface erosion while vegetation becomes established.

C. Where bedrock outcrops constrain the floodplain width, upstream and downstream floodplains will transition rapidly to conform to those restrictions and then return to the standard floodplain widths as described above.

1433924.1

# PERMANENTE CREEK RESTORATION PLAN

## DRAFT
## 70% DESIGN SUBMITTAL

### SHEET INDEX


| | |
|---|---|
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| C2 | OVERVIEW |
| C3 | EXISTING CHANNEL PROFILE |
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| C5 | CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN |
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| C20 | ACCESS AND STAGING PLAN (1 OF 2) |
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| C22 | DEWATERING DETAILS |
| C23 | MISCELLANEOUS DETAILS |
| C24 | HABITAT LOG DETAILS AND ROCK SPECIFICATIONS |
| C25 | NOTES |
| L1 | RIPARIAN PLANTING SECTIONS (1 OF 3) |
| L2 | RIPARIAN PLANTING SECTIONS (2 OF 3) |
| L3 | RIPARIAN PLANTING SECTIONS (3 OF 3) |

VICINITY MAP
N.T.S. (GOOGLE)

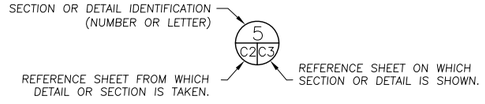
### GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013, FEBRUARY THROUGH MAY 2014, MARCH 2015.
2. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
3. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
4. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 20, 2013
5. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, IF SHOWN, WERE COMPILED FROM RECORD INFORMATION AND FROM FIELD TIES TO EXISTING BOUNDARY MONUMENTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
7. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

8. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
9. SURVEYED TREES INCLUDE:
   A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
   B. ALL OTHER TREES 12 INCHES OR LARGER DBH
   C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH

### SECTION AND DETAIL CONVENTION




### ABBREVIATIONS

| | | | |
|---|---|---|---|
| AVG. | AVERAGE | NTS | NOT TO SCALE |
| CC | CONCRETE | O.C. | ON CENTER |
| CY | CUBIC YARDS | O.D. | RELATIVE COMPACTION |
| DBH | DIAMETER BREST HEIGHT | RSP | ROCK SLOPE PROTECTION |
| DIA. | DIAMETER | SD | STORM DRAIN |
| E | EXISTING | SPK | SPIKE |
| E.G. | EXISTING GROUND | SQ.FT. | SQUARE FOOT |
| ELEV. | ELEVATION | TBD | TO BE DETERMINED |
| DI | DRAINAGE INLET | TYP | TYPICAL |
| FG | FINISHED GRADE | UNK | UNKNOWN |
| FT | FEET | WSE | WATER SURFACE ELEVATION |
| INV | INVERT | YR | YEAR |
| N | NEW | | |

### PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 70% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

THE DESIGNS ARE SUBJECT TO CHANGE BASED ON RESOURCE AGENCY COMMENTS, ENVIRONMENTAL REVIEW AND PERMIT ISSUANCE.

### TREE REMOVAL NOTES

1. DBH IS THE DIAMETER MEASURED AT BREAST HEIGHT.
2. WILLOWS TO BE REMOVED SHALL BE SALVAGED PER DETAIL 2, SHT. C23. THIS INCLUDES ALL UNMAPPED WILLOWS. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ARBORIST.
3. ALL OTHER TREES REMOVED DURING CONSTRUCTION SHALL BE SALVAGED WITH ROOTWADS INTACT AND INCORPORATED ON BENCHES AS FLOODPLAIN ROUGHNESS LOGS. BRANCHES SHALL BE PLACED ON FLOODPLAIN BENCHES AND ADJACENT UPPER BANK SLOPES AS SLASH.

### TREE ABBREVIATIONS

| | |
|---|---|
| A | ALDER |
| B | BAY |
| BK | BUCKEYE |
| M | MAPLE |
| O | OAK |
| SYC | SYCAMORE |
| W | WILLOW |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wra
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS AND PLANNERS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax


PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

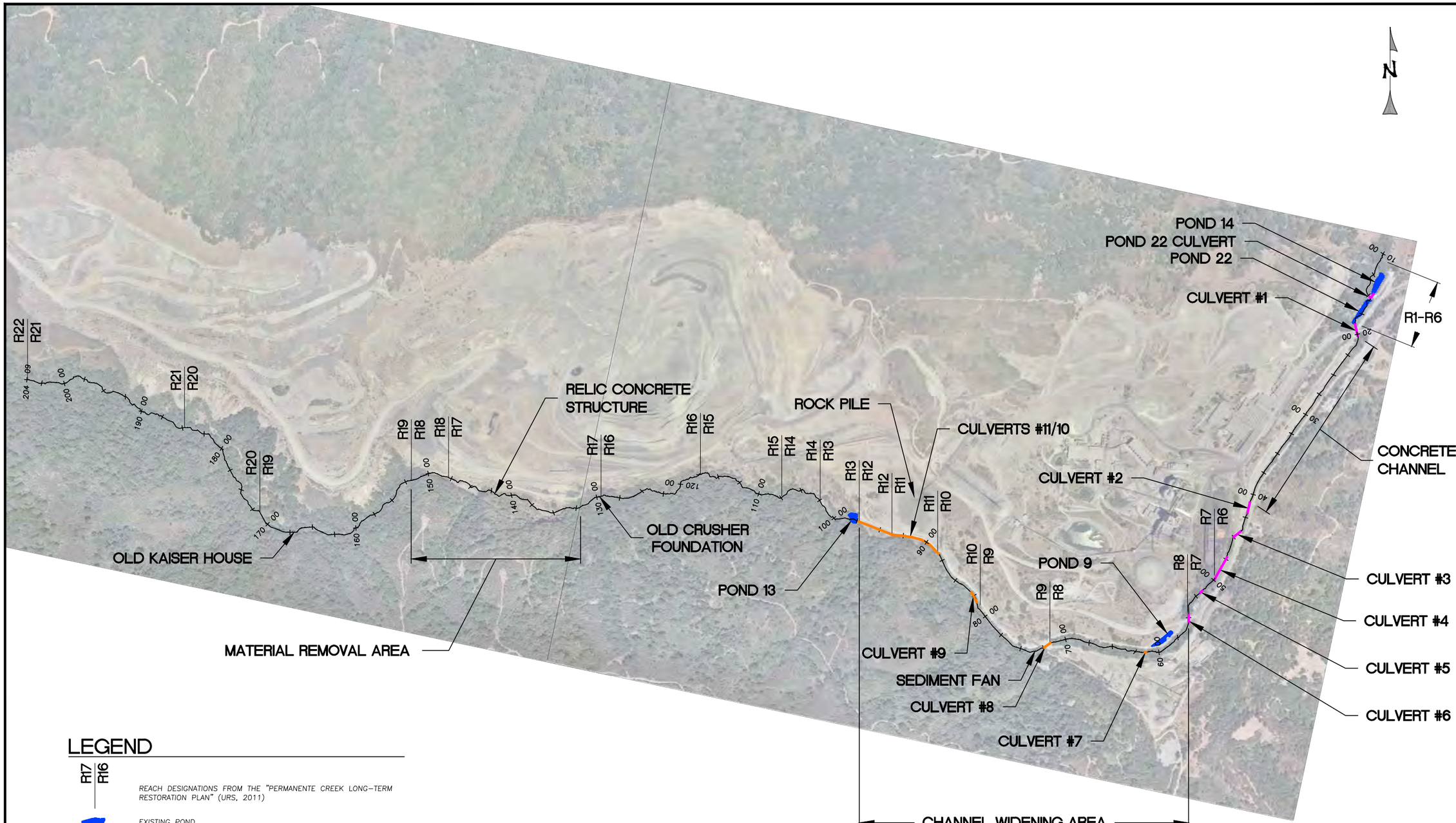
COVER SHEET

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1 | 1 OF 25




## LEGEND

R17 | R16 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING POND

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

70 00 — THALWEG ALIGNMENT 2013

## PROJECT AREA OVERVIEW

SCALE: 1" = 500'

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HEIDELBERG CEMENT GROUP

OVERVIEW

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
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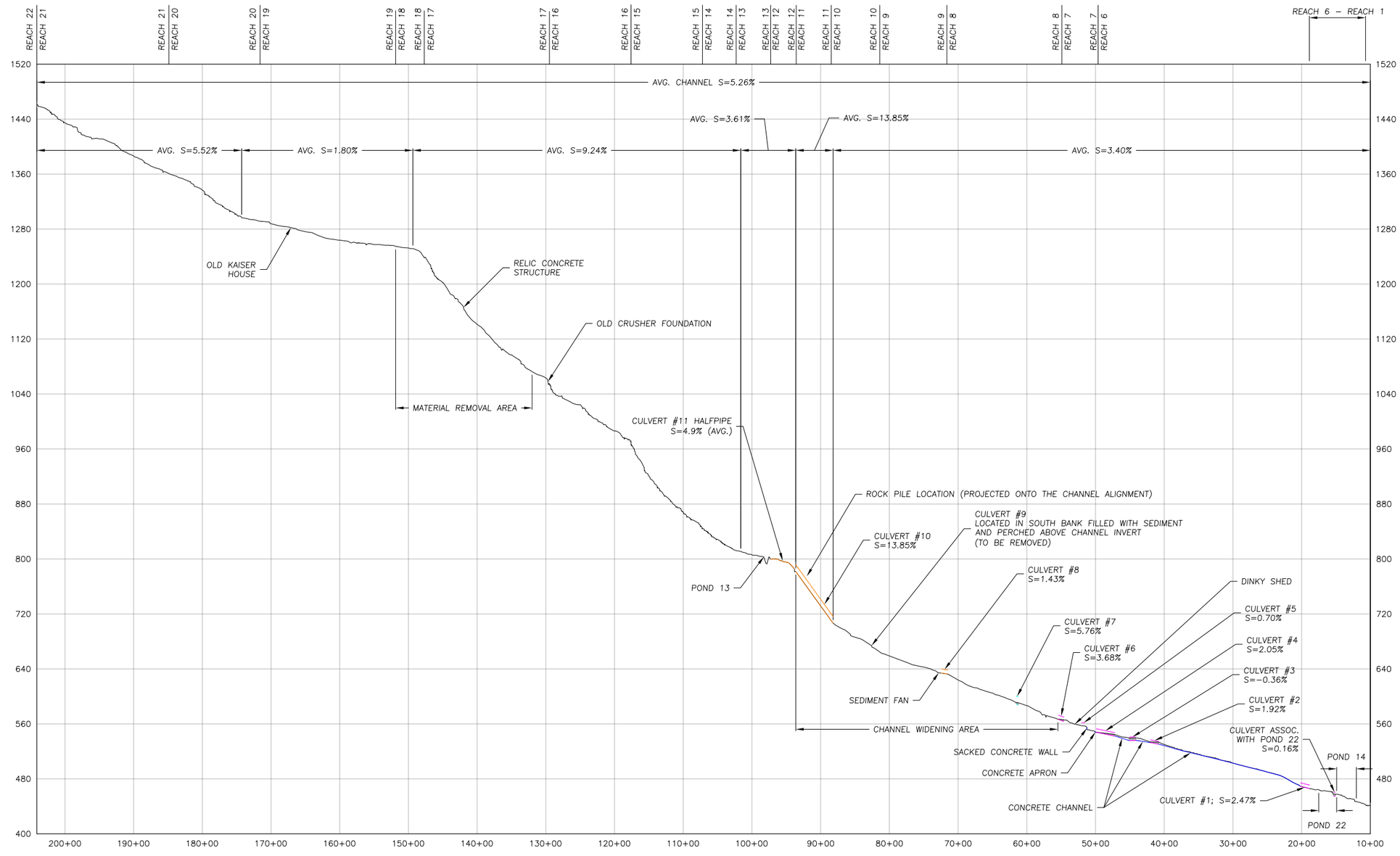
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C2

2 OF 25




## LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

## EXISTING CHANNEL PROFILE

SCALE: H: 1" = 800'; V: 1"=80'

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EXISTING CHANNEL PROFILE

PERMANENTE CREEK RESTORATION PLAN
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| | |
|---|---|
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| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

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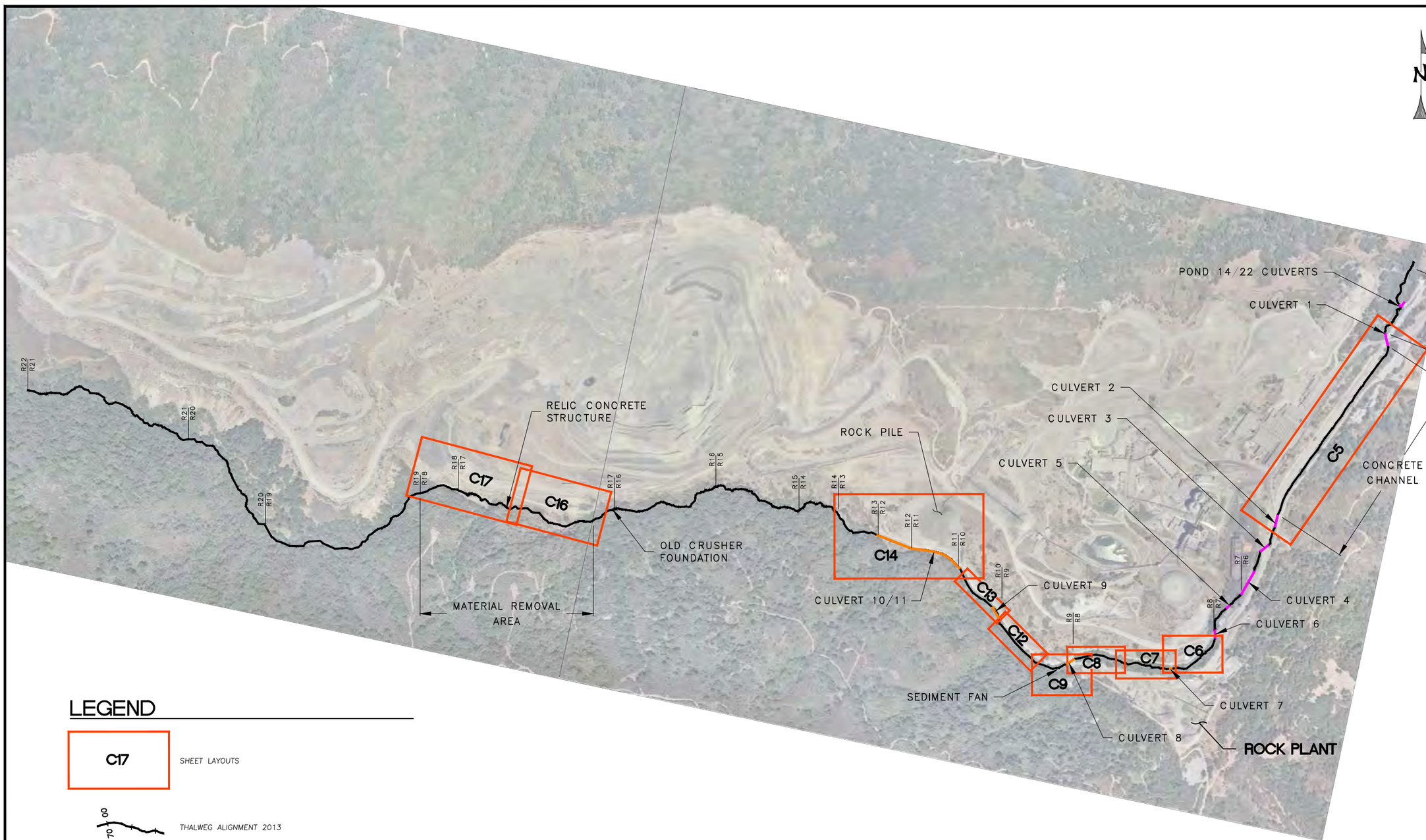
0 1"

C3

3 OF 25

Exhibit C, Part 1 of 6




## LEGEND

C17 — SHEET LAYOUTS

00 / 70 — THALWEG ALIGNMENT 2013

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

SHEET LAYOUT OVERVIEW
SCALE: 1" = 500'

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SHEET LAYOUT OVERVIEW

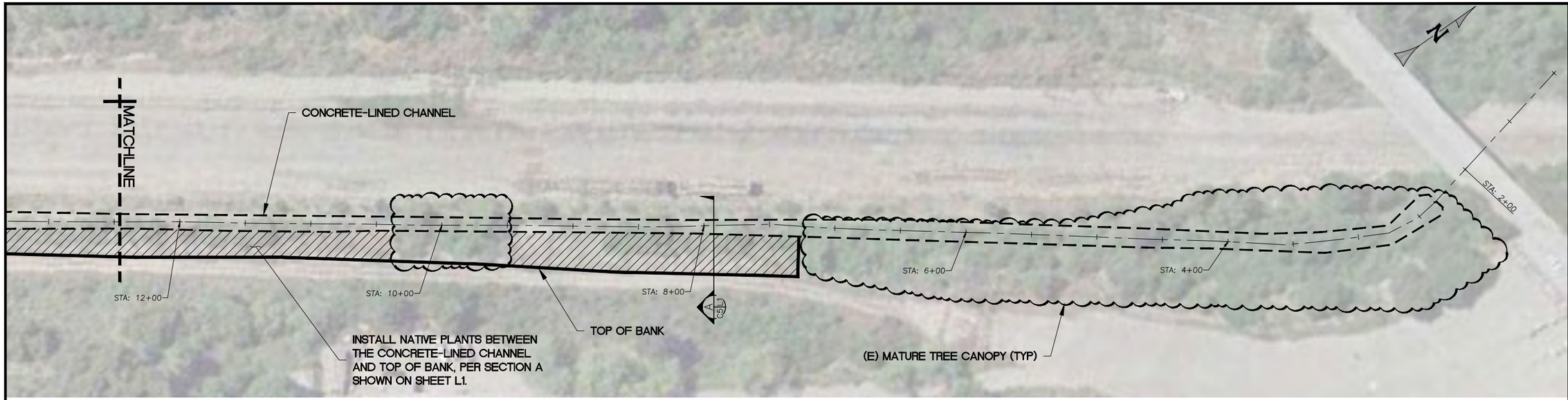
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C4

4 OF 25




NOTES:

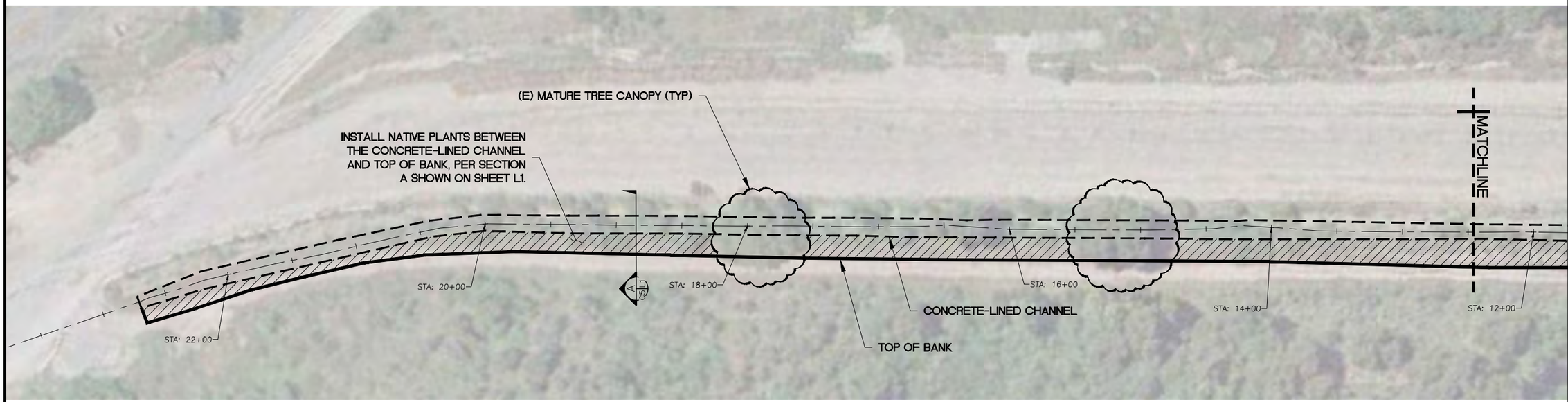
1. ALL EXISTING NATIVE TREES AND SHRUBS SHALL BE PROTECTED IN PLACE. EXISTING PLANT SPECIES INCLUDE, BUT ARE NOT LIMITED TO, PRUNUS ILICIFOLIA, QUERCUS AGRIFOLIA, SALIX LAEVIGATA, SALIX LASIOLEPSIS, AND UMBELLULARIA CALIFORNICA. WEED CONTROL ACTIONS SHALL BE PERFORMED AROUND EXISTING OAK SEEDLINGS, AS DESCRIBED BELOW, TO ENCOURAGE ESTABLISHMENT.
2. A THREE-FOOT DIAMETER AREA SHALL BE CLEARED AND GRUBBED AT EACH PROPOSED PLANTING LOCATION AND AROUND EACH EXISTING OAK SEEDLING. CLEARING AND GRUBBING AROUND OAK SEEDLINGS SHALL OCCUR BY HAND-WEEDING TO AVOID ANY ROOT DISTURBANCE OR PLANT DAMAGE.
3. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
4. A QUALIFIED RESTORATION SPECIALIST SHALL CONFIRM THE LOCATION OF PROPOSED PLANTS AND OAK SEEDLINGS PRIOR TO PLANTING AND WEED CONTROL TO CONFIRM AVOIDANCE OF EXISTING VEGETATION.
5. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT WITH GREEN WASTE COMPOST. EXCESS SOIL SHALL BE USED TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
6. THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS SHALL BE PLACED IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

LEGEND

PROPOSED REVEGETATION AREA = 0.55 ACRES




## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: H: 1" = 40'

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HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

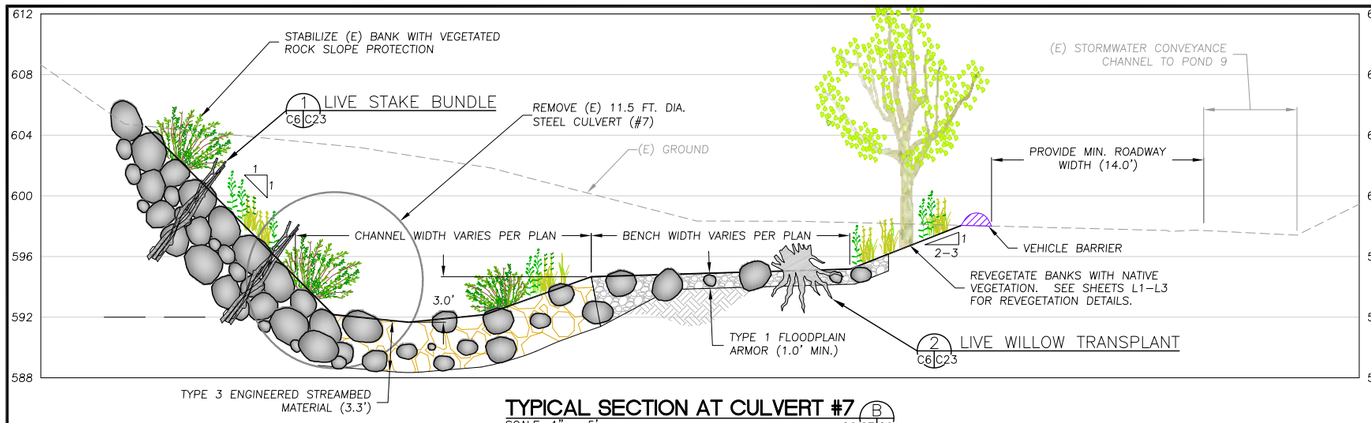
| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.Z. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

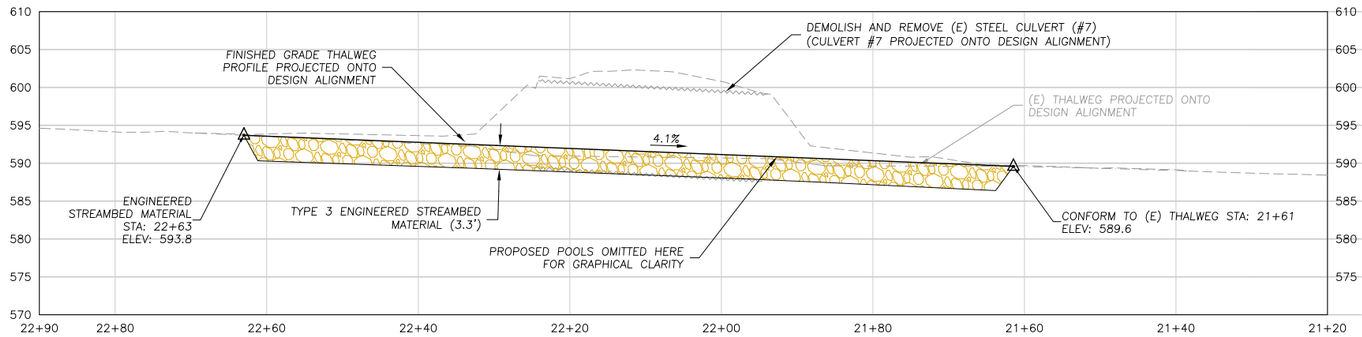
C5

5 OF 25



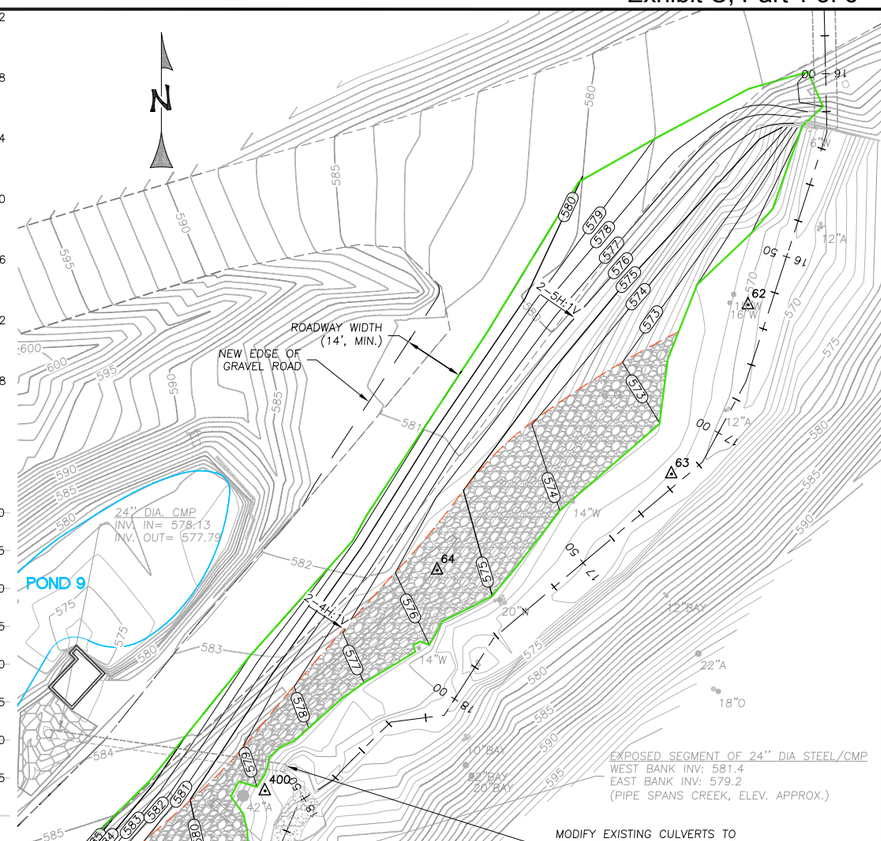

## TYPICAL SECTION AT CULVERT #7 (B C6,C7 C6)

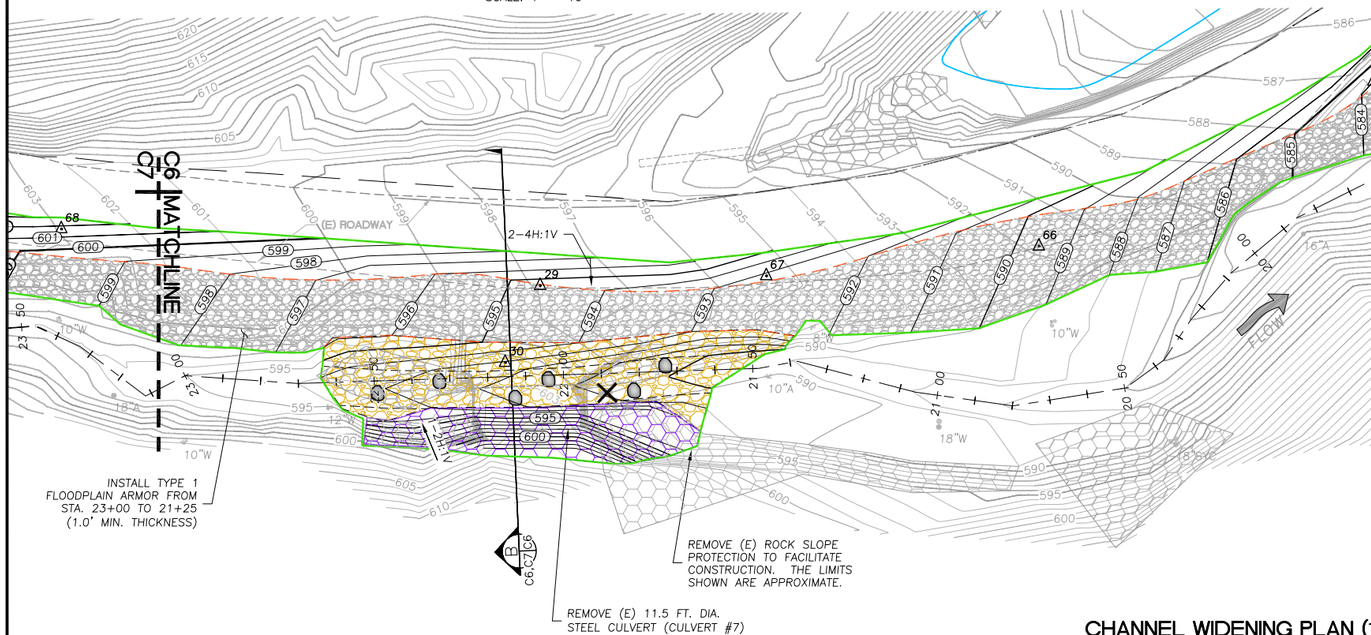
SCALE: 1" = 5'




## CULVERT #7 CHANNEL PROFILE

SCALE: 1" = 10'




## CHANNEL WIDENING PLAN (1 OF 5)

SCALE: 1" = 20'

### TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER (DOUBLE STEM) | 24" | 1 |

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

### LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION

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CHANNEL WIDENING PLAN (1 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
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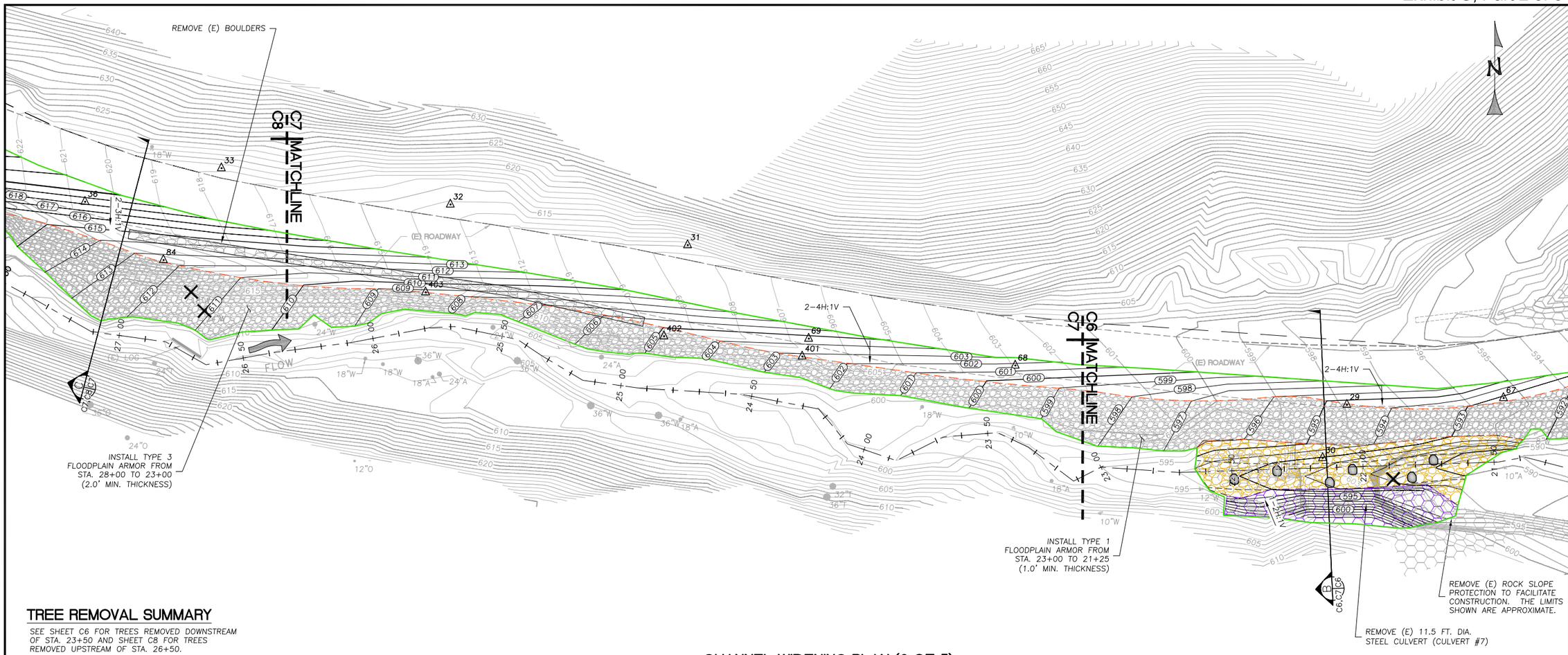
0 1"

C6

6 OF 25




## TREE REMOVAL SUMMARY

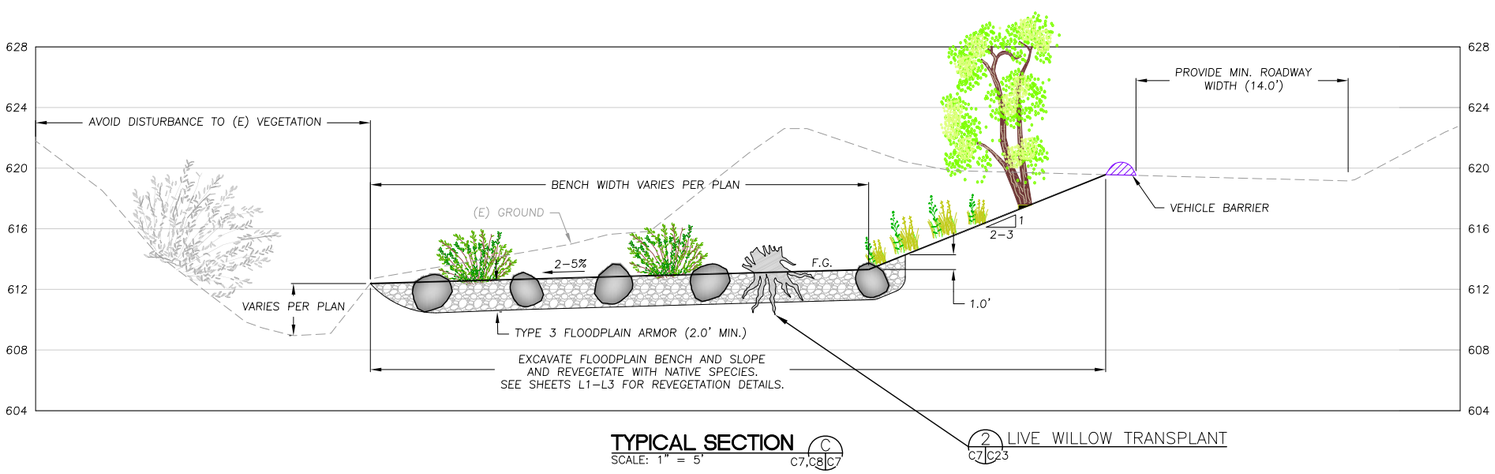
SEE SHEET C6 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C8 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

## CHANNEL WIDENING PLAN (2 OF 5)

SCALE: 1" = 20'

## LEGEND

| | |
|---|---|
| △2 | SURVEY CONTROL |
| 8"A | (E) TREE |
| X | (E) TREE TO BE REMOVED |
| 585 586 | (E) CONTOURS |
| 586 585 | PROPOSED CONTOURS |
| | (E) THALWEG ALIGNMENT |
| | (E) EDGE OF DIRT ROAD |
| W | (E) WATER LINE |
| SD | (E) STORM DRAIN LINE |
| | (E) EXPOSED ROCK SLOPE PROTECTION |
| | LIMITS OF GRADING (APPROX.) |
| | EXPANDED FLOODPLAIN BENCH (APPROX.) |
| | ENGINEERED STREAMBED MATERIAL |
| | VEGETATED ROCK SLOPE PROTECTION |




## TYPICAL SECTION

SCALE: 1" = 5'

C C7,C8 C7

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LEHIGH HANSON HEIDELBERG CEMENT GROUP

PRELIMINARY

NOT FOR CONSTRUCTION

CHANNEL WIDENING PLAN (2 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

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| | |
|---|---|
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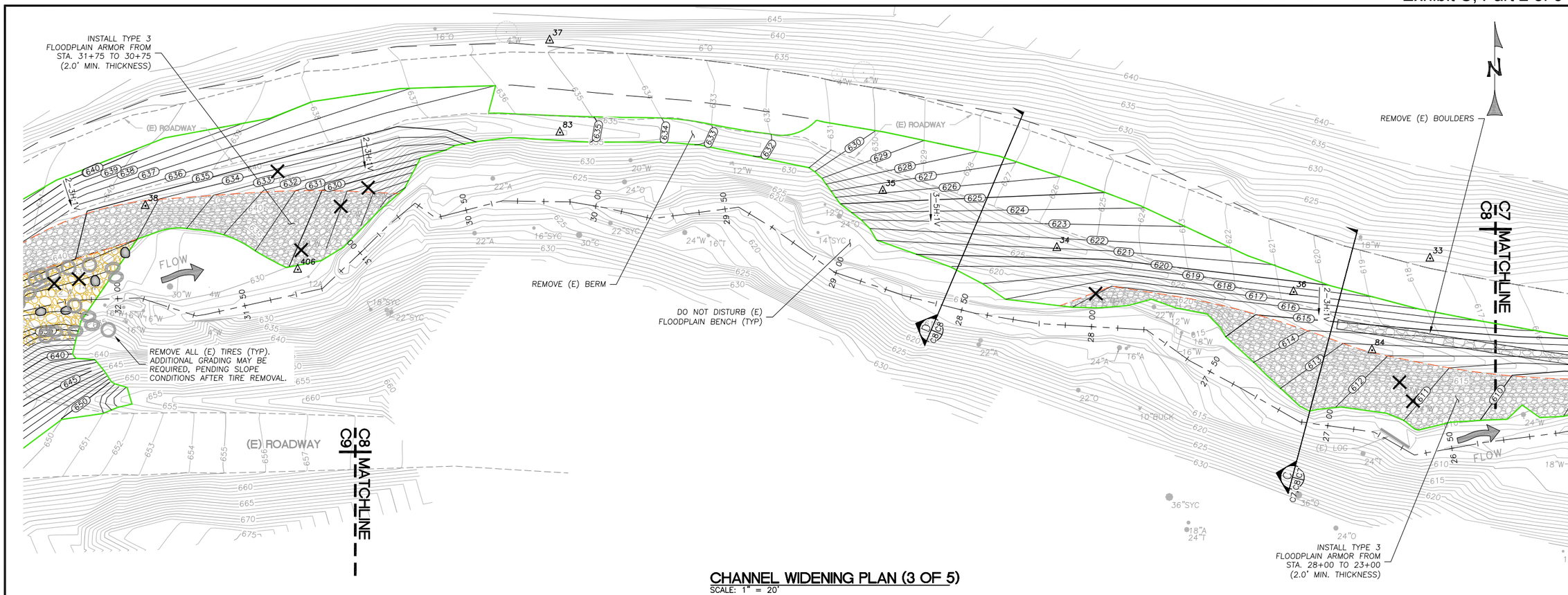
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C7 | 7 OF 25




## CHANNEL WIDENING PLAN (3 OF 5)
SCALE: 1" = 20'

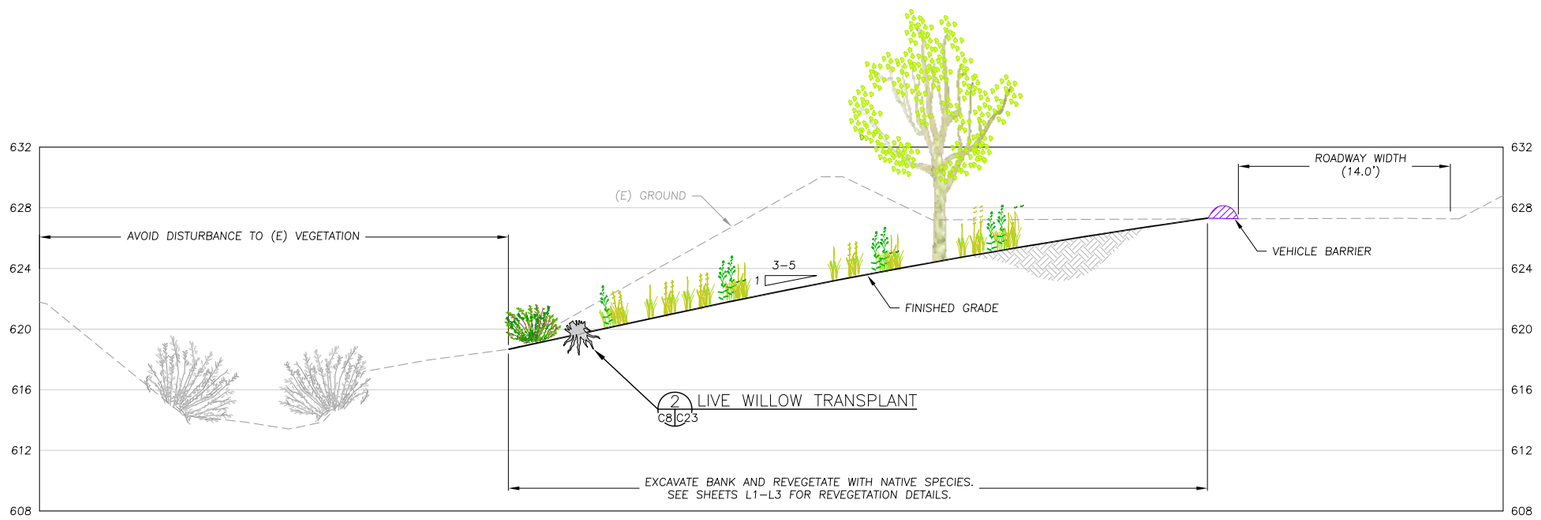
## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| WILLOW | 14" | 1 |
| WILLOW | 18" | 2 |
| WILLOW | 24" | 1 |
| WILLOW | 22" | 1 |
| OAK | 10" | 1 |
| BAY | 16" | 1 |

NOTES:
1. SEE SHEET C9 FOR TREES TO BE REMOVED UPSTREAM OF STA. 31+50. SEE SHEET C7 FOR TREES TO BE REMOVED DOWNSTREAM OF STA. 26+50.

## LEGEND

- △2 — SURVEY CONTROL
- 8"A — (E) TREE
- X — (E) TREE TO BE REMOVED
- 585 586 — (E) CONTOURS
- 585 / 586 — PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- W — (E) WATER LINE
- SD — (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION




## TYPICAL SECTION
SCALE: 1" = 5'

D C8|C8

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PRELIMINARY

NOT FOR CONSTRUCTION

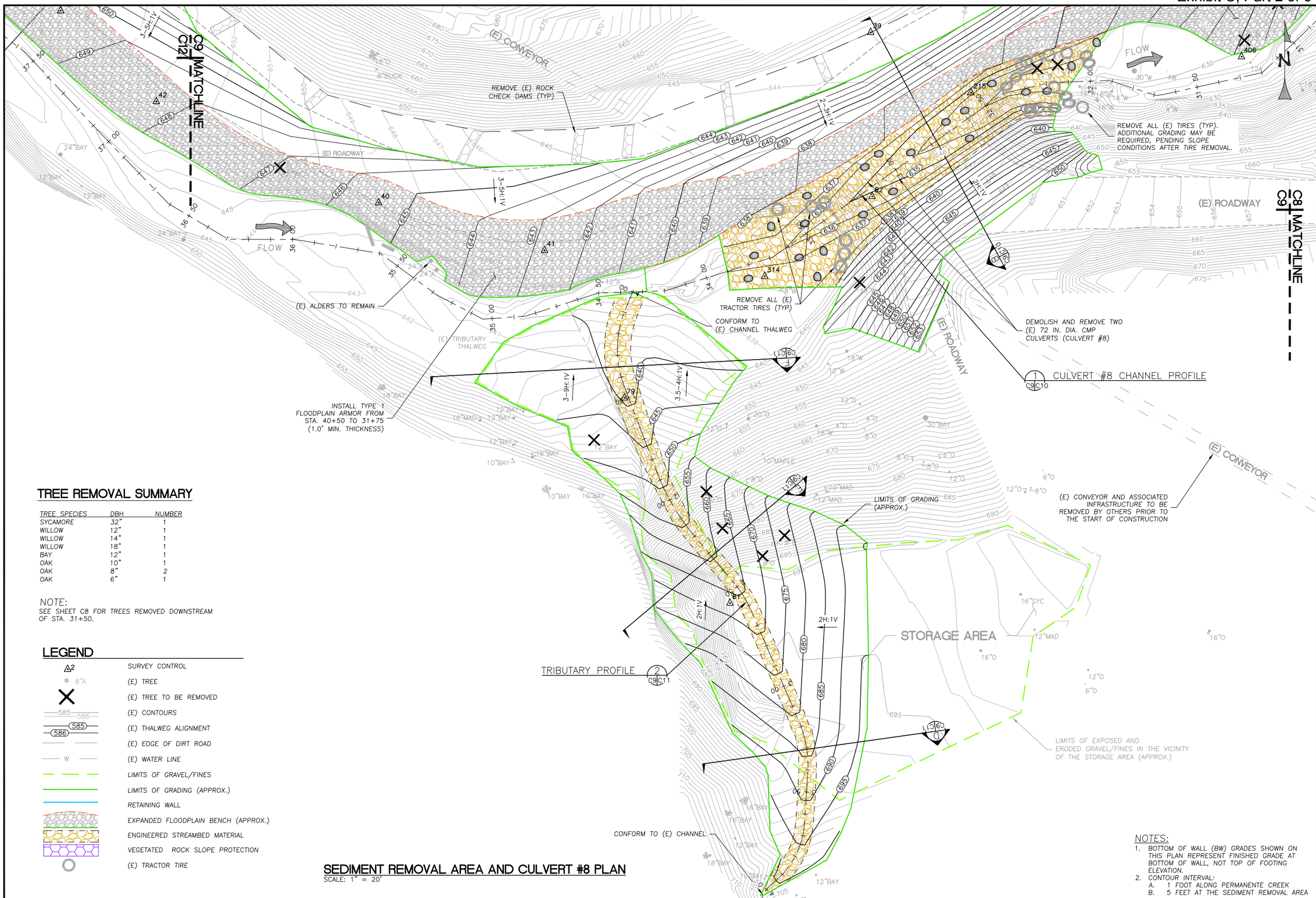
PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (3 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| SYCAMORE | 32" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 18" | 1 |
| BAY | 12" | 1 |
| OAK | 10" | 1 |
| OAK | 8" | 2 |
| OAK | 6" | 1 |

NOTE:
SEE SHEET C8 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- RETAINING WALL
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- (E) TRACTOR TIRE

## SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

SCALE: 1" = 20'

NOTES:
1. BOTTOM OF WALL (BW) GRADES SHOWN ON THIS PLAN REPRESENT FINISHED GRADE AT BOTTOM OF WALL, NOT TOP OF FOOTING ELEVATION.
2. CONTOUR INTERVAL:
   A. 1 FOOT ALONG PERMANENTE CREEK
   B. 5 FEET AT THE SEDIMENT REMOVAL AREA

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LEHIGH HANSON
HEIDELBERG CEMENT GROUP

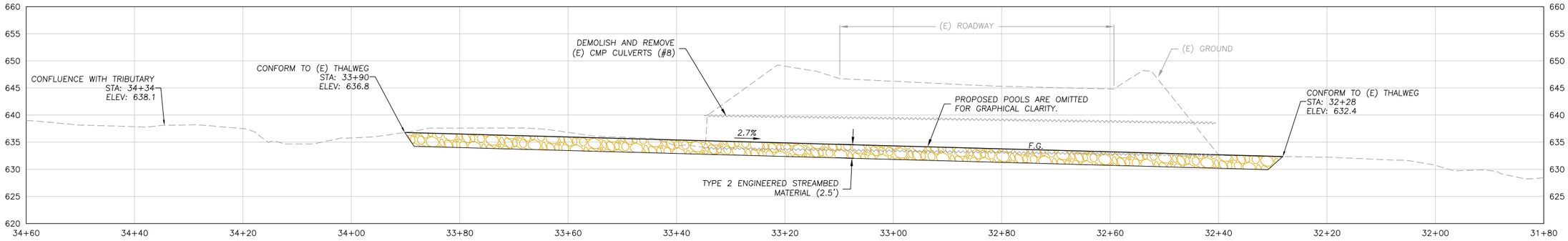
SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

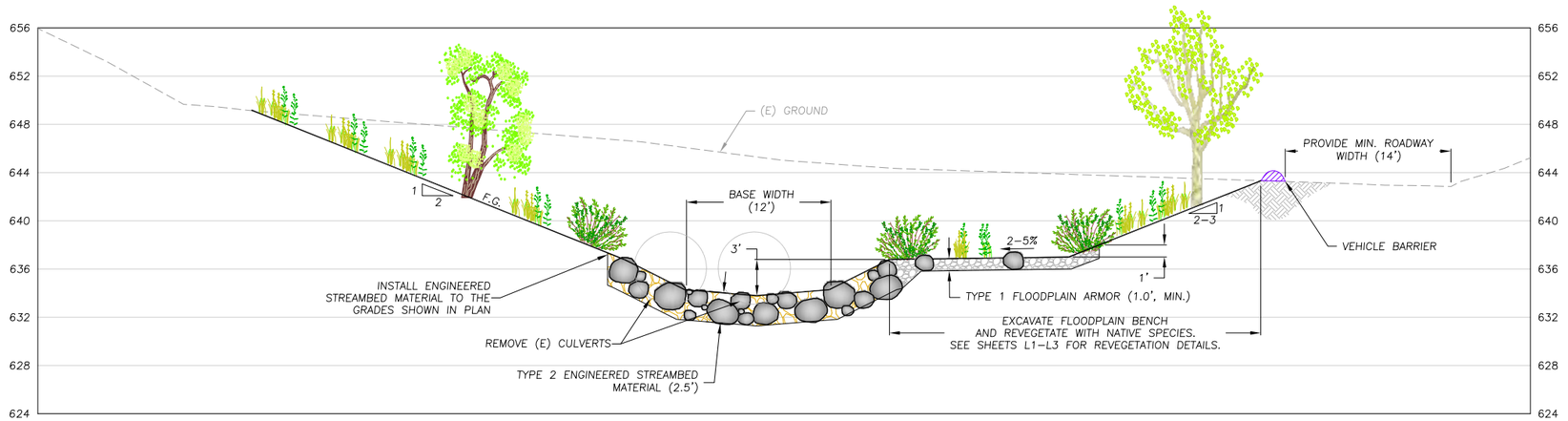
DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C9 | 9 OF 25




CULVERT #8 CHANNEL PROFILE (1 / C9|C10)
SCALE: 1" = 10'




CULVERT #8 SECTION (B / C9|C10)
SCALE: 1" = 6'

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HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

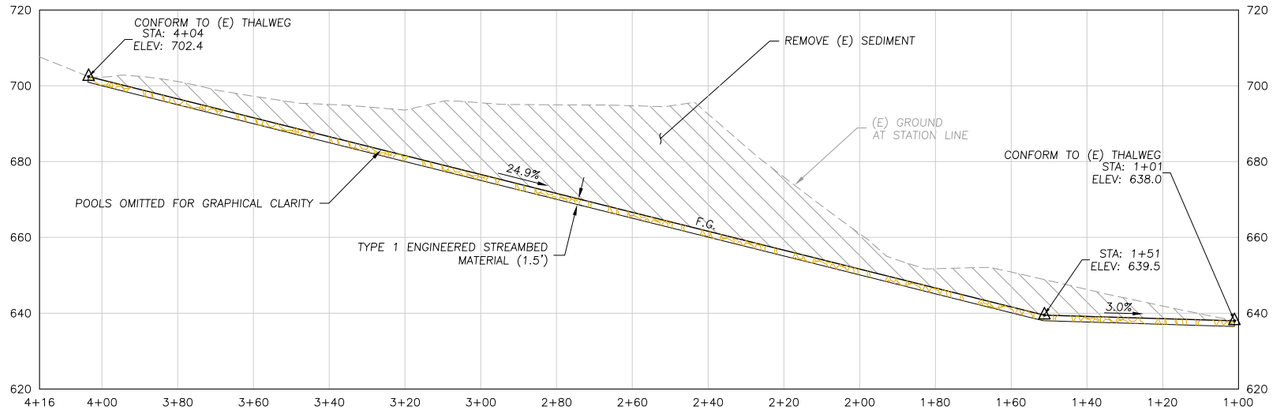
PERMANENTE CREEK
RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

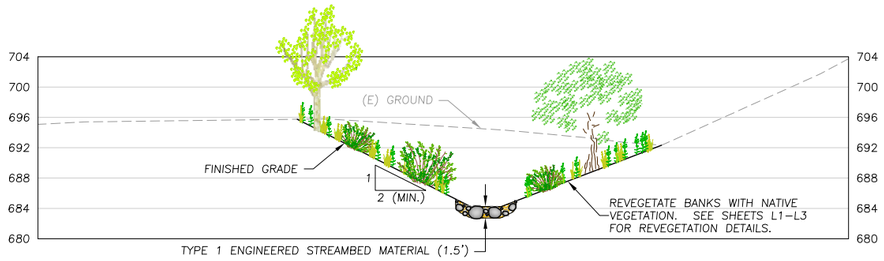
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C10 | 10 OF 25

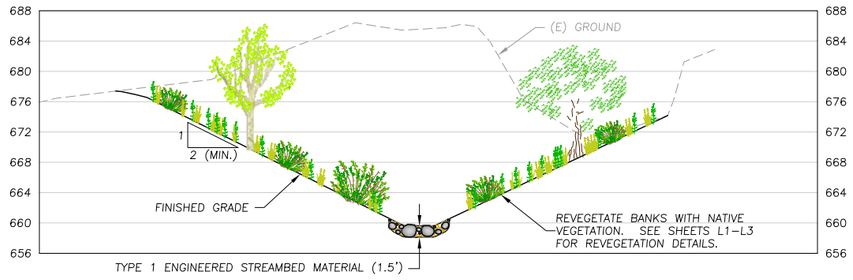



TRIBUTARY PROFILE (2 C9|C11)
SCALE: 1" = 20'

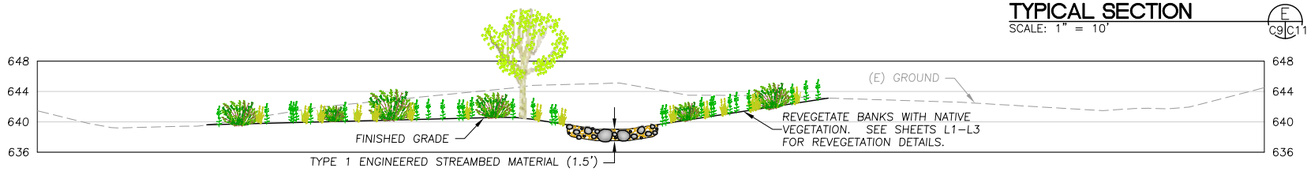
NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



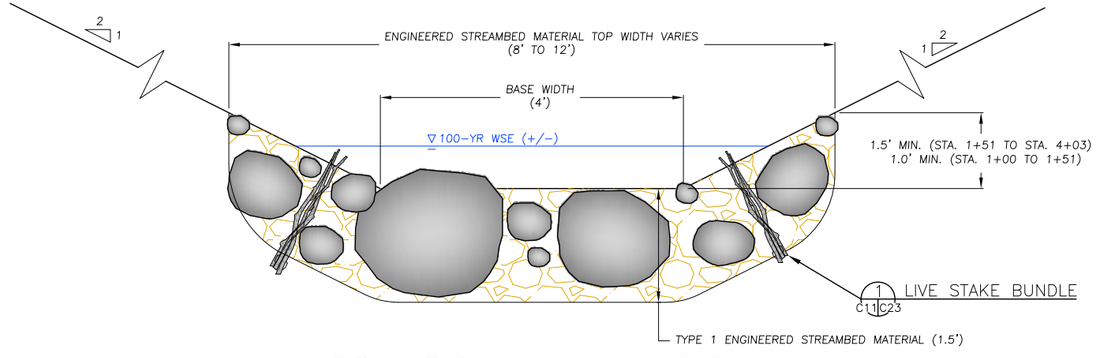

TYPICAL SECTION (D C9|C11)
SCALE: 1" = 10'




TYPICAL SECTION (E C9|C11)
SCALE: 1" = 10'




TYPICAL SECTION (F C9|C11)
SCALE: 1" = 10'




TYPICAL TRIBUTARY CHANNEL SECTION
SCALE: 1" = 1'

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HEIDELBERG CEMENT
GROUP

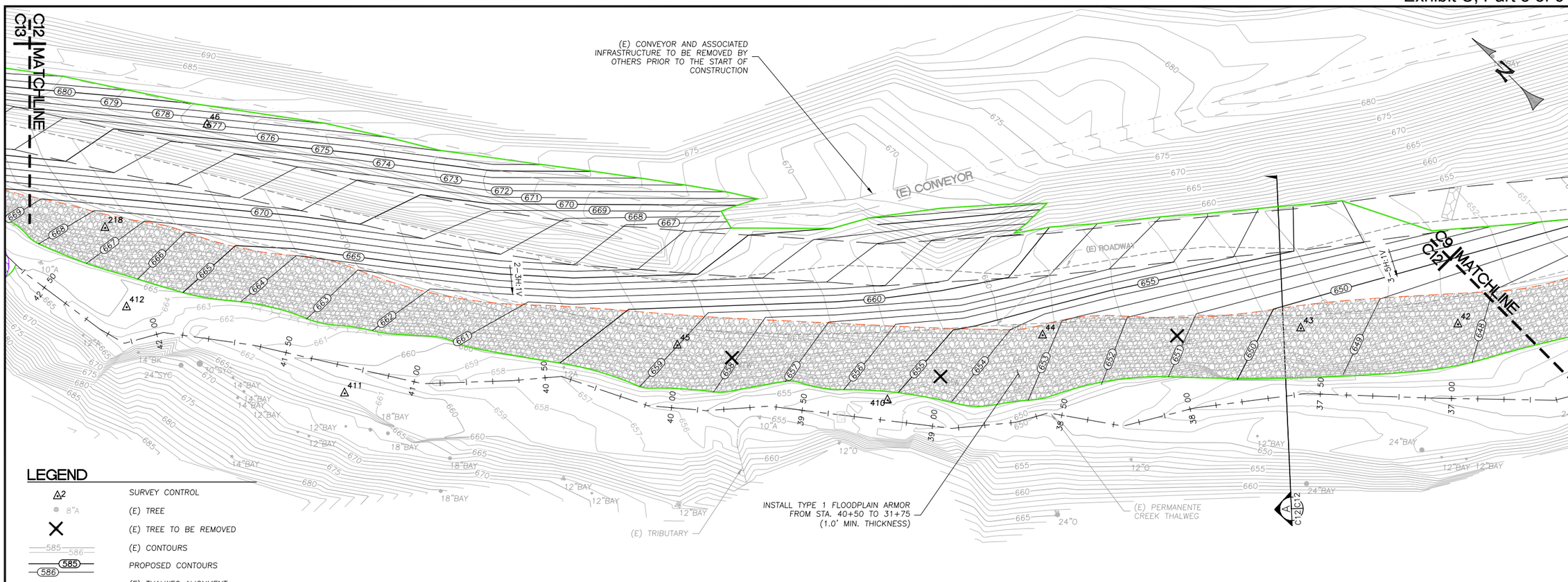
SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C11 | 11 OF 25




## LEGEND

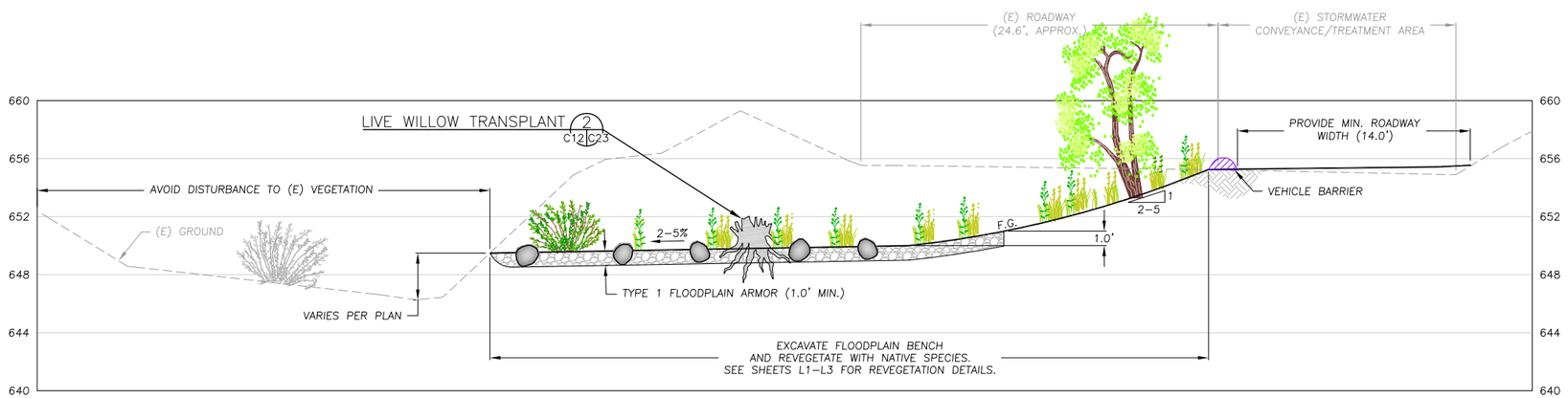
- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 18" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 24" | 1 |

## CHANNEL WIDENING PLAN

SCALE: 1" = 20'




## TYPICAL SECTION

SCALE: 1" = 5'

A C12 C12

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PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (4 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

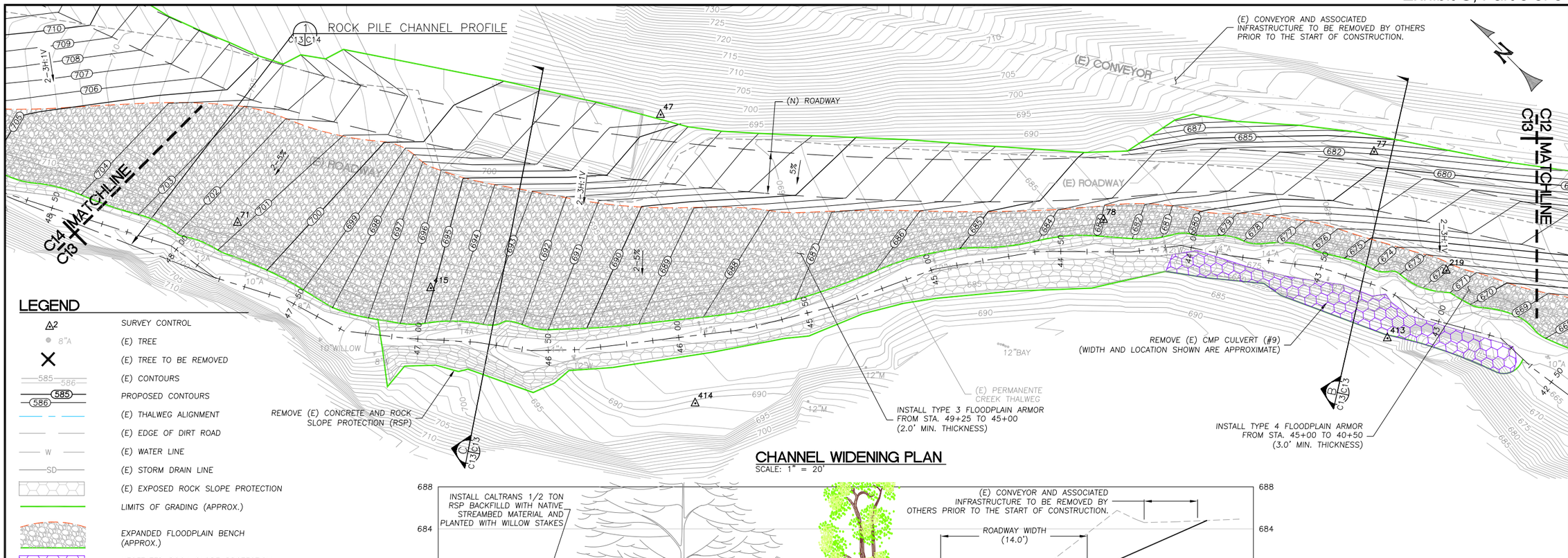
| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C12

12 OF 25




## LEGEND

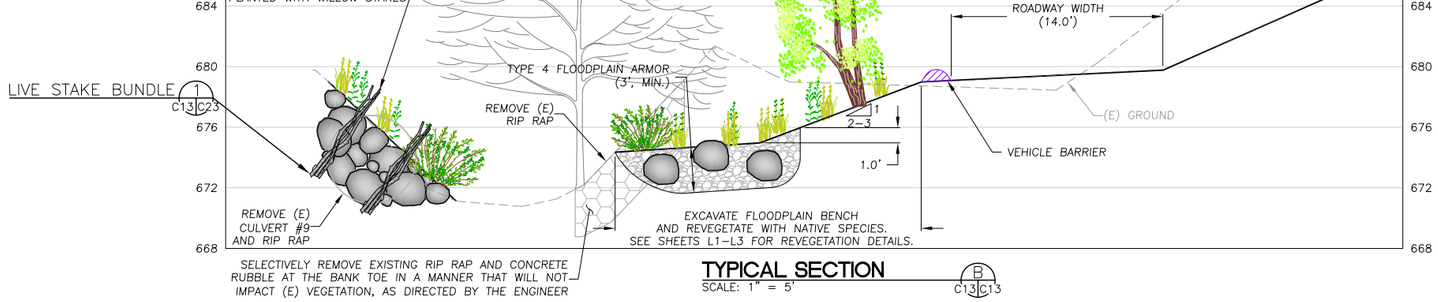
- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- VEGETATED ROCK SLOPE PROTECTION

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| NONE | N/A | N/A |

## CHANNEL WIDENING PLAN

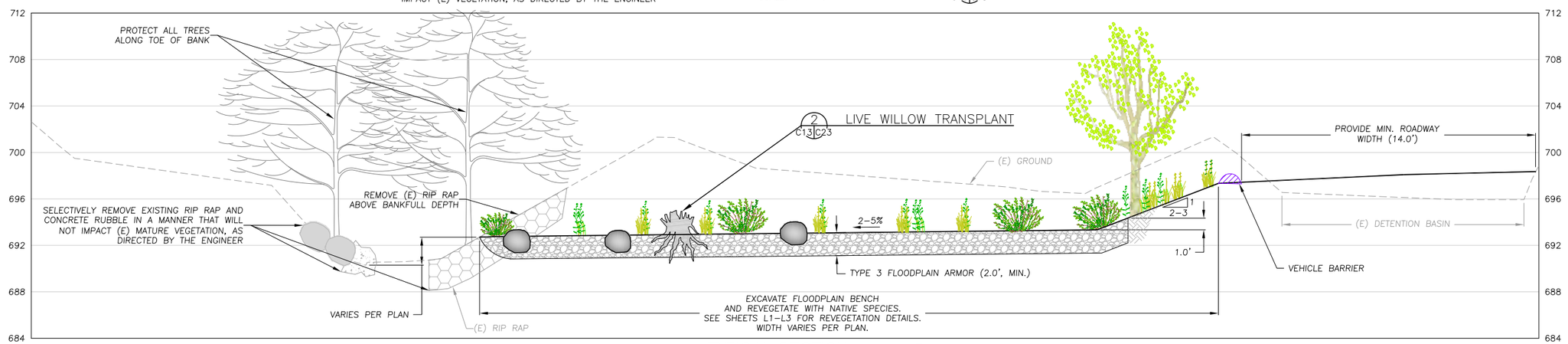
SCALE: 1" = 20'




## TYPICAL SECTION

SCALE: 1" = 5'

B C13|C13




## TYPICAL SECTION

SCALE: 1" = 5'

C C13|C13

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PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (5 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

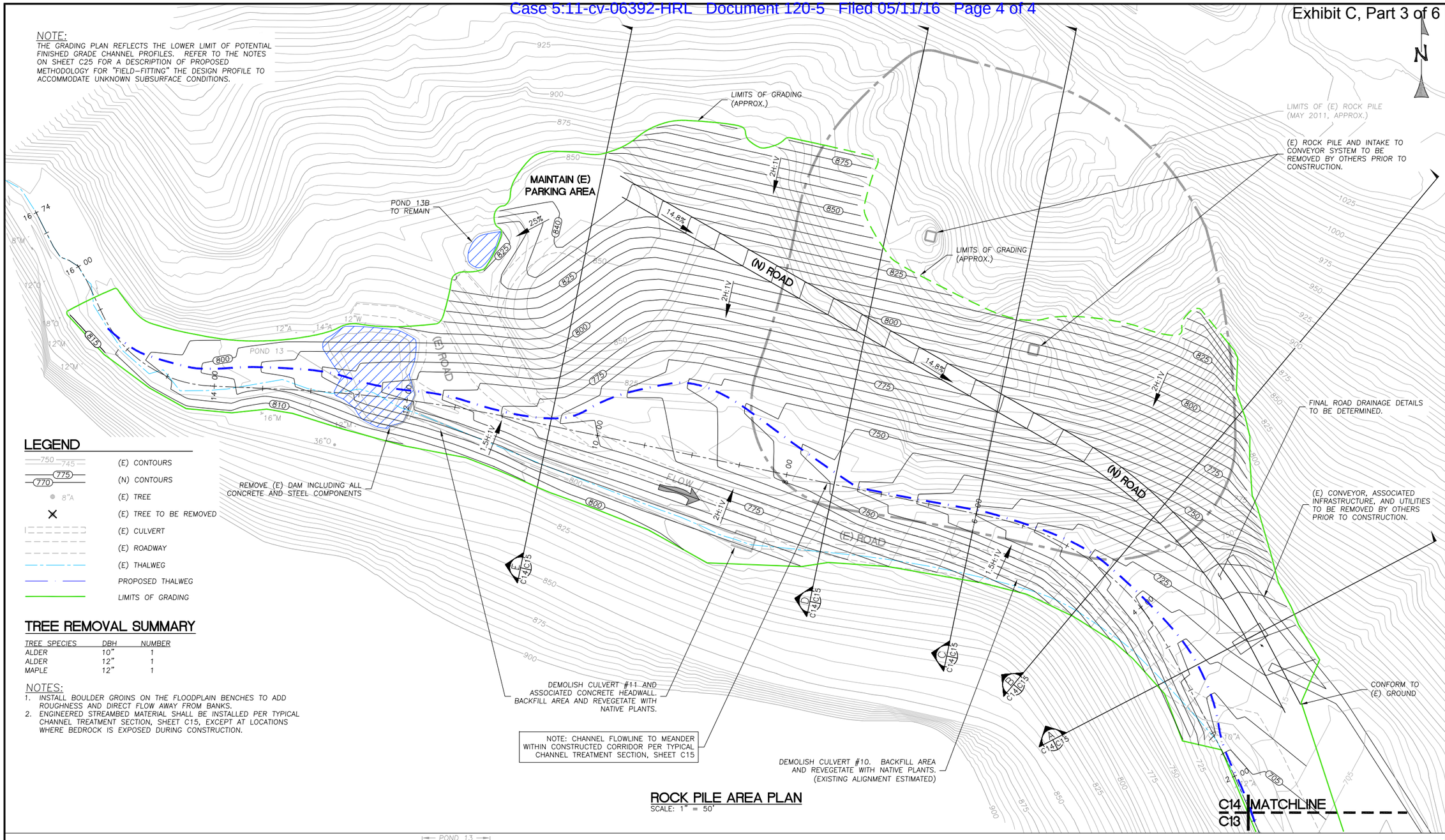
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C13

13 OF 25

NOTE:
THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.




## LEGEND

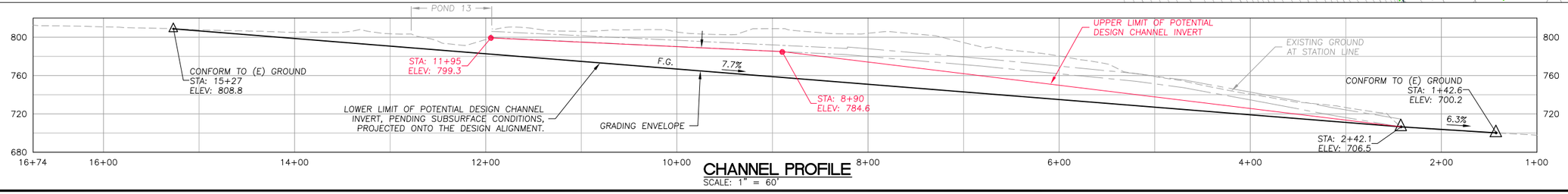
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 10" | 1 |
| ALDER | 12" | 1 |
| MAPLE | 12" | 1 |

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

## ROCK PILE AREA PLAN
SCALE: 1" = 50'




## CHANNEL PROFILE
SCALE: 1" = 60'

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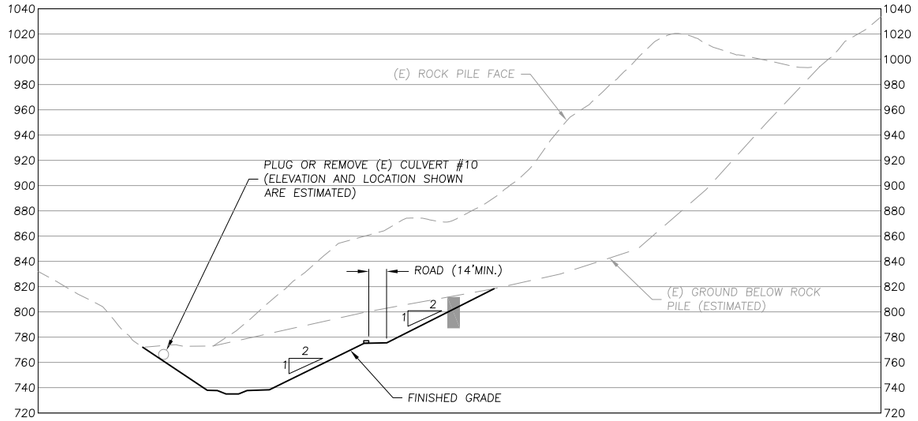
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA PLAN

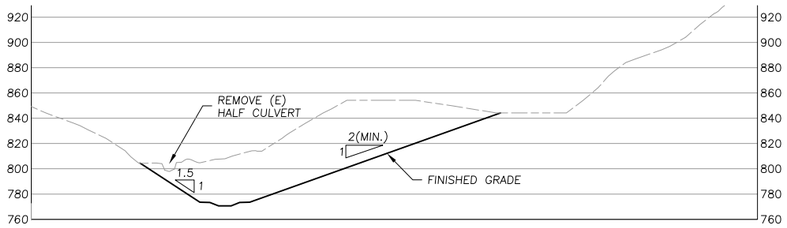
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.R.S
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

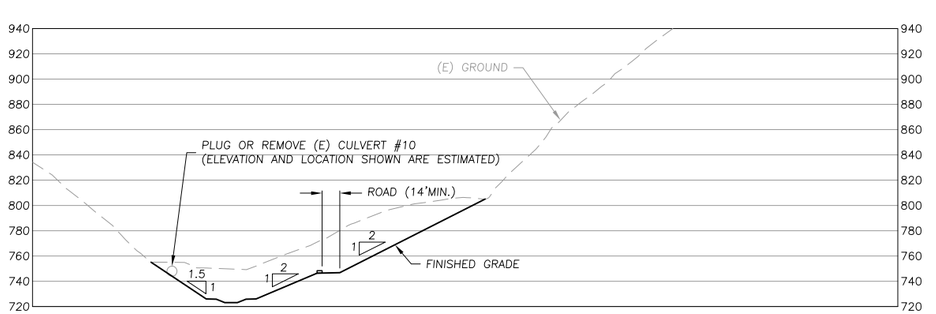
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"



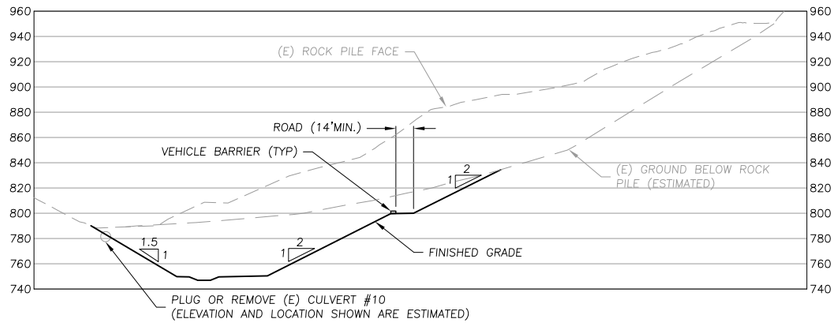

TYPICAL SECTION C (C14|C15)
SCALE: 1" = 60'



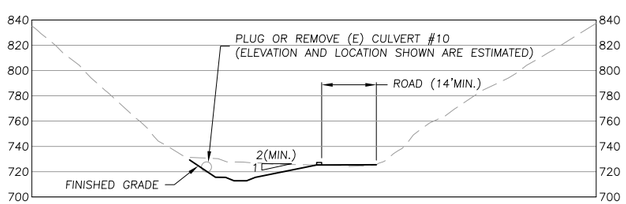

TYPICAL SECTION E (C14|C15)
SCALE: 1" = 60'



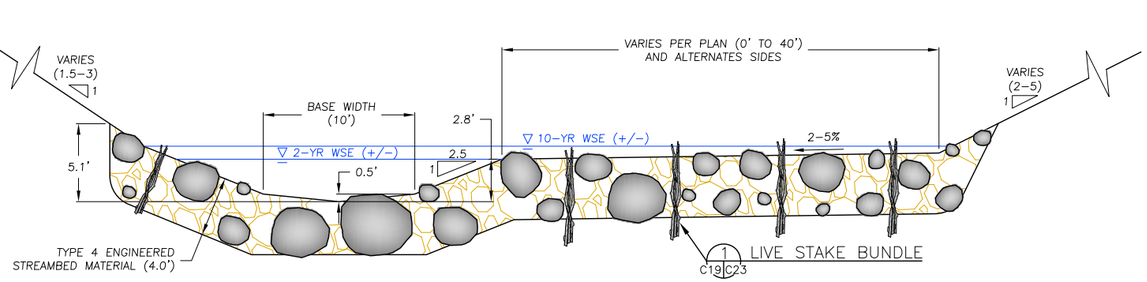

TYPICAL SECTION B (C14|C15)
SCALE: 1" = 60'




TYPICAL SECTION D (C14|C15)
SCALE: 1" = 60'




TYPICAL SECTION A (C14|C15)
SCALE: 1" = 60'




TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE
AREA
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.R.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

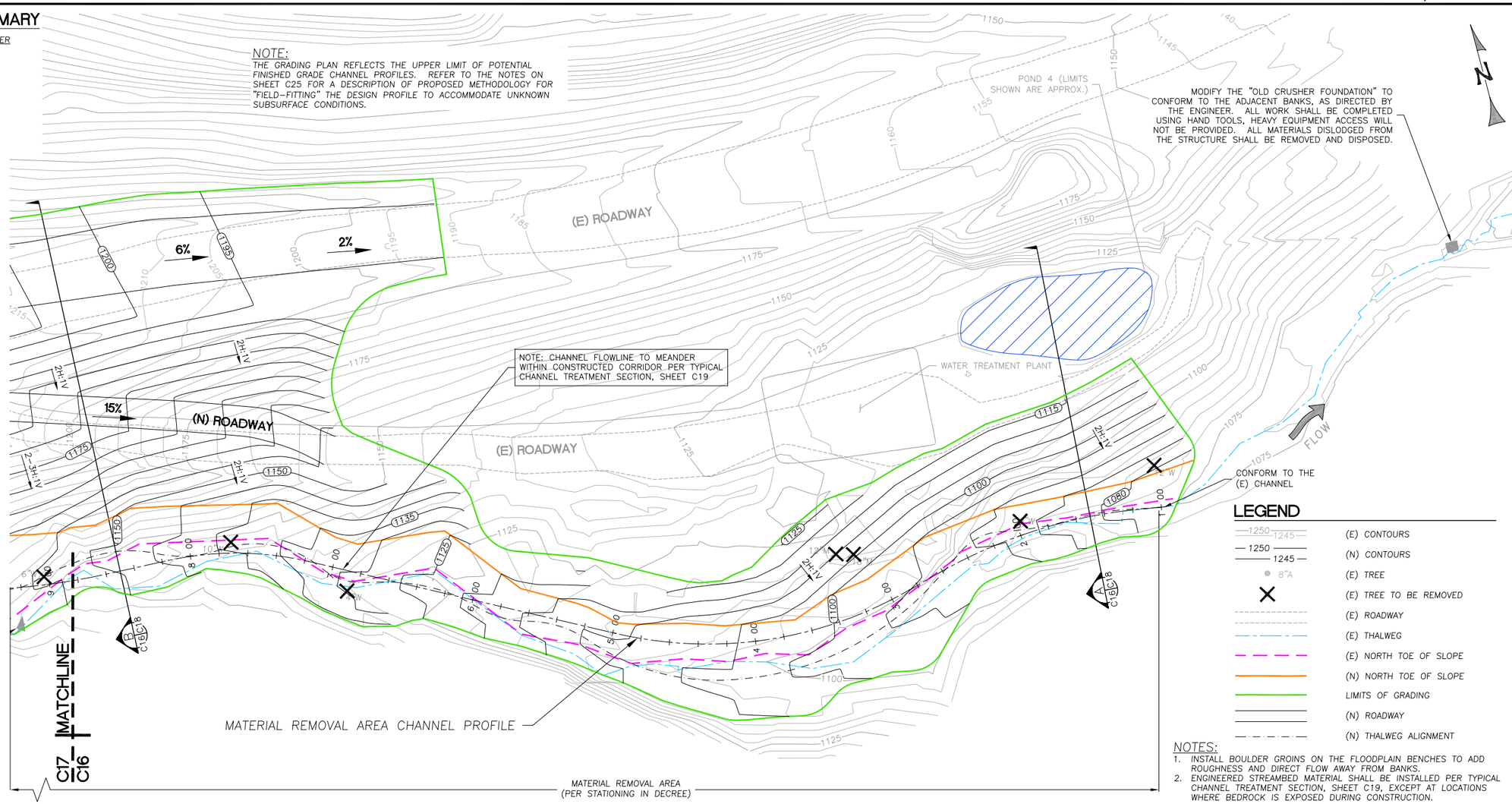
C15

15 OF 25

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| MADRONE | 12" | 1 |
| MADRONE | 18" | 1 |
| WILLOW | 4" | 1 |
| WILLOW | 6" | 2 |
| WILLOW | 10" | 1 |
| WILLOW | 12" | 1 |

NOTE:
THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

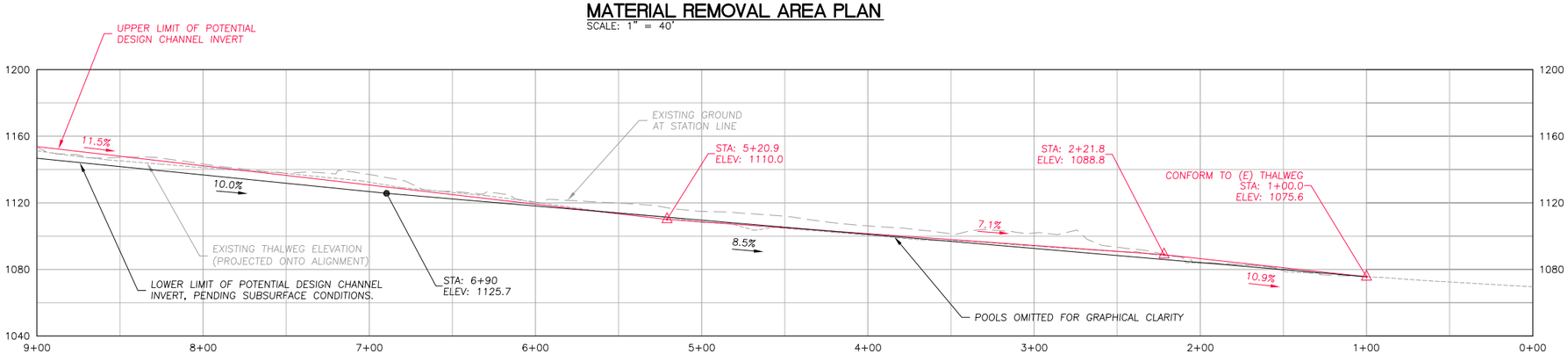



## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C19, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

## MATERIAL REMOVAL AREA PLAN
SCALE: 1" = 40'




## MATERIAL REMOVAL AREA CHANNEL PROFILE
SCALE: 1" = 40'

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C16 | 16 OF 25

## LEGEND

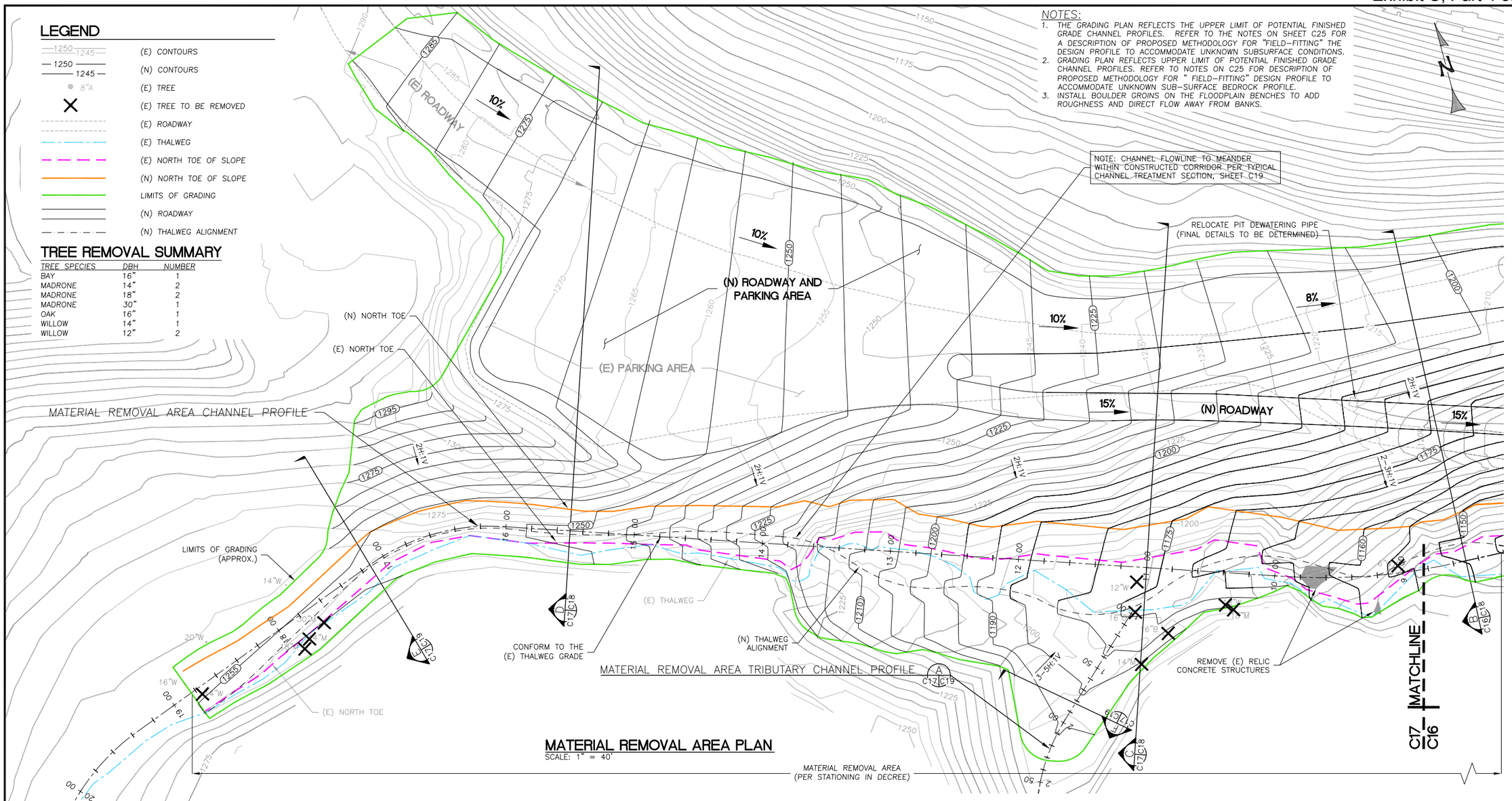
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| BAY | 16" | 1 |
| MADRONE | 14" | 2 |
| MADRONE | 18" | 2 |
| MADRONE | 30" | 1 |
| OAK | 16" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 12" | 2 |

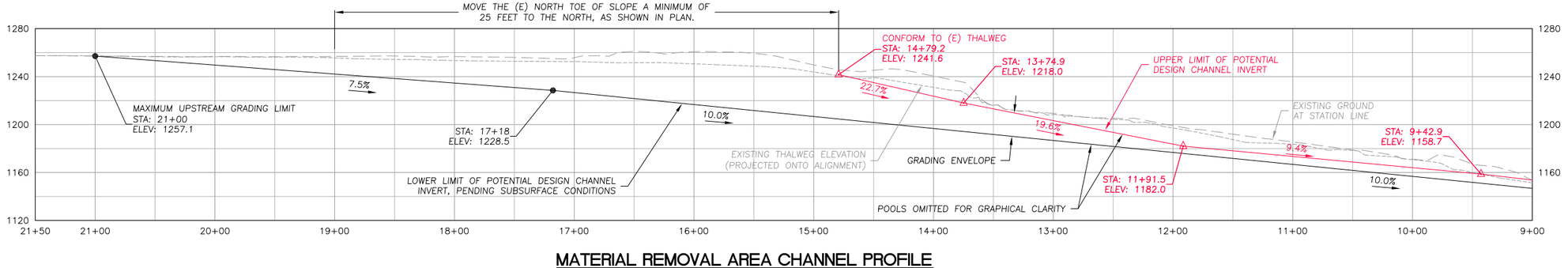
NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. GRADING PLAN REFLECTS UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO NOTES ON C25 FOR DESCRIPTION OF PROPOSED METHODOLOGY FOR " FIELD-FITTING" DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUB-SURFACE BEDROCK PROFILE.
3. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.




## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'

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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

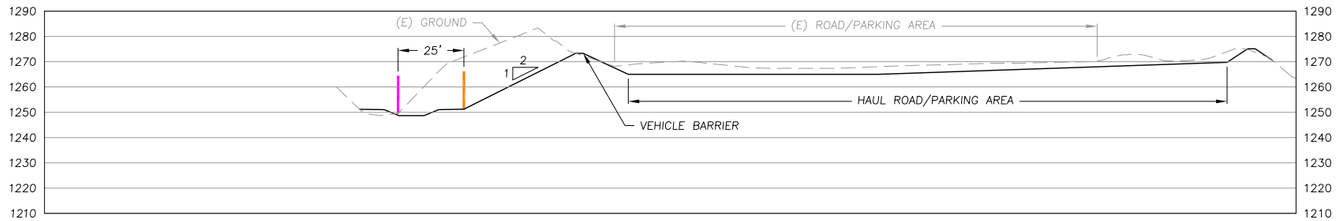
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

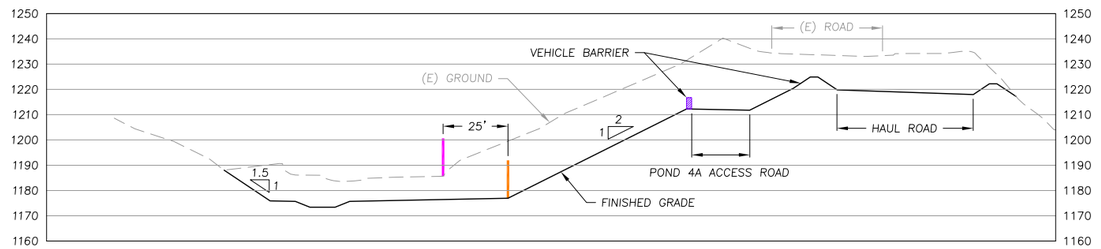
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C17 | 17 OF 25



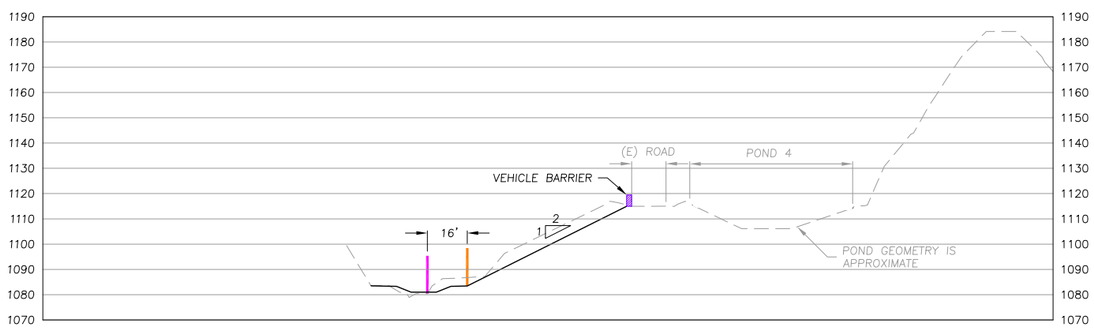

TYPICAL SECTION (D) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (C) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (B) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (A) C17 C18
SCALE: 1" = 30'

## LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

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MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
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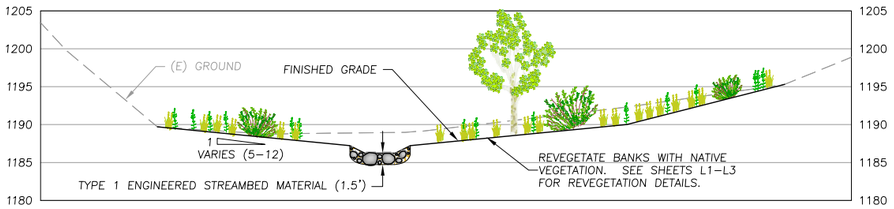
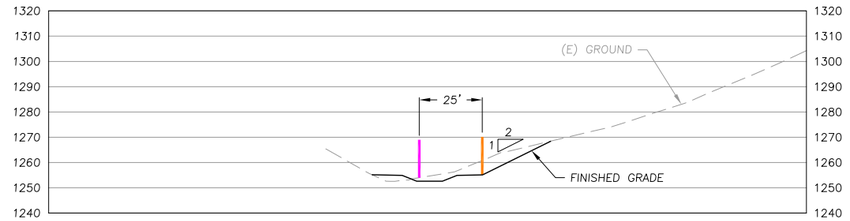
0 1"

C18




TYPICAL SECTION
SCALE: 1" = 10'
F C17|C19

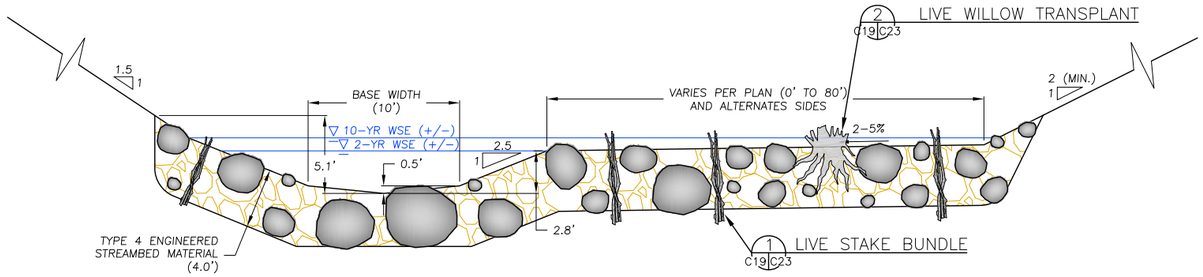



TYPICAL SECTION
SCALE: 1" = 30'
E C17|C19

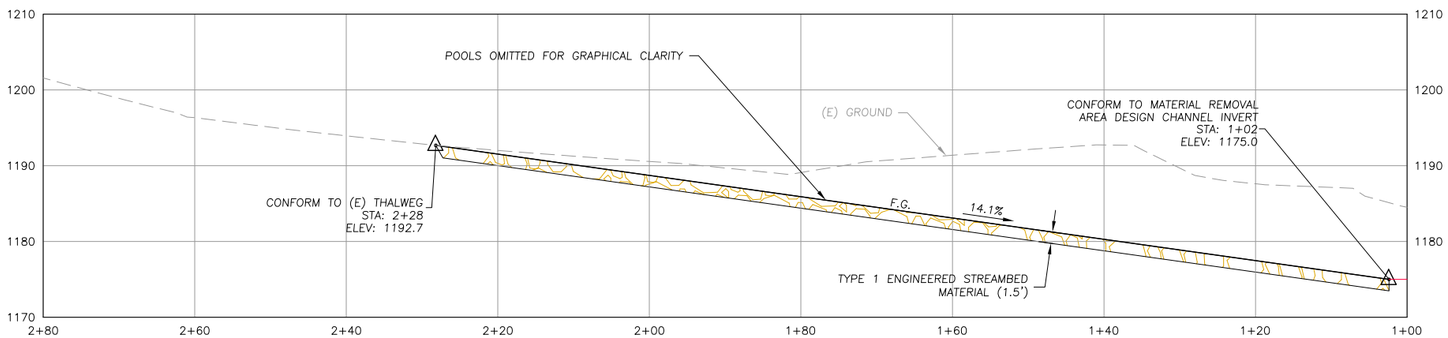
## LEGEND

(E) NORTH SLOPE TOE

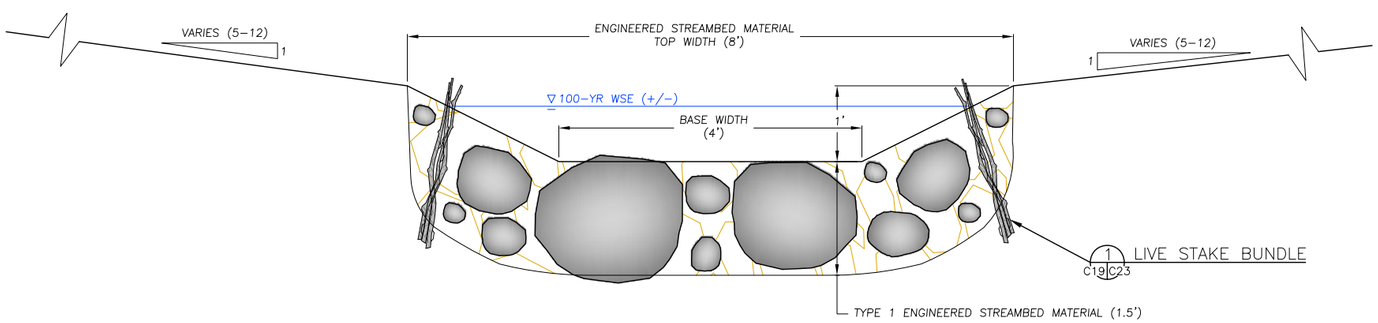
PROPOSED NORTH SLOPE TOE




TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'




MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10'
A C17|C19




TYPICAL TRIBUTARY CHANNEL TREATMENT SECTION
SCALE: 1" = 1'

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LEHIGH HANSON
HEIDELBERG CEMENT GROUP

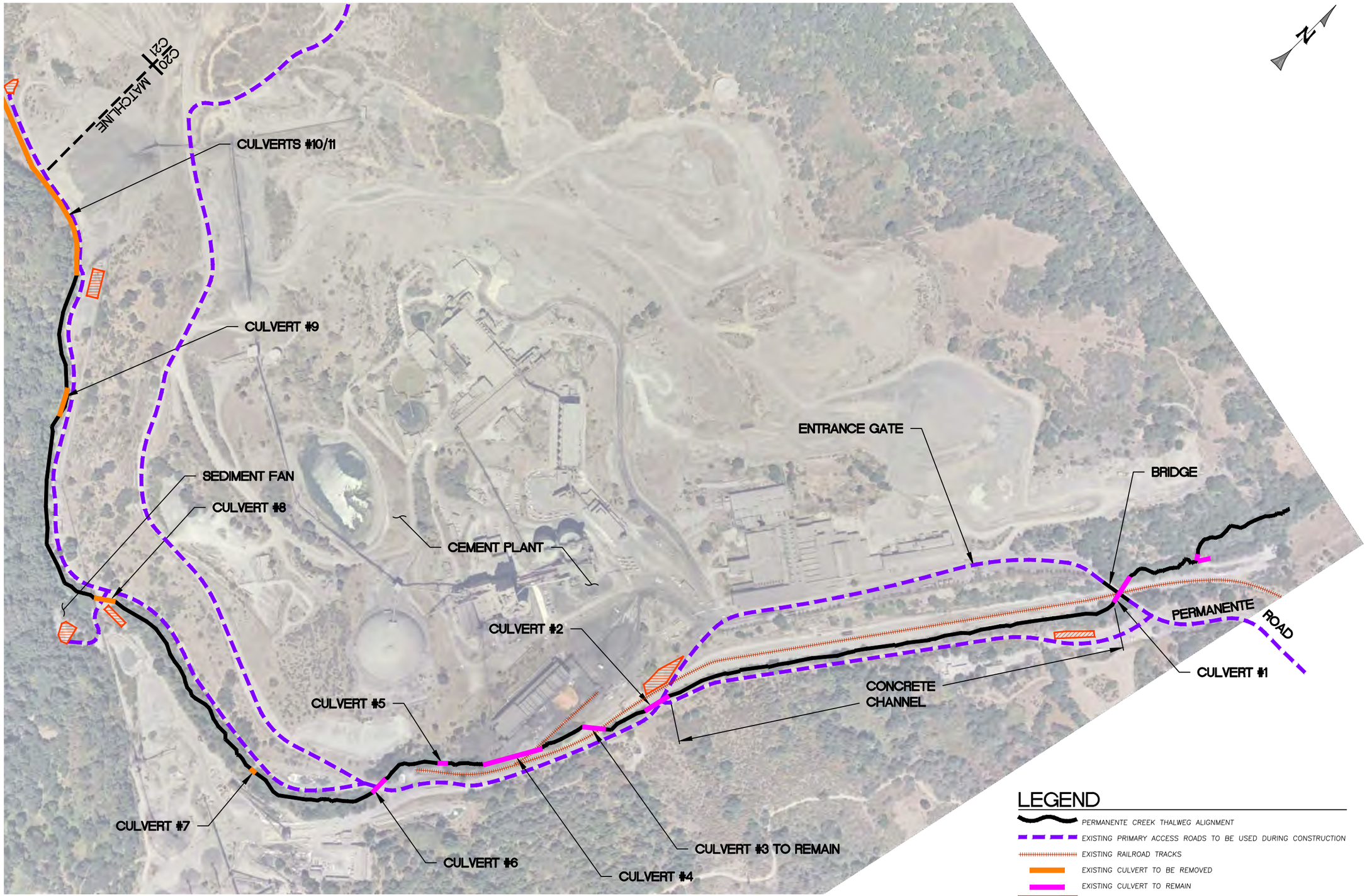
MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C19 | 19 OF 25




ACCESS AND STAGING PLAN
SCALE: 1"=200'

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ACCESS AND STAGING PLAN (1 OF 2)

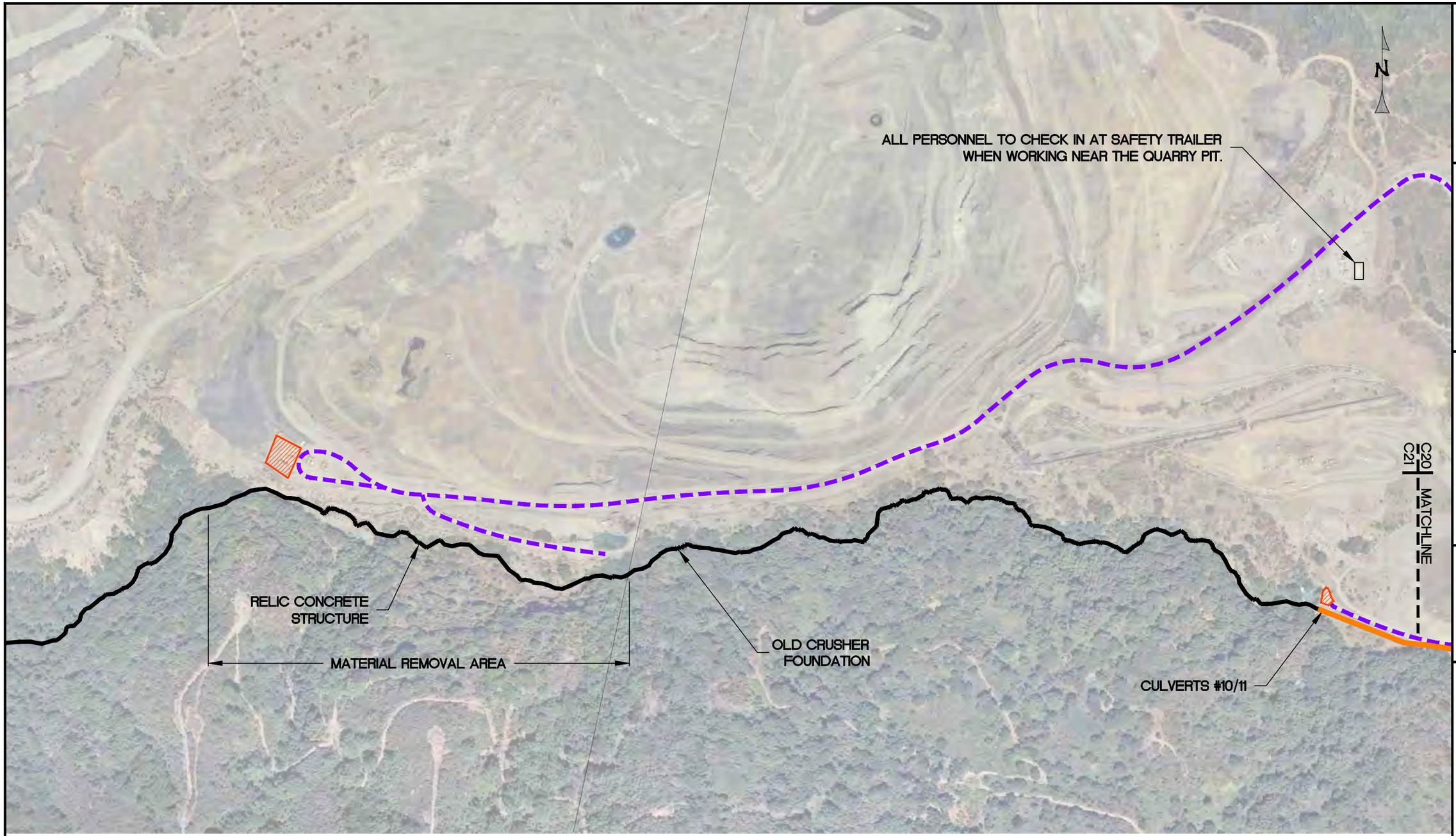
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C20

20 OF 25




## LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING RAILROAD TRACKS
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS

ACCESS AND STAGING PLAN
SCALE: 1" = 200'

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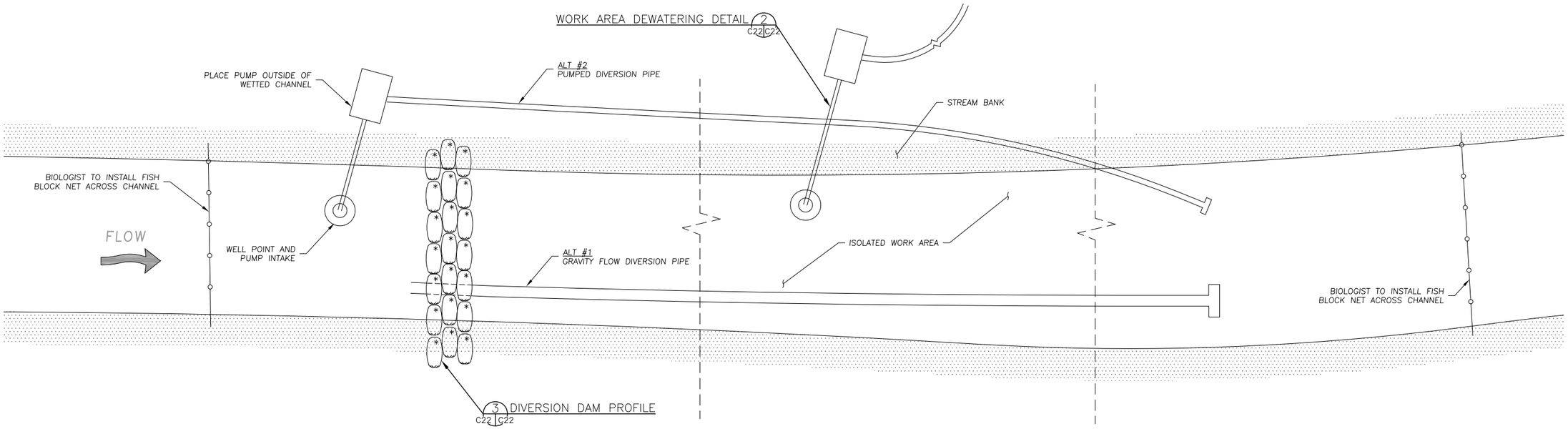
ACCESS AND STAGING PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

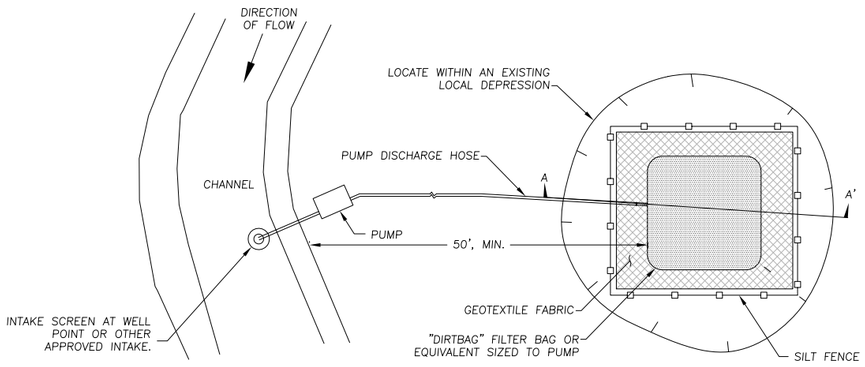
DESIGNED BY: B.M.S.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

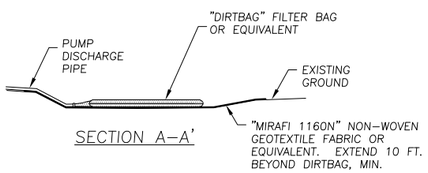
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C21 | 21 OF 25




## TYPICAL DEWATERING PLAN
N.T.S. 1 C22 C22



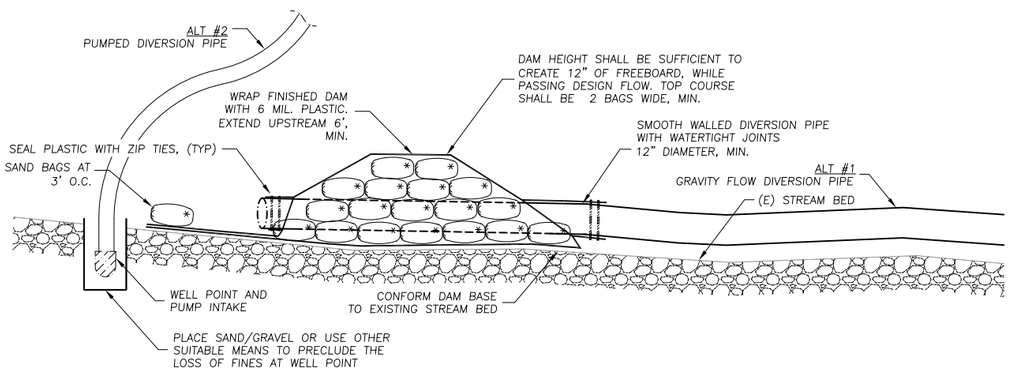




SECTION A–A'

### DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. PROPOSED FILTRATION METHODS WILL BE FIELD–FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
4. TURBID WATER SHALL BE DISCHARGED AT A LOCATION WHERE THERE IS AN EXISTING DEPRESSION AT A MINIMUM OF 50 FEET FROM THE EXISTING CHANNEL. EXACT LOCATION TO BE APPROVED BY THE ENGINEER. WHERE NATURAL DEPRESSION CANNOT BE FOUND, FILTER BAGS, "BAKER TANKS" OR OTHER APPROVED MEANS SHALL BE EMPLOYED.
5. NO OVERLAND FLOW SHALL BE ALLOWED TO DRAIN FROM A DISCHARGE AREA TO AN EXISTING OR PROPOSED CHANNEL.

## WORK AREA DEWATERING DETAIL
N.T.S. 2 C22 C22

### DIVERSION NOTES
1. THE DIVERSION PLAN SHOWN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE DIVERSION/DEWATERING PLAN FOR APPROVAL BY THE ENGINEER. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SPECIFIED IN THE SPECIAL PROVISIONS.
2. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO SEPARATE TYPES OF DIVERSION STRUCTURES TO BE INSTALLED AND MAINTAINED DURING CONSTRUCTION. THESE STRUCTURES MAY BE USED SEPARATELY OR IN TANDEM AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS.
3. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.




## DIVERSION DAM PROFILE
N.T.S. 3 C22 C22

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

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HEIDELBERG CEMENT GROUP

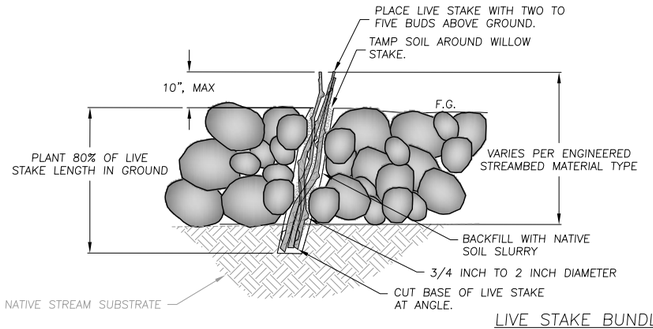
DEWATERING DETAILS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13–016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C22 | 22 OF 25

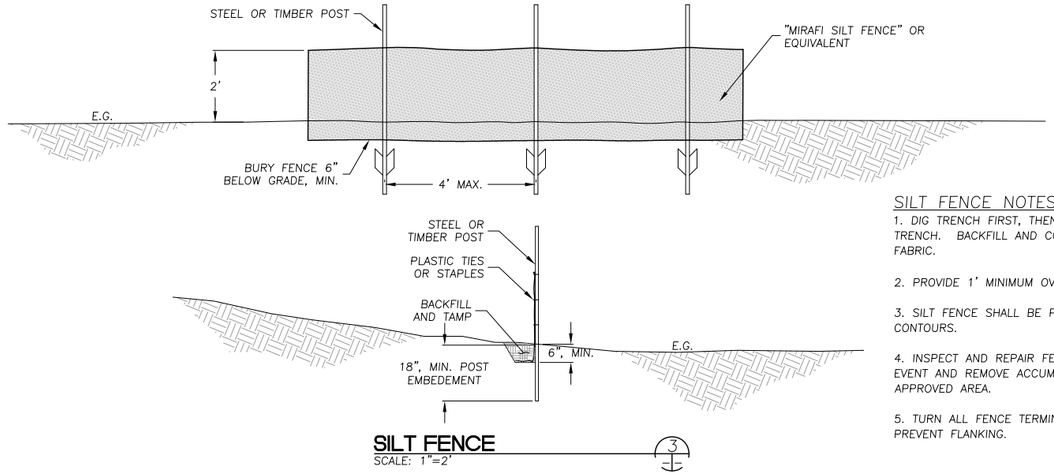



## LIVE STAKE BUNDLE

N.T.S. 1

### LIVE STAKE BUNDLE NOTES:

1. LIVE STAKE BUNDLES TO BE INSTALLED WITHIN ENGINEERED STREAMBED MATERIAL ON EXCAVATED FLOODPLAINS AND WITHIN FLOODPLAIN ARMOR AT 7' ON-CENTER SPACING.
2. LIVE STAKE BUNDLES SHALL CONTACT NATIVE SOIL.
3. LIVE STAKE BUNDLES TO CONSIST OF LIVE STAKES 3/4"-2" IN DIA. AT THE BASAL END.
4. TOP ENDS OF STAKES SHALL BE BLUNT AND BASAL ENDS SHALL BE ANGLED AT 45 DEGREES.
5. PLACE LIVE STAKE BUNDLES COINCIDENT WITH THE ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR.
6. AFTER PLACEMENT, BACKFILL AND WATER-JET ALL VOIDS AROUND LIVE STAKE BUNDLES TO REMOVE AIR POCKETS.
7. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 10" EXPOSED, MAX.

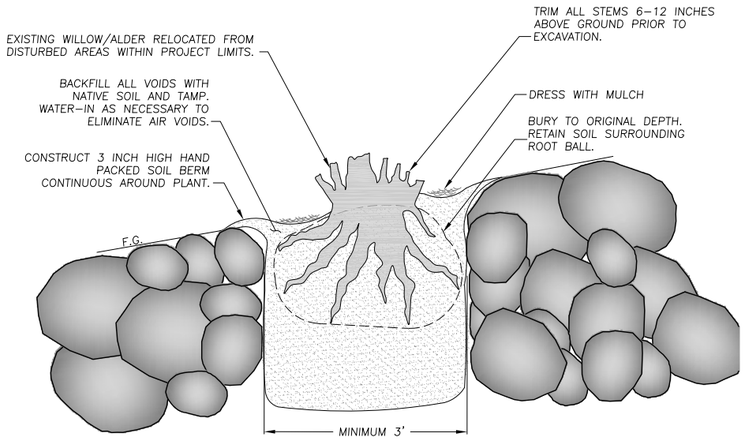



## SILT FENCE

SCALE: 1"=2' 3

### SILT FENCE NOTES

1. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
2. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
4. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
5. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.




## WILLOW TRANSPLANT DETAIL

SCALE: N.T.S. 2

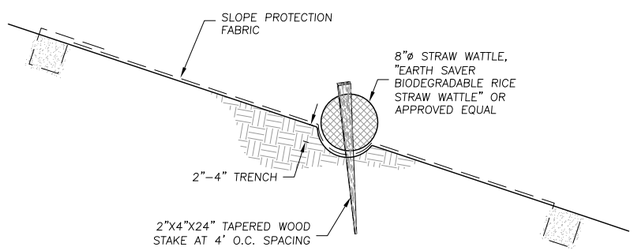
### WILLOW TRANSPLANT NOTES:

1. SALVAGE:
   - 1.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   - 1.2. PRIOR TO REMOVAL, LOP BRANCHES TO 6-12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   - 1.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   - 1.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACED UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. CONTRACTOR SHALL MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   - 1.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   - 1.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
2. INSTALLATION
   - 2.1. PLACE LIVE SHRUBS AT FLOODPLAIN LOCATIONS FLAGGED IN THE FIELD BY THE ENGINEER.
   - 2.2. PLACE THE EXCAVATED ROOTWAD IN A PRE-PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   - 2.3. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.




## BOUNDARY FENCE DETAIL

SCALE: 1"=3' 4




## FIBER ROLL

SCALE: 1"=1' 5

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PREPARED AT THE REQUEST OF:
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HEIDELBERG CEMENT
GROUP

MISCELLANEOUS DETAILS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | - |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C23

23 OF 25

## ROCK SPECIFICATIONS

THERE SHALL BE THREE CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (R.S.P.)

ALL IMPORTED ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) ROCK SHALL BE RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) ROCK SHALL BE SUB–ROUNDED TO SUB–ANGULAR IN SHAPE.
3) ROCK SHALL BE GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE SHALL BE CONSTANT THROUGHOUT THE STOCKPILE.

SAMPLES OF ALL IMPORTED ROCK SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL, PRIOR TO STOCKPILING ON SITE.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

### 1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

#### TYPE 1 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 18" | 100 |
| 12" | 60–85 |
| 8" | 40–60 |
| 4" | 25–40 |
| 0.6" | 10–20 |
| No. 4 | 5–10 |

#### TYPE 2 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 30" | 100 |
| 24" | 60–85 |
| 12" | 40–60 |
| 4" | 25–40 |
| 0.6" | 10–20 |
| No. 4 | 5–10 |

#### TYPE 3 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 40" | 100 |
| 30" | 60–85 |
| 16" | 40–60 |
| 8" | 25–40 |
| 4" | 15–25 |
| 0.6" | 10–15 |
| No. 4 | 5–10 |

#### TYPE 4 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 48" | 100 |
| 36" | 60–85 |
| 20" | 40–60 |
| 10" | 25–40 |
| 4" | 15–25 |
| 0.6" | 10–15 |
| No. 4 | 5–10 |

A) ENGINEERED STREAMBED MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

### 2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

#### TYPE 1 GRADATION:

TYPE 1 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

#### TYPE 2 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 24" | 100 |
| 18" | 60–85 |
| 12" | 40–60 |
| 6" | 25–40 |
| 3" | 10–25 |
| No. 4 | 5–15 |
| No. 10 | 0–5 |

#### TYPE 3 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 30" | 100 |
| 24" | 60–85 |
| 18" | 40–60 |
| 6" | 25–40 |
| 3" | 10–25 |
| No. 4 | 5–15 |
| No. 10 | 0–5 |

#### TYPE 4 GRADATION:

TYPE 4 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) FLOODPLAIN ARMOR MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

### 3 – ROCK SLOPE PROTECTION

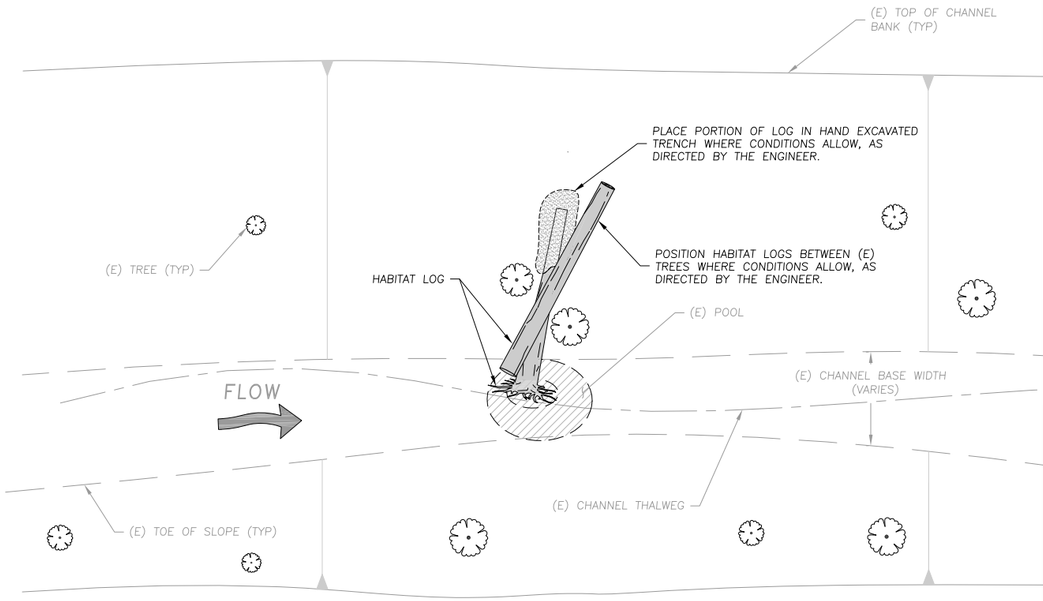
A) ROCK SLOPE PROTECTION SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS FOR 1/2 TON ROCK.

B) BACKFILL MATERIAL CONSISTING OF GRANULAR NATIVE STREAMBED MATERIAL SHALL BE USED TO BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION. IF GRANULAR NATIVE MATERIAL IS NOT AVAILABLE CONTRACTOR SHALL BLEND SAND, GRAVELS, AND NATIVE SOILS TO THE SATISFACTION OF THE ENGINEER FOR USE IN BACKFILLING THE RSP VOIDS.

C) BACKFILL MATERIAL SHALL BE PLACED TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER JETTED TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. GEOTEXTILE FABRIC SHALL BE PLACED BELOW ROCK SLOPE PROTECTION.
2. GEOTEXTILE FABRIC SHALL BE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.




**HABITAT LOG PLAN**
SCALE: 1" = 5'

### HABITAT LOG NOTES:

1. GENERAL

1.1. PLACE TWO HABITAT LOGS AT FOUR LOCATIONS PER REACH IN REACHES R14 TO R16 AND R19 TO R21 (SEE SHEET C2 FOR REACH LOCATIONS).

1.2. HABITAT LOGS SHALL BE LOCALLY SOURCED FROM EXISTING LIVE AND DEAD TREES. TREES TO BE SALVAGE WILL BE FLAGGED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE PROJECT ENGINEER AND ARBORIST. SALVAGE DOWNED TREES WHERE POSSIBLE, PREFERABLY WITH THE ROOTWAD INTACT. IF DOWNED LOGS ARE NOT AVAILABLE, THE PROJECT ARBORIST WILL IDENTIFY TREES TO BE FELLED. LOGS SHALL BE OAK, WILLOW, OR ALDER.

1.3. LOCATIONS FOR HABITAT LOG PLACEMENT WILL BE DETERMINED BY THE ENGINEER AND FISHERIES BIOLOGIST AT THE TIME OF CONSTRUCTION. FINAL LOCATIONS SHALL BE BASED ON LOCAL GEOMORPHIC CONDITIONS AND THE AVAILABILITY OF EXISTING POOLS AND SUITABLE LOGS, MEETING THE CRITERIA BELOW.

1.4. INCORPORATE HABITAT LOGS INTO EXISTING POOLS WHEN LOCALLY AVAILABLE.

2. LOG PLACEMENT AND DIMENSIONS

2.1. HABITAT LOG DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER OBSERVE INSTALLATION OF THE HABITAT LOGS TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS WILL INCLUDE LOG SELECTION, PLACEMENT, AND ANCHORING STABILIZATION.

2.2. HABITAT LOGS SHALL BE A MINIMUM OF 12 FT. IN LENGTH AND 1 FT. IN DIAMETER, ALONG THE LENGTH OF THE LOG.

2.3. POSITION HABITAT LOGS BETWEEN EXISTING TREES WITH A PORTION OF THE LOG BURIED IN A TRENCH WHERE CONDITIONS ALLOW. CABLING WILL NOT BE EMPLOYED THEREFORE, LOGS MAY BE MOBILIZED DURING LARGE FLOODING EVENTS.

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PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

HABITAT LOG DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.Z.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C24

24 OF 25

## GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE MAY 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, CONTRACTOR SHALL DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, HE SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

## DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

## EARTHWORK NOTES

1. GRADING SUMMARY:
   TOTAL CUT VOLUME = 420,000 CY
   TOTAL FILL VOLUME = 5,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS SHALL BE REMOVED TO AN APPROVED DUMP SITE OR DISPOSED OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION,

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

## GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION, SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. A STANDBY CREW SHALL BE AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM SEDIMENT CONTROL MEASURES.

10. THE CONTRACTOR IS RESPONSIBLE TO KEEP IN FORCE ALL EROSION CONTROL DEVICES AND TO MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. THE CONTRACTOR SHALL MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. THE CONTRACTOR SHALL CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

## DIVERSION NOTES

1. GENERAL
   1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
   1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
   1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
   1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
   1.5. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
   2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
   2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
   3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
   3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
   3.3. THE DIVERSION STRUCTURE SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
   3.4. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
   4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
   4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS, FILTER BAGS, SETTLING (BAKER) TANKS, OR TEMPORARY SEDIMENT BASINS, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
   4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

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WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

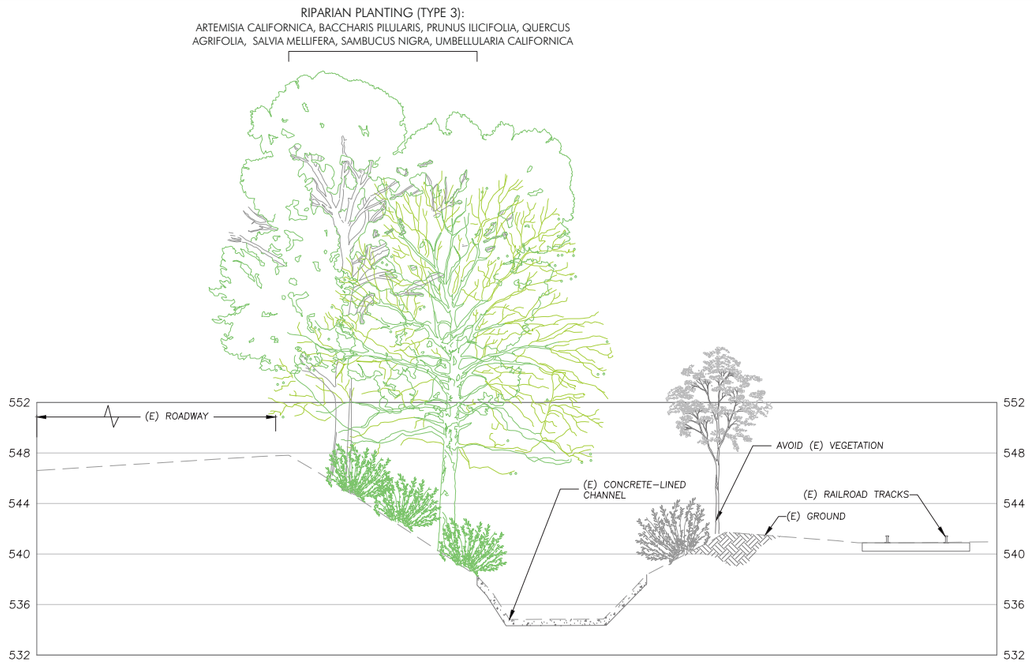
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

NOTES

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | - |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

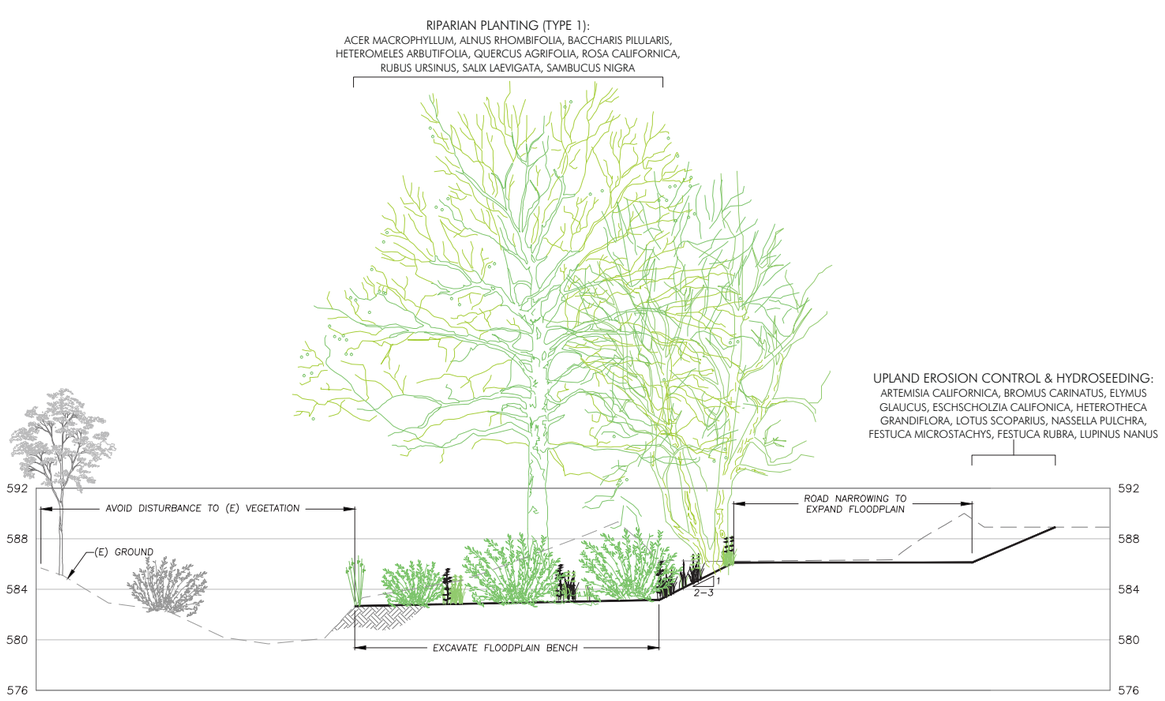
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




TYPICAL CONCRETE-LINED CHANNEL BANK PLANTING SECTION A

PER SHEET C5

SCALE: 1" = 10'




TYPICAL CHANNEL WIDENING (ROAD NARROWING) RIPARIAN PLANTING SECTION

STATIONS 16+20 TO 29+20 AND 30+50 TO 49+30: PER SHEETS C6 TO C9, C12 AND C13

SCALE: 1" = 10'

NOTE: WHEREVER POSSIBLE, EXISTING TREES IN THE CHANNEL WIDENING AREA THAT CAN BE SAVED WILL BE FLAGGED BY A BIOLOGIST FOR PROTECTION PRIOR TO GRADING.

## RIPARIAN PLANT LEGEND - TYPE 1

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ACE MAC | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | 16' DEEPOT | 25 | +2.7' AND ABOVE |
| AES CAL | *AESCULUS CALIFORNICA* | CALIFORNIA BUCKEYE | 16' DEEPOT | 15 | +2.7' AND ABOVE |
| ALN RUB | *ALNUS RHOMBIFOLIA* | WHITE ALDER | 16' DEEPOT | 20 | +2.7' TO +5.0' |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| HET ARB | *HETEROMELES ARBUTIFOLIA* | TOYON | 1 GAL | 8 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16' DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| ROS CAL | *ROSA CALIFORNICA* | CALIFORNIA WILD ROSE | 16' DEEPOT, 1 GAL | 6 | +4.0' AND ABOVE |
| RUB URS | *RUBUS URSINUS* | CALIFORNIA BLACKBERRY | 1 GAL | 5 | +4.0' AND ABOVE |
| SAL LAE | *SALIX LAEVIGATA* | RED WILLOW | POLE CUTTINGS, 16' DEEPOT | 12 | +2.7' TO +6.0' |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +5.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16' DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0.
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## RIPARIAN PLANT LEGEND - TYPE 2

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ACE MAC | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | 16' DEEPOT | 25 | +2.3' AND ABOVE |
| ARB MEN | *ARBUTUS MENZESII* | PACIFIC MADRONE | 16' DEEPOT | 12 | +5.0' AND ABOVE |
| ART CAL | *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 1 GAL | 3 | +4.0' AND ABOVE |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16' DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| SAL LAE | *SALIX LAEVIGATA* | RED WILLOW | POLE CUTTINGS, 16' DEEPOT | 12 | +2.3' TO +6.0' |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +6.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16' DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## RIPARIAN PLANT LEGEND - TYPE 3

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ART CAL | *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 1 GAL | 3 | +4.0' AND ABOVE |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| PRU ILI | *PRUNUS ILICIFOLIA* | HOLLYLEAF CHERRY | 2 GAL | 10 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16' DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +6.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16' DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |
| UMB CAL | *UMBELLULARIA CALIFORNICA* | CALIFORNIA BAY | 16' DEEPOT, 1 GAL | 12 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## UPLAND HYDROSEED MIX

| BOTANICAL NAME | COMMON NAME | RATE OF APPLICATION PLS LBS / ACRE |
|---|---|---|
| *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 0.5 |
| *BROMUS CARINATUS* | CALIFORNIA BROME | 12.0 |
| *ELYMUS GLAUCUS* | BLUE WILDRYE | 10.0 |
| *ESCHSCHOLZIA CALIFORNICA* | CALIFORNIA POPPY | 1.5 |
| *HETEROTHECA GRADIFLORA* | TELEGRAPH WEED | 0.5 |
| *LOTUS SCOPARIUS* | DEERWEED | 3.0 |
| *NASELLA PULCHRA* | PURPLE NEEDLEGRASS | 5.0 |
| *FESTUCA MICROSTACHYS* | THREE WEEKS FESCUE | 6.0 |
| *FESTUCA RUBRA* | RED FESCUE | 5.0 |
| *LUPINUS NANUS* | LUPINE | 4.0 |
| | TOTAL | 47.5 |

wra
ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

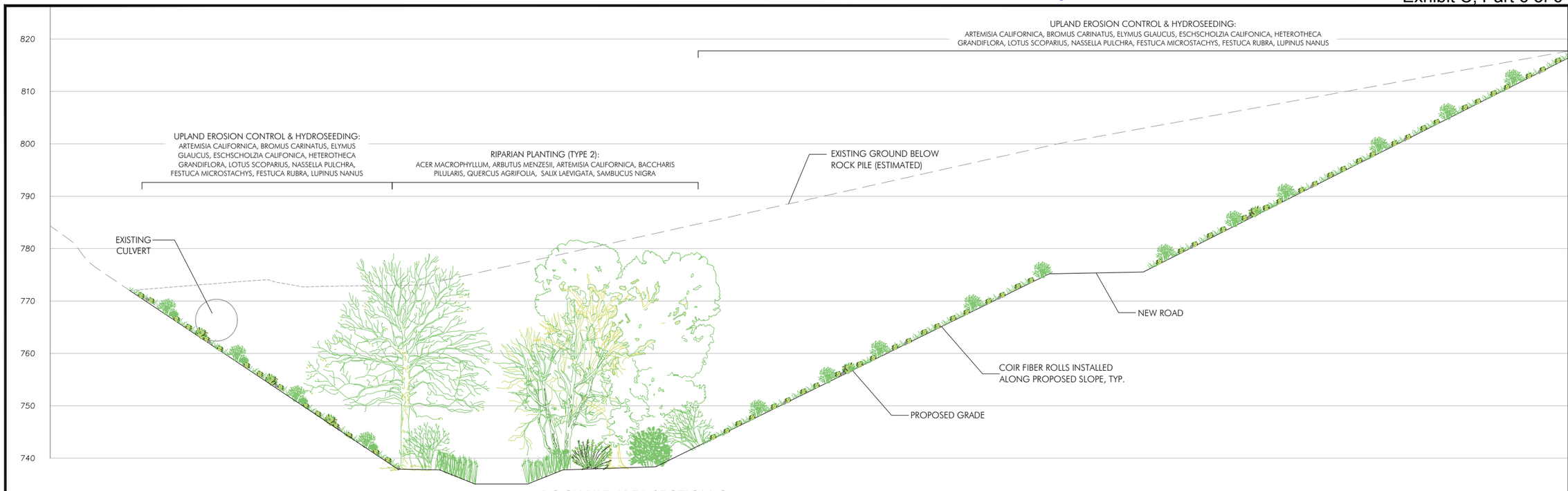
RIPARIAN
PLANTING
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

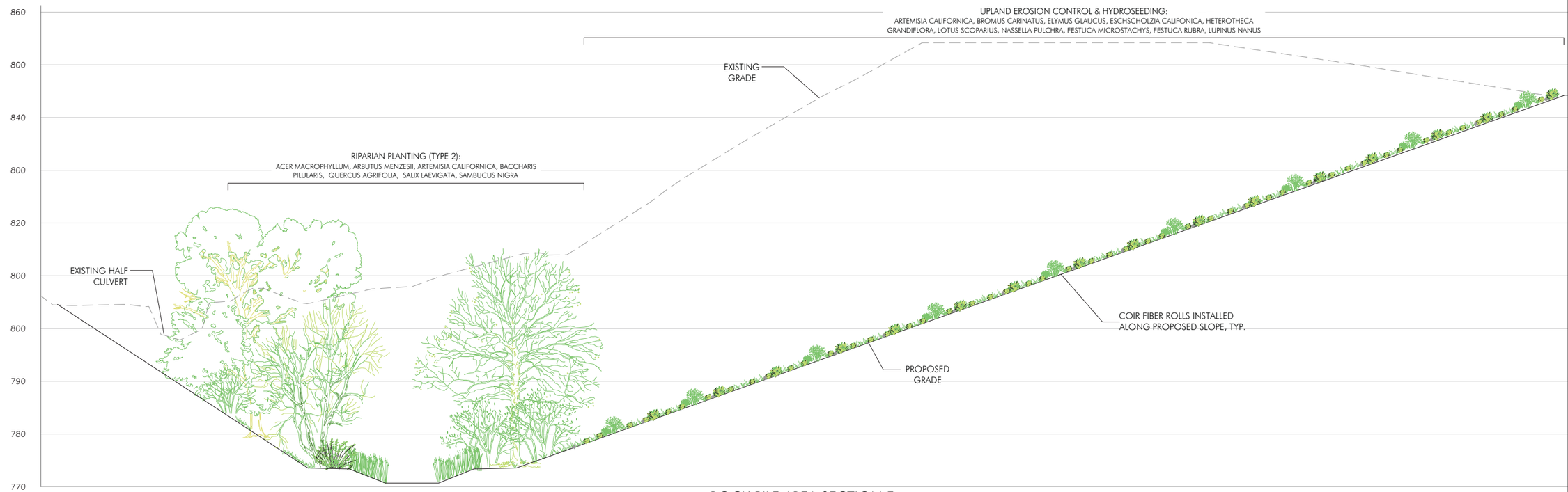
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L1




## ROCK PILE AREA SECTION C

PER SHEET C14 AND C15
SCALE: 1" = 10'




## ROCK PILE AREA SECTION E

PER SHEET C14 AND C15
SCALE: 1" = 10'

wra
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2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
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RIPARIAN
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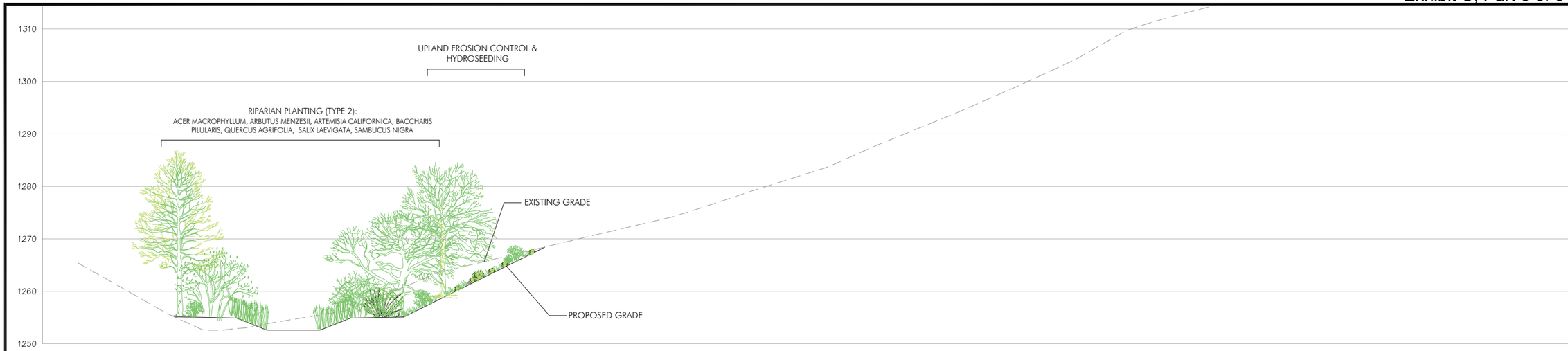
DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

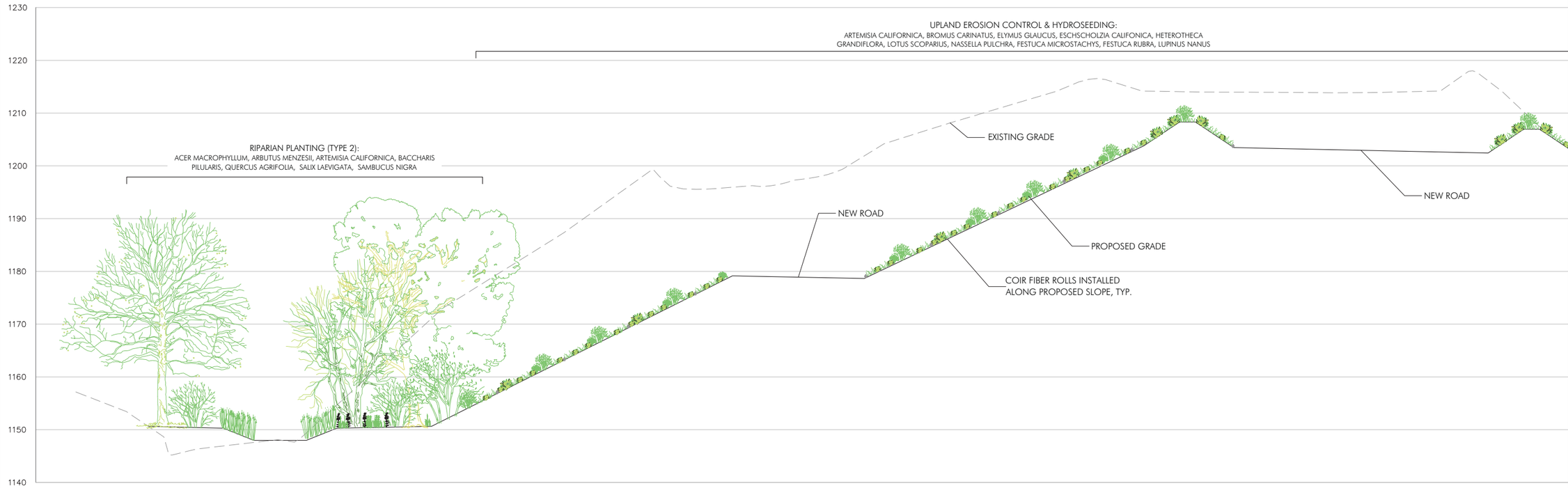
L2

2 OF 3




OVERBURDEN REMOVAL AREA SECTION E

PER SHEETS C16 T0 C19
SCALE: 1" = 10'




OVERBURDEN REMOVAL AREA SECTION B

PER SHEETS C16 TO C19
SCALE: 1" = 10'

wra ENVIRONMENTAL CONSULTANTS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
NOT FOR
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LEHIGH HANSON
HEIDELBERG CEMENT GROUP

RIPARIAN
PLANTING
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143-5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L3 | 3 OF 3

Exhibit D -- including March 1, 2016 Surety Rider

**PERFORMANCE GUARANTEE**

**Bond No. 09098099**

KNOW ALL MEN BY THESE PRESENTS, that we, **Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.,** as Principal, and **Fidelity and Deposit Company of Maryland**, licensed to do business in the State of **California**, as Surety, are held and firmly bound unto **The United States District Court for the Northern District of California** (Obligee), in the penal sum of **Twelve million and no/100** Dollars (**$12,000,000.00**) lawful money of the United States of America (Surety Bond), for the payment of which sum, well and truly to be made, the Principal and Surety do bind themselves, their heirs, executors, administrators, and successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the above bounden Principal has entered into a certain written Consent Decree with the **Sierra Club**, lodged with the Court on the **24th day of April, 2013**, which Consent Decree is made a part hereof and incorporated herein by reference, except that nothing said therein shall alter, enlarge, expand, or otherwise modify the term of the bond as set out below.

IN PARTICULAR, the Principal and Surety agree to convey all Surety Bond funds to the Permanente Creek Restoration escrow account within fourteen (14) days of Sierra Club providing notice of a Work Takeover pursuant to Paragraph 70 of the Consent Decree.

NOW, THEREFORE, if Principal, its executors, administrators, successors and assigns shall promptly and faithfully perform the Consent Decree, according to the terms, stipulations or conditions thereof, then this obligation shall become null and void, otherwise to remain in full force and effect. This bond is executed by the Surety and accepted by the Obligee subject to the following express condition:

Notwithstanding the provisions of the Consent Decree, the term of this bond shall apply from **June 28, 2013** until **June 27, 2014**, and will automatically renew for subsequent terms of one (1) year, subject to revision pursuant to Paragraph 68 of the Consent Decree. Such annual renewal shall include an adjustment to the value of the original penal sum above by the percentage increase or decrease in construction costs as set forth in the applicable Engineering News-Record construction cost index for the Bay Area or, if unavailable, a comparable cost index. In the event the Surety elects not to renew the bond, the Surety must provide Principal and Obligee written notice their intent to non-renew the bond no less than sixty (60) days prior to the expiration date of the bond. Principal shall provide a replacement performance guarantee acceptable to Sierra Club, as set forth in the Consent Decree, prior to the expiration date of the bond.

The liability of the Surety under this bond and all Continuation Certificates issued in connection therewith shall not be cumulative and shall in no event exceed the amount as set forth in this bond or in any additions, riders, or endorsements properly issued by the Surety as supplements thereto.

Sealed with our seals and dated this **29th day of August, 2013**.

**Lehigh Southwest Cement Company**

Witness

Principal

**Hanson Permanente Cement, Inc.**

Witness

Principal

**Fidelity and Deposit Company of Maryland**

Witness

Terri L. Morrison, Attorney-in-Fact

Fidelity and Deposit Company of Maryland
1400 American Lane, Tower 1, 18th Floor
Schaumburg, IL 60196
847-605-6000
Matthew Cook, Zurich Commercial Surety
Matthew.cook@zurich.com

**CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT** Exhibit D -- including March 1, 2016 Surety Rider No. 5907

State of Texas

County of Harris

On August 29, 2013 (DATE) before me, Mary Pena, Notary (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"),

personally appeared _____ (NAME(S) OF SIGNER(S)),

☐ personally known to me - **OR** - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

MARY PENA
Notary Public, State of Texas
My Commission Expires
September 27, 2014

WITNESS my hand and official seal.

Mary Pena
SIGNATURE OF NOTARY

## OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

**CAPACITY CLAIMED BY SIGNER**

☐ INDIVIDUAL
☐ CORPORATE OFFICER

_____
TITLE(S)

☐ PARTNER(S) ☐ LIMITED ☐ GENERAL
☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER: _____

**SIGNER IS REPRESENTING:**
NAME OF PERSON(S) OR ENTITY(IES)

**DESCRIPTION OF ATTACHED DOCUMENT**

_____
TITLE OR TYPE OF DOCUMENT

_____
NUMBER OF PAGES

_____
DATE OF DOCUMENT

_____
SIGNER(S) OTHER THAN NAMED ABOVE


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CALIFORNIA ALL-PURPOSE ACKNOWLEDGMENT Exhibit D -- including March 1, 2016 Surety Rider No 5907

State of Texas

County of Dallas

On 9-3-2013 (DATE) before me, Amy Yi, Notary Public (NAME, TITLE OF OFFICER - E.G., "JANE DOE, NOTARY PUBLIC"),

personally appeared Michael Hyer & James Wallmann (NAME(S) OF SIGNER(S)),

☑ personally known to me - OR - ☐ proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

AMY C. YI
My Commission Expires
November 12, 2014

WITNESS my hand and official seal.

SIGNATURE OF NOTARY

## OPTIONAL

Though the data below is not required by law, it may prove valuable to persons relying on the document and could prevent fraudulent reattachment of this form.

**CAPACITY CLAIMED BY SIGNER**

☐ INDIVIDUAL
☐ CORPORATE OFFICER

TITLE(S)

☐ PARTNER(S) ☐ LIMITED ☐ GENERAL

☐ ATTORNEY-IN-FACT
☐ TRUSTEE(S)
☐ GUARDIAN/CONSERVATOR
☐ OTHER:

**SIGNER IS REPRESENTING:**
NAME OF PERSON(S) OR ENTITY(IES)

**DESCRIPTION OF ATTACHED DOCUMENT**

TITLE OR TYPE OF DOCUMENT

NUMBER OF PAGES

DATE OF DOCUMENT

SIGNER(S) OTHER THAN NAMED ABOVE


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Exhibit D -- including March 1, 2016 Surety Rider

**EXTRACT FROM BY-LAWS OF THE COMPANIES**

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

**CERTIFICATE**

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 29th day of August, 2013.

Geoffrey Delisio

Geoffrey Delisio, Vice President

Exhibit D -- including March 1, 2016 Surety Rider

# SURETY RIDER

To be attached to and form a part of Fidelity and Deposit Company of Maryland

Bond No. 09098099

Type of Bond: Performance Guarantee Bond

dated effective June 28, 2013
(MONTH-DAY-YEAR)

executed by Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. , as Principal.
(PRINCIPAL)

and by Fidelity and Deposit Company of Maryland , as Surety,

in favor of The United States District Court for the Northern District of California
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing the bond detail as follows:

Consent Decree is amended globally to read: Amended Consent Decree

Paragraph two (2) - lodged with the court date amended to read: February 22, 2016

Paragraph three (3) - Work Takeover pursuant to paragraph to read: 69

Paragraph five (5) - subject to revision pursuant to paragraph to read: 67

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective March 1, 2016
(MONTH-DAY-YEAR)

Signed and Sealed March 1, 2016
(MONTH-DAY-YEAR)

Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.
(PRINCIPAL)

By: _____
(PRINCIPAL) Ana V. Damonte

Fidelity and Deposit Company of Maryland
(SURETY)

By: _____
(ATTORNEY-IN-FACT) Melissa Haddick

S-0443/GE 8/08

XDP

Exhibit D -- including March 1, 2016 Surety Rider

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**
**POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **THOMAS O. MCCLELLAN, Vice President,** in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Terri L. MORRISON, Sandra PARKER, Gina A. RODRIGUEZ, Melissa HADDICK and Tannis MATTSON, all of Houston, Texas, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings, EXCEPT bonds on behalf of Independent Executors, Community Survivors and Community Guardians.** and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND,** this 19th day of June, A.D. 2013.

**ATTEST:**

**ZURICH AMERICAN INSURANCE COMPANY**
**COLONIAL AMERICAN CASUALTY AND SURETY COMPANY**
**FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

By: _____
*Secretary*
*Eric D. Barnes*

_____
*Vice President*
*Thomas O. McClellan*

**State of** Maryland
County of Baltimore

On this 19th day of June, A.D. 2013, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **THOMAS O. MCCLELLAN, Vice President, and ERIC D. BARNES, Secretary,** of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

_____
Maria D. Adamski, Notary Public
My Commission Expires: July 8, 2015

POA-F 168-7623

Exhibit D -- including March 1, 2016 Surety Rider

## EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify of revoke any such appointment or authority at any time."

## CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 1st day of March, 2016.

Geoffrey Delisio

Geoffrey Delisio, Vice President

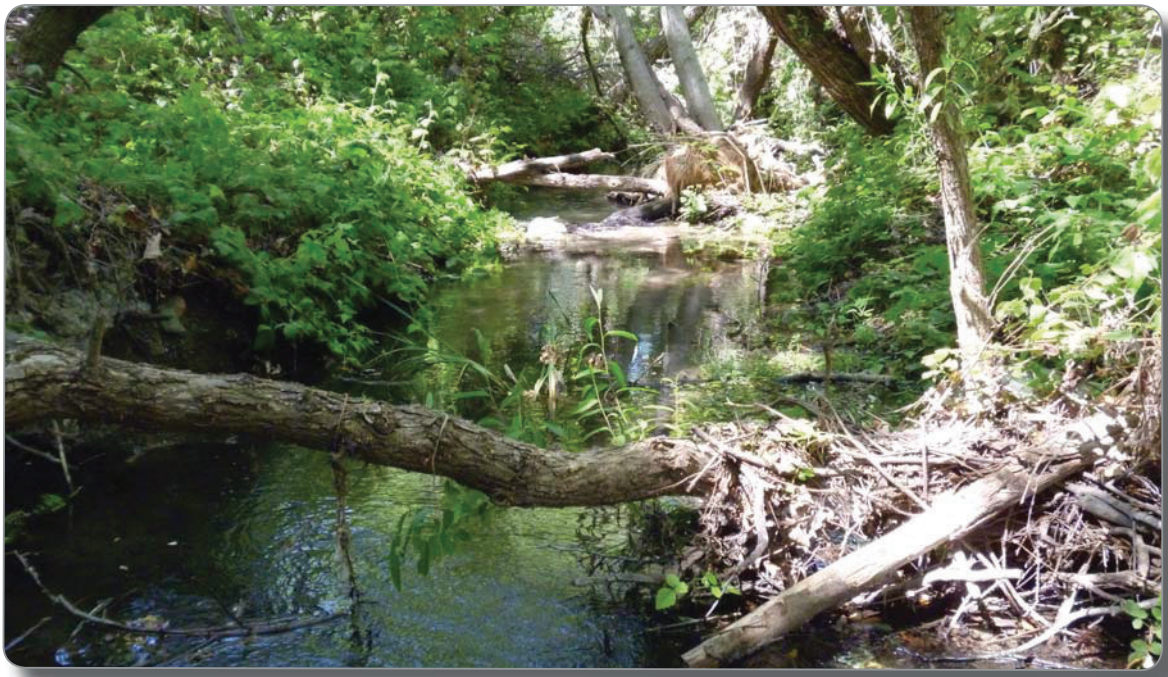
# Appendix C

## Permanente Creek Restoration Plan Updated 90% Level Submittal Design Basis Technical Memorandum

# PERMANENTE CREEK RESTORATION PLAN

## Updated - 90% LEVEL SUBMITTAL

DESIGN BASIS TECHNICAL MEMORANDUM



*prepared for*

LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

*prepared by*

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August 26, 2022

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# 1.0 INTRODUCTION

## 1.1 OBJECTIVES OF THIS MEMORANDUM

This technical memorandum has been prepared to describe stream restoration features presented in the "Permanente Creek Restoration Plan Updated 90% Design, Santa Clara County CEQA Review Submittal" drawings ("90% Designs"), dated August 26, 2022, and to document important design criteria, assumptions, and site constraints that have influenced their development. Sheet C2 of the 90% Designs provides an overview for locating project areas discussed in this memorandum. The August 26, 2022 Updated 90% Design drawings, among other things, update the existing topography surrounding the Rock Pile Area and Material Removal Area to reflect the recent May 2022 aerial survey of these areas, eliminate the need for installation of a retaining wall along the north toe of slope below Pond 1250 due to Lehigh's commitment to relocate Pond 1250 rather than leave it in place and require an extensive retaining structure in the creek and include additional project details responsive to reviewing agency comments on the project to date.

The Designs have been prepared, in part, to fulfill the requirements set forth in an Amended Consent Decree (Decree) between the Sierra Club and Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc., lodged February 22, 2016, and to fulfill other regulatory obligations stemming from a 1999 Cleanup and Abatement Order issued by the San Francisco Regional Water Quality Control Board. The 90% Designs specifically address the Decree requirements under Section VI. "Creek Restoration". This memorandum and the 90% Designs comprise the "Complete 90 Percent Level Restoration Plan".

## 1.2 PROJECT GOALS AND OBJECTIVES

The primary objectives of the work, as set forth in the Decree, include the following:

- Increase quantity and quality of resident rainbow trout habitat through creation of pools, increased channel complexity and cover, and by fish passage through and between reaches consistent with a geomorphically stable, self-sustaining channel unless DFW Restoration Manual hydraulic design criteria cannot be met due to (1) the gradient of the reach, or (2) bedrock grade controls confirmed by an independent geologist;
- Improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function;
- Remove mining-related fill and sediments in the bed, banks and adjacent slopes;
- Remove or alter man-made structures so as to improve riparian habitat;
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek;
- Require restoration that is no less stringent than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board, and that is to be performed in a period of time no greater than any restoration that is approved or required by any agency, including but not limited to the Santa Clara County Planning Department, the DFW, and the Regional Water Board.

The 90% Designs address these broad objectives and comply with the more detailed reach-specific direction provided within paragraphs 34 through 42 of the Decree. Where feasible, the designs follow fish passage design approaches for resident rainbow trout, consistent with the California Department of Fish & Wildlife's "California Salmonid Stream Habitat Restoration Manual, 4th Edition (Vols. I-II, 2010)" ("DFW Restoration Manual").

It should be noted that the Restoration Plan has evolved considerably as designs have progressed beyond initial concepts. For example, a primary objective of the Restoration Plan as recently as 2014 was to modify Permanente Creek within the quarry property to allow the passage of anadromous salmonids. Following subsequent detailed analysis of existing and historic site constraints and consultation with resource agencies, anadromous fish passage has been removed as a design objective.

### 1.2.1 Introduction to Project Area & Types of Work

Sheets C2 and C4 of the 90% Designs provide an overview of the proposed work area in both plan and profile. For continuity and ease of comparison, we have retained the original reach designations provided in the URS Permanente Creek Long-Term Restoration Plan (URS 2011). However, the project area overview stream stationing has been revised to reflect the results of a more accurate stream centerline survey performed in the summer of 2013.[1] The work is presented in the drawings proceeding from the downstream to upstream limits. There are generally five major component project areas, as shown on Sheet C2, which include:

- Concrete Channel
- Channel Widening Area
- Rock Pile Area (which is included in the Channel Widening Area)
- "Old Crusher Foundation"
- Material Removal Area

Restoration work proposed at each area includes the following design elements and objectives:

<u>Concrete Channel (Sheet L1)</u>

- Encourage development of mature riparian canopy along the southern bank to shade the concrete channel to reduce solar heat gain on instream flow and discourage the establishment of tules;
- Preservation of existing native vegetation;
- Removal of non-native species and suppression of weeds around existing native seedlings and smaller native plants to encourage their establishment; and
- Installation of native vegetation.

<u>Channel Widening Area (Sheets C11-C18)</u>

- Removal of concrete road segments;
- Construction of floodplain bench areas with habitat elements and reduction of access road width;
- Removal of 260 linear feet of culverts, including a road crossing, and daylighting the creek to improve fish passage conditions and ecological complexity;

[1] Note: Design alignments and stationing at individual project sites differ from the 2013 stream centerline survey because the design alignments have been oriented to the proposed features shown on the drawings.

- Installation of large woody debris (LWD) at the Culvert 7 and Culvert 8 removal sites.
- Removal of old tractor tires along streambanks at a culvert removal site;
- Removal of imported sediment from the bed and banks of a tributary reach;
- Select removal of rock slope protection (RSP) and concrete rubble bank protection at an area that now has adequate mature riparian vegetation that is providing root reinforcement to bank soils;
- Removal of the idled Rock Plant conveyor system and associated infrastructure; and
- Installation of native vegetation.

Rock Pile Area (Sheets C19-C21)

- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve fish passage conditions and ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve fish passage conditions and ecological complexity;
- Removal of Rock Pile, idled Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam infrastructure;
- Construction of a restored channel through the abandoned Pond 13; and,
- Installation of native vegetation.

"Old Crusher Foundation" (Sheet C22)

- Cutting back the concrete block that is projecting into the channel to better conform to the natural creek bank.

Material Removal Area (Sheets C23-C26)

- Removal of overburden/fill and a relic concrete structure and moving the north toe of slope northward 25 feet along the majority of the project area. Pond 4A is decommissioned. Lehigh will relocate Pond 1250 and the Upper Treatment Facility, as needed.
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve fish passage conditions and ecological complexity, and
- Installation of native vegetation.

## 2.0 BASIS OF DESIGN

There are numerous considerations that contribute to the design of a successful stream restoration project. Initial design efforts typically include researching features of the project setting such as site geology, regional climate, basin hydrology, topographic features, and vegetation. These features and others are considered in light of project goals and objectives to develop opportunities and constraints and design alternatives. As design alternatives gel into a preferred project, calculations begin to inform the project details. The following sections provide an overview of important site features and design criteria that have shaped the project and describe the calculations that have been used to design specific project elements.

## 2.1 HYDROLOGY

### 2.1.1 Peak Flow Hydrology

The determination of design peak flow values is critical to the process of analyzing erosive forces on proposed bed and bank stabilization elements, understanding sediment transport and scour potential, and assisting with the specification of appropriate channel geometry.

Design flows were derived from a hydrologic analysis prepared by the Santa Clara Valley Water District (SCVWD) and presented in a report titled "Santa Clara Valley Water District Stevens and Permanente Creeks Hydrology Report" (Wang et al, 2007). Peak flow values published by the SCVWD for Permanente Creek were developed using a rainfall-runoff model. Rainfall data used in the model were derived from a weighted average of precipitation data collected at gaging stations throughout the area. Other model parameters included loss rates, time of concentration estimates, and routing coefficients.

Design flows were calculated for the four drainage areas at the site (Figure 1) by normalizing SCVWD's published values for Upper Permanente Creek (drainage area = 4.01 sq.mi.) upstream of the confluence with the West Branch Permanente Creek. Normalization was performed using a ratio of the project site's drainage area compared to the total area above the confluence (4.01 sq. mi.) and then relating to the SCVWD's published peak flow values (Table 1). The 1.5-year flow event was calculated by extrapolating values using a log-normal trend-line plotted through the data.

**Table 1. Summary of Peak Flows (cfs)**

| Recurrence Interval | Santa Clara Valley Water District Upper Permanente Creek Peak Flow Rates (Drainage Area = 4.01 sq. mi.) | Project Site (Drainage Area A = 3.5 sq.mi.) | Project Site (Drainage Area B = 3.01 sq.mi.) | Project Site (Drainage Area C = 2.7 sq.mi.) | Project Site (Drainage Area D = 2.02 sq.mi.) |
|---|---|---|---|---|---|
| 1.5-year | N.A. | 284 | 244 | 219 | 164 |
| 2.33-year | 450 | 393 | 338 | 303 | 227 |
| 5-year | 730 | 637 | 548 | 492 | 368 |
| 10-year | 970 | 847 | 728 | 653 | 489 |
| 25-year | 1,300 | 1,135 | 976 | 875 | 656 |
| 50-year | 1,500 | 1,309 | 1,126 | 1,010 | 757 |
| 100-year | 1,700 | 1,484 | 1,276 | 1,145 | 858 |
| **Applicable Stream Reaches** | **Not Applicable** | **R1-R6[1]** | **R6-R8[2]** | **R9-R15** | **R16-18** |

[1]The drainage area extends into a portion of Reach 6, ending at the Concrete Channel downstream of Culvert #2.
[2]The drainage area includes a portion of Reach 6, beginning at Culvert #2.

### 2.1.2 Fish Passage Hydrology

The California Department of Fish and Wildlife (CDFW) prescribe upper and lower fish passage "design flows" for juvenile and adult rainbow trout. The design flows represent flow rates at which certain hydraulic parameters (*e.g.*, depth, velocity) must be met to consider a reach "passable" by fish. Where flow duration data is available or can be modeled, the upper fish passage design flow is equal to the 5% annual exceedance flow for adult rainbow trout (*i.e.,* adult non-anadromous salmonids) and the 10% annual exceedance for all juvenile salmonids. These flows represent the mean daily flow that is likely to be exceeded 5% or 10% of the time, respectively, in an average year. Similarly, the lower fish passage design flow for adult rainbow trout is equal to the greater of either the 90% annual exceedance or 2 cfs. For juveniles, it is the greater of either the 95% annual exceedance or 1 cfs (CDFW 2003).

Flow duration data for the project were developed from mean daily flows recorded at USGS gaging station 11166000 (Matadero Creek at Palo Alto). This gage is located seven miles north of the project site in a watershed with similar topography and average annual precipitation. We evaluated approximately 65 years of mean daily flow data, from October 1952 to August 2017. Exceedance flows calculated for the gage site were normalized by drainage area to estimate the fish passage flows at the project sites (Table 2). Detailed fish passage design flow calculations are included in Appendix A.

**Table 2. Summary of Fish Passage Flows (cfs)**

| Design Flow / Species and Life Stage | Percent Exceedance | USGS Gage (11166000) Drainage Area =7.26 sq.mi. | Project Site Drainage Area A = 3.5 sq.mi. | Project Site Drainage Area B = 3.01 sq.mi. | Project Site Drainage Area C = 2.7 sq.mi. | Project Site Drainage Area D= 2.02 sq.mi. |
|---|---|---|---|---|---|---|
| Low Flow Juvenile Salmonids | 95% | 0 | 1* | 1* | 1* | 1* |
| Low Flow Adult Non-Anadromous Salmonids | 90% | 0 | 2* | 2* | 2* | 2* |
| High Flow Juvenile Salmonids | 10% | 3.5 | 1.7 | 1.5 | 1.3 | 1 |
| High Flow Adult Non-Anadromous Salmonids | 5% | 9.9 | 4.8 | 4.1 | 3.7 | 2.8 |
| **Corresponding Stream Reaches** | -- | **Not Applicable** | **R1-R6[1]** | **R6-R8[2]** | **R9-R15** | **R16-18** |

* The alternative low fish passage design flows of 2 cfs and 1 cfs were adopted for the adult non-anadromous salmonid and juvenile salmonid fish passage analyses, respectively.

[1]The drainage area extends into a portion of Reach 6, ending at the Concrete Channel downstream of Culvert #2.

[2]The drainage area includes a portion of Reach 6, beginning at Culvert #2.

## 2.2 GEOMORPHIC DESIGN BASIS

Successful channel restoration requires an understanding of suitable channel geometries (*e.g.*, bankfull width and depth), longitudinal gradients, and step and pool spacing and size for a particular geomorphic context and hydraulic regime. Among other things, appropriate channel geometric design helps to ensure sediment transport continuity through constructed reaches and appropriately distributes shear

stresses across the channel bed and floodplain areas during floods. It is also important to have a firm understanding of flood hydraulics to size bed and floodplain material appropriately to ensure short-term channel stability while vegetation becomes established, and long-term stability within the active channel where vegetation will be absent.

This project includes the design and reconstruction of the channel bed and banks at multiple locations - Culverts #7 and #8 within the Channel Widening Area, and the Rock Pile and Material Removal Areas. To assist with developing appropriate channel geometry, we evaluated existing datasets for gaged sites located in the Santa Cruz Mountains to help develop relationships for bankfull width and depth as a function of watershed area. We also surveyed and evaluated geometry data from four nearby "reference" channel reaches, where the channel is considered to be "natural". This includes two analog channels (within Swiss Creek and Corte Madera Creek) identified as having watershed and geomorphic characteristics similar to Permanente Creek (URS, 2011) and two channel segments located in the upper Permanente Creek watershed within Reach 20. The channel geometry of the reference reaches was incorporated into the dataset for the regional geometry developed from the gaged sites to refine bankfull channel dimensions for the project area. An overview of how bankfull channel dimensions were developed for the reconstructed channel segments is included in Appendix B, Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment. A summary of the bankfull channel dimensions is included below in Table 3. Minimum and maximum bankfull dimensions are provided for design slope ranges to provide for variability and flexibility during channel construction. The bankfull dimensions have also been included on the appropriate design drawing sheets included in the 90% Designs.

**Table 3. Proposed Channel Dimensions for Constructed Reaches**

| Project Site | Design Slope (%) | Design Slope Range (%) | Proposed Bankfull Width Min (ft) | Proposed Bankfull Width Max (ft) | Proposed Bankfull Depth Min (ft) | Proposed Bankfull Depth Max (ft) | Cross Sectional Area Min ($ft^2$) | Cross Sectional Area Max ($ft^2$) |
|---|---|---|---|---|---|---|---|---|
| Culvert 7 | 4.3% | 4%-8% | 16.5 | 20.5 | 2.1 | 2.5 | 28.2 | 34.2 |
| Culvert 8 | 2.7% | <4% | 18.0 | 22.0 | 1.9 | 2.3 | 28.2 | 34.2 |
| Rock Pile Area | Varies | <4% | 17.5 | 21.5 | 1.8 | 2.2 | 26.9 | 32.9 |
| | | 4%-8% | 16.0 | 20.0 | 2.0 | 2.4 | | |
| | | >8% | 15.5 | 18.5 | 2.4 | 2.8 | | |
| Overburden Removal Area | Varies | <4% | 16.0 | 20.0 | 1.7 | 2.1 | 22.5 | 28.5 |
| | | 4%-8% | 14.5 | 18.5 | 1.9 | 2.3 | | |
| | | >8% | 14.0 | 17.0 | 2.3 | 2.7 | | |

An evaluation of pool and step dimensions and spacing was also conducted. Data from the reference reach channel surveys and the 2013 Permanente Creek channel survey was used to help inform pool design geometry. A review of literature related to channel morphology and bed profile arrangements was used to refine the pool design geometry and incorporate steps into the channel forms at the Rock Pile and Material Removal Areas. A summary of the proposed pool and step dimensions and spacing are included in Table 4. Sheet C34 includes tables with pool and step dimensions and spacing for the Rock Pile and Material Removal Areas. Sheet C34 also includes typical details demonstrating how the

pools and steps will be constructed. The Culvert #7 and #8 removal sites are relatively short and include a single pool each. The pool dimensions are shown on the respective culvert removal area design profiles (Sheets C11 and C15).

**Table 4. Pool and Step Dimensions and Spacing**

| Average Channel Slope | Pool Geometry | | | | | Step Geometry | | |
|---|---|---|---|---|---|---|---|---|
| | Pool Length (ft.) | Pool Depth (ft.) | Drop Height (ft.) | Pool Spacing (ft.) | Pool Spacing (bankfull widths) | Step Drop (ft.) | Step Spacing (ft.) | Step Spacing (bankfull widths) |
| 4% - 8% (Step-Pool Channel) | 10 – 20 | 0.5 - 2 | 0.5 – 1 | 30 – 120 | 2 - 6 | 0.5 – 1 | 8 - 20 | 0.5 - 1 |
| 8% - 12% (Cascade Channel) | 6 - 13 | 0.5 - 2 | 0.5 - 1 | 28 - 75 | 2 - 4 | 0.5 – 1 | 6 - 13 | 0.4 – 0.8 |

## 2.3 HYDRAULIC ASSESSMENT

### 2.3.1 Approach to Fish Passage Evaluation

The improvement of passage conditions for resident rainbow trout is a primary goal of the proposed work. Within the various project reaches, we have attempted to meet this goal through a combination of channel and floodplain enhancements. The nature and extent of these enhancements varies by reach, and each location requires a carefully considered approach to the design and analysis of fish passage elements. Our design basis and methodology are outlined below.

CDFW allows for varying approaches to analyzing fish passage within natural or constructed channels. The "Stream Simulation Method" consists of constructing a channel that mimics geomorphically similar adjacent reference reaches. The Stream Simulation Method works on the premise that a constructed channel that mimics adjacent natural reaches will present no more of an obstacle to passage than the adjacent natural channel.

The "Hydraulic Design" approach allows for construction of a channel geometry that has been proven through modeling to meet specific hydraulic design criteria. For channels designed using Hydraulic Design methods, CDFW provides general guidelines prescribing minimum water depths, maximum velocities, and maximum hydraulic drop heights (Table 5). Projects designed using the Hydraulic Design Method must satisfy these criteria throughout the full range of fish passage design flows.

| Table 5. Fish Passage Design Criteria | | | |
|---|---|---|---|
| **Species and Life stage** | **Minimum Flow Depth (ft)** | **Maximum Water Velocity (ft/s)** | **Maximum Drop (ft)** |
| Adult Non-Anadromous Salmonids | 0.67 | 2 [1] | 1 |
| Juvenile Salmonids | 0.5 | 1 | 0.5 |

[1] *2 ft/s for culverts or riffles between pools greater than 200 feet long.*

Each of these methods has its limitations. For instance, the Hydraulic Design method is not recommended where profile grades exceed approximately 5%. The Stream Simulation Method is not recommended where adjacent reaches are disturbed or where sediment supply or transport has been significantly altered from natural conditions, which is the case throughout the project area. For these reasons and others, the direct application of these methods has proven difficult at many locations throughout the project area.

Our approach has been to use Hydraulic Design methods to analyze fish passage conditions where the profile gradient is relatively low and where hydraulic design standards for fish passage can be achieved within the recommended range of applicable channel profile gradients. These areas include Reaches 8-10.

Where average profile gradient exceeds that recommended for the Hydraulic Design method (Reaches 11-18), we have designed a channel based upon analogs from less-disturbed reaches within and near to the Permanente Creek Watershed. The objective of channel design within these reaches is the creation of a geomorphically appropriate and stable channel that enhances opportunities for fish passage where feasible. However, the presence of bedrock may ultimately dictate channel geometry and dependent fish passage characteristics at many locations. We have evaluated velocity and depth within these steeper reaches to determine if the Hydraulic Design criteria for fish passage are satisfied, as discussed in the following section.

Although the proposed project does not provide optimal passage opportunities along its entire length, resident rainbow trout passage is still a primary objective of the work. Numerous constraints make it difficult to create optimal fish passage conditions within the project area, or even to meet established minimum performance standards. Some of these constraints include:

- Reaches with historically high gradients prior to development of the quarry (>10%);
- The presence of natural bedrock drops exceeding 6 feet in height; and
- Highly unstable reaches with excessive bed load.

Where these constraints exist, we have done our best to optimize passage and habitat benefits, while considering the need to ensure the following:

- Maintenance of channel, bank, and floodplain stability;
- Maintenance of flood conveyance (where infrastructure is present);
- Protection of public safety;
- Preservation and protection of existing critical infrastructure; and
- Preservation of existing mature riparian vegetation, where feasible.

One of the greatest challenges to the development of the Designs has been a lack of knowledge of the extent to which past anthropogenic disturbances at the site may have altered the original channel geometry, and as a result, fish passage conditions. Within Reaches 11-12 and 17-18, it appears that the channel profile has been altered through the placement of fill. The designs lower the profile in these reaches to remove culverts and/or fill material to establish a profile grade more closely following what existed prior to disturbance, a portion of which will likely follow bedrock. The resulting profile grades are still quite steep, averaging up to 12% in portions of Reach 11 and up to 22.7% in portions of Reach 17.

The design profiles at these locations are based on a best fit to subsurface bedrock locations that were identified through a seismic refraction study (Appendix C), and later refined at the Rock Pile Area based on exploratory borings. In order to avoid alternating steep chutes or drops and low gradient segments, and optimize fish passage potential, the design attempts to follow an average grade that connects the high points of the bedrock profile rather than following it continuously. It is likely that the original channel would have followed a more irregular profile with exposed bedrock at pinch points and steepened reaches, as seen at other less disturbed reaches within the project area (*e.g.,* reaches 15 and 16). A process has been outlined to further evaluate the geometry of bedrock in the field during construction and make field adjustments allowing the proposed channel to conform to uncovered areas of bedrock. For instance, the minimum design profile grade upstream of bedrock controls will be set to 4% and the maximum constructed profile grade between bedrock outcrops will not exceed 12%. For further details, see the "Field Engineering Notes" included on Sheet C40 of the 90% Designs..

Individual project components or areas are discussed in detail within Section 2.7. Within each section, we have provided a summary of the ability of the design to meet recommended fish passage criteria.

#### 2.3.1.1 *Assessment of Fish Passage within Constructed Channel Reaches*

Manning's equation is the primary method we used to determine depths and average velocities within the constructed channel sections under design fish passage flows to evaluate compliance with the fish passage criteria listed in Table 5[2]. Fish passage was evaluated at the following locations where channel bed modifications or reconstruction is proposed:

- Culvert #7;
- Culvert #8;
- Rock Pile Area; and
- Material Removal Area.

Proposed channel gradients are less than 4% at Culverts #7 and #8. Fish passage design criteria were evaluated using the Hydraulic Design Method at these locations.

The maximum average gradient at which a restored channel segment will be constructed at the Rock Pile and Material Removal Areas is 12%. This maximum gradient has been established by the guidelines included in the Field Engineering Notes (Sheet C40). As discussed above, 12% is considerably steeper than the 5% maximum profile grade that is recommended for application of the Hydraulic Design

[2] Design fish passage criteria were evaluated within channel sections where the channel bed and lower banks would be modified. The portions of Permanente Creek where only a floodplain bench would be constructed along the main channel (e.g. Channel Widening Area) were not evaluated.

method. We evaluated hydraulic parameters of a 12% channel for comparison to fish passage design criteria established under the Hydraulic Design method to determine if the fish passage design criteria would still be met.

Manning's equation is a universally accepted method for determining relationships between depth, velocity, and channel geometry (*e.g.*, shape, size and roughness of the channel) for open channel flow conditions. Calculations were performed using the "Hydraflow Express" extension of AutoCAD Civil 3D. Parameters used in the equation include:

- Discharge;
- Channel bed slope;
- Hydraulic radius; and
- Manning's roughness coefficient.

The roughness coefficients were estimated using depth-based roughness equations applicable to the proposed channels (Mussetter, 1989). Refer to Appendix E for detailed calculations.

Hydraulic calculations for the constructed channel sections are also presented in detail within Appendix D. The modeled cross section geometry incorporates boulders that will protrude above the channel bed to take into account cracks between rocks that fish can use for moving between reaches. Results indicate that depth and velocity criteria would be satisfied over the range of design fish passage flows described in Section 2.1.2 "Fish Passage Hydrology". It should be noted that within steep (>6-8%) portions of the reconstructed channel, it will be impossible to avoid post-construction channel adjustments and the reorganization and associated formation of steps, chutes, and pools, the geometry of which cannot be accurately predicted. Further, the channel will likely conform to bedrock outcrops in some locations, which may dictate cross section and profile geometry in ways that we cannot anticipate.

Fish passage flows were also modeled using HEC-RAS to generate water surface profiles and velocity profiles for existing and proposed conditions, as requested by the reviewing agencies. This was completed for the two locations where the channel bed will be reconstructed and the Field Engineering Notes (Sheet C40) do not apply - Culvert #7 and Culvert #8 removal areas within the Channel Widening Area. The culverts will be removed and the channel will be reconstructed as shown on the drawings. Reconstruction of the channel at these two locations greatly improves fish passage conditions. See Section 2.3.2.2 below for a summary of model results. Since there is uncertainty regarding the post-project channel profile within the Rock Pile and Material Removal Areas due to the unknown depth to bedrock, it does not seem relevant to present existing versus proposed HEC-RAS results. If bedrock is encountered the constructed profile could be very steep (>12%) and potentially include significant vertical drops of several feet.

Qualitatively, it is apparent that removal of Culverts #10 and #11 at the Rock Pile Area and the construction of an open channel will improve fish passage opportunities within this channel segment. This, of course, assumes that significant drops over bedrock or bedrock chutes are not uncovered once the culvert is removed.[3] Culverts with a low Manning's n value will be replaced with open channels constructed using Engineered Streambed Material (ESM) with increased hydraulic roughness. This

[3] See the Field Engineering Notes on Sheet C40 of the 90% Designs for a description of how the channel will be constructed if bedrock is encountered.

changed condition will both reduce flow velocities and increase flow depth, along with providing improved habitat and hydraulic complexity. The coarse-grained ESM will provide areas of velocity shadowing behind large boulders, and cracks and small pools between boulders with increased flow depths and resting areas that will provide more conducive conditions for fish passage under proposed conditions. See Section 2.3.2.2 for a discussion of the HEC-RAS model results that predict improved fish passage conditions once Culverts #7 and #8 are removed and the channel bed is reconstructed.

We could not locate a resource that estimates the maximum sustained channel slope that will be a barrier to upstream passage of resident rainbow trout. However, studies show that adult anadromous salmonids can navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). Considering this, CDFW has identified a sustained slope of greater than 8% as a barrier to anadromy (CDFW, 2009). Therefore, it is reasonable to assume that sustained slopes of 8% are a barrier to resident rainbow trout passage. The Washington Department of Transportation considers a slope of 12% for >160 meters as the cutoff for anadromous passage. We have provided passage calculations for reaches up to 12% average profile gradient, although extended reaches at this slope are likely too steep for resident rainbow trout to navigate, especially given the likelihood of channel adjustments and bedrock exposures discussed above.

### 2.3.2 Channel Hydraulics

Having a good understanding of channel hydraulics is important for developing designs that will provide the intended instream habitat complexity while also providing channel stability during the first few years following construction, until vegetation becomes established. Peak flood hydraulic modeling was conducted using HEC-RAS 5.0.4 river analysis software, developed by the United States Army Corps of Engineers (USACE). Modeling results were used to confirm that appropriate bankfull channel dimensions have been incorporated into project designs, to assist with sizing surface treatments (*e.g.*, engineered streambed material) to provide channel stability and erosion protection, and to ensure infrastructure and access roads won't be significantly impacted by the 100-year flood.

#### 2.3.2.1 *Peak Flood Modeling (1D HEC-RAS)*

Two separate HEC-RAS models have been developed for the project. One model was prepared for the Channel Widening and Rock Pile Areas since they are integrally connected, and a separate model was developed for the Material Removal Area because it is located more than 3,000 feet upstream of the Rock Pile Area. The existing conditions models were developed using topography from detailed surveys conducted at both areas by Waterways between 2013 and 2015. Proposed condition channel geometry was developed by importing the design grade topography into the existing conditions model and adding additional sections as necessary to model areas where culverts are proposed for removal. The Channel Widening and Rock Pile Area model extends over approximately 6,500 linear feet of channel, beginning just downstream of Culvert #2, and extending approximately 400 feet upstream of Pond 13. The Material Removal Area model extends over approximately 2,900 feet, beginning over 500 feet downstream of the Upper Treatment Facility located on the north bank approximately twenty feet above the channel and extending approximately 400 upstream of the proposed restoration limits. Overview figures have been prepared for each of the models and are included in Appendix E.[4] The first

[4] The HEC-RAS models extend beyond the limits of the proposed work to account for downstream conditions that could affect hydraulics within the proposed restoration areas. Because of this, design stationing does not match stationing used in the HEC-RAS models. To assist with comparison between HEC-RAS and the design drawings,

two figures show the locations of the cross sections included in the model for the Channel Widening and Rock Pile Areas. The third figure shows the location of the cross sections included in the model for the Material Removal Area.

Roughness values (Manning's n) were chosen from field-based observation of the channel and floodplains for existing conditions. The United States Geological Survey (USGS) "Roughness Characteristics of Natural Channels" report was used to aid in the selection of roughness values for proposed conditions. The report includes descriptive data and photographs for fifty different stream channels for which roughness coefficients have been determined.

Boundary conditions were set using the normal depth method and are included in Appendix E. The upstream and downstream boundary conditions were set to match the slope of the energy grade line at these respective locations, which roughly matches the channel slope.

**1.5-Year Flood Model**

The 1.5-year flood was evaluated to confirm that the bankfull geometry for the Rock Pile and Material Removal Areas developed in the "Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment" included in Appendix B, is appropriate for the constructed channel segments. This modeled flow was also used to assist with determining the channel-side design elevation of the floodplain bench along the Channel Widening Area. Graphical outputs of water surface profiles are included in Appendix E. Results for existing and proposed conditions have been included per the request of the reviewing agencies. The profile outputs include a profile of the channel-side design elevation of the floodplain bench to demonstrate that the design elevations of the floodplain benches are near the 1.5-year water surface elevation. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

**10-Year Flood Model**

The 10-year flood was evaluated to assist with establishing the upper limits of floodplain armor throughout the project area. Floodplain armor will be placed over constructed benches up to approximately the 10-year water surface elevation to provide erosion protection while vegetation becomes established. Results for existing and proposed conditions have been included per the request of the reviewing agencies. Graphical outputs of 10-year water surface profiles are included in Appendix E. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

**100-Year Flood Model**

The 100-year flood was evaluated to assist with designing surface treatments to ensure reconstructed channel areas remain stable, and that floodplain benches remain stable while vegetation becomes established. It was also used to evaluate the potential for erosion above the limits of floodplain armor, which has been set to approximately the 10-year water surface elevation, and whether the proposed angular rock vehicle barrier along the Channel Widening Area would remain stable at locations where bank overtopping will occur. See Section 2.4 below for design details related to surface treatments.

HEC-RAS stationing for the Channel Widening and Rock Pile Area model includes the design stationing plus 100+00. The Material Removal Area model includes the design stationing plus 10+00.

Graphical outputs of 100-year water surface profiles under existing and proposed conditions are included in Appendix E. Detailed output tables that include flow depth, velocity, and top width for both existing and proposed conditions have also been included in Appendix E.

Angular Rock Vehicle Barrier Assessment

At locations where bank overtopping flows will run along the rock vehicle barrier, the maximum velocity of the overtopping flow was determined to be 5 ft/sec. with a flow depth of approximately 1.2 feet and a maximum shear stress of 4.5 lbs/ft$^2$. This occurs for approximately 50 linear feet near the upstream end of the Channel Widening Area (HEC-RAS Station 144+50) where the proposed floodplain bench narrows and the height of the bank between the bench and access road is reduced.

Overtopping flow that occurs at discrete locations along the Channel Widening Area has velocities that range from 0.3 – 5.0 ft/sec with an average velocity of 2.9 ft/sec. Six-inch diameter cobbles can resist flow velocities up to 10 ft/sec and shear stresses of 2.5 lbs/ft$^2$ (Fischenich 2001). The vehicle barrier will be composed of 4 to 8-inch diameter angular rock along most of its length, which is more stable than sub-rounded to rounded cobble. To protect against mobilization at the area of maximum velocity the vehicle barrier will be composed of 10 to 16-inch dimeter angular rock, which can resist flow velocities up to 13 ft/sec and shear stresses of 5.1 lbs/ft$^2$ (Fischenich 2001). A summary of the overtopping locations, flow depths, and velocities are included in Appendix E. Overtopping flow velocities were determined using the velocity distribution module in HEC-RAS, which provides a graphical output of flow velocities across a given cross section. A cross section velocity output for each section where overtopping occurs is included in Appendix E.

#### 2.3.2.2 *Fish Passage Hydraulics at the Culvert #7 and #8 Removal Areas*

Fish passage has been assessed at the Culvert #7 and #8 removal areas within the Channel Widening Area where the channel bed and banks will be reconstructed as shown on Sheets C11 and C15. Results of the modeling effort are included Appendix E. Water surface profiles and velocity profiles for adult and juvenile high and low design flows are presented in the appendix as well. As can be seen, flow depths are increased, and velocities are reduced under proposed versus existing conditions along the length of proposed channel reconstruction. The HEC-RAS results document that flow depths and velocities meet fish passage design criteria along the reconstructed channel segments at all locations within the culvert removal areas, except that flow depths are slightly below the design criteria listed in Table 5 for both adult and juvenile low flows at the upstream end of the Culvert #7 removal area. The adult low flow depth is 0.50 ft. versus 0.67 ft. and the juvenile depth is 0.37 ft. versus 0.5 ft. However, unlike the Manning's at a section calculations (Appendix D), the model does not account for cracks within the boulders that will occur within the engineered streambed material. These cracks will provide additional depth for fish to utilize for passage. Fish passage design criteria are not necessarily met outside the culvert removal areas shown on the profile plots, where active channel geometry reverts to existing conditions.

#### 2.3.2.3 *Model Calibration and Sensitivity Analysis*

Model calibration has not been possible because no gauge data correlating water surface elevations to discharge rates is available in the project area for the design peak flood recurrence intervals. Golder Associates (Golder) maintained stream gauges in the project area during the 2017-2018 and 2018-2019

winters. However, measured peak flow rates were well below the 1.5-year recurrence interval flood (35 cfs vs. 284 cfs) during this time period.

The main aspects of the design that the model has been used for are sizing of the various rock materials specified for the project, determining the upper limit of the rock placements, establishing the floodplain bench elevation at the Channel Widening Area and evaluating the 100-year water surface elevation. The design bankfull channel dimensions where complete reconstruction of the channel bed is proposed are based on geomorphic criteria developed through evaluating nearby reference reaches. However, the model was used to confirm the design bankfull dimensions are reasonable relative to expected flows.

As a means to assess the sensitivity of the hydraulic model and evaluate implications for assumptions related to chosen Manning's roughness values we varied n-values by +10/-10 percent. Manning's n-values account for channel roughness due to irregularities in channel bed and bank forms, bed material size and natural debris in the channel, and vegetation. Small changes in n-values have the potential to affect the modeled water surface elevations and flow velocities. As n-values decrease flow depths typically decrease and velocities increase. The opposite is true for increases in n-values.

Chosen n-values for this project have the potential to effect floodplain bench design elevations at the Channel Widening Area, where reconstruction of the bed is not proposed, and criteria from the analog study at nearby references reaches is not relevant. Altering the n-values by +10/-10 percent generally resulted in the change of water surface elevations by less than 0.3 tenths of a foot along the project reaches for the 1.5-, 10-, 100-year peak flows, with the average change in water surface being less than (+/-) 0.1 tenth of a foot. This level of variability is within the tolerance for which the channel features will be constructed and is not considered significant. Results from the sensitivity analysis performed on the Channel Widening to Rock Pile hydraulic model are included in Appendix E.

We found the sensitivity analysis to have a limited effect on the proposed rock sizing. Rock slope protection (RSP), engineered streambed material (ESM), and floodplain armor sizing equations are based on flow velocity, with velocity explicitly included in the RSP calculations and the design flow (Q) over a given channel width (e.g., bankfull width) included in the ESM and floodplain armor calculations (see Appendix F). As expected, decreases in n-values resulted in high flow velocities, which in turn has the potential to result in larger rock sizing if the increase in velocity is significant enough. The opposite is true for increases in n-values. We found that the variation of n-values was not significant regarding RSP sizing, and that the calculations still resulted in rock size classes falling within the size range of the Caltrans Standard Specifications for RSP that were determined using the initial model inputs for channel roughness. We also found that the variation of n-values did not result in any significant differences in ESM or floodplain armor size. We have included the RSP calculations in Appendix F for reference.

### 2.3.3 Sediment Transport

The project has been designed to help maintain sediment transport continuity while creating depositional zones on the extensive floodplain areas that will be constructed as part of project implementation. As discussed above, proposed bankfull channel dimensions at each of the reconstructed reaches have been informed by a reference reach study and would vary as channel slope changes. Appropriately sized bankfull dimensions that adjust with changes in the channel profile slope will assist with sediment transport continuity through the reconstructed channels. See Table 3 for proposed bankfull dimensions based on channel slope. To help maintain sediment transport continuity and channel stability upstream of bedrock controls encountered at the Rock Pile and

Material Removal Areas, the minimum design profile grade at these areas will be set to 4 percent, as outlined in the Field Engineering Notes (Sheet C40).

Constructed floodplain areas will provide depositional zones for fine sediment and smaller coarse material when flood flows occur. Floodplains constructed along the Channel Widening Area will serve as a depositional area for fine sediment that will be mobilized from the Rock Pile and Material Removal Areas during the first couple of years after their construction, as floodplain and riparian vegetation become established.

## 2.4 SURFACE TREATMENTS AND GRADE CONTROL ELEMENTS

Surface treatments and grade control elements have been included throughout the project area to ensure that the channel and newly constructed surfaces remain stable against erosive forces. Surface treatments and grade control elements include:

- Engineered streambed material (ESM) that will be used as channel substrate where the bed is reconstructed.
- Floodplain armor to protect newly constructed floodplain surfaces.
- Vegetated rock slope protection to protect newly constructed streambanks that are steeper than 2H:1V and the area adjacent to the Culvert #6 inlet.
- Boulders sills that will periodically extend across the proposed floodplains to serve as grade control if significant erosion were to occur along floodplain areas.
- Boulder weirs that will be incorporated into the ESM and keyed into the floodplain armor to provide grade control at locations of energy dissipation where channel flow plunges into pools.
- Vegetation, which includes live willow stakes, container plants and seeding to provide rooting strength to help reinforce substrate along the channel, at floodplain and riparian areas, and on newly, constructed creek banks.
- Erosion control BMPs (e.g. fiber rolls).

### 2.4.1 Engineered Streambed Material (ESM)

Throughout the Designs, we have specified the placement of engineered streambed material (ESM) within the bed of the reconstructed portions of the channel. ESM is a term derived from the CDFW Design Guidelines and refers to a well-graded mixture of boulders, cobble, gravel, sand, and fines, proportioned in a way that is stable under design flood flows and still meets habitat enhancement goals. ESM is mixed to the Engineer's gradation requirements for stability for specific locations, containing sufficient amounts of fine material to ensure that vegetation can establish and that flows do not "sub-out" or move beneath the surface of the mix during times of low flow. Properly specified ESM placed in a geomorphically appropriate location should look and behave like a natural streambed.

At the Rock Pile and Material Removal Areas, ESM sizing may vary depending on the location of bedrock exposures and the constructed channel geometry. The Field Engineering Notes (Sheet C40) will guide channel construction since there is uncertainty regarding the vertical and lateral position of bedrock. ESM sizing will be refined during construction, as needed, to account for conform locations along exposed bedrock where hydraulic forces may be more significant than can be foreseen during the design phase.

Steps and pools will be incorporated into the Rock Pile and Material Removal Areas as shown on the Typical Cascade and Step-Pool Reach Details on Sheet C34. The head of large pools will be reinforced

with boulder weirs to promote plunging flow into the pool and provide profile grade control. Boulder weirs will be keyed into adjacent floodplain armor as shown on Sheet C36. The weir boulders will extend five to seven feet into the floodplain armor to protect against flanking. The ESM material has been designed to remain stable during the 100-year recurrence interval flow, with only minor adjustments expected to channel shape in reaches with bed slopes less than approximately 6-8%. In steeper reaches (>6-8%) post-construction channel adjustments are expected, as described above in Section 2.3.1.1. These adjustments may result in changes to constructed pool and step geometry and the formation of new pools and steps in response to flood flows. Detailed ESM sizing calculations are included in Appendix F. Resulting ESM gradations are presented on Sheet C39.

### 2.4.2 Floodplain Armor

Floodplain armor was sized similarly to ESM, using CDFW Design Guidelines for developing a well-graded mixture of boulders, cobble, gravel, sand, and fines. The substrate is proportioned to be stable under design flood flows while providing appropriately sized material to enhance constructed floodplain habitats. Sufficient fine material has been included to ensure that vegetation can establish and the flows do not "sub-out" or move beneath the surface of the mix when floodplains are activated by flood flows. As with the ESM, the floodplain armor has been designed to remain stable during the 100-year recurrence interval flow, with only minor adjustments expected to floodplain shape in reaches with slopes less than approximately 6-8%. Post-construction floodplain adjustments are anticipated in steeper reaches.

Planting pockets have been incorporated throughout proposed floodplain areas to provide locations for planting during project revegetation. Planting pockets are areas 5 to 8 feet in diameter that will be interspersed within the floodplain and filled with a soil mix designed to support container plants. If erosion of planting pocket soils were to occur, the floodplain armor would adjust to fill and protect eroded areas. Boulder sills have also been periodically incorporated across proposed floodplain areas to provide roughness to help reduce overbank flow velocities and serve as grade control if significant erosion were to occur along floodplain areas. Boulders used in the construction of boulder sills will be in the D84 - D100 size range of the respective floodplain armor gradation. The planting pocket and boulder sill details are included on Sheets C35 and C36, respectively.

At the Rock Pile and Material Removal Areas floodplain armor sizing may vary depending on the location of bedrock exposures and the constructed channel geometry. The Field Engineering Notes (Sheet C40) will guide floodplain construction since there is uncertainty regarding the vertical and lateral position of bedrock. Floodplain armor sizing will be refined, as needed, during construction to conform to exposed bedrock. Detailed floodplain armor calculations are included in Appendix F. Resulting floodplain armor gradations are presented on Sheet C39.

### 2.4.3 Vegetated Rock Slope Protection (RSP)

Vegetated rock slope protection (RSP) has been proposed at three locations. Vegetated RSP will be constructed using boulders of a specified gradation with live stakes installed throughout the RSP. Live stakes are live plant cuttings capable of regenerating into mature plants. Live stakes are typically taken from willows. RSP sizing calculations are included in Appendix F.

Vegetated RSP will be used to provide channel stability at the Culvert #7 and #9 removal areas, where the right bank (looking downstream) will be left in an over-steepened condition after culvert removal, and where the floodplain bench conforms to the inlet of Culvert #6 at the downstream end of the

Channel Widening Area. Culvert #7 is an 11.5-foot diameter culvert that will be removed along with the fill placed over the top of the culvert. After culvert removal the right bank side slope will range from 1-2H:1V. Laying back the bank to a consistent slope of 2H:1V is not practical at this location given the extensive vegetation removal and bank grading that would be required due to the steepness of the existing slope, which is 1-1.5H:1V (see Sheet C11). Grading would have to extend approximately 50 vertical feet to the top of slope at the edge of the idled Rock Plant. RSP is required to ensure the over-steepened reconstructed streambank remains stable while vegetation becomes established.

Culvert #9 consists of a 60-inch diameter corrugated metal pipe that is perched in the bank above the channel. The culvert appears to be a relic of an historic crossing. The culvert likely became plugged or the entrance obstructed at some time in the past and the channel cut around it. The right bank side slope will be 1-1.5H:1V after culvert removal. As with Culvert 7, it is not practical to lay back the bank to 2H:1V due to the steepness of the existing valley wall. See Sheet C18 for the existing average bank slope near the creek. Flow velocities are high at the Culvert 9 removal area, as the channel narrows and steepens, requiring large RSP to protect the channel bank.

Flow velocities are relatively low at the entrance to Culvert #6 as this area becomes somewhat backwatered due to the undersized culvert. However, vegetated RSP is required to protect the existing over-steepened slope at the floodplain bench conform to the Culvert #6 inlet (See Appendix F for rock sizing calculations).

### 2.4.4 Vegetation

Vegetation will be an essential component of ensuring short and long-term erosion projection and habitat value on excavated slopes, constructed floodplains and the reconstructed channel banks. All areas disturbed during construction will be revegetated with native species appropriate to the setting. Planting will include live staking, container planting and seeding. Sheets L1-L6 show proposed planting areas, tables identifying proposed species, container sizes, on-center spacings, seed quantities, and installation details. Irrigation details have not been included with this submittal. However, an irrigation system will be designed to maintain installed plantings during their establishment period. The irrigation plan will primarily consist of drip emitters at container plants. Overhead sprinklers may be used to irrigate seed during initial establishment only. A detailed plan will be included with the next design submittal.

Sheet L1 includes details for planting that will occur along the concrete channel. Grading is not proposed along the concrete channel. The planting information on Sheet L1 reflects habitat enhancement specifications included in the Decree.

The remaining landscape sheets include planting information for the areas that will be disturbed by grading activities. Planting tables have been included for each work area (e.g. Rock Pile Area) for both floodplain and riparian areas. A seed mix table has also been included. The seed mix will be applied to all disturbed areas as shown on the Drawings. The seed is expected to provide short-term erosion control through dense establishment of a groundcover including grasses and herbaceous species. Woody species and container plantings will contribute to long-term erosion control and habitat value.

Container plants will be installed in planting pockets and live stakes will be installed throughout the floodplain armor and ESM at floodplain and streambank areas at the spacings shown in the planting tables and relevant details. Live stake trench packs and live willow transplants will also be installed

throughout floodplain areas. Refer to relevant details on Sheets C35 and C37 for trench pack and willow transplant installation and spacing information.

For revegetation purposes, the "riparian" planting zone has been defined as the areas extending 10 vertical feet up the channel bank from the toe of slope at the edge of constructed floodplain benches. Riparian areas will be revegetated with container plants and seed mix. Refer to the planting tables for individual component project areas (Sheets L1-L6).

Erosion Protection above the 10-Year Water Surface Elevation

Revegetation will be the primary means of erosion control on slopes above the limits of floodplain armor (i.e. 10-year water surface) Flow velocities along the lateral margin of floodplain areas average less than 3 ft/sec during the 100-year flood. Revegetated soils can resist flow velocities of 4-6 ft/sec (Fischenich 2001). These areas will be seeded and planted. Mulch and/or erosion control fabric will be provided as appropriate pending constructed geometry, with fabric preferred on slopes steeper than 2.5H:1V.

### 2.4.5 Project Best Management Practices (BMPs)

Project designs typically incorporate BMPs to reduce construction-related impacts during and after construction. BMPs may include structural elements (*e.g.,* dewatering of work areas, installation of fiber rolls, sediment barrier fence and revegetation of disturbed areas) and may also include planning measures such as beneficial phasing and scheduling of work or limitations on disturbance areas. Some of these elements are typically shown on the Design Drawings, while others are often presented within a detailed Stormwater Pollution Prevention Plan (SWPPP). A SWPPP is a separate document that provides specifications for implementation as well as monitoring and reporting and is submitted to the Regional Water Quality Control Board for review. At present, a SWPPP has not been prepared for the project. Given the complexity of the project site and the particular challenges associated with work within the streambed, we anticipate a very detailed SWPPP document will be required to address the phasing of the work and the potential variations on final geometry and surface materials (*e.g*., bedrock vs. alluvium in channel banks).

The primary concerns at this site include limiting disturbance to adjacent riparian areas, avoiding episodic or chronic release of sediments to the creek, and quickly reestablishing a dense riparian canopy within disturbed work areas. Some of the principal BMPs currently included in the design are presented below.

Construction fencing will be installed along limits of disturbance prior to commencement of grading activities. Access to project areas will be along existing quarry access roads, as shown on Sheets C27-C28. Equipment will be staged and refueled within established staging areas. Continuous dust control will be provided throughout construction in accordance with the dust control notes shown on Sheet C27 and project permits.

Dewatering will occur at all sites where surface water is present and grading is proposed along the channel bed, or where access across the channel is required (i.e. Culvert #9 removal area). Diversion plans are included on Sheets C29-C32, with a typical dewatering plan and details shown on Sheet C33. Block nets will be installed upstream/downstream of the area to be dewatered, and fish and other aquatic organisms will be removed and relocated by a qualified biologist, prior to the installation of dewatering facilities. Where removal of seepage water is required within an isolated construction area, the water will be pumped to a depression or temporary basin to either infiltrate or be detained until it

is routed through a sediment treatment facility, as needed. Any pumping of surface water with the potential to entrain aquatic organisms will be screened using a mesh with a maximum opening size of 5 millimeters. The screen will be checked regularly to ensure it is functioning as intended and that animals are not becoming entrapped. Turbid waters will not be allowed to discharge into Permanente Creek. At the completion of construction, all accumulated sediment will be removed from the work area, characterized, and, if appropriate, placed elsewhere at the Facility in a manner that will not result in erosion or mobilization of sediment to Permanente Creek, and that will be consistent with applicable Waste Discharge Requirements. The final placement location will be determined by the Engineer, in consultation with Lehigh, the Regional Water Board, and the Geotechnical Engineer or Project Geologist at the time of construction.

Fiber rolls will be installed around staging areas and a sediment barrier fence[5] will be installed along the creek-side edge of the proposed floodplain bench excavation areas at the Channel Widening Area. Fiber rolls will be in place to trap mobilized sediment in the event there is rain during construction. The sediment barrier fence will act as a barrier to any loose material during floodplain bench excavation.

Constructed channel areas and bank slopes will be protected from erosion using the specified rock mixtures and/or vegetation as shown on the drawings. Erosion control fabric will be utilized if needed. Fiber rolls will be installed across excavated slopes as shown on Sheets C29 to C32. Prior to revegetating slopes, these areas will be track-walked to ensure drainage in the intended direction and provide smooth transitions to undisturbed sloped. Fiber rolls and container plants will be installed, where specified, and the slopes will be hydroseeded with the seed mix shown on the drawings. The hydroseed mixture will include hydromulch, amendment/fertilizer, and tackifier, to assist with erosion control and seed establishment[6]. Constructed channel and floodplain areas will receive ESM, floodplain armor, and vegetation as discussed above.

All constructed slopes that are steeper than 2H:1V will be evaluated by the Geotechnical Engineer or Project Geologist, and recommendations will be provided, as needed, to ensure geotechnical stability.

## 2.5 FLOODPLAIN LOGS AND LARGE WOODY DEBRIS INSTALLATIONS

Floodplain Logs

Floodplain logs have been proposed throughout the project. Floodplain logs will consist of both “live logs” and “roughness logs”, as described on Sheet C35. All floodplain logs will be salvaged with rootwads left intact. Live logs will consist of willows that will be removed during project grading. These trees will have all limbs removed to increase the likelihood they will survive and regrow, and they will be partially buried on floodplain areas with the expectation that the majority of them will re-sprout. Roughness logs will consist of all other tree species impacted by project grading. These trees will be partially buried like the live logs, but some limbs will be left intact to add additional roughness and complexity to the floodplain. Calculations have been completed to determine ballasting requirements, and the floodplain logs will be properly ballasted so they will not be moved by flood flows. Ballast calculations are included in Appendix G. Calculations will be adjusted, as necessary, during project implementation to ensure appropriate ballasting for trees of varying dimensions.

[5] Lehigh will coordinate with USFWS staff during the Section 7 Consultation to identify an appropriate fabric for use as a sediment barrier.

[6] Hydroseeding specifications will be included in the next design submittal.

Large Woody Debris (LWD) Structures

Large woody debris structures have been proposed at each of the pools that will be constructed at the Culvert #7 and Culvert #8 removal areas. Each of the two structures will consist of one log with a rootwad and one log without a rootwad. The Engineer will be present during installation to ensure the LWD structures are installed in accordance with the design intent to promote pool scour and provide cover for aquatic species. The logs will either be Douglas fir or redwood meeting the dimensions shown on Sheet C39. The structures have been designed to remain stable during the 100-Year discharge. Each structure will be ballasted and stabilized by cabling each log to two 4-foot diameter boulders (four boulders total per structure) and cabling the logs to each other. Ballast calculations are included in Appendix G.

## 2.6 GEOTECHNICAL AND GEOLOGIC CONSIDERATIONS

Golder Associates (Golder) and Stantec have provided geologic and geotechnical review of the proposed project. Golder has been involved in the project since the initial concept designs were prepared in 2014. They have reviewed each round of drawings as they have been developed. Stantec has recently been added to the project team to provide additional geotechnical engineering review, evaluation and design support.

Golder prepared a detailed assessment of project area geology and geotechnical considerations in 2019 at the request of the reviewing agencies (Golder 2019). The Technical Memorandum titled: "Geologic and Geomorphic Assessment of Permanente Creek" is included in Appendix H. Design slopes shown on the drawings meet Golder's recommendations for proposed slopes above the restored creek. Subsurface investigations have been performed to gain an understanding of the materials underlying the project limits at the Material Removal and Rock Pile Areas. However, precise locations of bedrock are not known, including its position (both vertically and laterally) and orientation. Field adjustments and modifications to conform to existing bedrock will likely be required.

In addition to their work developing an estimated bedrock profile beneath the Rock Pile and Material Removal Areas, Golder's geotechnical assessment focused primarily on evaluating the stability of the final valley slopes within restored reaches. Golder has provided recommendations on allowable slope angles for the different material types that may be encountered within excavations and the project geotechnical engineer or project geologist will be integrally involved with construction at the Rock Pile and Material Removal Areas to inspect excavated areas and provide recommendations, as necessary, to ensure finished slopes meet geotechnical criteria for stability. At both the Rock Pile and Material Removal Areas, excavations on the southern side of Permanente Creek are expected to follow similar slope angles as the existing exposed slope, likely uncovering areas of bedrock. The 90% Designs show a 1.5H:1V side slope at these locations for the two sites. The northern bank of the creek will be initially excavated into fill material and may potentially expose underlying bedrock depending on the depth of excavation. Default design side slopes on the north bank are 2H:1V or flatter. The northern banks may be constructed at a steeper slope if bedrock is uncovered. The project geotechnical engineer or project geologist will inspect the slope below the Rock Pile once it is removed and evaluate the nature and stability of the exposed material. Recommendations will be developed, as necessary, to ensure the slope is geotechnically stable.

In response to comments received from reviewing agencies, Golder prepared a stability assessment of the slope underlying the large aggregate pile at the Rock Pile Area (Golder 2021). Golder's assessment found the slope will be stable after removal of the rock pile but noted that the underlying slope should

be inspected by a qualified professional engineer or geologist to confirm the assumptions used in the analysis. Notes are also included on Sheet C19 of the 90% Designs that require the project geotechnical engineer or project geologist to inspect the slope exposed below the rock pile following its removal and provide recommendations on final stabilization measures. The Golder slope stability analyses report is included in Appendix I.

Most recently, Golder has also prepared a report to assess potential water quality impacts associated with specific project construction elements (Golder 2022). The report is included in Appendix J. The water quality evaluation assesses geologic units (e.g. limestone bedrock) likely to be uncovered in the creekbed by project implementation and found no significant impacts to water quality. The evaluation also determined that the locally available greenstone and graywacke encompassing the majority of the Permanente Creek basin is not detrimental to water quality if used as backfill and that from a water quality perspective can also be used as engineered streambed material and floodplain armor in the restored channel reaches.

Stantec prepared the Permanente Creek Restoration Project (PCRP) Stability Analysis, dated August 26, 2022, to support the updated project design (Stantec 2022). The assessment reevaluated the stability of the proposed slopes at the Rock Pile Area and also assessed the stability of the proposed slopes at the Material Removal Area (Appendix K). The report presents the results of their analysis assessing the most extreme conditions along the north slope of the creek at both sides. The slopes were analyzed under both static and pseudo-static conditions and were found to have acceptable factors of safety.

## 2.7 DESCRIPTION OF INDIVIDUAL PROJECT COMPONENTS

The individual project components are briefly described below, introduced from the downstream to the upstream limits of the proposed work.

### 2.7.1 Concrete Channel (Reach 6, Sheet L1)

Native riparian plantings will be installed along the southern bank of the concrete channel, from the edge of concrete to the top of bank. Installed plantings will infill areas outside of existing mature tree canopy. Existing oak seedlings will be preserved and a 3-foot radius around each seedling will be hand-weeded to reduce competition. The goal of the work is to expand the riparian corridor and increase canopy cover over the channel to lower stream temperature. Shading will also reduce the ability of cattails to established or persist in the channel. Cattails currently block the channel in many locations, thereby reducing sediment transport and flood capacity. They also present a partial barrier to the movement of any fish within the concrete channel.

Fish passage was not evaluated within the concrete channel, as there are not any improvements proposed within the concrete channel.

These proposed improvements meet the conditions outlined in paragraph #40 of the Decree.

### 2.7.2 Channel Widening Area (Reaches 8-12, Sheets C11-C18)

Within Reaches 8 through 10, the north bank will be excavated to form a bench at the estimated bankfull (1.5-year) water surface elevation. The bench width will be maximized by narrowing the existing roadway. The bench will be constructed to leave a maximum roadway width of 20 feet, as measured to the top of the creekside vehicle barrier. Work generally avoids disturbance to the bed of the channel and the south bank, except where large concrete debris or culverts are proposed for removal. Where

existing mature riparian trees are present, the bench excavation has been modified to preserve them, where feasible, in the interest of maintaining shade cover and improved habitat.

The floodplain bench will be over-excavated and then lined with a mixture of coarse alluvial materials sized to resist mobilization during floods. Periodic floodplain roughness elements (e.g., floodplain logs and boulder sills) will be incorporated to minimize channel migration into the benches as vegetation becomes well established.

Fish passage was not evaluated where only the construction of a floodplain bench is proposed because work is not proposed within the active channel bed.

These improvements meet the conditions outlined in paragraphs #38-39 of the Decree.

### 2.7.3 Culvert 7 (Reach 8, Sheet C11)

Culvert #7 will be completely removed and the area restored with a floodplain bench incorporated along the northern bank. Biomechanical bank stabilization treatments will be required along the southern bank to support the toe of the hillslope where the culvert and associated fill are proposed for removal. The biomechanical treatment includes the installation of vegetated RSP. A pool that will include the installation of a large woody debris structure has been included to provide habitat and cover for aquatic species.

Fish passage design criteria for both depth and velocity are met when using the "Hydraulic Design" approach.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

### 2.7.4 Culvert 8 (Reach 9, Sheets C14-C15)

Culvert #8 will be completely removed and the area restored with a floodplain bench incorporated along the northern bank. A pool that will include the installation of a large woody debris structure has been included to provide habitat and cover for aquatic species.

Fish passage design criteria for both depth and velocity are met when using the "Hydraulic Design" approach.

These improvements meet the conditions outlined in paragraph #39 of the Decree, although Culvert #8 is not specifically mentioned.

### 2.7.5 Sediment Removal Area (Reach 9, Sheets C14 & C16)

Accumulated sediments and fill materials will be removed as necessary to restore pre-disturbance geometry within the tributary channel and adjacent floodplain area. The access road and existing storage area will be revegetated. Final grades will be dependent upon sub-surface conditions (*i.e.*, the location of bedrock). All disturbed areas will be revegetated with native riparian species.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

### 2.7.6 Culvert #9 Removal Area (Reach 10, Sheet C18)

Stream flow does not pass through Culvert #9. The pipe is perched above the channel in the south bank. There is exposed RSP along the channel margins, as shown on Sheet C18 of the drawings, and cobbles

and boulders are present along the channel bed providing sufficient armoring to resist erosion. Mature riparian vegetation is also present along the channel banks providing rooting strength to bank soils. The culvert will be removed and the void will be filled with vegetated RSP (see Section B, Sheet C18). There will be limited impacts to the channel bed and existing vegetation during the culvert removal work. It is expected that some significant vegetation pruning and disturbance of roots will be required, but the native alders and willows along the channel are used to disturbance and will rebound quickly to provide shade and rooting strength to any disturbed bank soils[7].

Culvert #9 will be completely removed from its perched location and the bank will be restored in the vicinity of the work. Biomechanical bank stabilization treatments will likely be required to restore the southern streambank where the culvert is removed unless bedrock is exposed during demolition. Any required biomechanical treatment work will include the installation of vegetated RSP.

Fish passage was not evaluated because there is not any work proposed within the active channel bed.

These improvements meet the conditions outlined in paragraph #39 of the Decree.

### 2.7.7 Culverts #10 & #11, Rock Pile, and Pond 13 (Reaches 11-13, Sheets C19-C21)

Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11, rip rap in the vicinity of the Culvert #10 outlet, and the dam at Pond 13.

As discussed above, the channel profile appears to have been significantly modified in this reach, resulting in a flattened profile downstream of Pond 13 at Culvert #11 (half culvert) and a very steep profile through Culvert #10. The design optimizes fish passage conditions by creating a more uniform grade through the reach. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert, which includes removal of Pond 13. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. The results of this seismic refraction analysis are attached as Appendix C. Since we cannot know the exact location of all bedrock without extensive subsurface exploration, (*e.g.*, drilling or trenching) final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The newly excavated floodplain benches will be lined with a mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Floodplain roughness elements (*e.g.*, log structures and/or boulder sills) will be incorporated to minimize channel migration into the benches until vegetation becomes well established.

The dam will be removed at Pond 13 and replaced with a boulder weir grade control structure, if the upper limit of potential design channel invert is constructed. Fine sediment impounded within the pond will be removed so the material is not transported downstream after the restoration project is implemented. The limits and thickness of accumulated sediment have not been surveyed. Accumulated fine sediment occurring below elevation 805.0 will be removed. Removal of fine sediment will occur until alluvial material (*i.e.,* gravel/cobble) or bedrock are encountered. Engineered fill would then be placed to raise grades, where necessary, and a channel conforming to the dimensions shown on the

[7] During site inspections in 2022 it appeared most of the alders shown on the drawings that were mapped during 2013-2015 have died and been replaced by willow volunteers.

Typical Channel Treatment Detail for the Rock Pile, Sheet C20, would be constructed through the previously ponded area to restore an open channel.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel, as shown on cross sections C and D of Sheet C21. An access road has been incorporated into the design for maintenance of Pond 13B. Newly disturbed upland hillslopes will be vegetated with native species, as will the constructed channel and floodplains. The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road.

These improvements meet the conditions outlined in paragraphs #37 & 38 of the Decree.

Fish passage design criteria for both depth and velocity are met when compared to the hydraulic design parameters established under the Hydraulic Design approach, due to the high roughness of the proposed channel substrate. However, it should be noted that the design profile grade of 12% exceeds CDFW's estimated limit to anadromy, which is a sustained slope of over 8%; and studies show that adult anadromous salmonids are able to navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). See Section 2.3.1.1 above for a discussion regarding fish passage evaluation in steep reaches.

### 2.7.8 "Old Crusher Foundation" Removal (Reach 17, Sheet C22)

The "old crusher foundation" will be modified to conform to the adjacent banks. The portion of the "old crusher foundation" that is projecting into the creek will be removed. Sheet C22 includes a site plan and cross sections of the proposed work. All work will be completed using hand labor and small equipment with worker safety being the highest priority, given that the foundation is located at the base of a very steep and tall slope. All waste material and spoils will be removed from the creek using hand tools and disposed of. Access is anticipated to be provided by use of a constant rate descender, or similar. Final geometry will be inspected by the Engineer to ensure a smooth hydraulic transition along the portion of the "old crusher foundation" to remain.

These improvements meet the conditions outlined in paragraph #35 of the Decree.

### 2.7.9 Material Removal Area (Reaches 17 & 18, Sheets C23-C26)

This area has been modified by the placement of material within and adjacent to the channel. The exact extent and depth of material is uncertain at this time, due to limited subsurface data. A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement. The results of this analysis are attached as Appendix C.

The 90% Designs show the area will be excavated to establish a more uniform profile gradient, as shown on Sheets C23 and C24. The grading plan reflects the Upper Limit of Potential Design Channel Invert and has been established as a best fit to bedrock elevations that were estimated using the seismic refraction analysis. The Lower Limit of Potential Design Channel Invert is shown in profile and represents the lowest grade at which the channel invert would be constructed if bedrock is not encountered.[8] Proposed

[8] Design drawings for the Lower Limit of Potential Design Channel Invert that include a grading plan and cross sections are included on Figures 1-4 in Appendix L.

cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best-fit bedrock exposures encountered during excavation. Since we cannot know the exact location of all bedrock without extensive subsurface exploration, (*e.g*., drilling or trenching) final geometry will likely vary somewhat from that shown on the drawings.

The proposed centerline of the creek was established by extending the existing southern hillside slope down at 1.5H: 1V to meet the new profile grade, and then leaving room for a bench that varies in width at bankfull elevation. The existing toe of the slope on the north side of the creek was relocated northward by twenty-five feet, except at the downstream end of the reach where the bench needed to be narrowed slightly to accommodate the Upper Treatment Facility and existing access road. The north bank is sloped at a maximum steepness of 2H:1V. The "relic concrete structures" shown on the Drawings will be removed during site grading. All disturbed areas will be revegetated with native species appropriate to the site.

The newly excavated floodplain benches will be lined with a mixture of coarse alluvial materials sized to resist mobilization, but able to adjust and reorganize in response to significant flood flows. Floodplain roughness elements (*e.g.,* log structures and/or boulder sills) will be incorporated to minimize channel migration into the benches until vegetation becomes well established.

These improvements meet the conditions outlined in paragraph #35 of the Decree. It should be noted, however, that the design profile grade within this reach will likely vary from 7.1% to 22.7% and may have drops over bedrock features. Fish passage will be an objective, but cannot be guaranteed with these site constraints, the majority of which exceed CDFW's estimated limit to anadromy, which is a sustained slope of over 8%; and studies show that adult anadromous salmonids are able to navigate steeper slopes than resident rainbow trout (Coastal Conservancy 2004). See Section 2.3.1.1 above for a discussion regarding fish passage evaluation in steep reaches.

# 3.0 IMPLEMENTATION

## 3.1 CONSTRUCTION SEQUENCING

There are many considerations when determining the optimal sequencing of a large stream restoration effort. At Permanente, examples include project area diversion and dewatering requirements, temporary impacts to stream and wetland habitat, post-construction sedimentation, quarry operations, and noise and dust. Permit requirements, including the in-stream work window, will also have bearing on the sequence of construction and the amount of construction that is completed in a given season.

In-stream flows can vary from year to year with surface water present in some portions of Permanente Creek and not in others. Although the presence of surface water will not dictate where work occurs in a given year, it will be considered to help simplify construction and reduce potential water quality impacts. Any relocation of the Upper Treatment Facility and associated infrastructure (*e.g.,* Pond 1250) that have been installed to remove selenium from quarry water will also be considered when determining construction sequencing. Work at the Material Removal Area may be sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in their current location at the start of project implementation. These facilities may be relocated in the localized area to accommodate changes to the slope if the facilities are necessary for post-creek restoration project activities associated with quarry dewatering and reclamation.

Ecological impacts from temporary site disturbances are also an important consideration. Of the potential impacts, soil disturbance and riparian vegetation removal are primary concerns. Vegetation removal reduces available cover and habitat for wildlife and shading of Permanente Creek. Soil disturbance associated with channel grading activities will further increase risk of erosion and sedimentation in the short term. Although the constructed features will be designed to ultimately reduce erosion and sedimentation, there will always be some minor erosion that mobilizes fine sediment while vegetation from erosion control seed and installed container plantings are becoming established during the first year following construction. Although the project will ultimately result in a significant expansion of riparian area, the removal of vegetation will temporarily reduce areas of riparian habitat, increase risk of erosion, and reduce shading of the creek until replacement plantings have matured.

In consideration of these short-term impacts, we have planned to stage the work so that the area of impact is limited in any given year, and in a manner that will allow newly constructed floodplains at the downstream limit of the work to treat runoff from the upstream end of the project area that would be disturbed in subsequent years.

We recommend that the initial stream restoration work occur along the Channel Widening Area, extending upstream to the end of Reach 10, where floodplain benches will be created. The benching will provide opportunities for sediment deposition to occur if material is mobilized from the Rock Pile and Material Removal Areas during the initial years after construction. The benches will also provide depositional areas for fine sediment mobilized from the large sediment deposits located within reaches, R14-R16 and R19-R21. In addition to providing this water quality benefit, the Channel Widening Area is also the least complex of the major construction components, allowing the opportunity for the construction team to gain familiarity with the particular challenges of the site (e.g., material processing, dewatering, topsoil salvage, and revegetation) before tackling the upstream reaches where channel grading is more complex.

The second phase of the work is expected to involve the Rock Pile Area. The final stage would include the Material Removal Area.

A final construction schedule will be prepared once all project permits and approvals are received for project construction, in accordance with paragraph #46 of the Decree.

### 3.2 FIELD ENGINEERING – ROCK PILE (REACHES 11-13) AND MATERIAL REMOVAL AREA (17-18)

The design engineers will be closely involved with construction implementation at the Rock Pile and Material Removal Areas. The drawings for each site present an “Upper Limit of Potential Design Channel Invert” and “Lower Limit of Potential Design Channel Invert”. The upper limit represents the design grade based on connecting high points on the bedrock profile that were identified during subsurface investigations. The lower limit represents the maximum extent of excavation at locations where bedrock is not encountered during project construction. The likelihood is that the constructed channel will lie somewhere between these two profiles. Sheet C40 includes a description of field engineering parameters that will guide determination of the final profile at the Rock Pile and Material Removal Areas. Final slopes steeper than 2H:1V will be evaluated by the Geotechnical Engineer or Project Geologist and recommendations will be provided, as needed, to ensure geotechnical stability.

## 4.0 ADAPTIVE MANAGEMENT

The project has been designed to restore significant portions of Permanente Creek and greatly expand floodplain and riparian areas along the component project areas. Project designs include elements to provide short-term stability, while also being able to respond to future flooding events and changes in the sediment transport regime. As with most stream restoration projects, it is not possible to predict all future adjustments that may occur, and adaptive management may be required.

The reconstructed channel and floodplains will be protected with engineered streambed material (ESM) and floodplain armor. These substrates have been sized to remain relatively stable while allowing for natural adjustments to flooding events and sediment transport from upstream reaches. Boulder sills have been incorporated throughout the project to reduce the percentage of large boulders used in the ESM and floodplain armor, and to protect against erosion from large flooding events that may occur in the initial years after project construction while vegetation is becoming established. We anticipate that the armoring and sills will perform as designed. However, adjustments or areas of erosion could occur that require attention to ensure the project evolves as intended.

The creation of inset floodplain benches will allow for significant sediment storage within the project reaches, or for the low flow channel to adjust laterally without consequence in most instances. However, sediment mobilized from project areas or from areas outside the influence of project construction may accumulate in undesirable locations within the reconstructed channel segments. Areas of significant aggradation would be evaluated and corrective measures would be proposed. In the initial years after project implementation, it will be important to ensure that sediment/debris does not accumulate at locations that may direct future flood flows in a manner that could affect project stability.

The plants selected for the revegetation effort were chosen based on experience revegetating other areas of the project site. Although a certain percentage of die-off is typical with any native revegetation effort, it is expected that the selected species will do well along the restored project areas. If it is found that the revegetation effort is not meeting project performance standards, the cause will be evaluated and either alternative species will be used, or the species that are performing well be increased to ensure the project meets required performance standards for vegetation establishment.

Each project area should be inspected during the first year after construction after storms delivering 1.5 inches or more of rainfall have occurred. If erosion or sedimentation does occur, the cause of the issue will be evaluated and adaptive management practices will be developed to help stabilize the area. The default approach at areas of erosion will be the installation of additional vegetation where this approach is a viable solution to help halt erosion. If the area of erosion is significant, and the installation of additional vegetation is not a potential solution, an approach will be developed and the resource agencies will be engaged if heavy equipment is involved.

During the permitting process, a Monitoring and Adaptive Management Plan (MAMP) will be prepared for review and approval by the resource agencies. The MAMP will establish monitoring protocols, performance criteria, the monitoring period and reporting requirements. Potential adaptive management strategies and approaches will be discussed. Ultimately the MAMP will be a tool for helping to ensure long-term channel stability and successful establishment of the revegetation effort.

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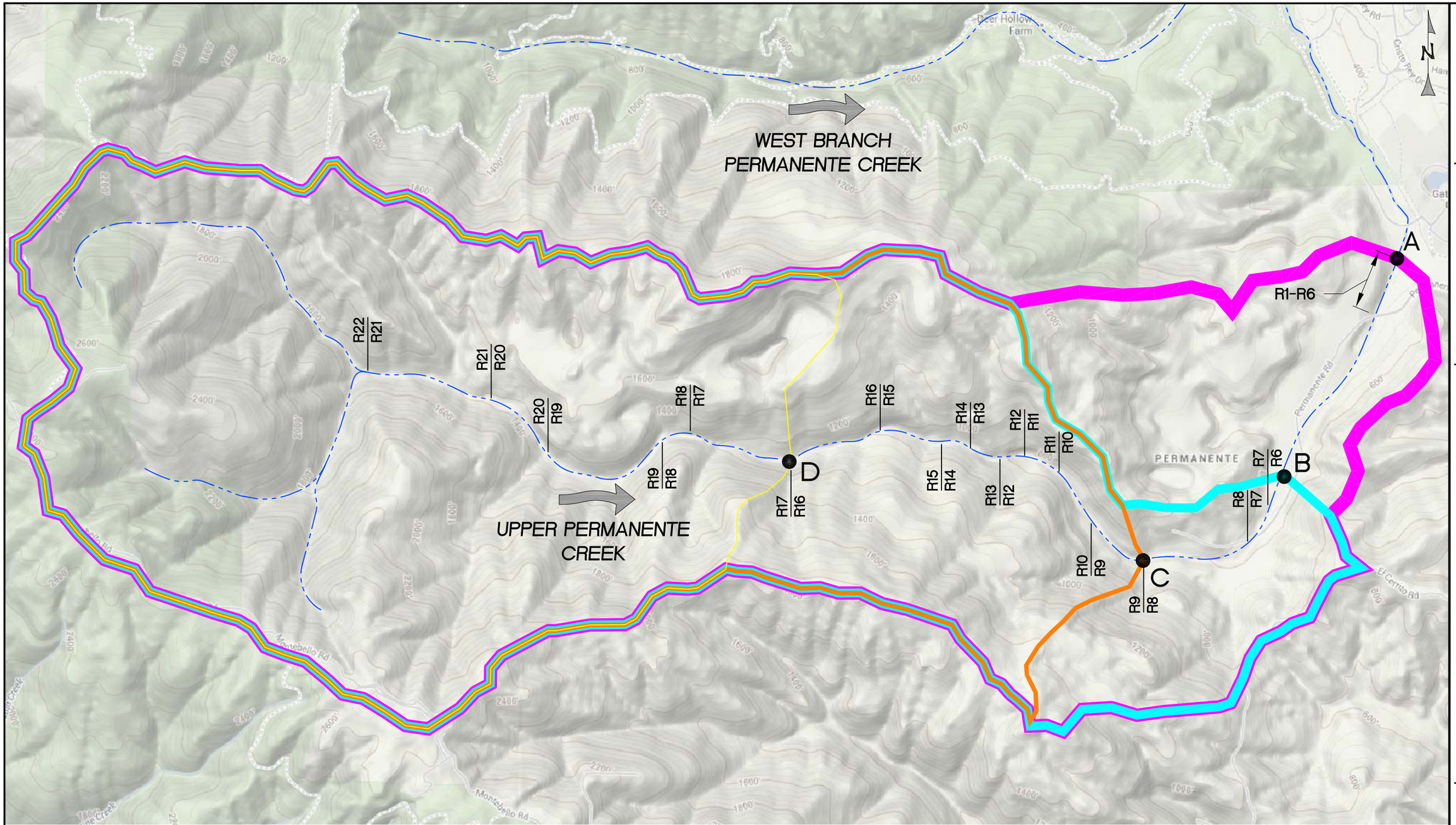



SOURCE: WWW.GOOGLEMAPS.COM

## WATERSHED DELINEATION MAP

SCALE: 1"=1300'

### LEGEND

- B — DRAINAGE AREA POINT OF CONCENTRATION
- WATERSHED BOUNDARY
- R14 / R13 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" PREPARED BY URS AND DATED MARCH 11, 2011

WATERWAYS CONSULTING INC.
Santa Cruz, CA | watways.com | Portland, OR

CONCEPT LEVEL SUBMITTAL

DESIGN BASIS TECHNICAL MEMORANDUM

PERMANENTE QUARRY - PERMANENTE CREEK WATERSHED DELINEATION MAP

BAR IS ONE INCH ON ORIGINAL DRAWING. USE TO SCALES FOR REDUCED PLOTS

0 1"

FIGURE

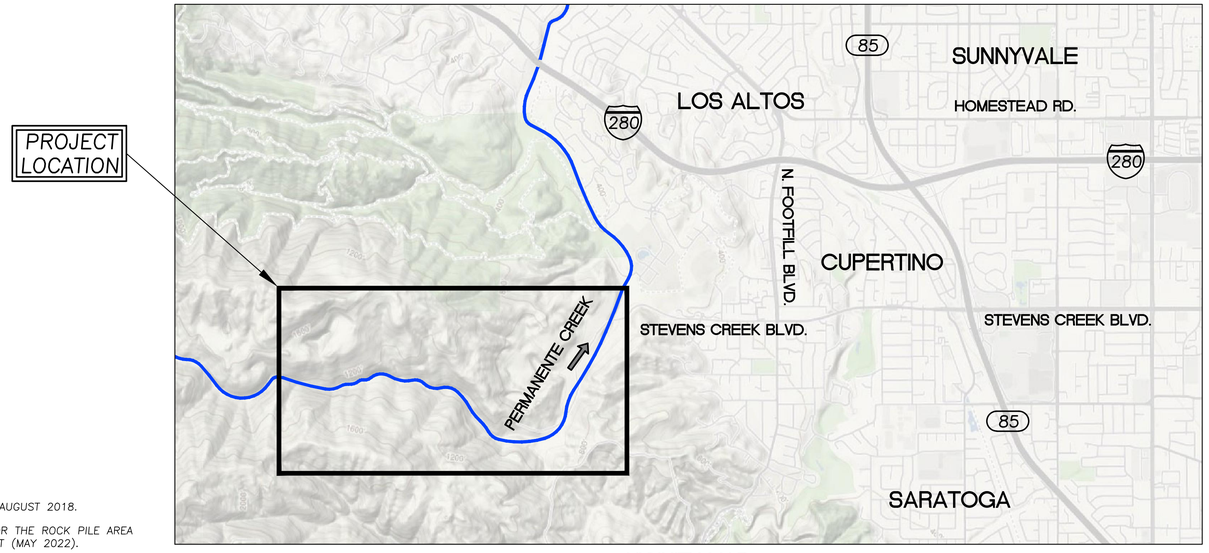
1.0

# ATTACHMENT 1

**Permanente Creek Restoration Plan - Updated 90% Design Drawings**

# PERMANENTE CREEK RESTORATION PLAN

## UPDATED 90% DESIGN
## SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL
## AUGUST 26, 2022




VICINITY MAP
N.T.S. (GOOGLE)

N

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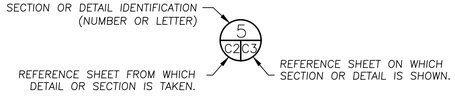
## GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013,
   FEBRUARY THROUGH MAY 2014, MARCH 2015, AUGUST 2018.
2. AERIAL CONTOURS PROVIDED BY TOWILL, INC. FOR THE ROCK PILE AREA AND THE MATERIAL REMOVAL AREA LiDAR FLIGHT (MAY 2022).
3. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
4. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
5. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 2013 AND JUNE 2017
6. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
7. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, WHERE SHOWN, WERE COMPILED FROM RECORD INFORMATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
8. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE

9. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
10. SURVEYED TREES INCLUDE:
    A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
    B. ALL OTHER TREES 12 INCHES OR LARGER DBH
    C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH
11. TREE MAPPING OCCURRED DURING THE 2013-2015 SURVEYS. SOME TREES SHOWN ON THE DRAWINGS MAY HAVE DIED SINCE THE DATE OF SURVEY. ADDITIONAL TREES MEETING THE SURVEY THRESHOLD USED DURING THE ORIGINAL MAPPING EFFORTS MAY NOW EXIST WITHIN THE MAPPED AREAS AND ARE NOT SHOWN ON THE DRAWINGS.
12. THE DRIPLINES ARE SHOWN AROUND ALL SURVEYED TREES. DRIPLINES ARE BASED ON A UNIFORM CANOPY RADIUS FOR EACH TREE. WHERE CANOPIES OF INDIVIDUAL TREES OVERLAP, THEY WERE JOINED TO SHOW A CONTIGUOUS DRIPLINE. THE DRIPLINES OF SMALL DIAMETER, UNMAPPED TREES ARE NOT SHOWN.

## SECTION AND DETAIL CONVENTION




## ABBREVIATIONS

| | | | |
|---|---|---|---|
| AVG. | AVERAGE | NTS | NOT TO SCALE |
| CC | CONCRETE | O.C. | ON CENTER |
| CY | CUBIC YARDS | O.D. | RELATIVE COMPACTION |
| DBH | DIAMETER BREST HEIGHT | RSP | ROCK SLOPE PROTECTION |
| DIA. | DIAMETER | S | SLOPE |
| E | EXISTING | SD | STORM DRAIN |
| E.G. | EXISTING GROUND | SPK | SPIKE |
| ELEV. | ELEVATION | SQ.FT. | SQUARE FOOT |
| DI | DRAINAGE INLET | TBD | TO BE DETERMINED |
| FG | FINISHED GRADE | TYP | TYPICAL |
| FT | FEET | UNK | UNKNOWN |
| INV | INVERT | WSE | WATER SURFACE ELEVATION |
| N | NEW | YR | YEAR |

## PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 90% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

## TREE REMOVAL NOTES

1. SALVAGE MAPPED WILLOWS SHOWN ON THE DRAWINGS FOR REMOVAL AND INCORPORATE THEM INTO THE WORK AS FLOODPLAIN LIVE LOGS, PER DETAIL 3, SHEET C35. ALL UNMAPPED WILLOWS WITHIN THE GRADING LIMITS SHALL BE RESERVED FOR SALVAGE AND TRANSPLANTING, PER THE WILLOW TRANSPLANT DETAIL 2 ON SHEET C37. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ENGINEER, PRIOR TO THE START OF ANY CLEARING OR GRADING ACTIVITIES.
2. SALVAGE ALL OTHER TREES REMOVED AS PART OF PROJECT CONSTRUCTION AND INCORPORATE THEM INTO THE WORK AS FLOODPLAIN ROUGHNESS LOGS, PER DETAIL 3, SHEET C35.

## TREE ABBREVIATIONS

| | |
|---|---|
| A | ALDER |
| B | BAY |
| BK | BUCKEYE |
| M | MAPLE |
| O | OAK |
| SYC | SYCAMORE |
| W | WILLOW |

* CALL BEFORE YOU DIG *
CONTACT UNDERGROUND SERVICE ALERT (USA)
PRIOR TO ANY CONSTRUCTION WORK 1-800-227-2600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PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

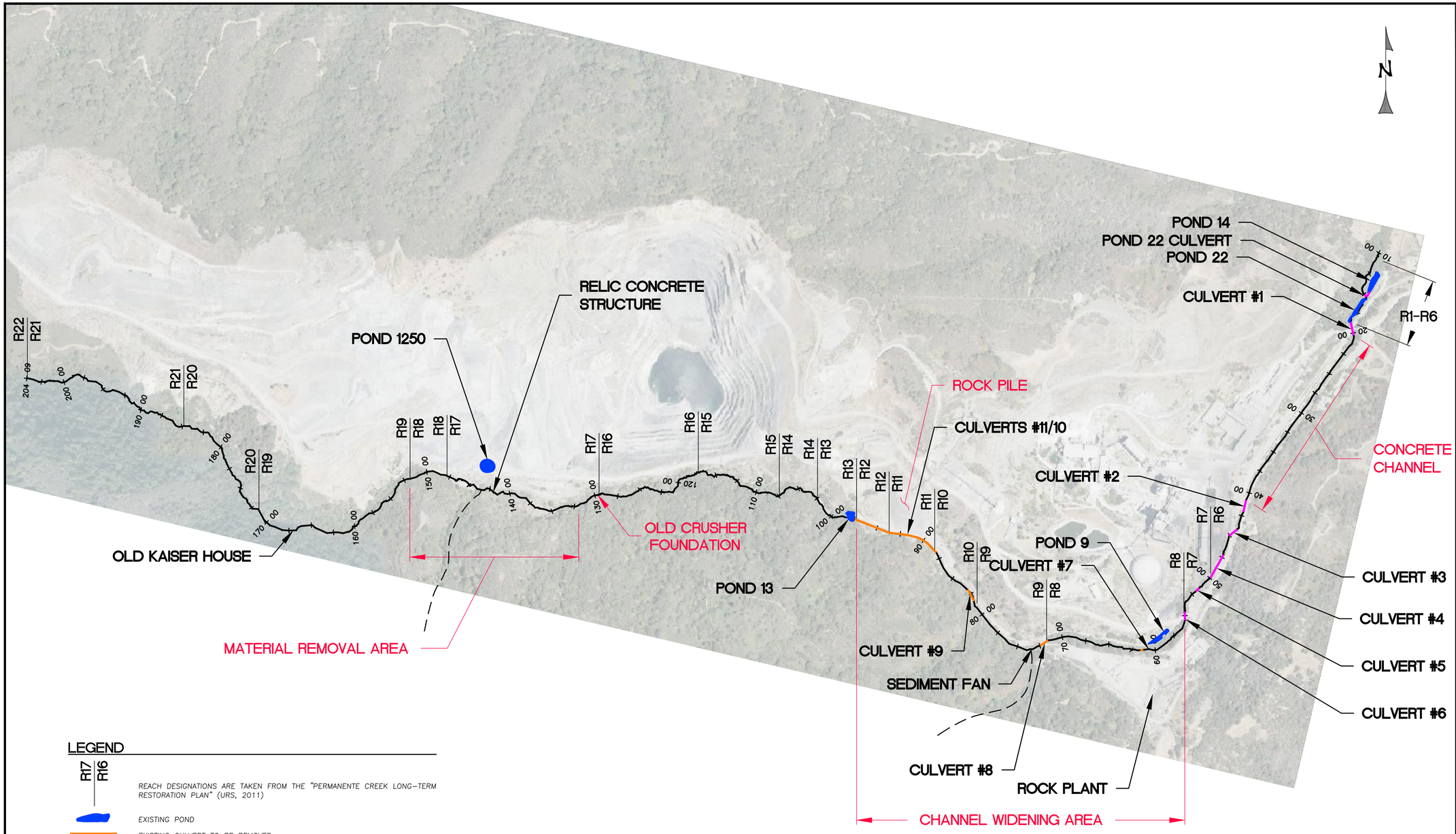
COVER SHEET

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C1




## LEGEND

R17 / R16 — REACH DESIGNATIONS ARE TAKEN FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING POND

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

TRIBUTARY (RELEVANT TO PROJECT)

70 00 — PERMANENTE CREEK THALWEG ALIGNMENT 2013
(NOTE: DESIGN ALIGNMENTS AND STATIONING VARY AT INDIVIDUAL WORK AREAS)

## PROJECT AREA OVERVIEW

SCALE: 1" = 500'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PROJECT AREA OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

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0 1"

RECLAMATION PLAN AREA BOUNDARY

AREA OF PROPOSED GRADING THAT FALLS OUTSIDE RECLAMATION PLAN AREA BOUNDARY

POND 1250

ROCK PILE

CULVERT 10/11

POND 13

(E) CONVEYOR

CULVERT 9

MATERIAL REMOVAL AREA

POND 14

POND 14/22 CULVERTS

POND 22

CULVERT 1

CULVERT 2

CULVERT 3

CULVERT 5

CULVERT 6

CULVERT 4

POND 9

CULVERT 8

CULVERT 7

ROCK PLANT

CONCRETE CHANNEL

CHANNEL WIDENING AREA

N

## LEGEND

- EXISTING POND
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CONVEYOR
- PERMANENTE CREEK THALWEG ALIGNMENT 2013

## RECLAMATION PLAN AREA OVERVIEW

SCALE: 1" = 500'

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RECLAMATION PLAN AREA OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

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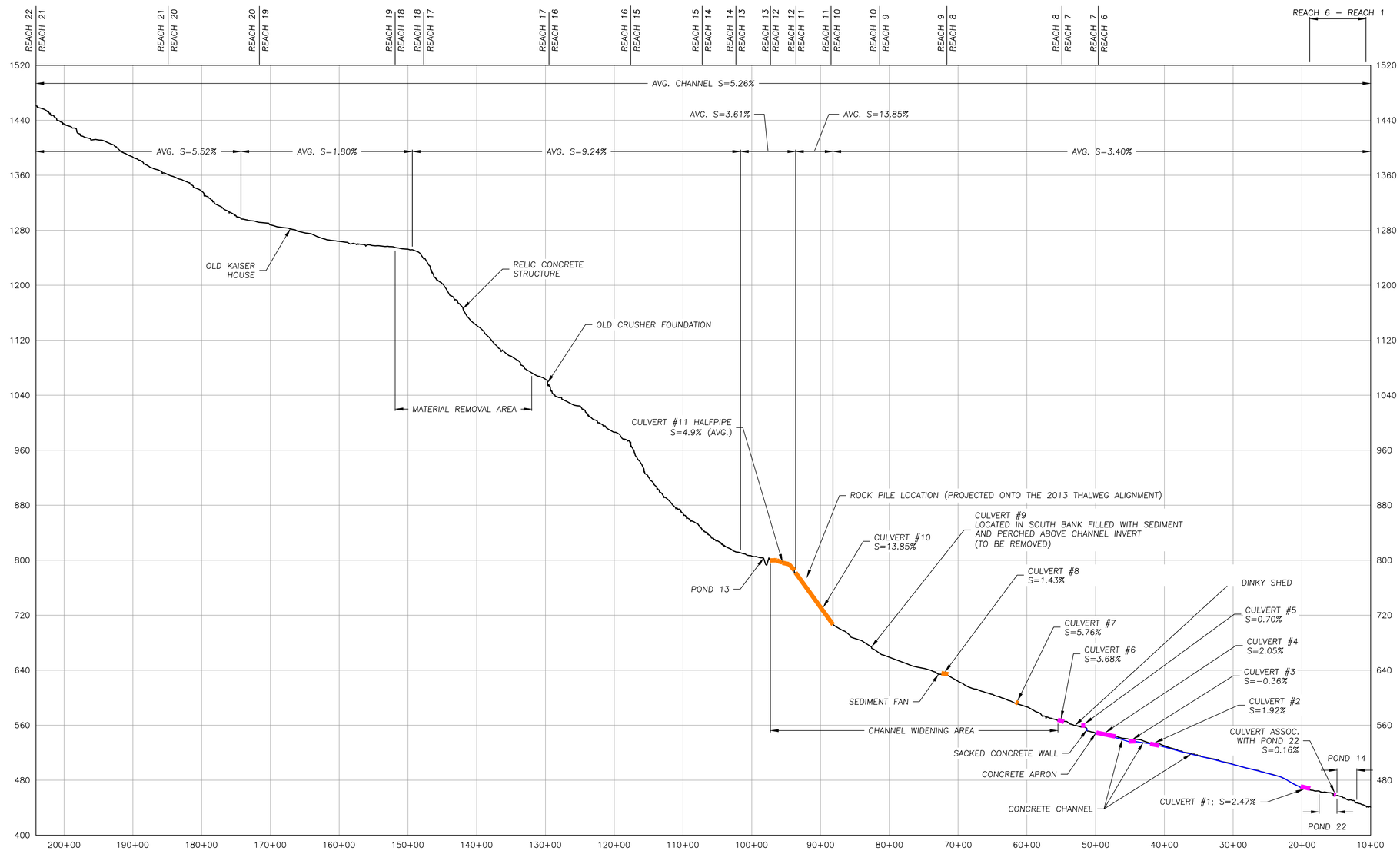
0 1"

C3




## LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

## EXISTING CHANNEL THALWEG PROFILE

SCALE: H: 1" = 800'; V: 1"=80'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EXISTING CHANNEL PROFILE

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
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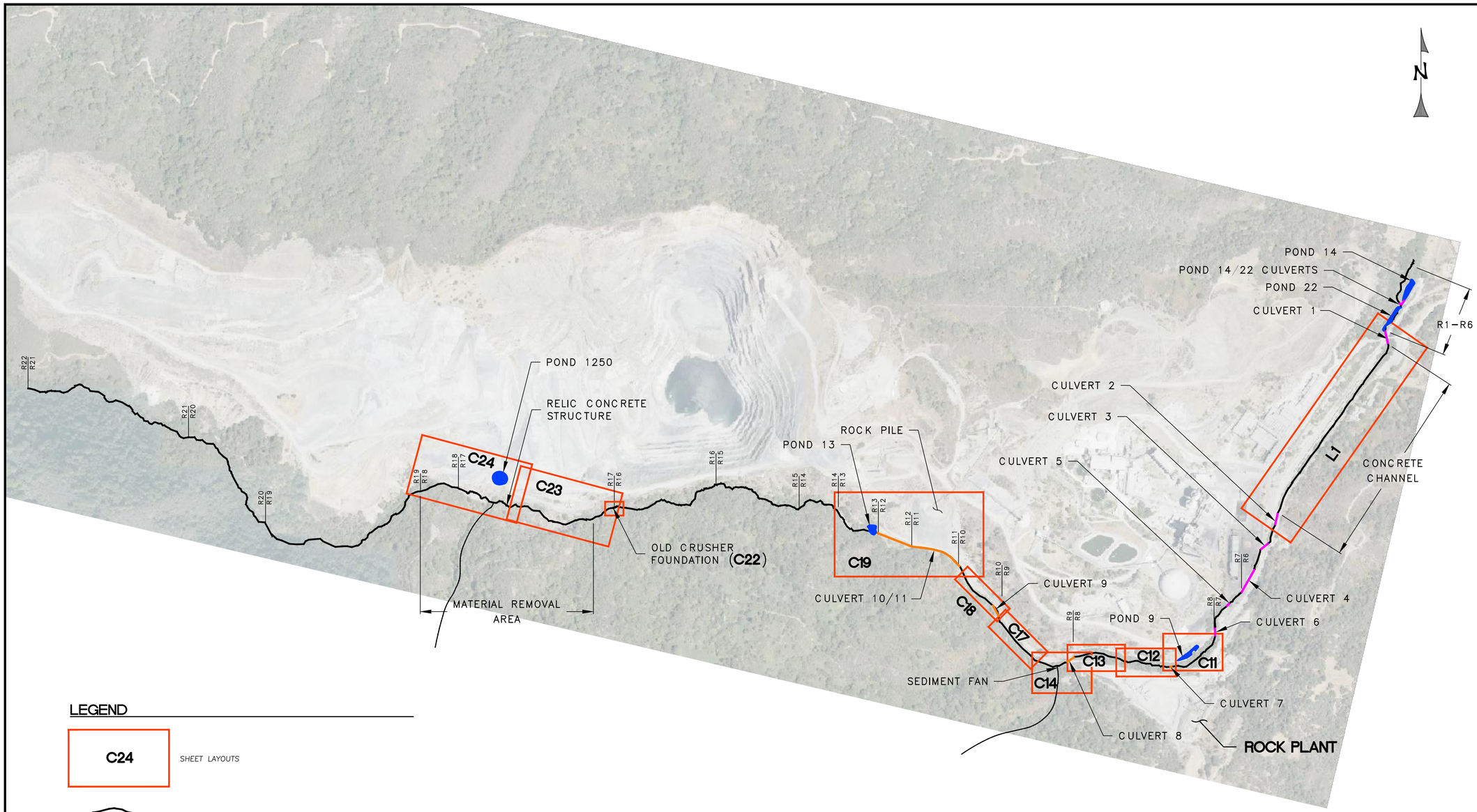
0 1"




## LEGEND

- C24 — SHEET LAYOUTS
- PERMANENTE CREEK THALWEG ALIGNMENT 2013
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN

## SHEET LAYOUT OVERVIEW

SCALE: 1" = 500'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SHEET LAYOUT OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

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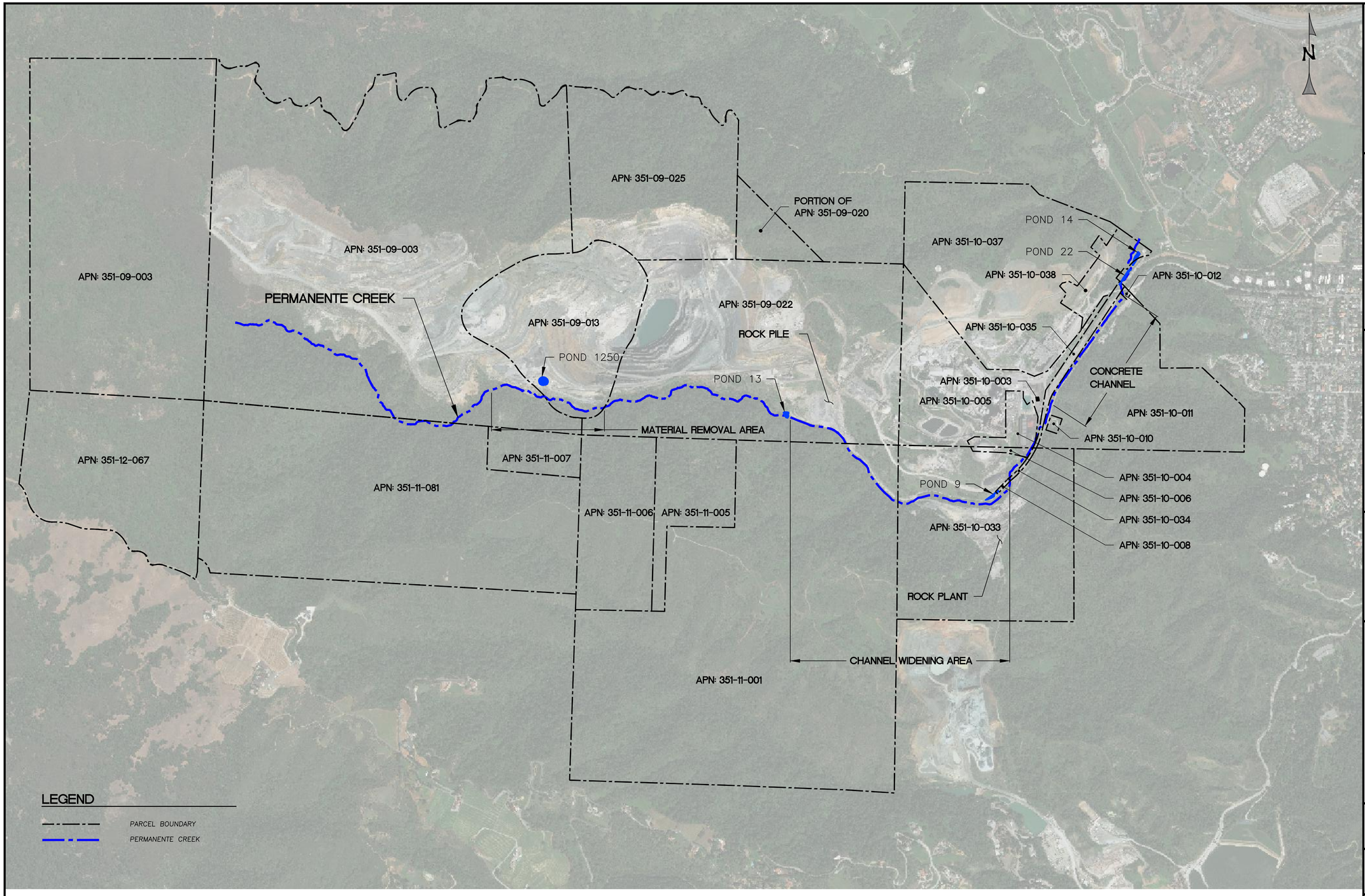
0 1"

C5




PARCEL BOUNDARY SOURCE:
SANTA CLARA COUNTY GIS WEBSITE (https://ges.sccgov.org/discovergis/sccmap)
DOWNLOADED JUNE 2022

**SITE PARCELS AND RIGHT-OF-WAY OVERLAY**
SCALE: 1"=700'

NOTE:
THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, WHERE SHOWN, WERE COMPILED FROM RECORD INFORMATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.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SITE PARCELS AND RIGHT-OF-WAY OVERLAY

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
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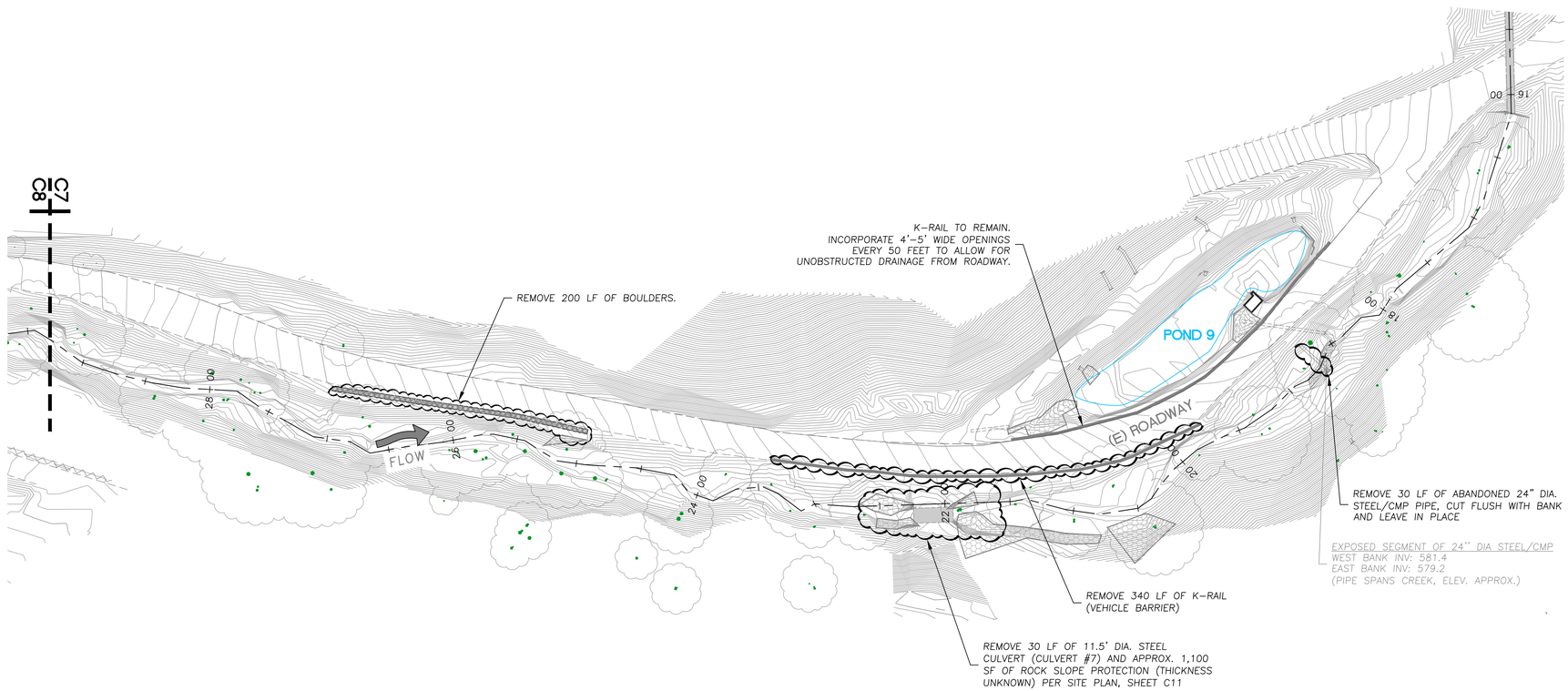
0 1"




## CHANNEL WIDENING DEMOLITION PLAN (1 0F 2)

SCALE: 1" = 50'

## LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- W — (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- 22+00 — DESIGN ALIGNMENT

## NOTES:

1. SEE SITE PLANS FOR TREES TO BE REMOVED.
2. REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.

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CHANNEL WIDENING DEMOLITION PLAN (1 OF 2)

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
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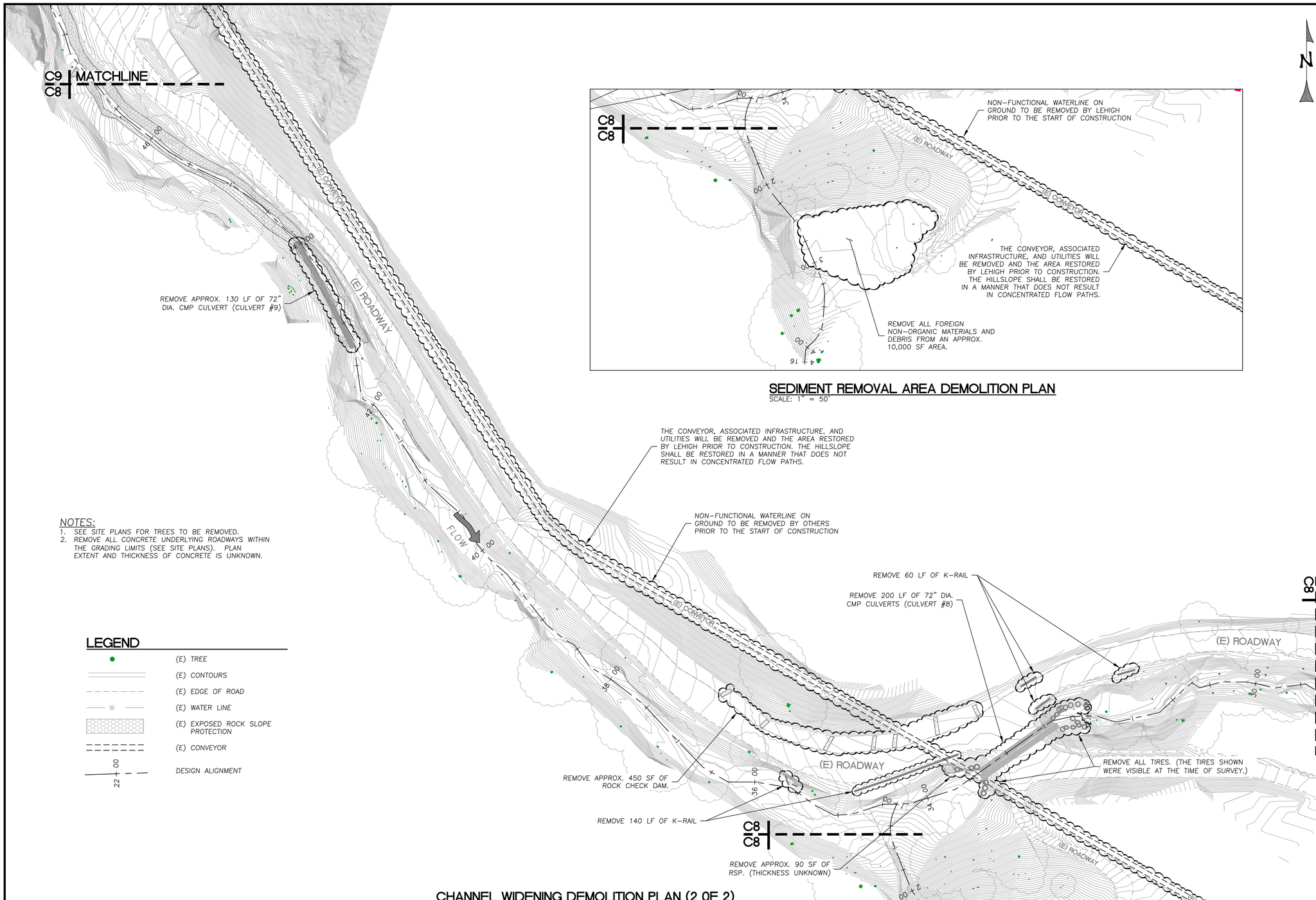
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 — 1"

C7

7 OF 47




## CHANNEL WIDENING DEMOLITION PLAN (2 0F 2)

SCALE: 1" = 50'




## SEDIMENT REMOVAL AREA DEMOLITION PLAN

SCALE: 1" = 50'

N

NOTES:
1. SEE SITE PLANS FOR TREES TO BE REMOVED.
2. REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- W — (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- 22+00 — DESIGN ALIGNMENT

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CHANNEL WIDENING DEMOLITION PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

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0 — 1"

C8

RETAIN POND 13B

RETAIN EXISTING CULVERT/SLOPEDRAIN AND INCORPORATE INTO THE RESTORED CHANNEL, AS DESCRIBED ON SHEET C19.

POND 13

(E) ROAD

FLOW

REMOVE POND 13 DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS.

REMOVE APPROX. 380 LF OF 11.5' DIA. CMP HALF-CULVERT (CULVERT #11) AND ASSOCIATED CONCRETE DROP STRUCTURE AT DOWNSTREAM END..

REMOVE APPROX. 550 LF OF 96" DIA. CMP CULVERT (CULVERT #10, ALIGNMENT ESTIMATED)

REMOVE 190 LF OF K-RAIL

REMOVE 220 LF OF K-RAIL

THE ROCK PILE, THE INTAKES TO CONVEYOR SYSTEM AND SUBGRADE CONVEYOR COMPONENTS WILL BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION.

THE CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES WILL BE REMOVED AND THE AREA RESTORED BY LEHIGH PRIOR TO CONSTRUCTION. THE HILLSLOPE SHALL BE RESTORED IN A MANNER THAT DOES NOT RESULT IN CONCENTRATED FLOW PATHS.

NON-FUNCTIONAL WATER LINE ON GROUND SURFACE TO BE REMOVED BY LEHIGH PRIOR TO THE START OF CONSTRUCTION.

REMOVE APPROX. 1,000 SF OF ROCK SLOPE PROTECTION (THICKNESS UNKNOWN) PER SITE PLAN, SHEET C19. FINAL EXTENT OF ROCK SLOPE PROTECTION REMOVAL WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO ENSURE A SMOOTH TRANSITION TO THE EXISTING CHANNEL.

NOTES:
1. SEE SITE PLANS FOR TREES TO BE REMOVED.
2. REMOVE ALL CONCRETE UNDERLYING ROADWAYS WITHIN THE GRADING LIMITS (SEE SITE PLANS). PLAN EXTENT AND THICKNESS OF CONCRETE IS UNKNOWN.

LEGEND

- (E) TREE
- (E) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- (E) CONVEYOR
- DESIGN ALIGNMENT

ROCK PILE AREA DEMOLITION PLAN
SCALE: 1" = 50'

C9 MATCHLINE C8

N

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ROCK PILE AREA DEMOLITION PLAN

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

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|---|---|
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BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C9

9 OF 47

POND 1250, THE UPPER TREATMENT FACILITIES, AND ASSOCIATED INFRASTRUCTURE THAT WILL BE IMPACTED BY PROJECT CONSTRUCTION WILL BE REMOVED AND RELOCATED, AS NEEDED, BY LEHIGH PRIOR TO THE START OF CONSTRUCTION AT THE MATERIAL REMOVAL AREA.

POND 1250

(E) THALWEG

(E) WATER TREATMENT FACILITIES

(E) WATER TREATMENT FACILITIES

(E) ROADWAY

(E) ROADWAY

(E) WATER TREATMENT FACILITIES

REMOVE RELIC CONCRETE STRUCTURES (CONCRETE EXTENTS EXPOSED AT THE SURFACE ARE SHOWN, VOLUME UNKNOWN)

FLOW

DEMOLISH A PORTION OF THE "OLD CRUSHER FOUNDATION" TO CONFORM TO THE ADJACENT BANKS, PER THE OLD CRUSHER SITE PLAN, SHEET C22.

NOTES:
1. SEE SITE PLANS FOR TREES TO BE REMOVED.

## LEGEND

- (E) TREE
- (E) CONTOURS
- (E) EDGE OF ROAD
- (E) WATERLINE
- (E) OVERHEAD ELECTRICAL LINE
- (E) ELECTRICAL POWER POLE
- TRIBUTARY
- DESIGN ALIGNMENT

## MATERIAL REMOVAL AREA AND "OLD CRUSHER FOUNDATION" DEMOLITION PLAN

SCALE: 1" = 60'


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MAT. REMOVAL AREA AND OLD CRUSHER FOUNDATION DEMO. PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

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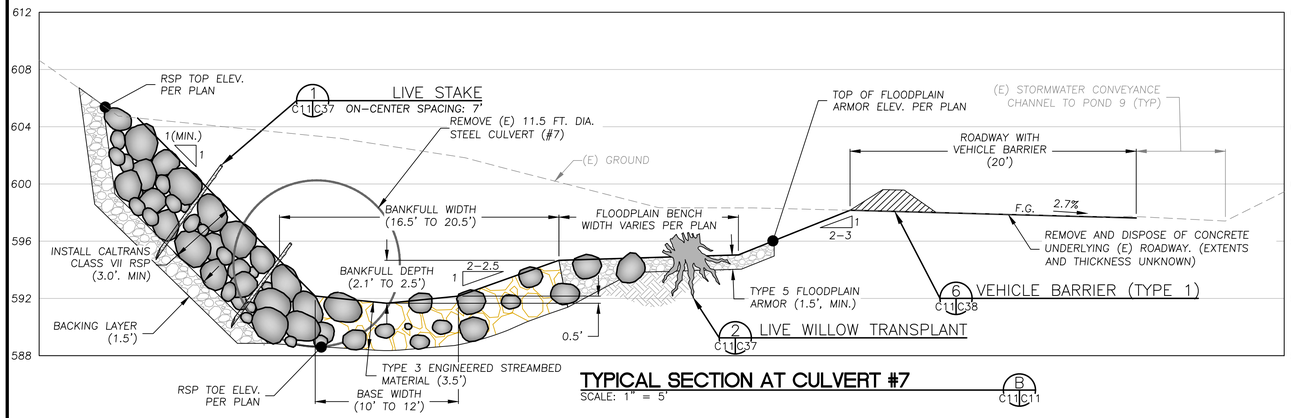
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C10

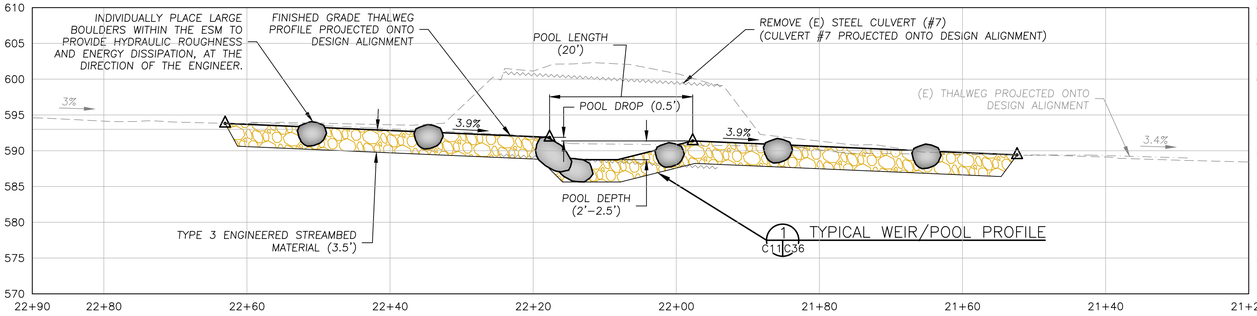
10 OF 47




## TYPICAL SECTION AT CULVERT #7

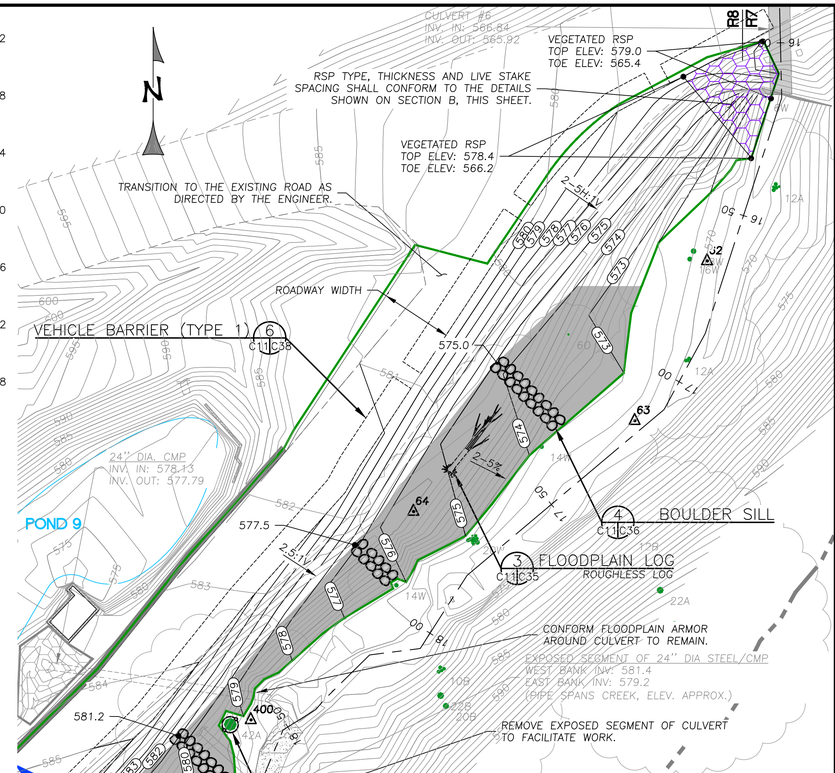
SCALE: 1" = 5'

B C11C11




## CULVERT #7 CHANNEL PROFILE

SCALE: 1" = 10'




## CHANNEL WIDENING PLAN (1 OF 6)

SCALE: 1" = 20'

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER (DOUBLE STEM) | 24" | 1 |

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## NOTES:

1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. FINISHED GRADE CONTOURS SHOWN WITHIN POOL DO NOT REPRESENT DETAILS OF POOL GRADING. REFER TO TYPICAL WEIR AND POOL SECTIONS AND PROFILE, SHT. C34.
3. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

## FLOODPLAIN ARMOR NOTES:

1. INSTALL TYPE 5 FLOODPLAIN ARMOR FROM STA. 16+70 TO 28+00 (1.5', MIN. THICKNESS)
2. INSTALL TYPE 6 FLOODPLAIN ARMOR FROM STA. 30+75 TO 31+75 (2', MIN. THICKNESS)
3. INSTALL TYPE 5 FLOODPLAIN ARMOR FROM STA. 31+75 TO 40+50 (1.5', MIN. THICKNESS)
4. INSTALL TYPE 7 FLOODPLAIN ARMOR FROM STA. 40+50 TO 45+00 (3', MIN. THICKNESS)
5. INSTALL TYPE 6 FLOODPLAIN ARMOR FROM STA. 45+00 TO 48+75 (2', MIN. THICKNESS)

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NOT FOR CONSTRUCTION

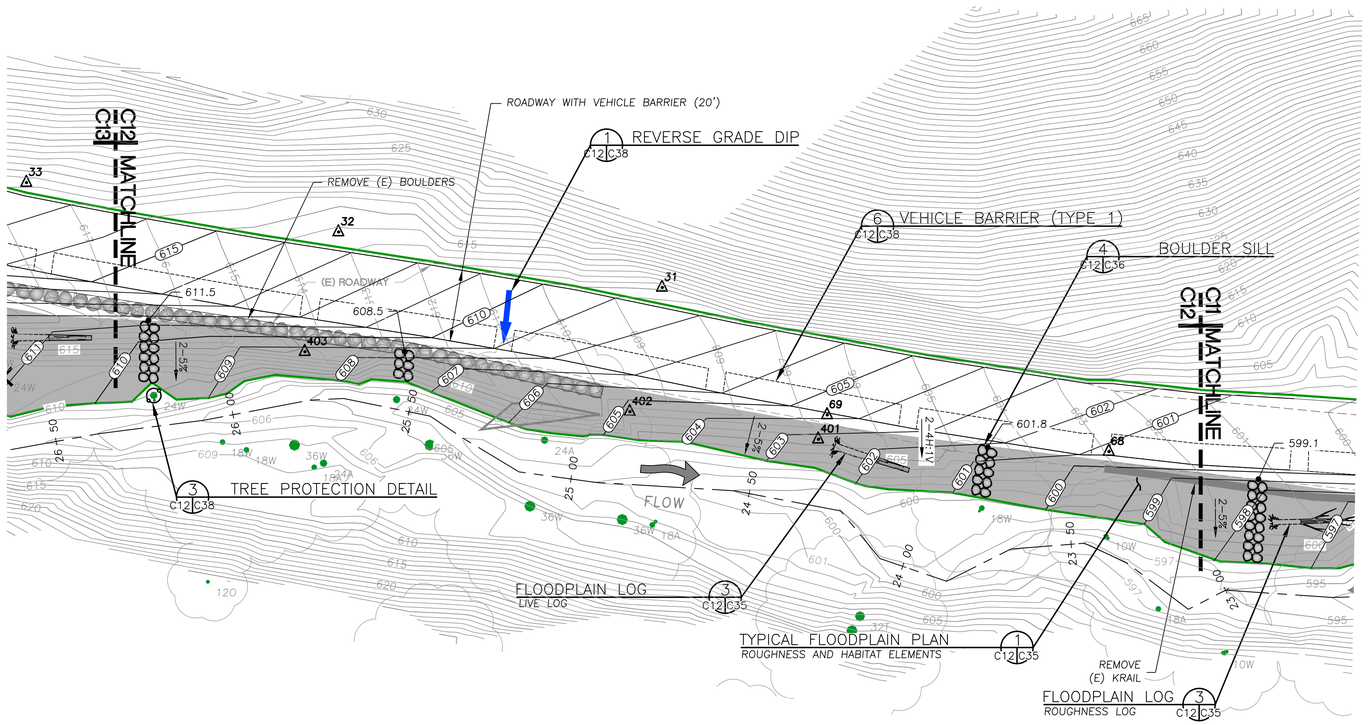
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# CHANNEL WIDENING PLAN (1 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"



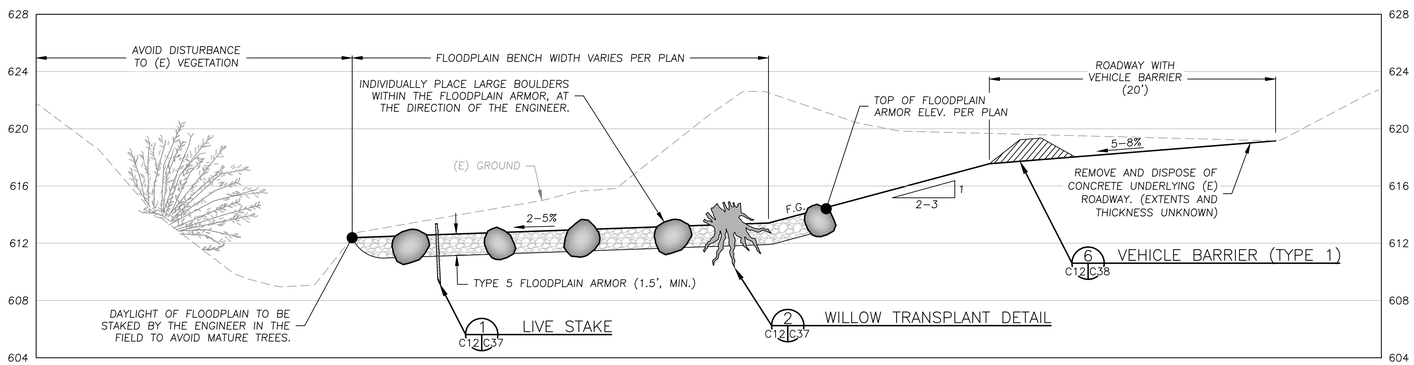

## CHANNEL WIDENING PLAN (2 OF 6)
SCALE: 1" = 20'

NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:
SEE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

## TREE REMOVAL SUMMARY
SEE SHEET C11 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C13 AND C14 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

## LEGEND
- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)




## TYPICAL SECTION
SCALE: 1" = 5'
C C13|C12

NOTES:
SEE REVEGETATION SHEETS (L1–L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.

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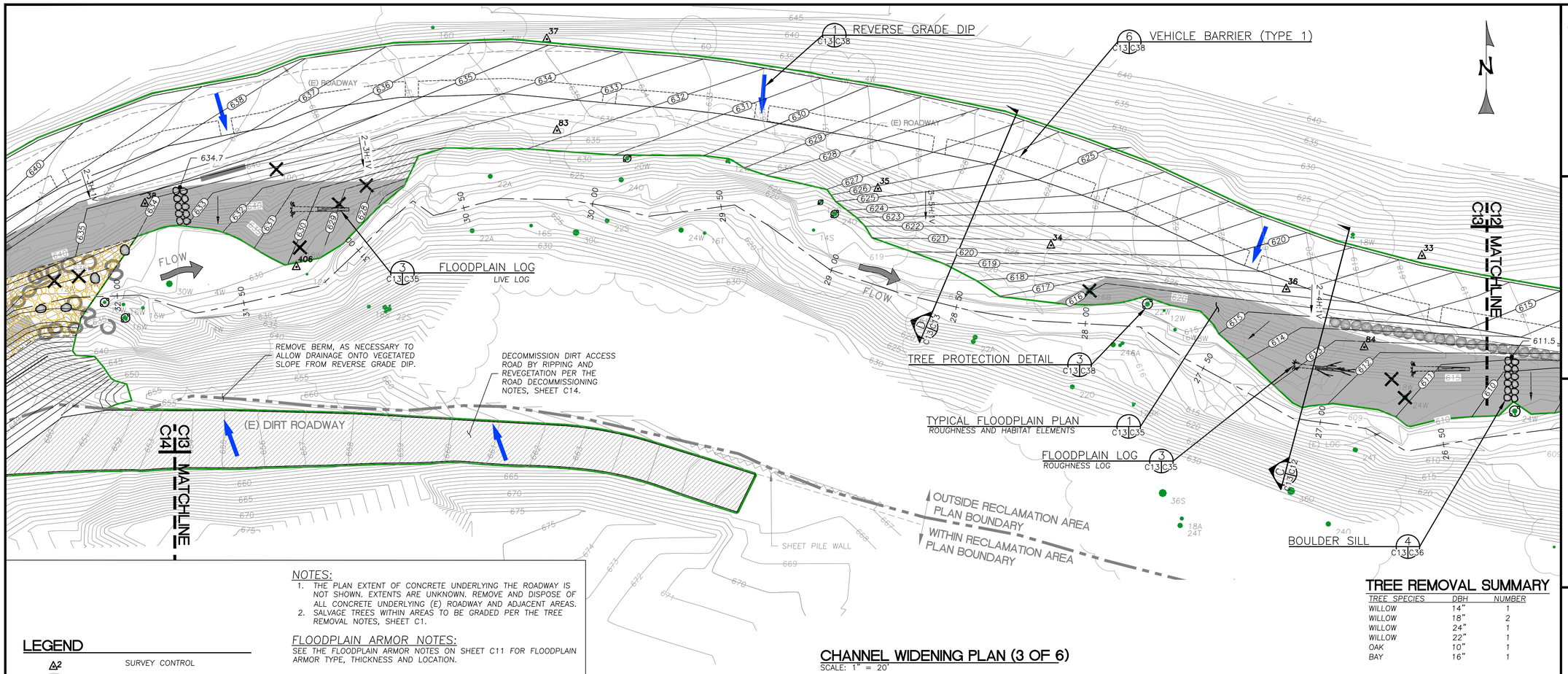
LEHIGH HANSON HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (2 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| WILLOW | 14" | 1 |
| WILLOW | 18" | 2 |
| WILLOW | 24" | 1 |
| WILLOW | 22" | 1 |
| OAK | 10" | 1 |
| BAY | 16" | 1 |

## CHANNEL WIDENING PLAN (3 OF 6)

SCALE: 1" = 20'

NOTES:

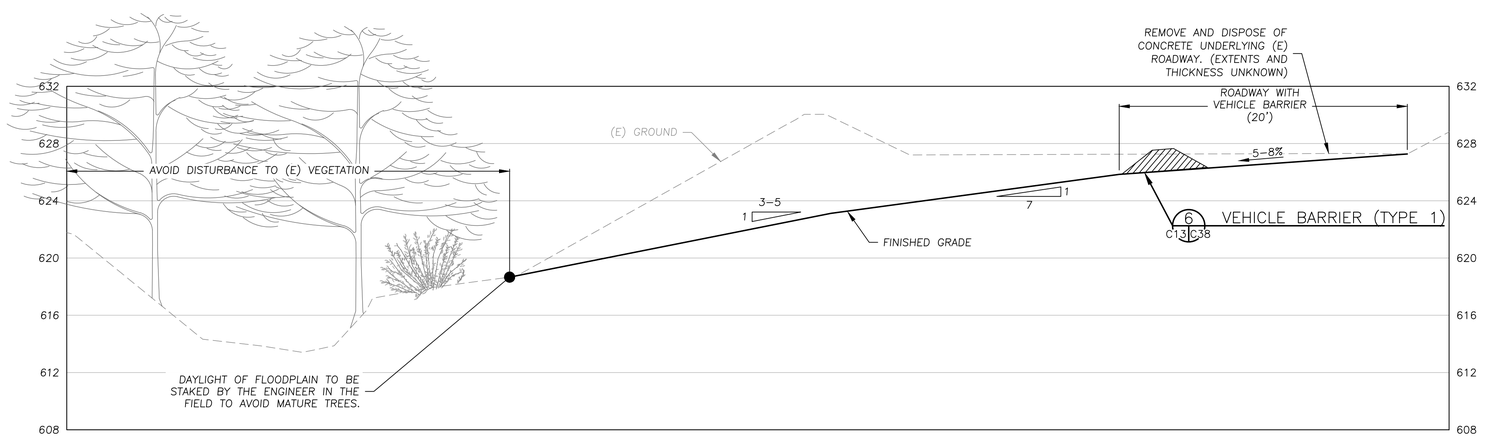
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:

SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER




## TYPICAL SECTION

SCALE: 1" = 5'

D C13|C13

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HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (3 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| SYCAMORE | 32" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 18" | 1 |
| BAY | 12" | 1 |
| OAK | 10" | 1 |
| OAK | 8" | 2 |
| OAK | 6" | 1 |

NOTE:
SEE SHEET C13 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING
- (E) TRACTOR TIRE
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. FINISHED GRADE CONTOURS SHOWN WITHIN POOL DO NOT REPRESENT DETAILS OF POOL GRADING. REFER TO TYPICAL WEIR AND POOL SECTIONS AND PROFILE.
3. CHANNEL GEOMETRY AT THE TRIBUTARY WILL BE FIELD FIT TO ANY BEDROCK EXPOSED DURING EXCAVATION, AS DIRECTED BY THE ENGINEER.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:
SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

ROAD DECOMMISSIONING NOTES:
1. SCARIFY SUBGRADE 12 INCHES AND RECOMPACT TO 85%.
2. INSTALL REVERSE GRADE DIPS, FIBER ROLLS (PER THE EROSION CONTROL PLANS), AND APPLY SEED (PER THE REVEGETATION PLANS).

# CHANNEL WIDENING (4 OF 6) AND SEDIMENT REMOVAL AREA PLAN
SCALE: 1" = 20'


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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (4 OF 6) AND SEDIMENT REMOVAL AREA

PERMANENTE CREEK RESTORATION PLAN

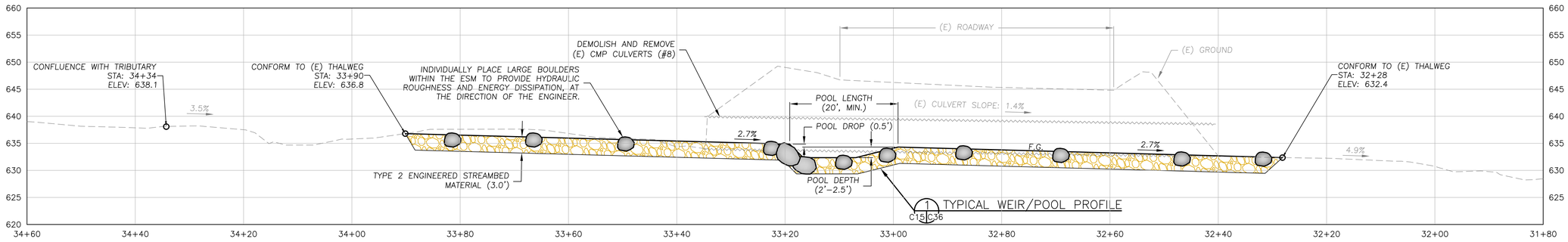
UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

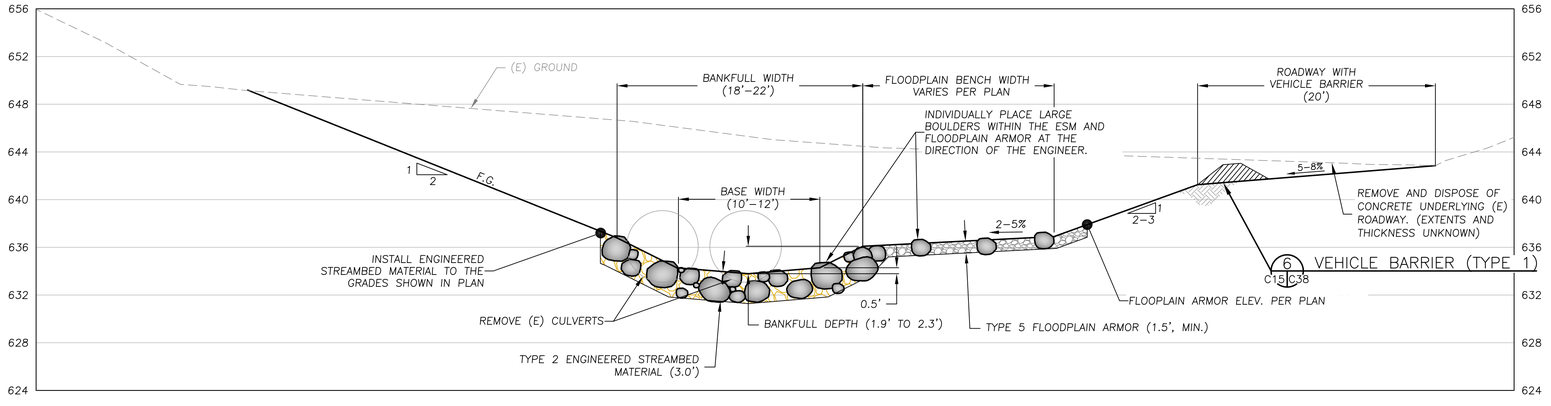
C14 | 14 OF 47




## CULVERT #8 CHANNEL PROFILE

SCALE: 1" = 10'

1 C14 C15




## TYPICAL SECTION AT CULVERT #8 SECTION

SCALE: 1" = 6'

B C14 C15

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LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
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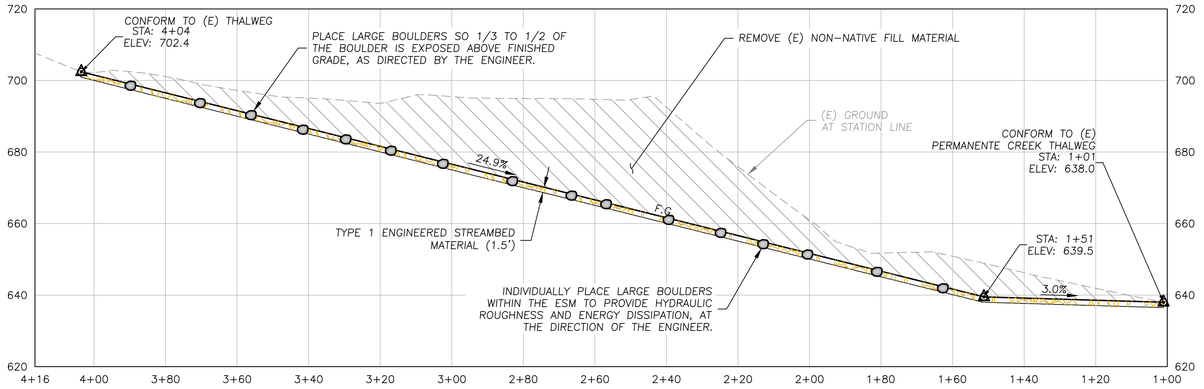
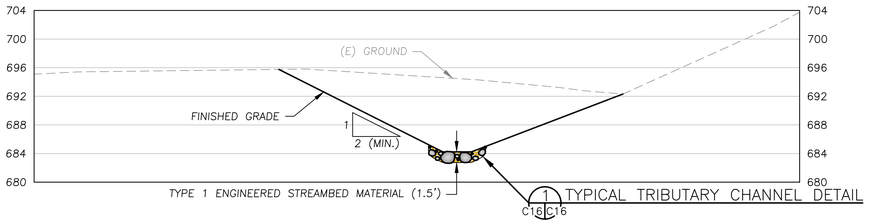
0 1"



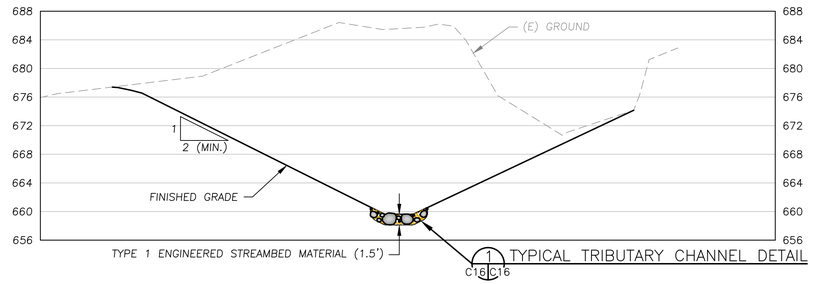

## TRIBUTARY PROFILE (2)
SCALE: 1" = 20'
C14|C16

NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CHANNEL GEOMETRY AT THE TRIBUTARY WILL BE FIELD FIT TO ANY BEDROCK EXPOSED DURING EXCAVATION, AS DIRECTED BY THE ENGINEER.
3. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



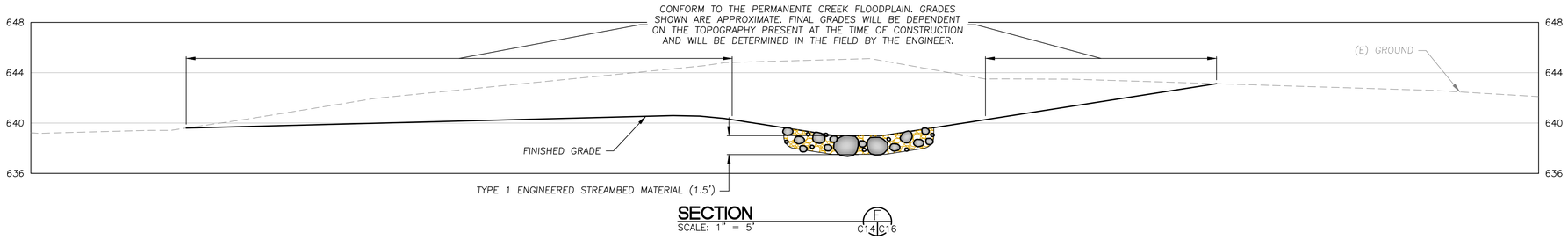

## 1 TYPICAL TRIBUTARY CHANNEL DETAIL
C15|C16

## SECTION (D)
SCALE: 1" = 10'
C14|C16

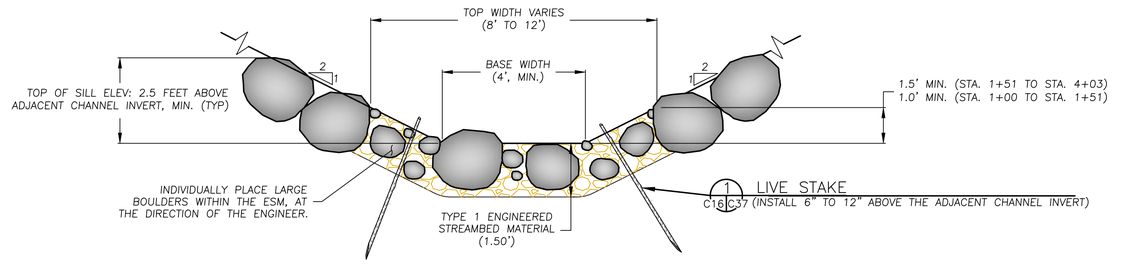



## 1 TYPICAL TRIBUTARY CHANNEL DETAIL
C15|C16

## SECTION (E)
SCALE: 1" = 10'
C14|C16




## SECTION (F)
SCALE: 1" = 5'
C14|C16




## TYPICAL TRIBUTARY CHANNEL DETAIL (1)
SCALE: 1" = 2'
C16|C16

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PREPARED AT THE REQUEST OF:
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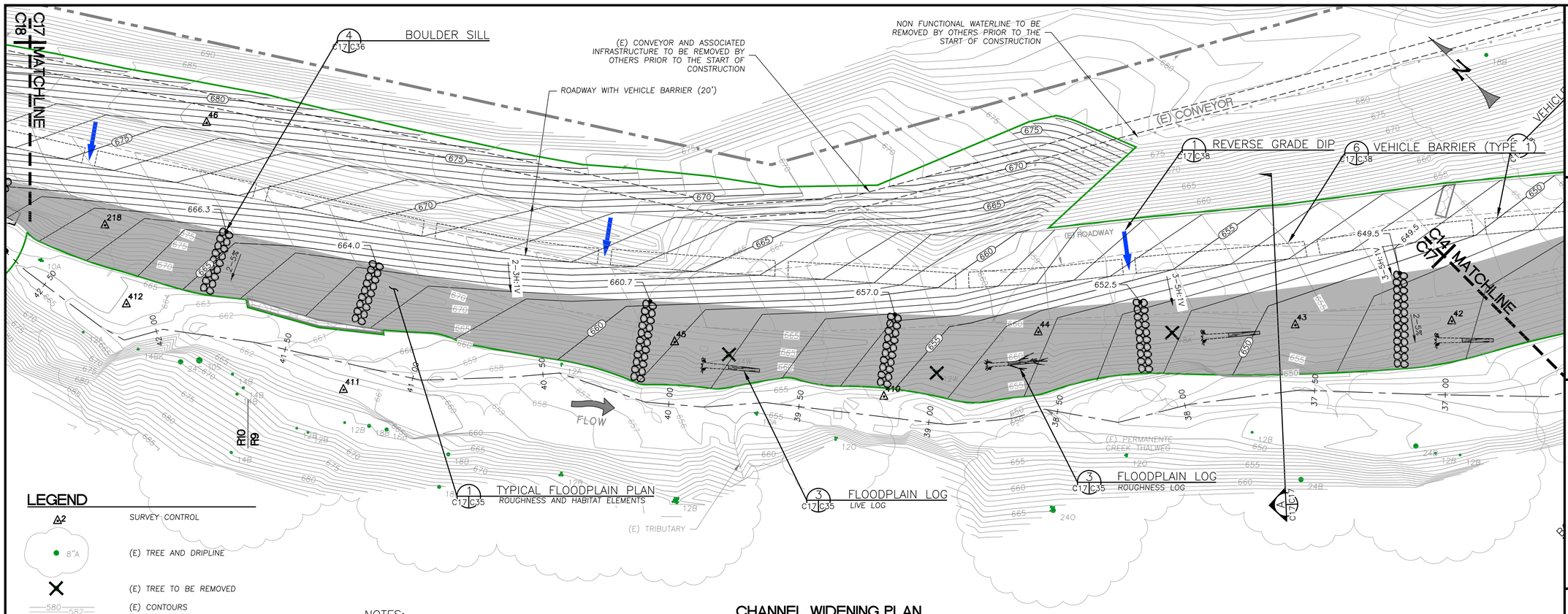
HEIDELBERG CEMENT GROUP

# SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 18" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 24" | 1 |

NOTES:

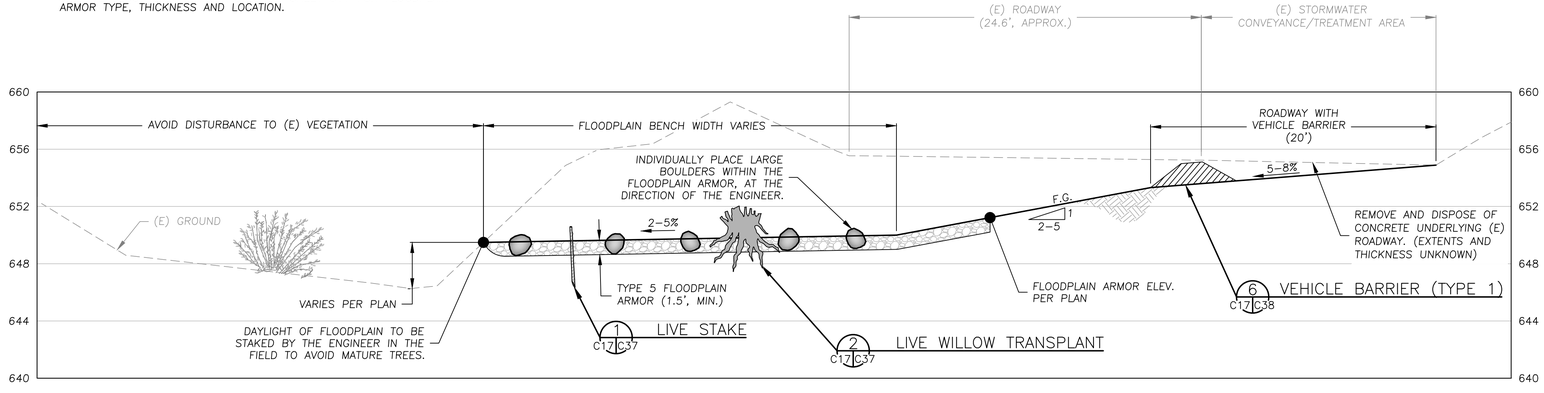
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

FLOODPLAIN ARMOR NOTES:

SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

## CHANNEL WIDENING PLAN

SCALE: 1" = 20'




## TYPICAL SECTION

SCALE: 1" = 5'

A C17|C17

NOTES:

SEE REVEGETATION SHEETS (L1-L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.

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PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

# CHANNEL WIDENING PLAN (5 OF 6)

PERMANENTE CREEK RESTORATION PLAN

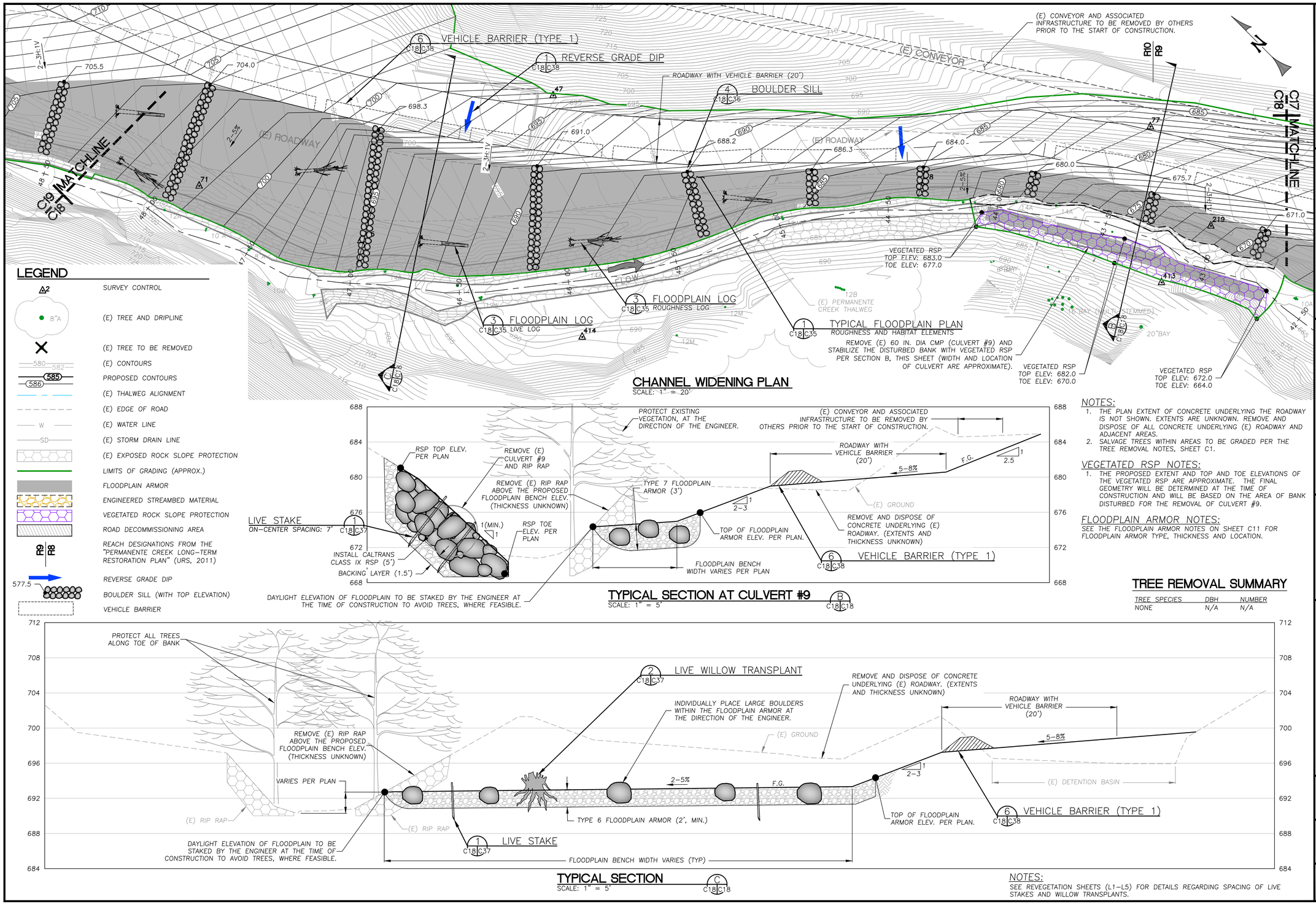
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"




## CHANNEL WIDENING PLAN
SCALE: 1" = 20'




## TYPICAL SECTION AT CULVERT #9
SCALE: 1" = 5'  B C18|C18




## TYPICAL SECTION
SCALE: 1" = 5'  C C18|C18

## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## NOTES:
1. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
2. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

## VEGETATED RSP NOTES:
1. THE PROPOSED EXTENT AND TOP AND TOE ELEVATIONS OF THE VEGETATED RSP ARE APPROXIMATE. THE FINAL GEOMETRY WILL BE DETERMINED AT THE TIME OF CONSTRUCTION AND WILL BE BASED ON THE AREA OF BANK DISTURBED FOR THE REMOVAL OF CULVERT #9.

## FLOODPLAIN ARMOR NOTES:
SEE THE FLOODPLAIN ARMOR NOTES ON SHEET C11 FOR FLOODPLAIN ARMOR TYPE, THICKNESS AND LOCATION.

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| NONE | N/A | N/A |

## NOTES:
SEE REVEGETATION SHEETS (L1-L5) FOR DETAILS REGARDING SPACING OF LIVE STAKES AND WILLOW TRANSPLANTS.


WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM


PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (6 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## KEY NOTES:

1. THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT. REFER TO THE FIELD ENGINEERING NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE CASCADE AND STEP-POOL DETAILS ON SHEET C34.
3. THE PROJECT GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST MUST INSPECT THE SLOPE EXPOSED BELOW THE ROCK PILE, FOLLOWING THE REMOVAL OF THE ROCK PILE, TO EVALUATE THE NATURE AND STABILITY OF THE EXPOSED MATERIAL AND PREPARE RECOMMENDATIONS FOR STABILIZING THE SLOPE. FINAL SLOPE GEOMETRY WILL BE ADJUSTED, AS NECESSARY, PER THE GEOTECHNICAL ENGINEER'S OR PROJECT GEOLOGIST'S RECOMMENDATIONS ONCE THE ROCK PILE IS REMOVED. BENCHING OF THE SLOPE MAY BE REQUIRED.

UPPER LIMITS OF GRADING ALONG THE PROJECT AREA ARE APPROXIMATE

MAINTAIN (E) PARKING AREA

RETAIN POND 13B

24-INCH DIA. CMP
INV. IN: NOT SURVEYED
INV. OUT: 805.5
(CONFORM PIPE OUTLET TO THE FINISHED GRADE CONDITION AS DIRECTED BY THE ENGINEER)

BOULDER SILL 4 C19|C36

POND 13

(E) ROAD

(N) ROAD

LIMITS OF (E) ROCK PILE (MAY 2022, APPROX.)

(E) ROCK PILE AND INTAKE TO CONVEYOR SYSTEM TO BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION. (PILE LIMITS AND INTAKE LOCATIONS SHOWN ARE APPROXIMATE.)

1 REVERSE GRADE DIP C19|C38

7 VEHICLE BARRIER (TYPE 2) C19|C38

(E) CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES TO BE REMOVED BY LEHIGH PRIOR TO CONSTRUCTION.

6 VEHICLE BARRIER (TYPE 1) C19|C38

TRANSITION FROM 18' TO 20' ROADWAY WIDTH OVER 10 LF

FLOODPLAIN LOG 3 C12|C35
ROUGHNESS LOG

TYPICAL FLOODPLAIN PLAN 4 C19|C35
ROUGHNESS AND HABITAT ELEMENTS

TYPICAL STEP-POOL AND CASCADE DETAILS 1 C19|C35

REMOVE 11.5' DIA. HALF CMP (CULVERT #11) AND ASSOCIATED CONCRETE HEADWALL AND DROP INLET.

REMOVE (E) DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS AND IMPOUNDED FINE SEDIMENT WITHIN THE POND. INSTALL BOULDER GRADE CONTROL PER TYPICAL SECTION AT WEIR, SHT. C36, IF THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT IS CONSTRUCTED

REMOVE 96" DIA. CMP (CULVERT #10). (EXISTING ALIGNMENT ESTIMATED)

REMOVE (E) RSP. THE EXTENT OF RSP REMOVAL WILL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION TO ENSURE A SMOOTH TRANSITION TO THE EXISTING CHANNEL

C19 MATCHLINE C18

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- SURVEY CONTROL POINT
- REVERSE GRADE DIP
- VEHICLE BARRIER

## TREE REMOVAL SUMMARY

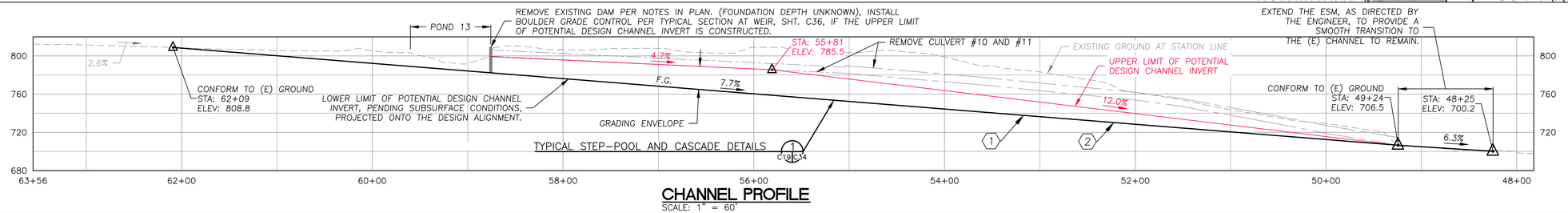
| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 10" | 1 |
| ALDER | 12" | 1 |
| MAPLE | 12" | 1 |

## NOTES (CONTINUED):

4. CONSTRUCT AN OPEN CHANNEL THROUGH POND 13 MEETING THE DIMENSIONS SHOWN ON THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C20, IF THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT IS FOLLOWED. THE CONSTRUCTED CHANNEL INVERT ELEVATION WILL BE DETERMINED BY THE ENGINEER AT THE TIME OF CONSTRUCTION BASED ON DOWNSTREAM BEDROCK ELEVATIONS, IN CONFORMANCE WITH THE FIELD ENGINEERING NOTES SHOWN ON SHEET C40.
5. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C20, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
6. THE PLAN EXTENT OF CONCRETE UNDERLYING THE ROADWAY IS NOT SHOWN. EXTENTS ARE UNKNOWN. REMOVE AND DISPOSE OF ALL CONCRETE UNDERLYING (E) ROADWAY AND ADJACENT AREAS.
7. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEET C1.

## ROCK PILE AREA PLAN

SCALE: 1" = 50'




## CHANNEL PROFILE

SCALE: 1" = 60'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PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE AREA PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.R.S |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

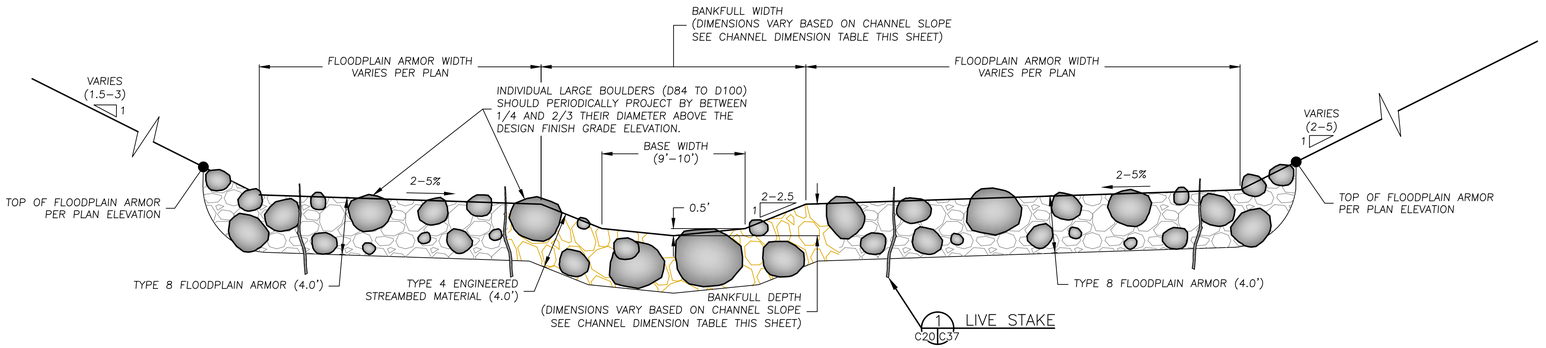
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C19

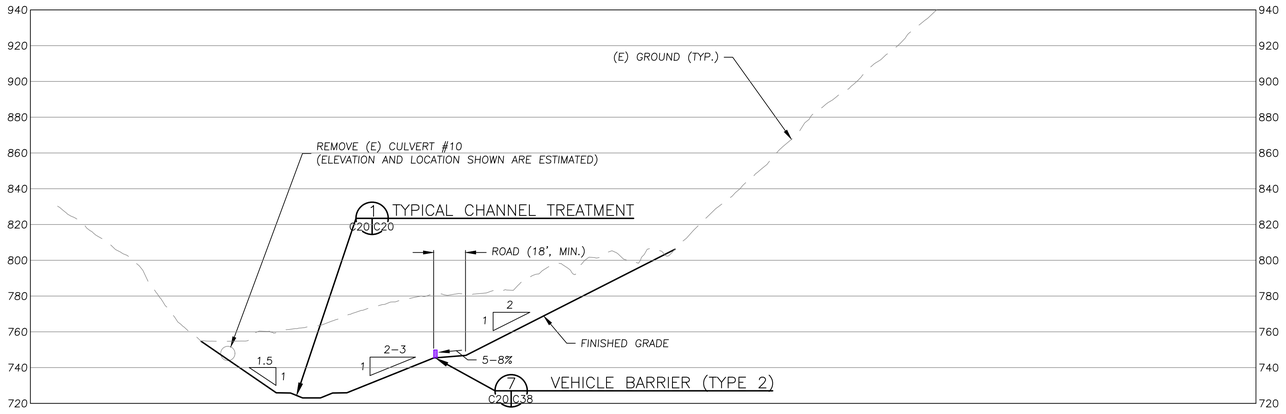
19 OF 47

| CHANNEL DIMENSIONS FOR ROCKPILE AREA | | |
|---|---|---|
| DESIGN SLOPE (%) | DESIGN DIMENSIONS | |
| | BANKFULL WIDTH | BANKFULL DEPTH |
| <4% | 17.5'–21.5' | 1.8'–2.2' |
| 4%–8% | 16.0'–20.0' | 2.0'–2.4' |
| >8% | 15.5'–18.5' | 2.4'–2.8' |

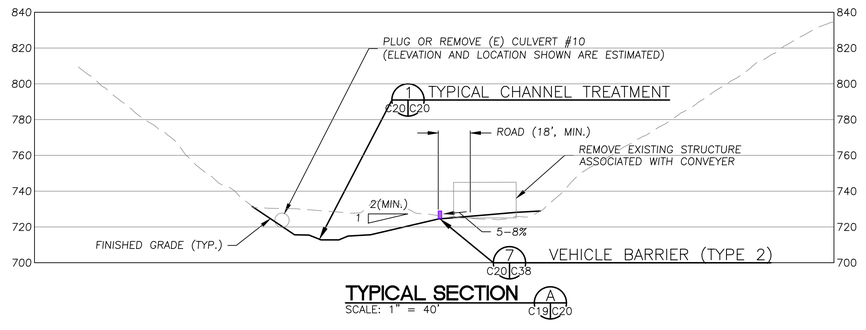



## TYPICAL CHANNEL TREATMENT DETAIL
SCALE: 1" = 5'
C20,C21 1 C20

NOTES:
1. INSTALL TYPE 8 FLOODPLAIN ARMOR FROM STA. 48+75 TO 62+09.
2. INSTALL TYPE 4 ENGINEERED STREAMBED MATERIAL FROM STA 49+15 (APPROX.) TO 62+09.
3. SEE THE TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN, SHEET C35 FOR INFORMATION REGARDING FEATURES NOT SHOWN ON THE TYPICAL TREATMENT DETAIL.




## TYPICAL SECTION
SCALE: 1" = 40'
B C19 C20




## TYPICAL SECTION
SCALE: 1" = 40'
A C19 C20

NOTES:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'–5' WIDE OPENINGS IN K–RAIL EVERY 50–60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. BACKFILL AREAS WHERE CULVERT REMOVAL OCCURS BELOW FINISHED GRADE BY PLACING TYPE 1 ENGINEERED STREAMBED MATERIAL, AS DIRECTED BY THE ENGINEER.

## LEGEND
- EXISTING GROUND AT TIME OF SURVEY
- ESTIMATED EXISTING GROUND BELOW ROCK PILE
- FINISH GRADE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LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ROCK PILE AREA SECTIONS (1 OF 2)

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.R.S. |
| CHECKED BY: | M.W.W. |
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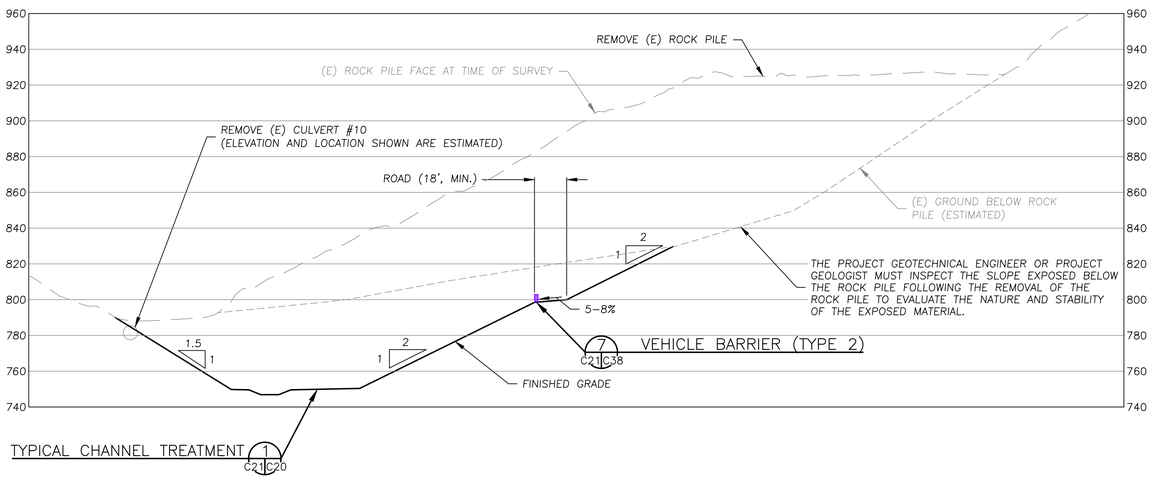
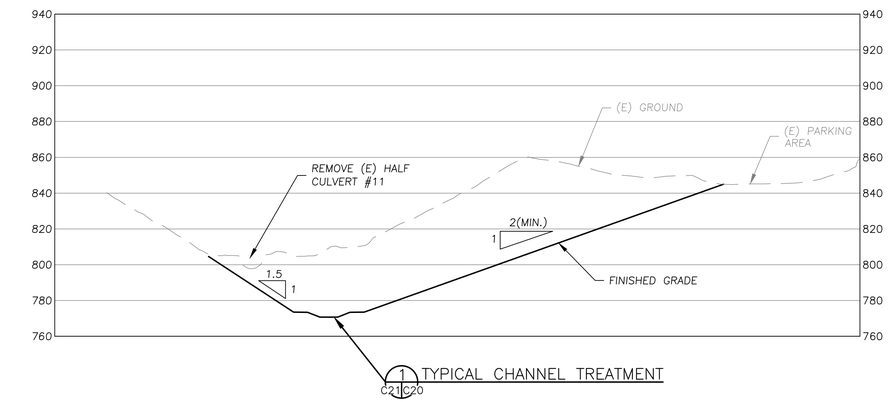
0 1"

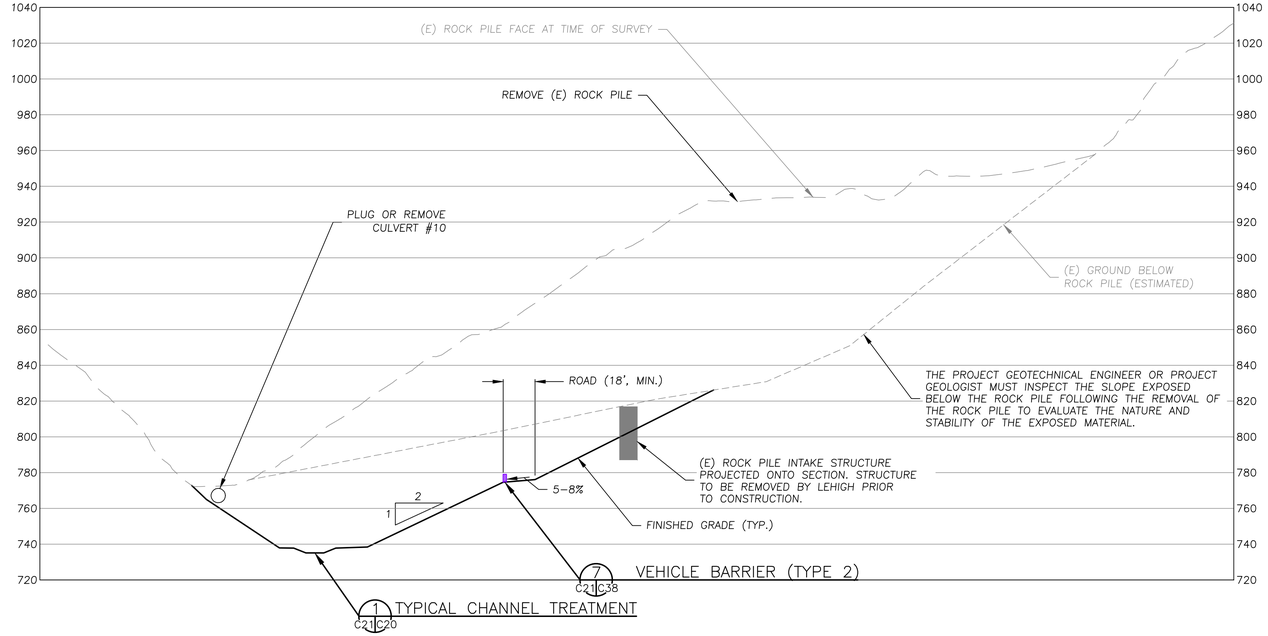



## TYPICAL SECTION
SCALE: 1" = 40'
D
C19 C21




## TYPICAL SECTION
SCALE: 1" = 40'
E
C19 C21

NOTE:
THE PROJECT GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST MUST INSPECT THE SLOPE EXPOSED BELOW THE ROCK PILE FOLLOWING THE REMOVAL OF THE ROCK PILE TO EVALUATE THE NATURE AND STABILITY OF THE EXPOSED MATERIAL.




## TYPICAL SECTION
SCALE: 1" = 40'
C
C19 C21

LEGEND

- EXISTING GROUND AT TIME OF SURVEY
- ESTIMATED EXISTING GROUND BELOW ROCK PILE
- FINISH GRADE

NOTES:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'-5' WIDE OPENINGS IN K-RAIL EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. BACKFILL AREAS WHERE CULVERT REMOVAL OCCURS BELOW FINISHED GRADE BY PLACING TYPE 1 ENGINEERED STREAMBED MATERIAL, AS DIRECTED BY THE ENGINEER.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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# ROCK PILE AREA SECTIONS (2 OF 2)

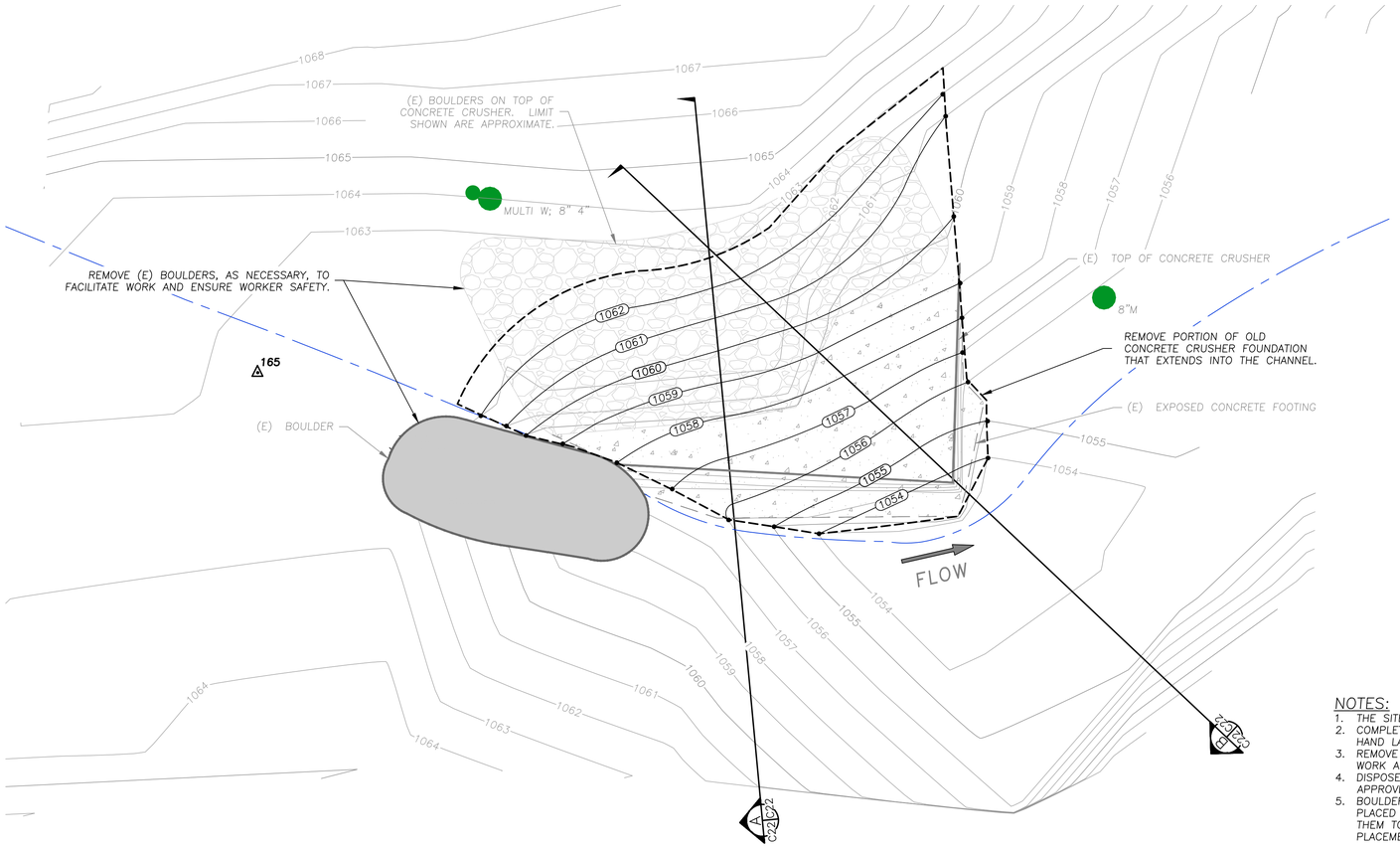
PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.R.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C21

21 OF 47




N

## LEGEND

- EXISTING CONTOURS (85 — 86)
- PROPOSED CONTOURS (100 / 101)
- EXISTING FLOW LINE
- SURVEY CONTROL POINT (2)
- EXISTING TREE (12"A)

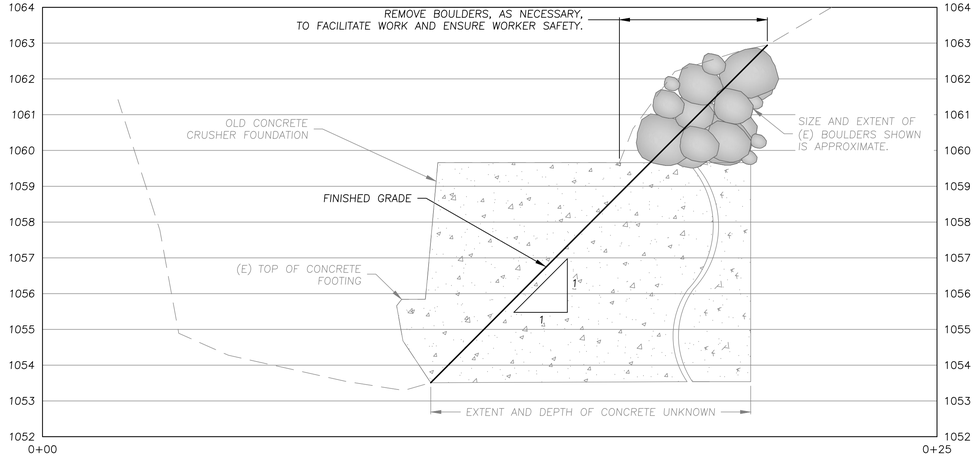
NOTES:

1. THE SITE IS NOT ACCESSIBLE TO VEHICLES.
2. COMPLETE WORK USING SMALL HAND-OPERATED EQUIPMENT AND HAND LABOR.
3. REMOVE BOULDERS AND DEBRIS, AS NECESSARY, TO FACILITATE WORK AND ENSURE WORKER SAFETY.
4. DISPOSE OF ALL REMOVED CONCRETE AND DEBRIS AT AN APPROVED, OFFSITE LOCATION.
5. BOULDERS REMOVED TO FACILITATE CONSTRUCTION MAY BE PLACED ON THE SLOPE IN A MANNER THAT WILL NOT ALLOW THEM TO ENTER THE CREEK. THE LOCATION FOR BOULDER PLACEMENT WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.

## OLD CRUSHER FOUNDATION SITE PLAN

SCALE: 1" = 2'

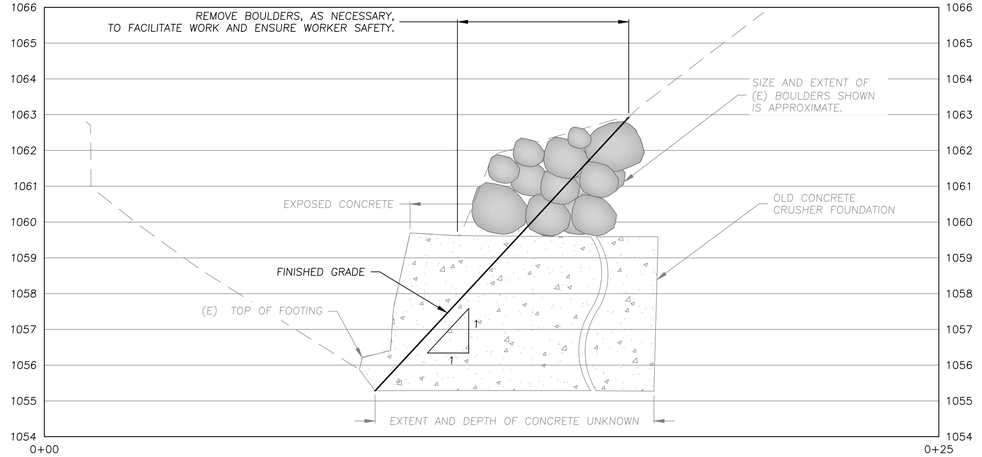
1 C23 C22




## SECTION

SCALE: 1" = 2'

B C22 C22




## SECTION

SCALE: 1" = 2'

A C22 C22

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SANTA CRUZ, CA 95060
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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

OLD CRUSHER FOUNDATION SITE PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | C.B.H. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

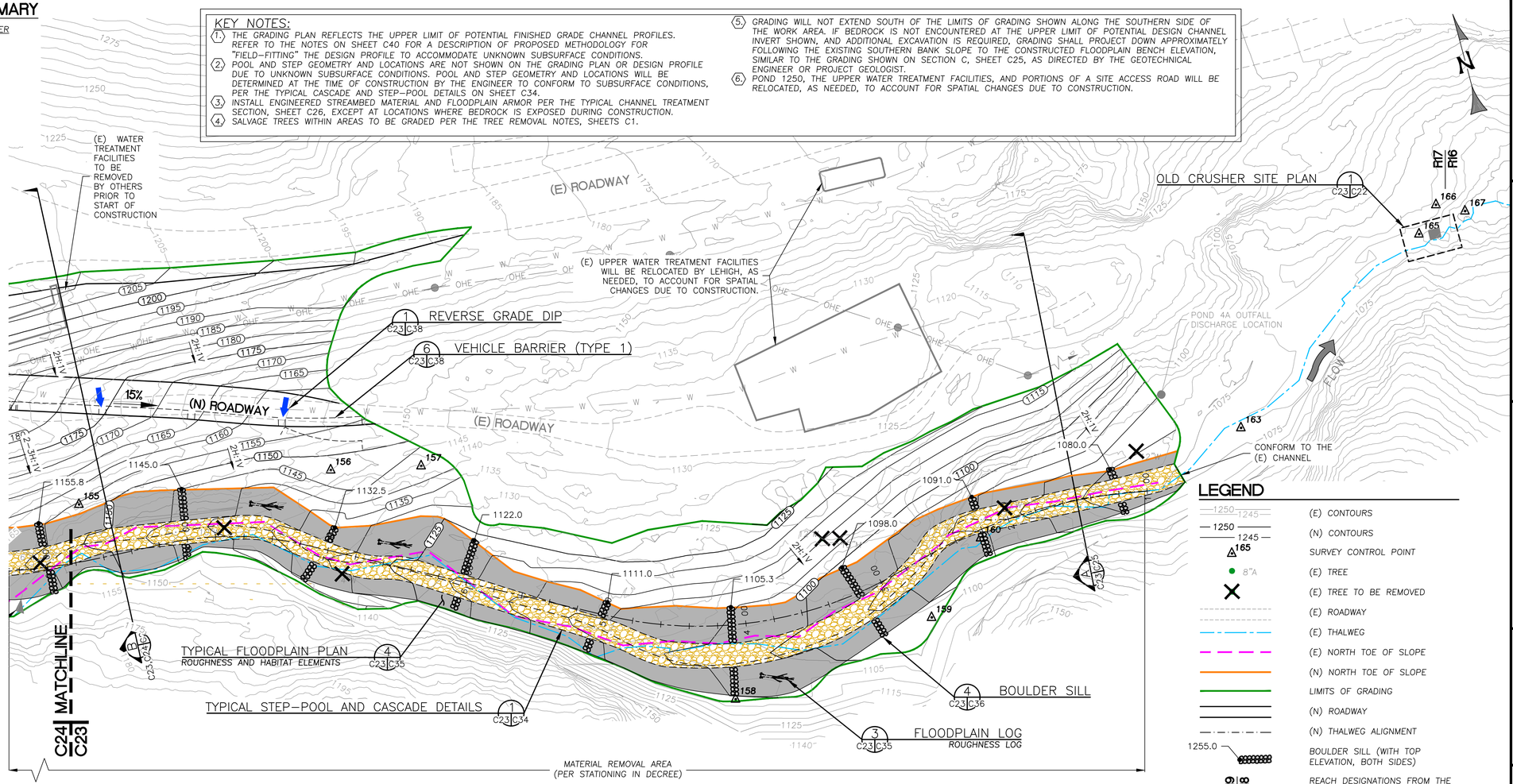
0 1"

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| MADRONE | 12" | 1 |
| MADRONE | 18" | 1 |
| WILLOW | 4" | 1 |
| WILLOW | 6" | 2 |
| WILLOW | 10" | 1 |
| WILLOW | 12" | 1 |

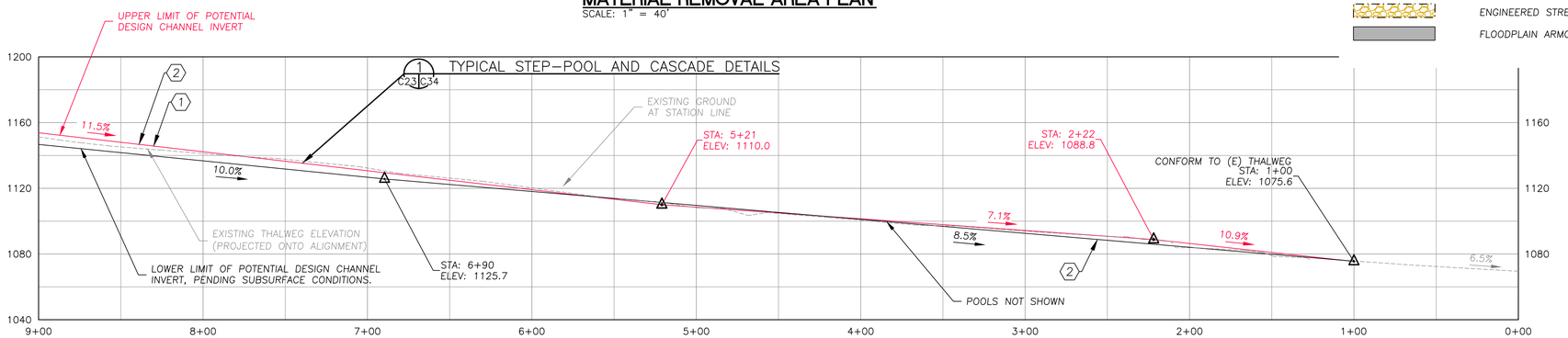
### KEY NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD–FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP–POOL DETAILS ON SHEET C34.
3. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
5. GRADING WILL NOT EXTEND SOUTH OF THE LIMITS OF GRADING SHOWN ALONG THE SOUTHERN SIDE OF THE WORK AREA. IF BEDROCK IS NOT ENCOUNTERED AT THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT SHOWN, AND ADDITIONAL EXCAVATION IS REQUIRED, GRADING SHALL PROJECT DOWN APPROXIMATELY FOLLOWING THE EXISTING SOUTHERN BANK SLOPE TO THE CONSTRUCTED FLOODPLAIN BENCH ELEVATION, SIMILAR TO THE GRADING SHOWN ON SECTION C, SHEET C25, AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.
6. POND 1250, THE UPPER WATER TREATMENT FACILITIES, AND PORTIONS OF A SITE ACCESS ROAD WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.




## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 40'

### LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG–TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR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LEHIGH HANSON HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
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BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## LEGEND

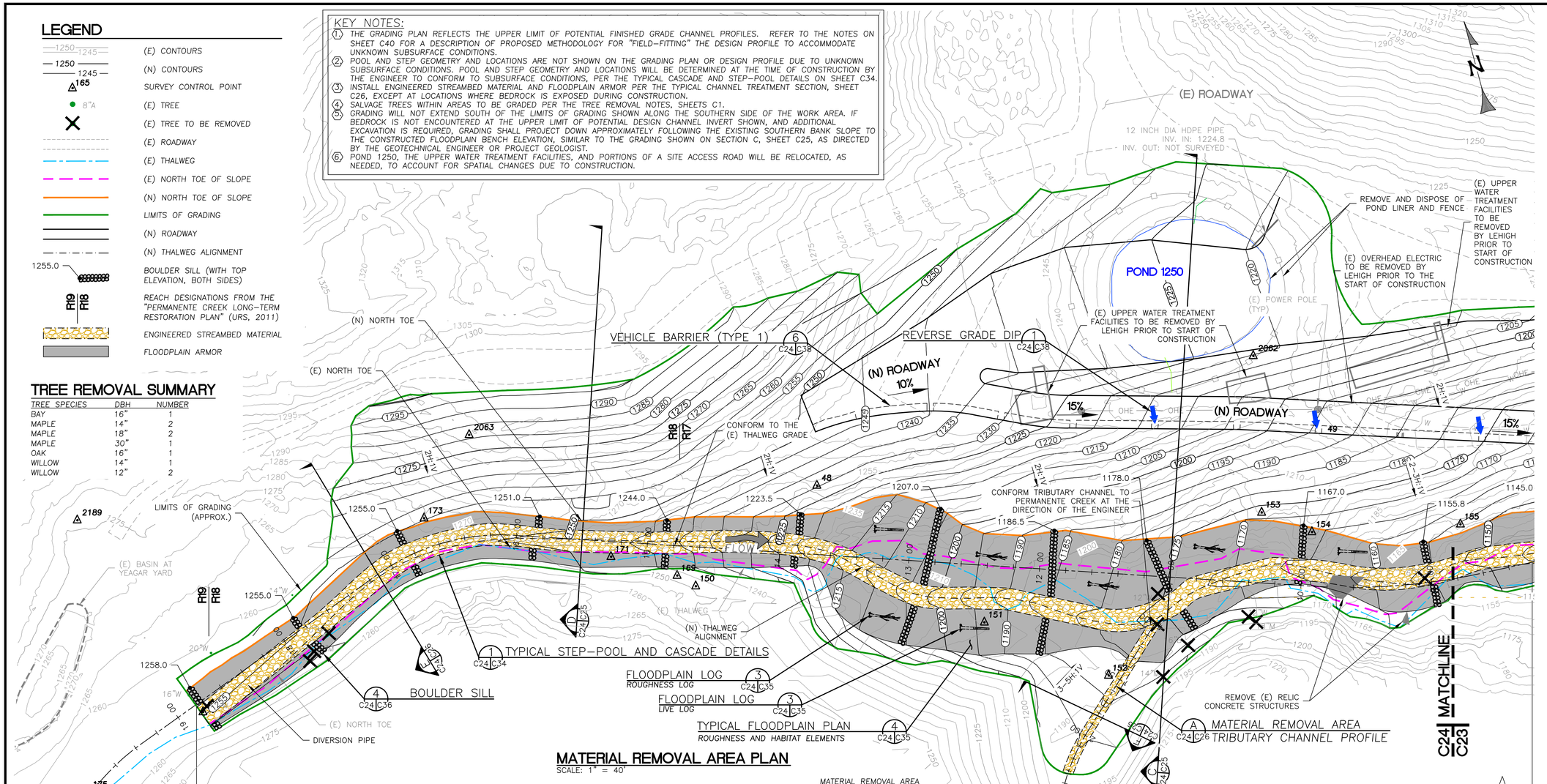
- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| BAY | 16" | 1 |
| MAPLE | 14" | 2 |
| MAPLE | 18" | 2 |
| MAPLE | 30" | 1 |
| OAK | 16" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 12" | 2 |

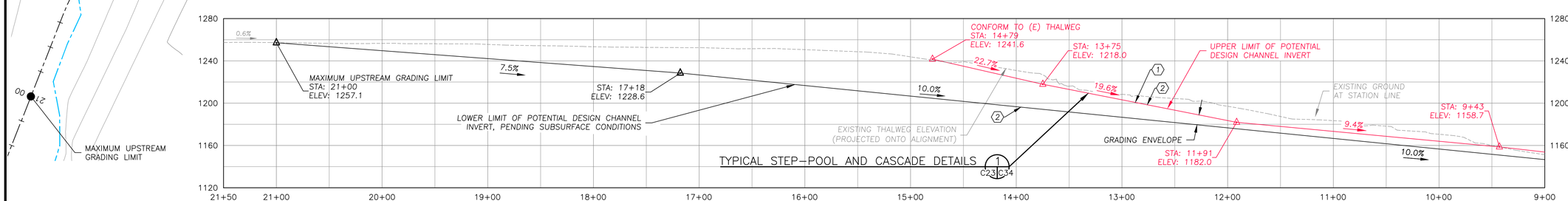
## KEY NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP-POOL DETAILS ON SHEET C34.
3. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
4. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
5. GRADING WILL NOT EXTEND SOUTH OF THE LIMITS OF GRADING SHOWN ALONG THE SOUTHERN SIDE OF THE WORK AREA. IF BEDROCK IS NOT ENCOUNTERED AT THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT SHOWN, AND ADDITIONAL EXCAVATION IS REQUIRED, GRADING SHALL PROJECT DOWN APPROXIMATELY FOLLOWING THE EXISTING SOUTHERN BANK SLOPE TO THE CONSTRUCTED FLOODPLAIN BENCH ELEVATION, SIMILAR TO THE GRADING SHOWN ON SECTION C, SHEET C25, AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.
6. POND 1250, THE UPPER WATER TREATMENT FACILITIES, AND PORTIONS OF A SITE ACCESS ROAD WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.




## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'


WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM


PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

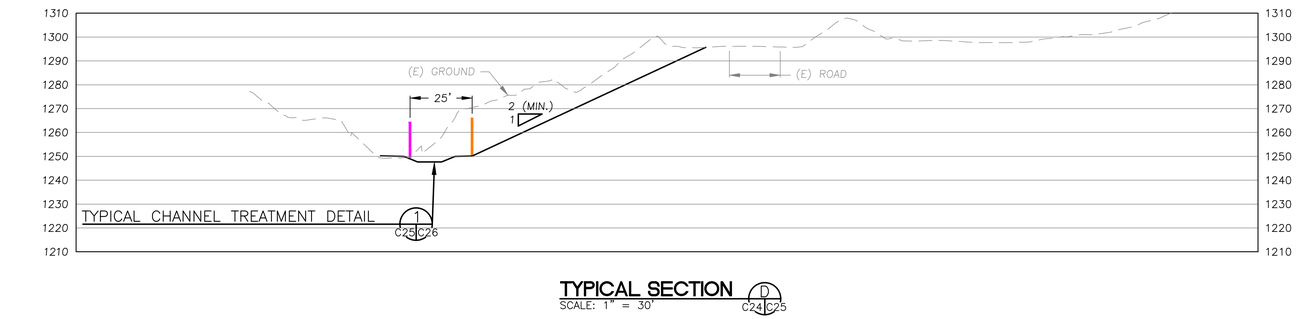
UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

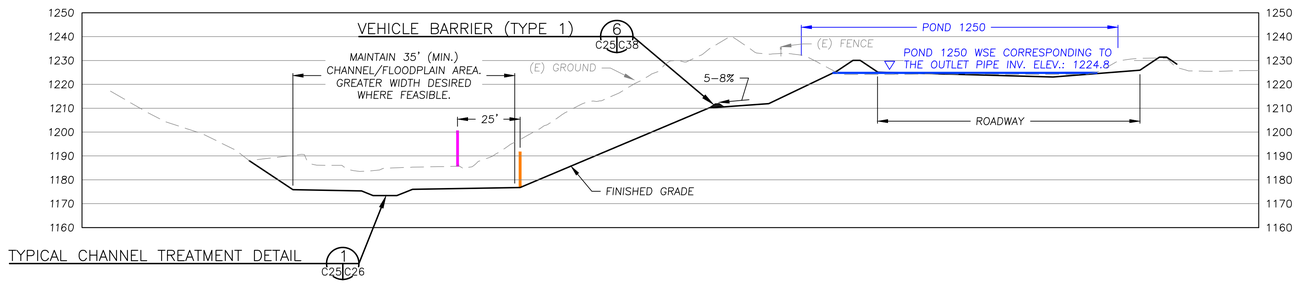
| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

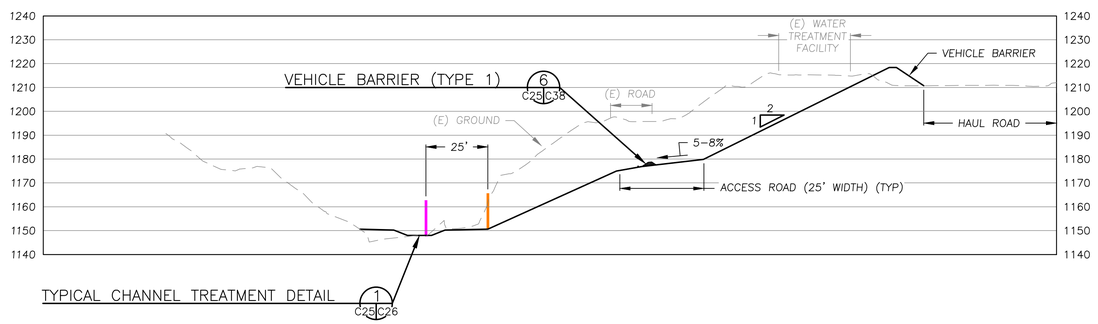
0 1"



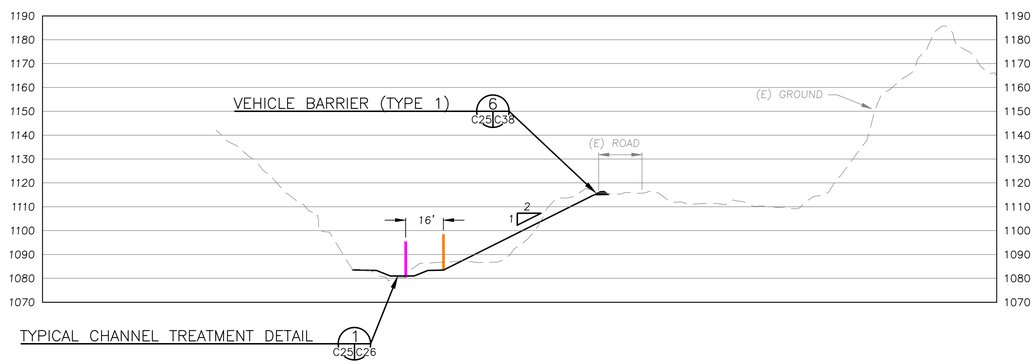

TYPICAL SECTION
SCALE: 1" = 30'
D
C24|C25




TYPICAL SECTION
SCALE: 1" = 30'
C
C24|C25




TYPICAL SECTION
SCALE: 1" = 30'
B
C23,C24|C25




TYPICAL SECTION
SCALE: 1" = 30'
A
C23|C25

NOTE:
1. FINISHED GRADE SHOWN REPRESENTS THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.
2. LEAVE 4'-5' WIDE OPENINGS IN K-RAIL EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.

LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

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HEIDELBERG CEMENT
GROUP

MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
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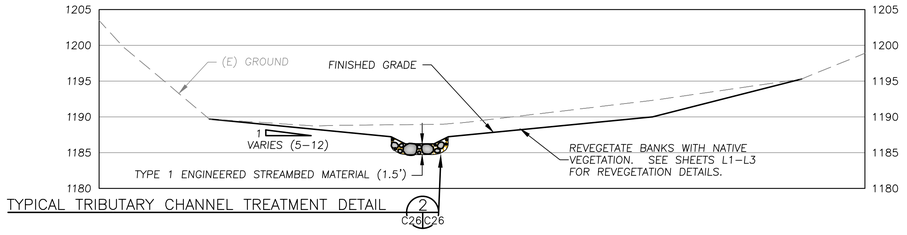
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

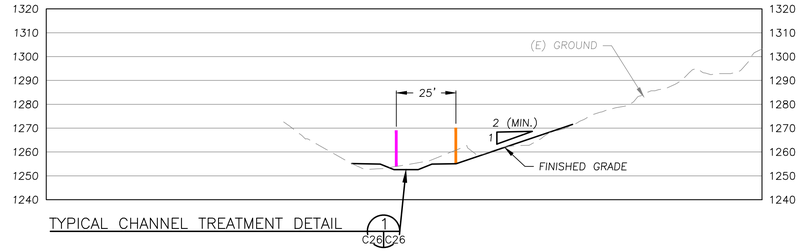
C25

25 OF 47




TYPICAL TRIBUTARY CHANNEL TREATMENT DETAIL 2 C26|C26

## TYPICAL SECTION F
SCALE: 1" = 10' C24|C26




TYPICAL CHANNEL TREATMENT DETAIL 1 C26|C26

## TYPICAL SECTION E
SCALE: 1" = 30' C24|C26

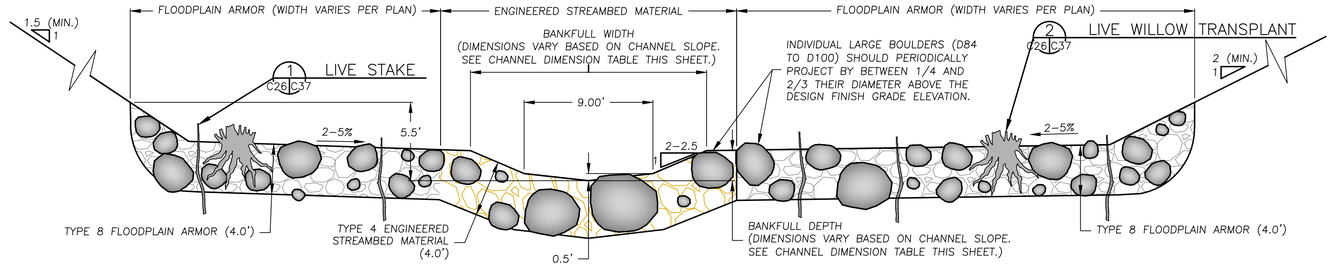
## LEGEND

(E) NORTH SLOPE TOE

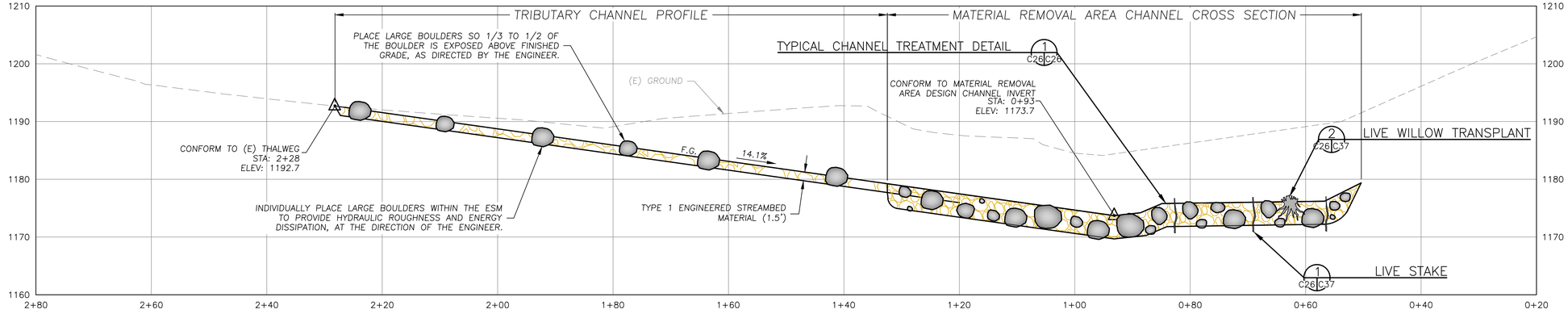
PROPOSED NORTH SLOPE TC

| CHANNEL DIMENSIONS FOR OVERBURDEN REMOVAL AREA | | |
|---|---|---|
| DESIGN SLOPE (%) | DESIGN DIMENSIONS | |
| | BANKFULL WIDTH | BANKFULL DEPTH |
| <4% | 16'–20' | 1.7'–2.1' |
| 4%–8% | 14.5'–18.5' | 1.9'–2.3' |
| >8% | 14'–18' | 2.3'–2.7' |

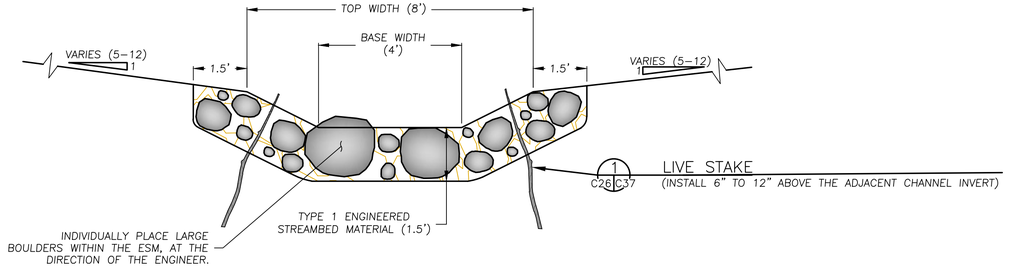
NOTES:
1. INSTALL TYPE 8 FLOODPLAIN ARMOR ALONG THE ENTIRE MATERIAL REMOVAL AREA PROJECT REACH WHERE FLOODPLAIN ARMOR IS SHOWN IN PLAN.
2. INSTALL TYPE 4 ENGINEERED STREAMBED MATERIAL ALONG THE ENTIRE MATERIAL REMOVAL AREA PROJECT REACH WHERE ESM IS SHOWN IN PLAN.
3. SEE THE TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN, SHEET C35 FOR INFORMATION REGARDING FEATURES NOT SHOWN ON THE TYPICAL TREATMENT DETAIL.
4. FINISHED GRADE SHOWN REPRESENTS THE UPPER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.




## TYPIAL CHANNEL TREATMENT DETAIL
SCALE: 1" = 5' 1 C25,C26|C26




## MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10' A C24|C26




## TYPICAL TRIBUTARY CHANNEL TREATMENT DETAIL
SCALE: 1" = 2' 2 C26|C26

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PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

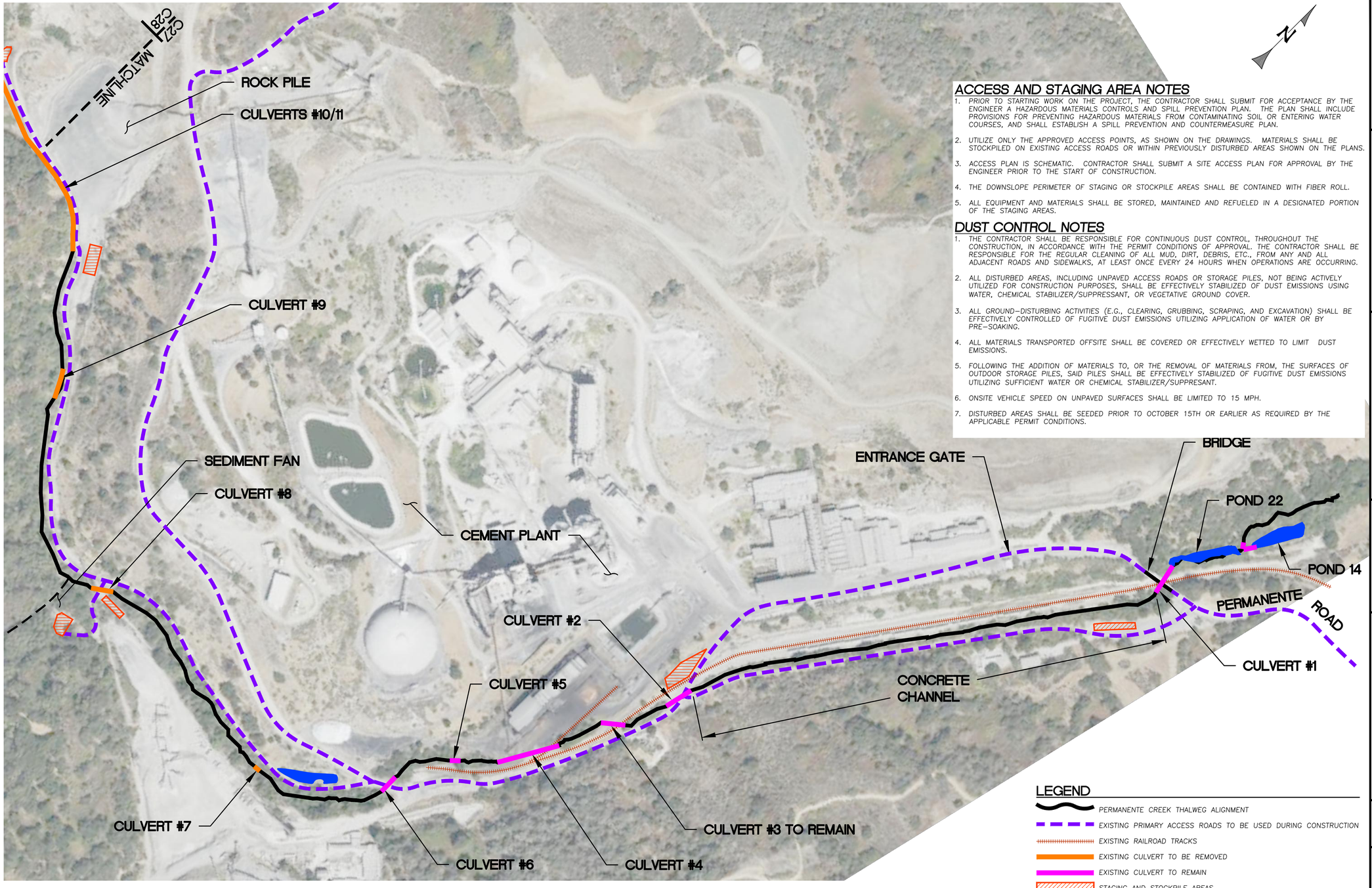
MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C26 | 26 OF 47




ACCESS AND STAGING PLAN
SCALE: 1"=200'

## ACCESS AND STAGING AREA NOTES

1. PRIOR TO STARTING WORK ON THE PROJECT, THE CONTRACTOR SHALL SUBMIT FOR ACCEPTANCE BY THE ENGINEER A HAZARDOUS MATERIALS CONTROLS AND SPILL PREVENTION PLAN. THE PLAN SHALL INCLUDE PROVISIONS FOR PREVENTING HAZARDOUS MATERIALS FROM CONTAMINATING SOIL OR ENTERING WATER COURSES, AND SHALL ESTABLISH A SPILL PREVENTION AND COUNTERMEASURE PLAN.
2. UTILIZE ONLY THE APPROVED ACCESS POINTS, AS SHOWN ON THE DRAWINGS. MATERIALS SHALL BE STOCKPILED ON EXISTING ACCESS ROADS OR WITHIN PREVIOUSLY DISTURBED AREAS SHOWN ON THE PLANS.
3. ACCESS PLAN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE ACCESS PLAN FOR APPROVAL BY THE ENGINEER PRIOR TO THE START OF CONSTRUCTION.
4. THE DOWNSLOPE PERIMETER OF STAGING OR STOCKPILE AREAS SHALL BE CONTAINED WITH FIBER ROLL.
5. ALL EQUIPMENT AND MATERIALS SHALL BE STORED, MAINTAINED AND REFUELED IN A DESIGNATED PORTION OF THE STAGING AREAS.

## DUST CONTROL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTINUOUS DUST CONTROL, THROUGHOUT THE CONSTRUCTION, IN ACCORDANCE WITH THE PERMIT CONDITIONS OF APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REGULAR CLEANING OF ALL MUD, DIRT, DEBRIS, ETC., FROM ANY AND ALL ADJACENT ROADS AND SIDEWALKS, AT LEAST ONCE EVERY 24 HOURS WHEN OPERATIONS ARE OCCURRING.
2. ALL DISTURBED AREAS, INCLUDING UNPAVED ACCESS ROADS OR STORAGE PILES, NOT BEING ACTIVELY UTILIZED FOR CONSTRUCTION PURPOSES, SHALL BE EFFECTIVELY STABILIZED OF DUST EMISSIONS USING WATER, CHEMICAL STABILIZER/SUPPRESSANT, OR VEGETATIVE GROUND COVER.
3. ALL GROUND-DISTURBING ACTIVITIES (E.G., CLEARING, GRUBBING, SCRAPING, AND EXCAVATION) SHALL BE EFFECTIVELY CONTROLLED OF FUGITIVE DUST EMISSIONS UTILIZING APPLICATION OF WATER OR BY PRE-SOAKING.
4. ALL MATERIALS TRANSPORTED OFFSITE SHALL BE COVERED OR EFFECTIVELY WETTED TO LIMIT DUST EMISSIONS.
5. FOLLOWING THE ADDITION OF MATERIALS TO, OR THE REMOVAL OF MATERIALS FROM, THE SURFACES OF OUTDOOR STORAGE PILES, SAID PILES SHALL BE EFFECTIVELY STABILIZED OF FUGITIVE DUST EMISSIONS UTILIZING SUFFICIENT WATER OR CHEMICAL STABILIZER/SUPPRESANT.
6. ONSITE VEHICLE SPEED ON UNPAVED SURFACES SHALL BE LIMITED TO 15 MPH.
7. DISTURBED AREAS SHALL BE SEEDED PRIOR TO OCTOBER 15TH OR EARLIER AS REQUIRED BY THE APPLICABLE PERMIT CONDITIONS.

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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

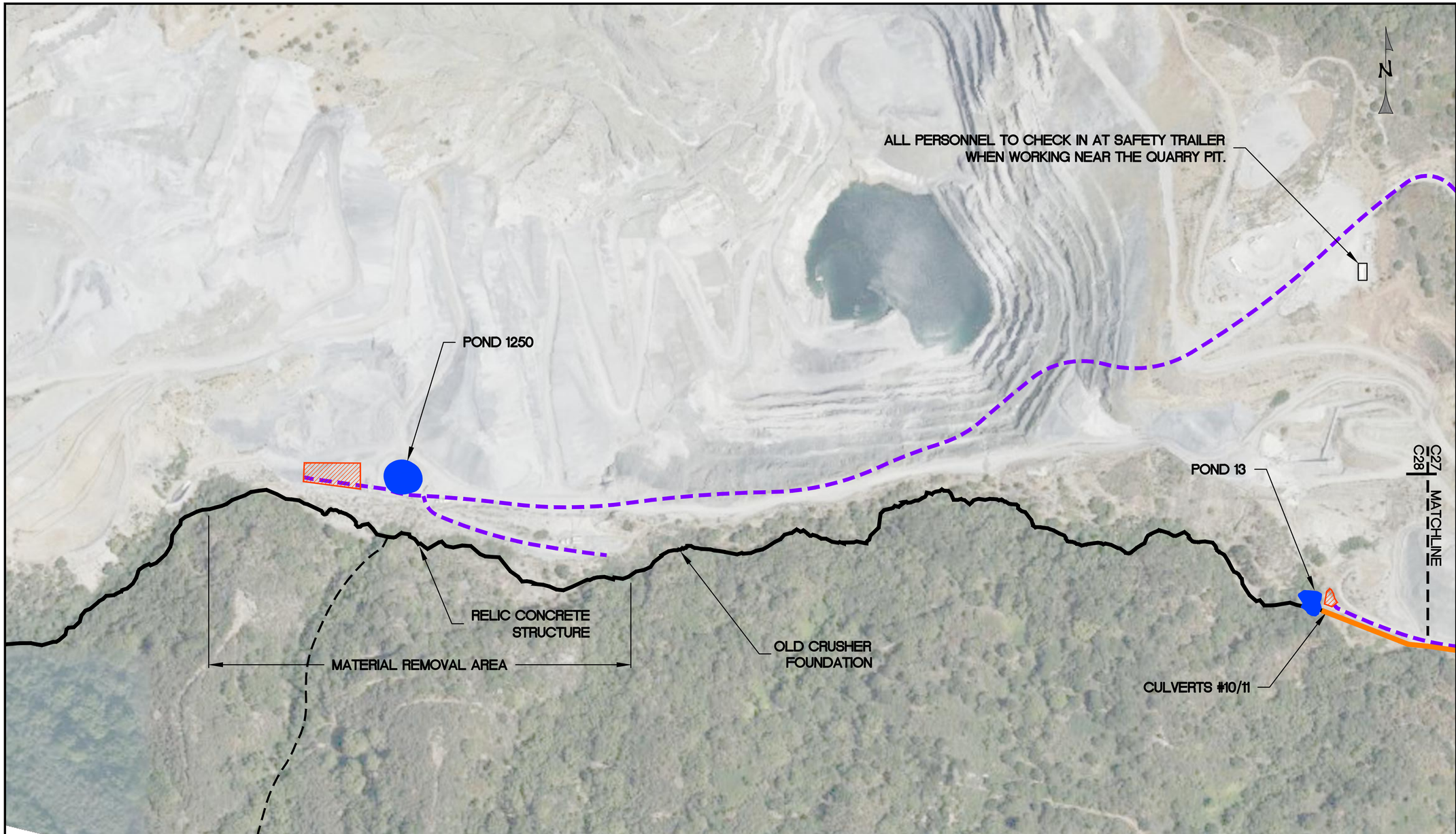
ACCESS AND STAGING PLAN
(1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C27
27 OF 47




## LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS
- TRIBUTARY (RELEVANT TO PROJECT)

## ACCESS AND STAGING PLAN

SCALE: 1" = 200'

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PRELIMINARY

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HEIDELBERG CEMENT GROUP

ACCESS AND STAGING PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
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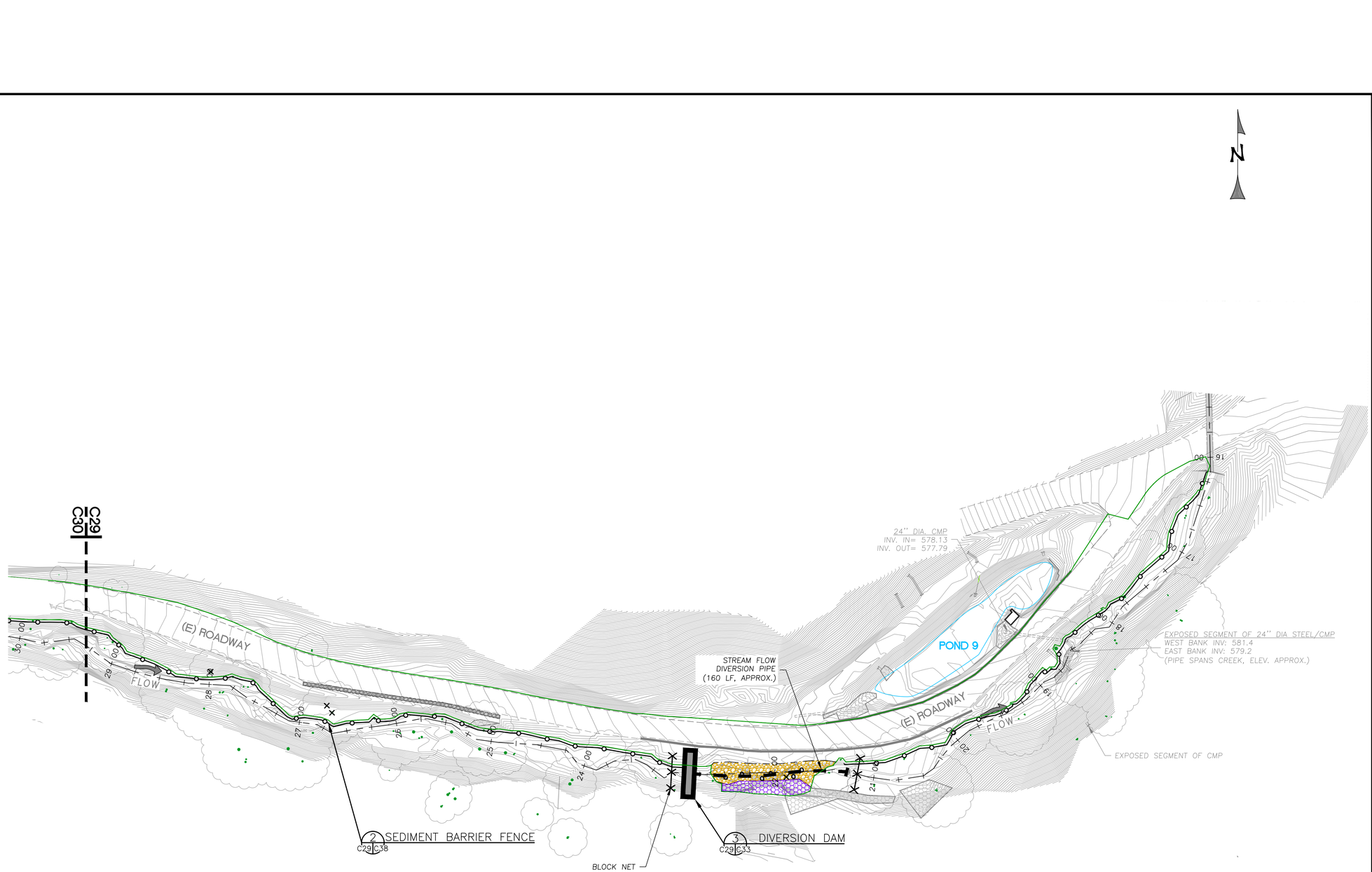
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C28

28 OF 47




## CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (1 OF 2)

SCALE: 1" = 50'

### LEGEND

- EXISTING CONTOURS
- EXISTING TREE
- (E) ROAD
- SEDIMENT BARRIER FENCE
- PROPOSED FIBER ROLL
- LIMITS OF GRADING
- DESIGN ALIGNMENT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HEIDELBERG CEMENT
GROUP

CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
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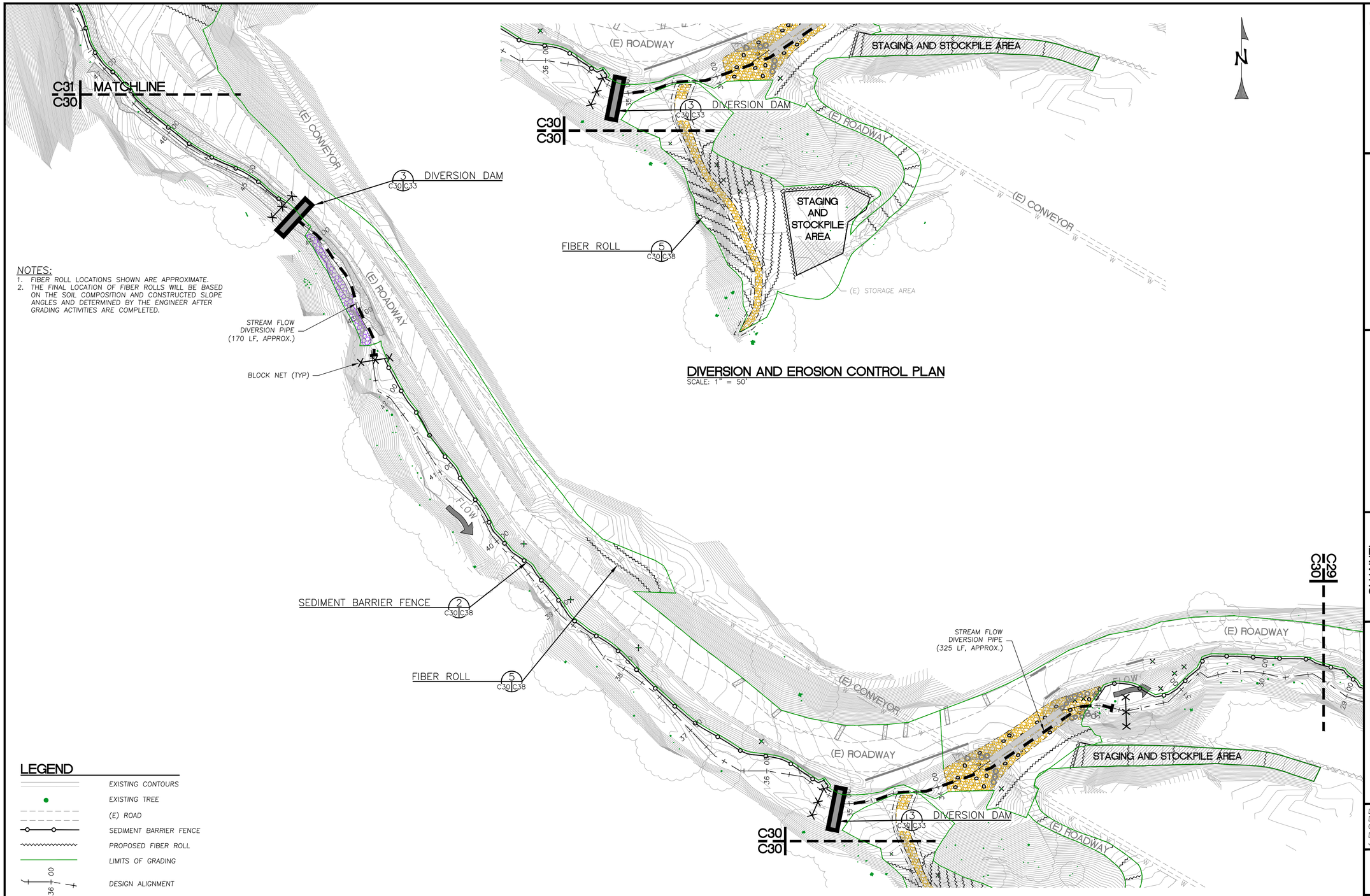
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C29

29 OF 47




NOTES:
1. FIBER ROLL LOCATIONS SHOWN ARE APPROXIMATE.
2. THE FINAL LOCATION OF FIBER ROLLS WILL BE BASED ON THE SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

## DIVERSION AND EROSION CONTROL PLAN
SCALE: 1" = 50'

## CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (2 OF 2)
SCALE: 1" = 50'

LEGEND
- EXISTING CONTOURS
- EXISTING TREE
- (E) ROAD
- SEDIMENT BARRIER FENCE
- PROPOSED FIBER ROLL
- LIMITS OF GRADING
- DESIGN ALIGNMENT (36 + 00)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HEIDELBERG CEMENT
GROUP

CHANNEL WIDENING DIVERSION AND EROSION CONTROL PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
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|---|---|
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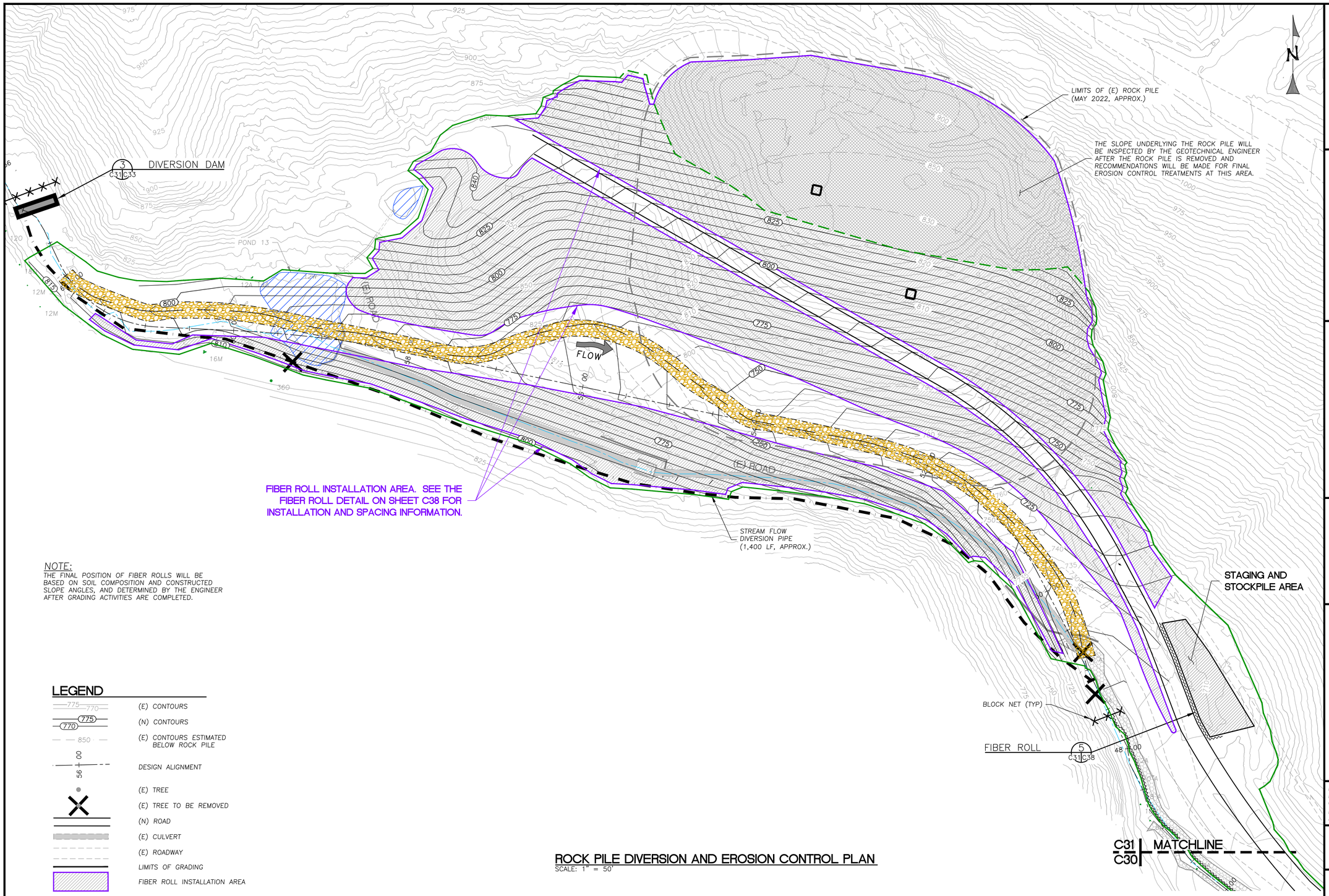
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C30 | 30 OF 47




NOTE:
THE FINAL POSITION OF FIBER ROLLS WILL BE BASED ON SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES, AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) CONTOURS ESTIMATED BELOW ROCK PILE
- DESIGN ALIGNMENT
- (E) TREE
- (E) TREE TO BE REMOVED
- (N) ROAD
- (E) CULVERT
- (E) ROADWAY
- LIMITS OF GRADING
- FIBER ROLL INSTALLATION AREA

## ROCK PILE DIVERSION AND EROSION CONTROL PLAN

SCALE: 1" = 50'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LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCK PILE AREA DIVERSION AND EROSION CONTROL PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

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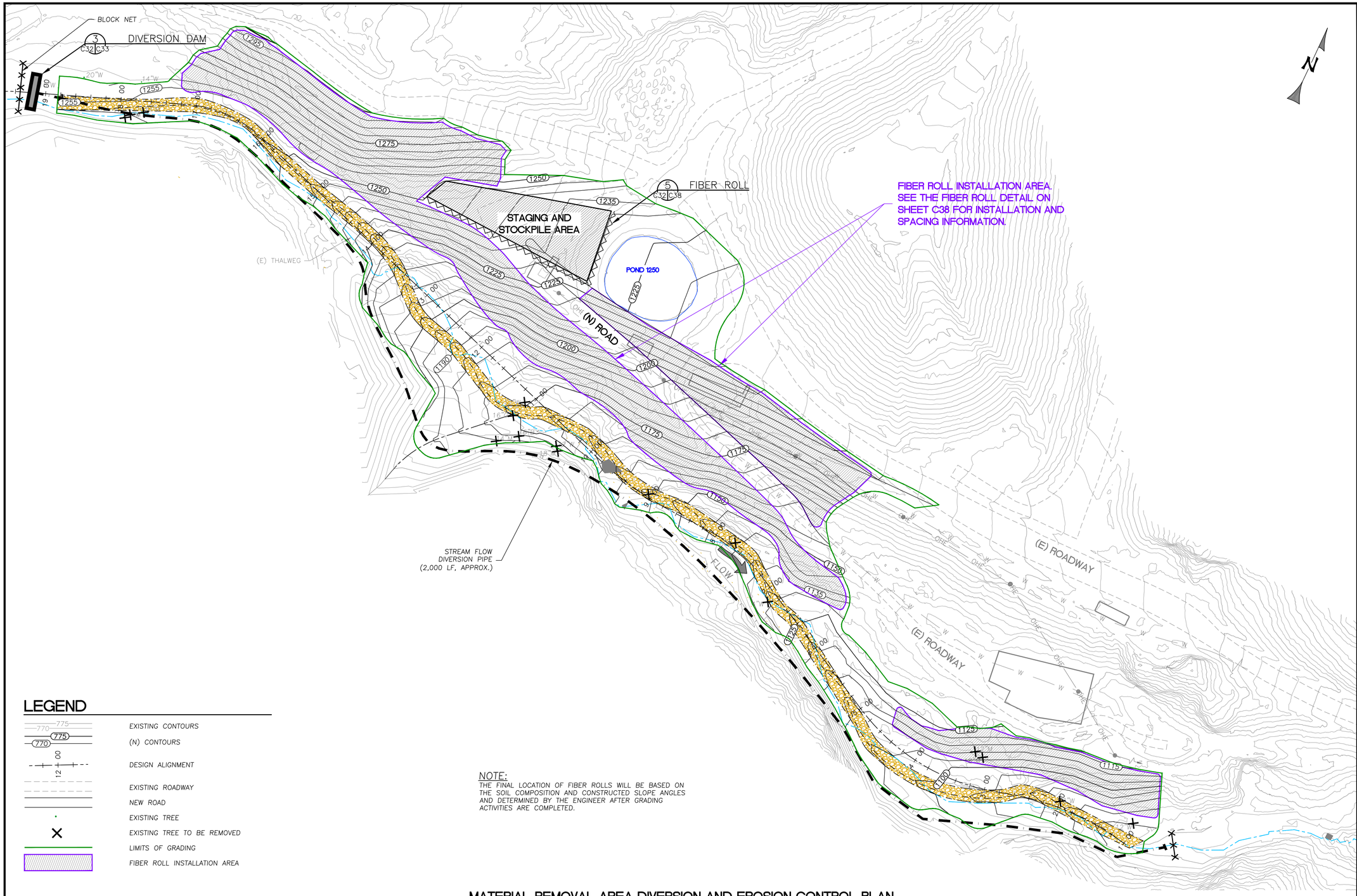
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C31

31 OF 47




## LEGEND

- EXISTING CONTOURS (775 / 770)
- (N) CONTOURS (775 / 770)
- DESIGN ALIGNMENT (12+00)
- EXISTING ROADWAY
- NEW ROAD
- EXISTING TREE
- EXISTING TREE TO BE REMOVED
- LIMITS OF GRADING
- FIBER ROLL INSTALLATION AREA

NOTE:
THE FINAL LOCATION OF FIBER ROLLS WILL BE BASED ON THE SOIL COMPOSITION AND CONSTRUCTED SLOPE ANGLES AND DETERMINED BY THE ENGINEER AFTER GRADING ACTIVITIES ARE COMPLETED.

# MATERIAL REMOVAL AREA DIVERSION AND EROSION CONTROL PLAN

SCALE: 1" = 60'

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PRELIMINARY

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA DIVERSION AND EROSION CONTROL PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

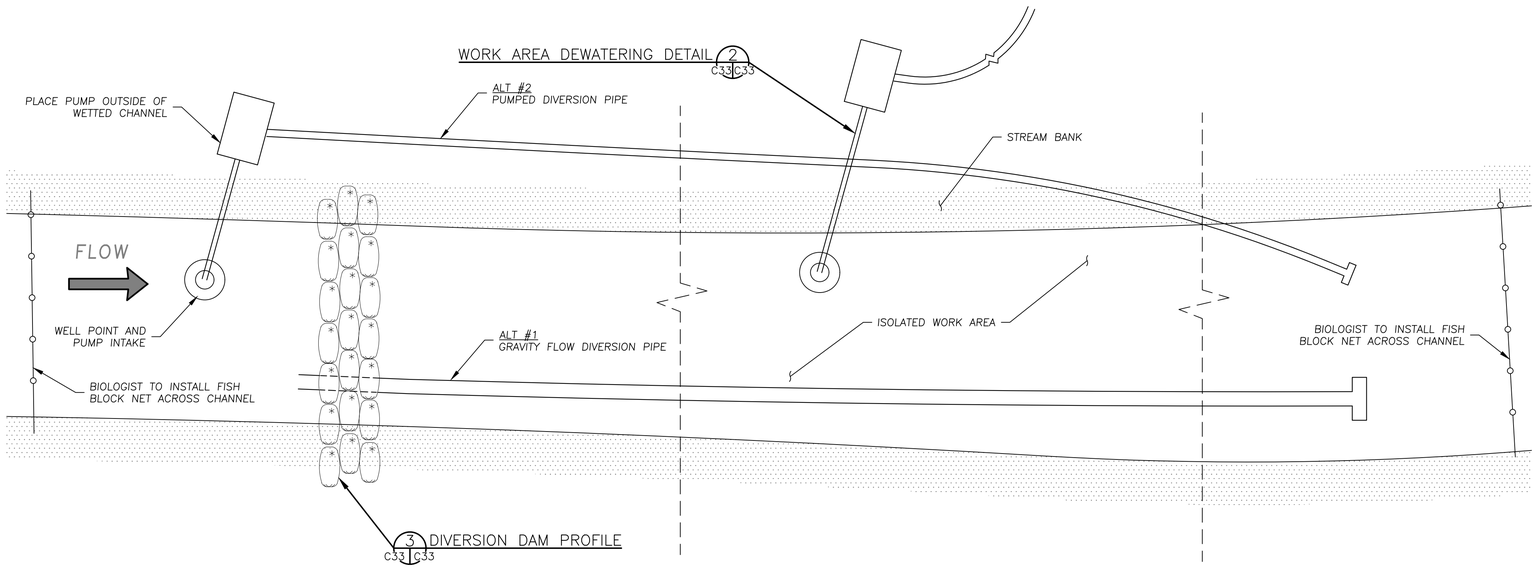
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C32

32 OF 47

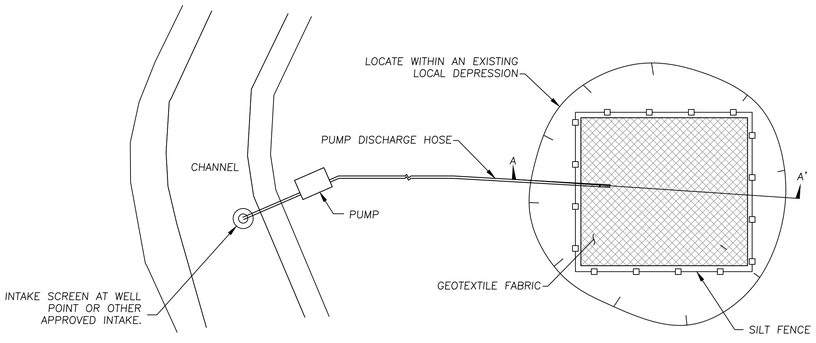


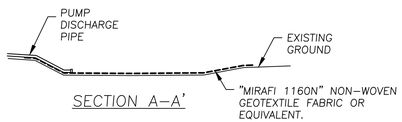

## TYPICAL DEWATERING PLAN
N.T.S. 1 C33 C33

## DIVERSION NOTES CONTINUED

1. GENERAL
 - 1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
 - 1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
 - 1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
 - 1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
 - 1.5. THE DIVERSION PLAN SHOWN IS SCHEMATIC. THE DESIGN AND IMPLEMENTATION OF THE DIVERSION DAM IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR PRIOR TO INSTALLATION. THE CONTRACTOR SHALL SUBMIT A DIVERSION PHASING PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SHOWN.
 - 1.6. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO ALTERNATIVE TYPES OF DIVERSION STRUCTURES. AN AUTOMATIC BACKUP SYSTEM MUST BE INSTALLED IF ALTERNATIVE #2 (PUMPED DIVERSION) IS THE SOLE METHOD OF DIVERSION.*
 - 1.7. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.
 - 1.8. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
 - 2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
 - 2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
 - 3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
 - 3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
 - 3.3. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
 - 4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
 - 4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS OR TREATMENT FACILITIES, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
 - 4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

*IF AT ANY TIME A PUMP IS USED THAT DRAWS WATER FROM THE SURFACE WHERE AQUATIC ORGANISMS CAN BECOME ENTRAINED, THE PUMP SHALL BE SCREENED USING A MESH WITH A MAXIMUM OPENING SIZE OF 5 MILLIMETERS. CHECK THE SCREEN REGULARLY TO ENSURE IT IS FUNCTIONING AS INTENDED AND THAT ANIMALS ARE NOT BECOMING ENTRAPPED.

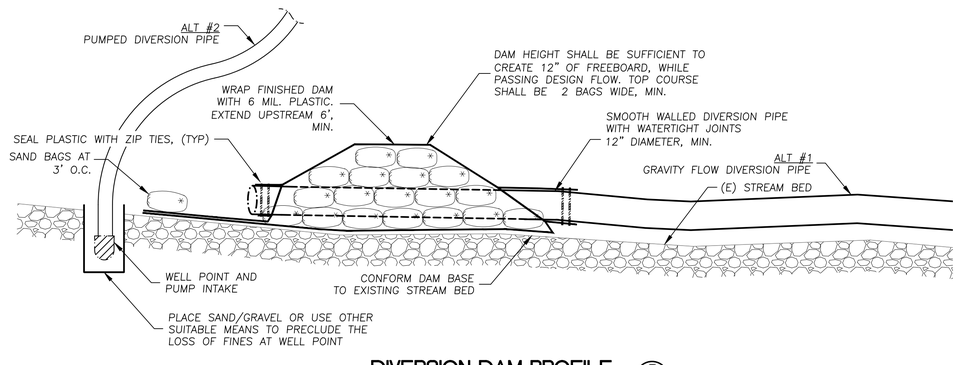



SECTION A-A'

## DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. TURBID WATER RESULTING FROM DEWATERING ACTIVITIES WILL EITHER BE TREATED OR DISCHARGED TO A LOCAL DEPRSSION(S) TO INFILTRATE OR EVAPORATE.
4. TURBID WATERS WILL NOT BE ALLOWED TO DISCHARGE INTO PERMANENTE CREEK.
5. PROPOSED FILTRATION METHODS WILL BE FIELD-FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
6. REMOVE ACCUMULATED SEDIMENT AT THE COMPLETION OF DEWATERING ACTIVITIES AND DISPOSE OF AT AN APPROVED LOCATION.

## WORK AREA DEWATERING DETAIL
N.T.S. 2 C33 C33




## DIVERSION DAM PROFILE
N.T.S. 3 C29,C30,C33 C33

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DEWATERING DETAILS (1 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | - |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C33 | 33 OF 47

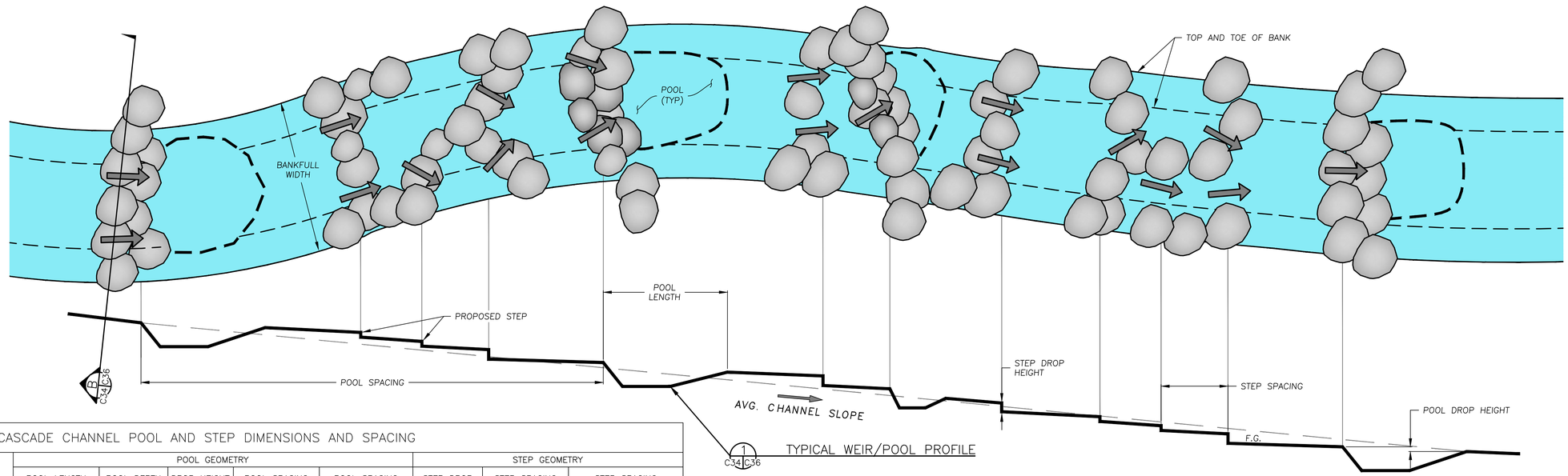



TABLE 1: CASCADE CHANNEL POOL AND STEP DIMENSIONS AND SPACING

| AVERAGE CHANNEL SLOPE | POOL GEOMETRY | | | | | STEP GEOMETRY | | |
|---|---|---|---|---|---|---|---|---|
| | POOL LENGTH (FT.) | POOL DEPTH (FT.) | DROP HEIGHT (FT.) | POOL SPACING (FT.) | POOL SPACING (BANKFULL WIDTHS) | STEP DROP HEIGHT (FT.) | STEP SPACING (FT.) | STEP SPACING (BANKFULL WIDTHS) |
| 8%–12% | 6–13 | 0.5–2 | 0.5–1 | 28–75 | 2–4 | 0.5–1 | 6–13 | 0.4–0.8 |

## TYPICAL CASCADE REACH DETAIL (FOR ROCK PILE AND MATERIAL REMOVAL AREA)

SCALE: 1" = 6'

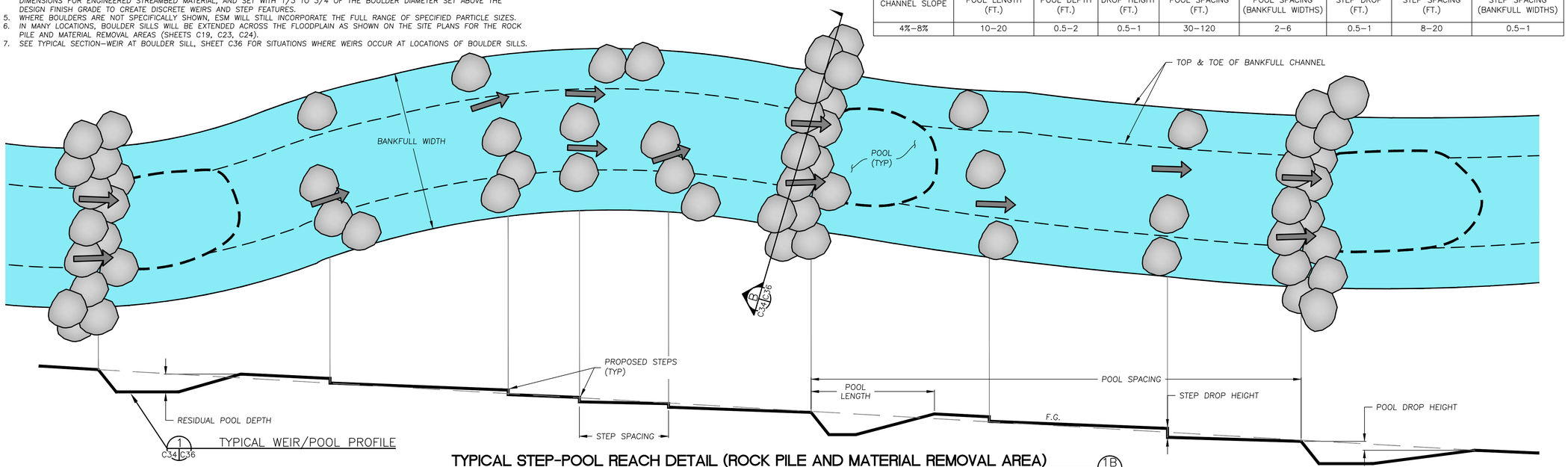
1A C19,C23,C24,C34

CONSTRUCTION NOTES:

1. THESE DETAILS ARE PROVIDED TO DEMONSTRATE GEOMETRY OF STEPS AND POOLS WITHIN STEP–POOL AND CASCADE REACHES.
2. CHANNEL GEOMETRY WILL BE CONSTRUCTED TO FOLLOW THE GUIDELINES PROVIDED IN TABLES 1 AND 2.
3. INDIVIDUAL POOLS AND STEPS WILL BE INSTALLED AS DIRECTED BY THE ENGINEER DURING INSTALLATION, IN ACCORDANCE WITH THE STANDARD GEOMETRY PROVIDED IN THE TABLES SHOWN HEREON.
4. INDIVIDUAL BOULDERS SHOWN IN PLAN VIEW REPRESENT TYPICAL PLACEMENT OF BOULDERS EXCEEDING THE SPECIFIED D50 DIMENSIONS FOR ENGINEERED STREAMBED MATERIAL, AND SET WITH 1/3 TO 3/4 OF THE BOULDER DIAMETER SET ABOVE THE DESIGN FINISH GRADE TO CREATE DISCRETE WEIRS AND STEP FEATURES.
5. WHERE BOULDERS ARE NOT SPECIFICALLY SHOWN, ESM WILL STILL INCORPORATE THE FULL RANGE OF SPECIFIED PARTICLE SIZES.
6. IN MANY LOCATIONS, BOULDER SILLS WILL BE EXTENDED ACROSS THE FLOODPLAIN AS SHOWN ON THE SITE PLANS FOR THE ROCK PILE AND MATERIAL REMOVAL AREAS (SHEETS C19, C23, C24).
7. SEE TYPICAL SECTION–WEIR AT BOULDER SILL, SHEET C36 FOR SITUATIONS WHERE WEIRS OCCUR AT LOCATIONS OF BOULDER SILLS.

TABLE 2: STEP–POOL CHANNEL: POOL AND STEP DIMENSIONS AND SPACING

| AVERAGE CHANNEL SLOPE | POOL GEOMETRY | | | | | STEP GEOMETRY | | |
|---|---|---|---|---|---|---|---|---|
| | POOL LENGTH (FT.) | POOL DEPTH (FT.) | DROP HEIGHT (FT.) | POOL SPACING (FT.) | POOL SPACING (BANKFULL WIDTHS) | STEP DROP (FT.) | STEP SPACING (FT.) | STEP SPACING (BANKFULL WIDTHS) |
| 4%–8% | 10–20 | 0.5–2 | 0.5–1 | 30–120 | 2–6 | 0.5–1 | 8–20 | 0.5–1 |




## TYPICAL STEP-POOL REACH DETAIL (ROCK PILE AND MATERIAL REMOVAL AREA)

SCALE: 1" = 6'

1B C19,C23,C24,C34

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HEIDELBERG CEMENT GROUP

TYPICAL CASCADE AND STEP-POOL REACH DETAILS (2 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
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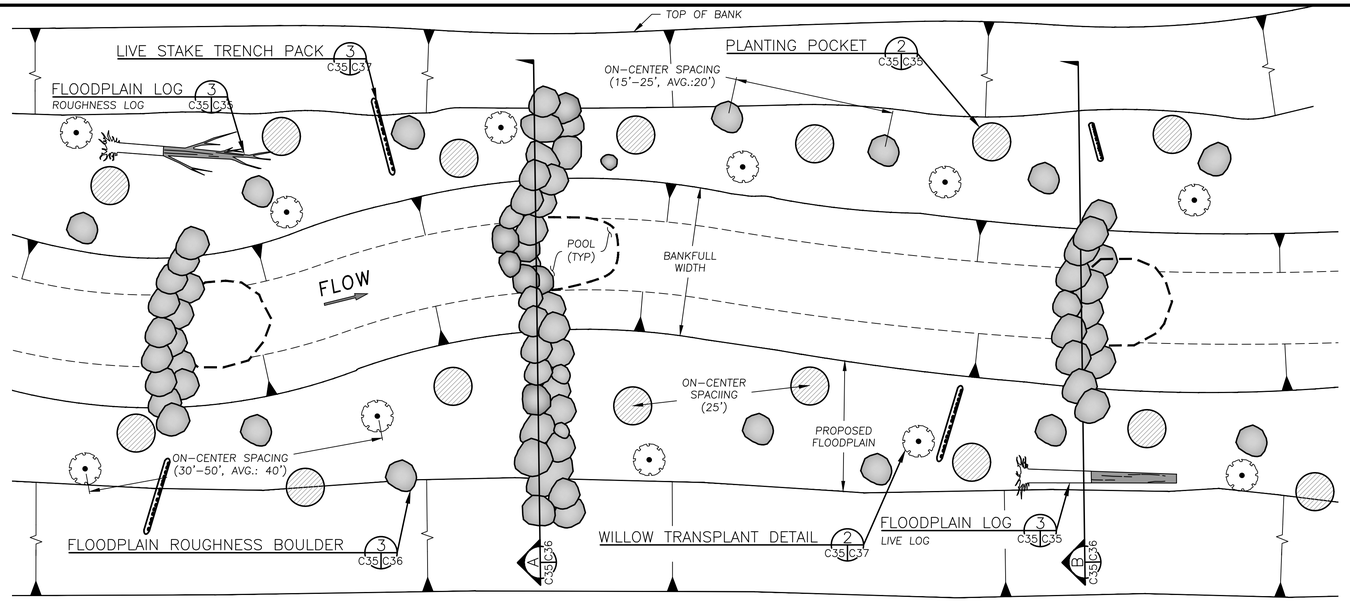
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN (FOR ROCK PILE AND MATERIAL REMOVAL AREA)

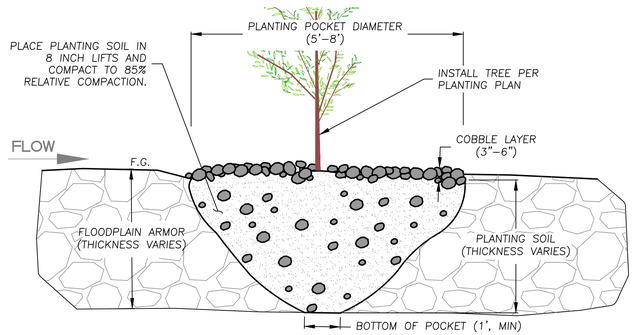
SCALE: 1" = 10'

4 C19,C23,C24,C35

### PLANTING SOIL NOTES

1. PLANTING SOIL SHALL CONSIST OF NATIVE SOILS EXCAVATED DURING PROJECT CONSTRUCTION.
2. OBTAIN PLANTING SOIL FROM EXCAVATED AREAS THAT ARE WITHIN 3 FEET OF EXISTING GROUND, PRIOR TO DISTURBANCE.
3. PLANTING SOIL SHALL MEET THE FOLLOWING GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 6" | 100 |
| 3" | 90–95 |
| 1" | 80–90 |
| No.4 | 60–80 |
| No.40 | 30–60 |
| No.100 | 15–30 |




## PLANTING POCKET

SCALE: 1" = 2'

2 C35 C35

### FLOODPLAIN LOG NOTES:

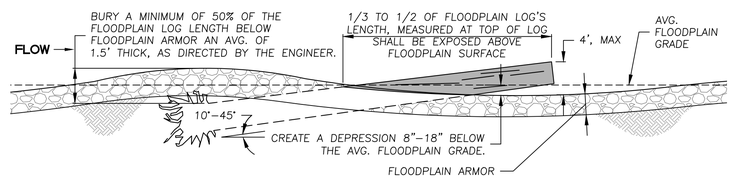
1. FLOODPLAIN LOGS SHALL BE SALVAGED WITH ROOTWADS INTACT.
2. TRIM ROOTS SO THE ROOTWAD DIAMETER IS 3'-5'.
3. FLOODPLAIN LOGS SHALL CONSIST OF BOTH ROUGHNESS LOGS AND LIVE LOGS, AS SHOWN ON RELEVANT SITE PLANS.

LIVE LOGS

1. SALVAGE ALL WILLOWS SHOWN FOR REMOVAL FOR USE AS LIVE LOGS.
2. REMOVAL ALL LIMBS FROM LIVE LOGS, MAKING CLEAN CUTS.

ROUGHNESS LOGS

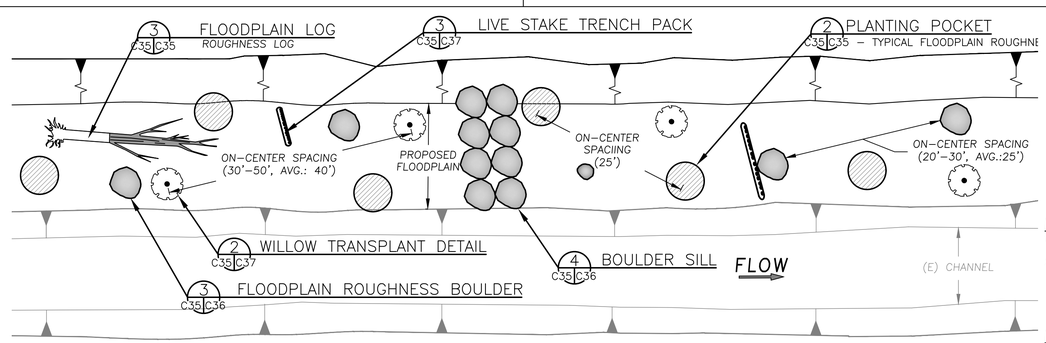
1. ALL SPECIES SHOWN FOR REMOVAL, OTHER THAN WILLOW, SHALL BE SALVAGED FOR USE AS ROUGHNESS LOGS.
2. REMOVE THE LIMBS ALONG THE LOWER HALF OF THE TREE. RETAIN THE LIMBS ALONG THE UPPER HALF TO ADD ADDITIONAL ROUGHNESS AND COMPLEXITY TO THE FLOODPLAIN.




## FLOODPLAIN LOG

SCALE: 1" = 5'

3 C11,C12,C13,C14,C17,C18,C19,C23,C24,C35 C35




## TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN (FOR CHANNEL WIDENING)

SCALE: 1" = 10'

1 C11,C12,C13,C14,C17,C18,C35

### LIVE STAKE TRENCH PACK NOTES:

1. LIVE STAKE TRENCH PACK LOCATIONS SHOWN ARE SCHEMATIC. TRENCH PACK LOCATION WILL BE STAKED IN THE FIELD BY THE ENGINEER.
2. INSTALL 30-50 LF (AVERAGE 40 LF) OF TRENCH PACK FOR EVERY 100 LF OF CONSTRUCTED CHANNEL.

### PLANTING POCKET NOTES:

1. INSTALL CONTAINER PLANTS IN THE PLANTING POCKETS PER THE REVEGETATION PLANS SHEETS L4 AND L5.

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HEIDELBERG CEMENT
GROUP

TYPICAL FLOODPLAIN ROUGHNESS AND HABITAT PLAN DETAILS (3 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

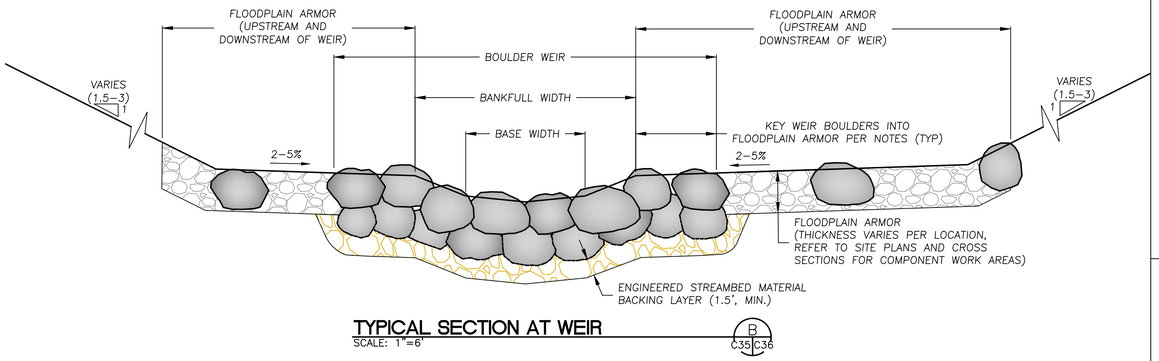
| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C35

35 OF 47




## TYPICAL SECTION AT WEIR

SCALE: 1"=6'

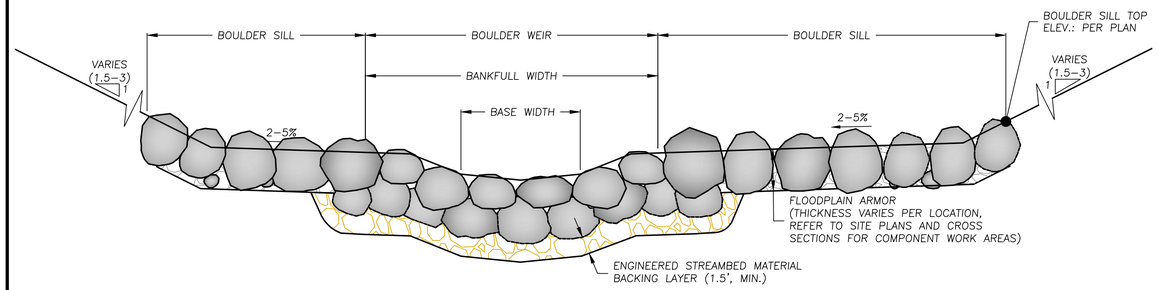
B C35|C36

NOTES:

1. CULVERT 7 AND 8 REMOVAL AREAS:
   WEIR BOULDER SIZE SHALL MEET THE MATERIAL SPECIFICATIONS FOR "WEIR BOULDERS (CULVERT 7 AND 8 REMOVAL AREAS)" SHOWN ON SHEET C39. KEY THE WEIR BOULDERS 3–5 FEET INTO THE ADJACENT FLOODPLAIN ARMOR.

2. ROCK PILE AND MATERIAL REMOVAL AREAS:
   WEIR BOULDER SIZE SHALL MEET THE MATERIAL SPECIFICATIONS FOR WEIR AND STEP BOULDERS INCLUDED IN THE "CONSTRUCTION NOTES" ON SHEET C34. KEY THE WEIR BOULDERS AT THE HEAD OF EACH CONSTRUCTED POOL 5–7 FEET INTO THE ADJACENT FLOODPLAIN ARMOR.

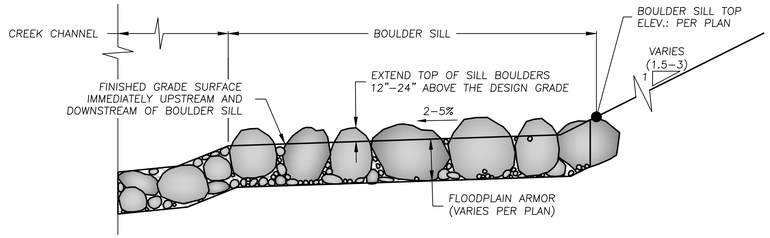
3. REFER TO COMPONENT WORK AREA CROSS SECTIONS FOR BANKFULL AND BASE WIDTH DIMENSIONS.




## TYPICAL SECTION – WEIR AT BOULDER SILL

SCALE: 1"=6'

A C35|C36

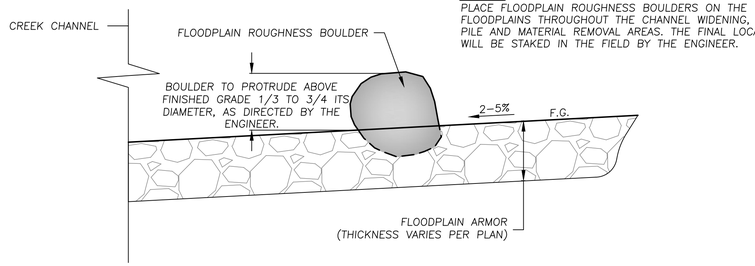



## TYPICAL BOULDER SILL

SCALE: N.T.S.

4 C11,C12,C13,C14,C35|C36

BOULDER SILL NOTE:
SILL WIDTH (MEASURED PARALLEL TO FLOW) SHALL BE 6 FEET.

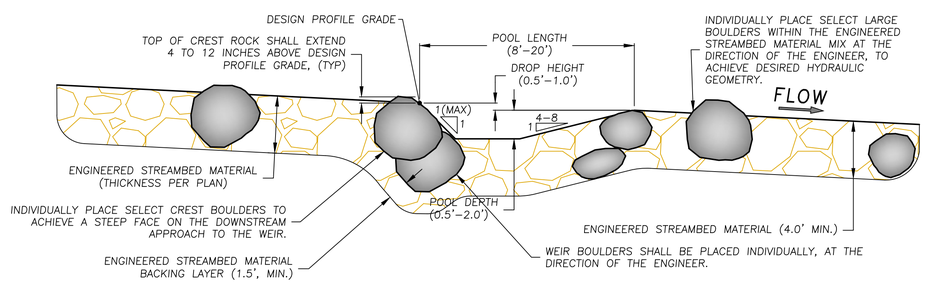



NOTE:
PLACE FLOODPLAIN ROUGHNESS BOULDERS ON THE FLOODPLAINS THROUGHOUT THE CHANNEL WIDENING, ROCK PILE AND MATERIAL REMOVAL AREAS. THE FINAL LOCATIONS WILL BE STAKED IN THE FIELD BY THE ENGINEER.

## FLOODPLAIN ROUGHNESS BOULDER

SCALE: 1"=3'

3 C35|C36




## TYPICAL WEIR/POOL PROFILE

SCALE: 1" = 5'

1 C11,C15|C36

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TYPICAL BOULDER WEIR, SILL, AND POOL DETAILS (4 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
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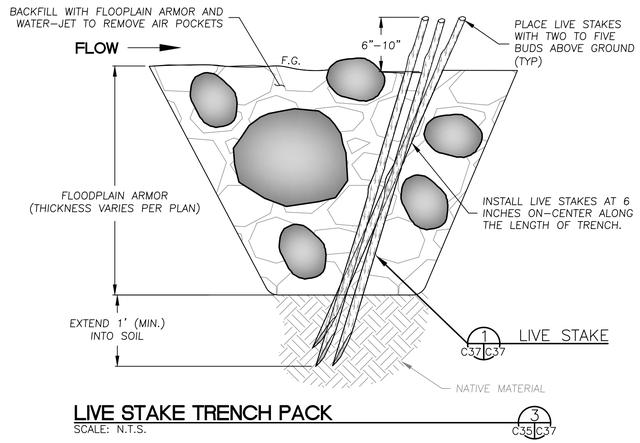
0 1"

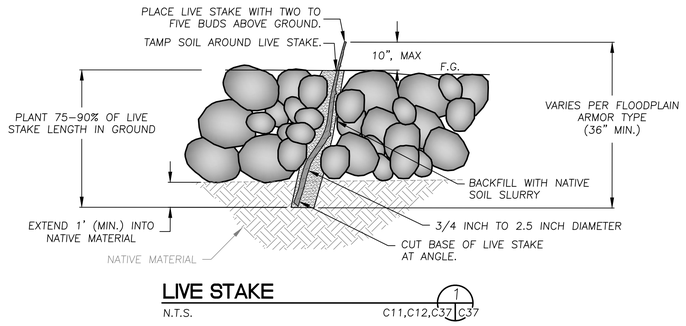
C36




## LIVE STAKE TRENCH PACK

SCALE: N.T.S.

3
C35 C37



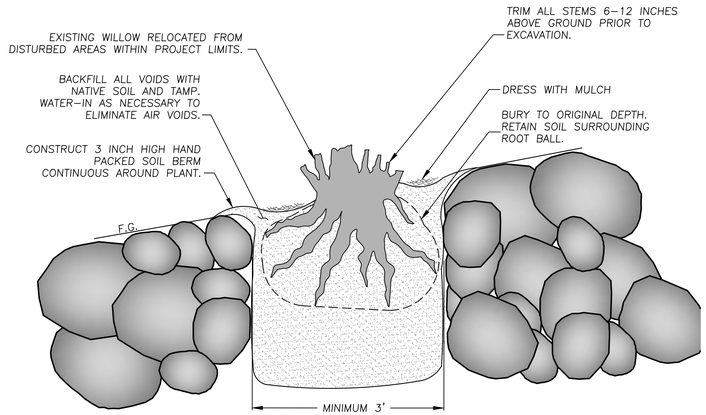

## LIVE STAKE

N.T.S.

1
C11,C12,C37 C37

### LIVE STAKE NOTES:

1. INSTALL LIVE STAKES WITHIN ENGINEERED STREAMBED MATERIAL, FLOODPLAIN ARMOR AND RSP.
2. EXTEND LIVE STAKES THROUGH SPECIFIED ROCK MATERIAL TO CONTACT SOIL.
3. CUT TOP ENDS OF STAKES BLUNT AND BASAL ENDS ANGLED AT 45 DEGREES.
4. AFTER PLACEMENT, BACKFILL AND WATER–JET ALL VOIDS AROUND LIVE STAKES TO REMOVE AIR POCKETS.
5. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 6–10 INCHES EXPOSED.




## WILLOW TRANSPLANT DETAIL

SCALE: N.T.S.

2
C11,C12,C35 C37

### WILLOW TRANSPLANT NOTES:

1. GENERAL
   1.1. SEE THE TREE REMOVAL NOTES ON SHEET C1 AND THE TYPICAL FLOODPLAIN AND HABITAT PLANS ON SHEET C35 FOR WILLOW TRANSPLANT INSTALLATION LOCATIONS.
2. SALVAGE:
   2.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   2.2. PRIOR TO REMOVAL, CUT BRANCHES TO 6–12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   2.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   2.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACE UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   2.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   2.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
3. INSTALLATION
   3.1. PLACE THE EXCAVATED ROOTWAD IN A PRE–PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   3.2. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.

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LEHIGH HANSON
HEIDELBERG CEMENT GROUP

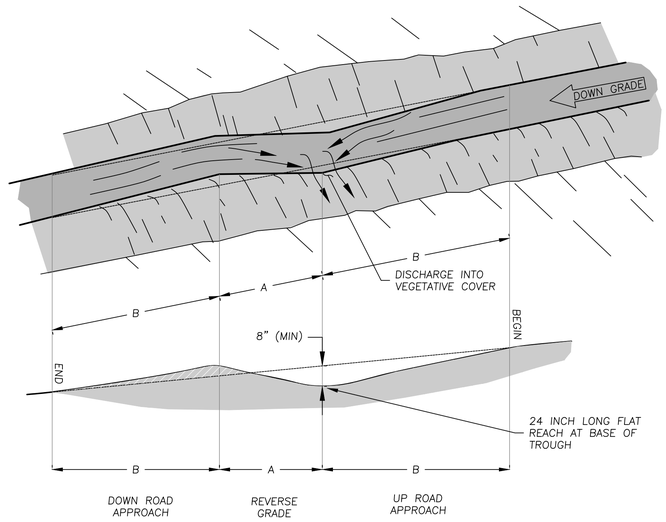
TYP WILLOW LIVE STAKE TRENCH PACK + RELOCATION DETAILS (5 OF 6)

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

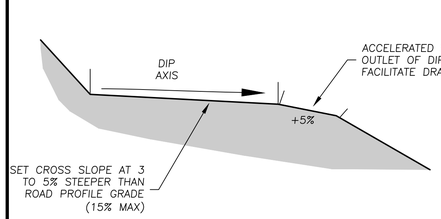
| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13–016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

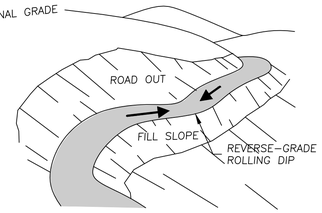
C37




## REVERSE GRADE DIP OVERVIEW




## ROAD SECTION




## OBLIQUE VIEW

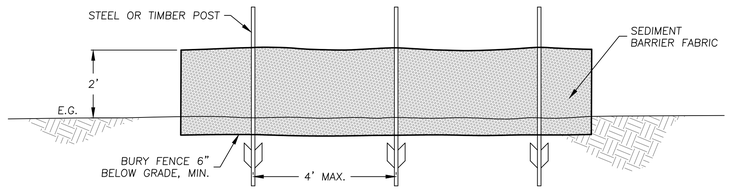
| ROAD GRADE (%) | TROUGH | A: REVERSE GRADE | B: UP ROAD APPROACH DOWN ROAD TRAIL | |
|---|---|---|---|---|
| | MINIMUM DEPTH BELOW DONWSLOPE CREST | MINIMUM DISTANCE AND GRADE FROM TROUGH AXIS TO DOWNROAD CREST (FT) | DISTANCE FROM UP-ROAD START OF ROLLING DIP TO TROUGH AXIS (FT) | GRADE (%) |
| <5 | 8 INCHES | 15 FEET AT 5% | 17 | 10 |
| 5 TO 10 | | | 30 | 15 |
| 10 TO 15 | | | 60 | 20 |
| >15 | | 7 FEET AT 10% | 60 | 25 |

### NOTES

1. CUT DIP INTO THE ROAD WITH THE DOWN ROAD APPROACH BUILT UP ON COMPACTED FILL.
2. CONSTRUCT DIP TO A MINIMUM OF 8 INCHES DEEP AND INCORPORATE A 2 FOOT LONG FLAT REACH AT THE BASE OF THE TROUGH (UNLESS OTHERWISE DIRECTED).
3. SLOPE THE DOWNROAD REVERSE GRADE AT 5% FOR A MINIMUM OF 7 FEET, TO 10% FOR MINIMUM OF 15 FEET, TO FORM THE MINIMUM 8 INCH DEEP DIP. ON ROADS STEEPER THAN 15% A STEEPER REVERSE-GRADE DIP MAY BE REQUIRED.
4. OUTSLOPE DIP AXIS 3-5% GREATER THAN ROAD GRADE TO MAXIMUM 15%. DIP AXIS MAY BE SKEWED DOWN ROAD AT 30 DEGREES TO FACILITATE INSTALLATION OF DIPS ON STEEPER GRADES.
5. DO NOT PUSH MATERIAL OVER THE EDGE OF SLOPE. ALL EXCAVATED MATERIAL SHALL BE USED TO CONSTRUCT THE DOWN ROAD APPROACH.
6. DIP LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE. FINAL LOCATIONS WILL BE STAKED IN THE FIELD BY THE ENGINEER.
7. ON EXISTING ROADS BUILD DOWNSLOPE LIP WITH COMPACTED FILL

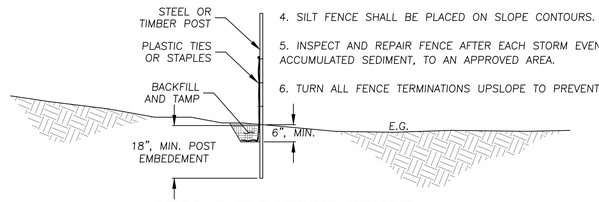
## REVERSE GRADE ROLLING DIP (1)

SCALE: N.T.S. C11,C12,C13,C14,C17,C18,C19,C19,C23,C24|C38



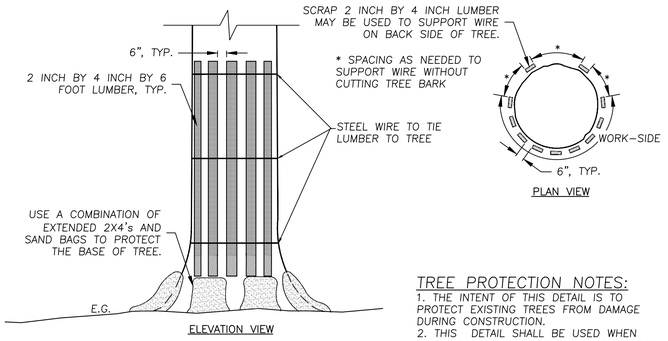

### SEDIMENT BARRIER FENCE NOTES

1. LEHIGH WILL COORDINATE WITH USFWS STAFF DURING THE SECTION 7 CONSULTATION TO IDENTIFY AN APPROPRIATE FABRIC FOR USE AS A SEDIMENT BARRIER.
2. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
3. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
4. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
5. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
6. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.




## SEDIMENT BARRIER FENCE (2)

SCALE: 1"=2' C29,C30|C38




ELEVATION VIEW

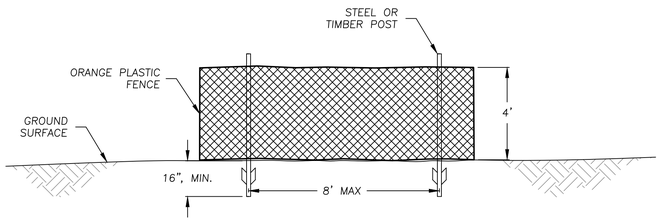
PLAN VIEW

### TREE PROTECTION NOTES:

1. THE INTENT OF THIS DETAIL IS TO PROTECT EXISTING TREES FROM DAMAGE DURING CONSTRUCTION.
2. THIS DETAIL SHALL BE USED WHEN WORKING WITHIN 10' OF AN EXISTING TREE TO REMAIN, AS DIRECTED BY THE ENGINEER.
3. DO NOT DAMAGE OR REMOVE TREES UNLESS NOTED OTHERWISE ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. LUMBER, WIRE, AND SANDBAGS MAY BE REUSED AT OTHER TREES, AS WORK PROGRESSES.

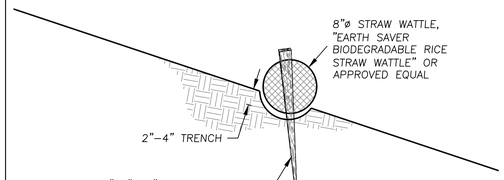
## TREE PROTECTION DETAIL (3)

SCALE: 1"=2' C11,C12,C13,C14|C38




## BOUNDARY FENCE DETAIL (4)

SCALE: 1"=3' C38




## FIBER ROLL (5)

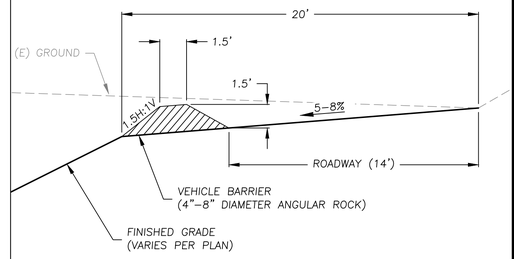
SCALE: 1"=1' C30|C38

### FIBER ROLL NOTES:

1. INSTALL FIBERS WITH THE SPACING SHOWN IN TABLE 2.
2. CLEAR THE BOTTOM OF TRENCH OF OBSTRUCTIONS INCLUDING ROCKS, CLODS, AND DEBRIS GREATER THAN ONE INCH IN DIAMETER BEFORE FIBER ROLL INSTALLATION.
3. INSTALL FIBER ROLLS PARALLEL TO THE SLOPE CONTOUR. ANGLE THE TERMINUS OF ROWS UP-SLOPE AT 45 DEGREES FOR A DISTANCE OF THREE FEET. WHERE FIBER ROLLS MEET, PROVIDE AN OVERLAP OF 1.5 FEET, WITH ADJACENT ROLLS TIGHTLY ABUTTING EACH OTHER.

### TABLE 2: FIBER ROLL SPACING

| SLOPE INCLINATION | SPACING ALONG SLOPE |
|---|---|
| 2H:1V AND STEEPER | 10 FEET |
| 4H:1V TO 2H:1V | 15 FEET |
| 10H:1V TO 4H:1V | 20 FEET |
| FLATTER THAN 10H:1V | MAX. 50 FEET |




### NOTES:

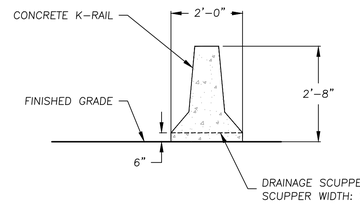
1. VEHICLE BARRIERS ARE DESIGNED FOR VEHICLES WITH A MAXIMUM AXLE HEIGHT OF 1.5 FEET FROM THE GROUND SURFACE.
2. LEAVE 4 TO 5 FOOT WIDE OPENINGS IN VEHICLE BARRIER EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.
3. CONSTRUCTION VEHICLE BARRIER OF 10" - 16" DIAMETER ANGULAR ROCK FROM STA. 44+25 TO 44+75 AT THE CHANNEL WIDENING AREA.

## VEHICLE BARRIER (TYPE 1) (6)

SCALE: 1"=5' C11,C12,C13,C14|C38

### NOTES:

LEAVE 4'-5' WIDE OPENINGS IN VEHICLE BARRIER EVERY 50-60 FEET TO ALLOW FOR UNOBSTRUCTED DRAINAGE FROM ROADWAY.




## VEHICLE BARRIER (TYPE 2) (7)

SCALE: 1"=2' C19,C20,C21|C38

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 / FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DETAILS (6 OF 6)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY: -
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C38

38 OF 47

# ROCK SPECIFICATIONS

THERE ARE EIGHT CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (RSP)
(4) – WEIR BOULDERS
(5) – SILL BOULDERS
(6) – FLOODPLAIN ROUGHNESS BOULDERS
(7) – BACKING LAYER
(8) – STREAM SUBSTRATE

ALL ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) SUB–ROUNDED TO ANGULAR IN SHAPE.
3) GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE CONSTANT THROUGHOUT THE STOCKPILE.

PROVIDE SAMPLES OF EACH GRADATION SPECIFIED FOR APPROVAL BY THE ENGINEER, PRIOR TO STOCKPILING AT INDIVIDUAL PROJECT AREAS.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

## 1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

### TYPE 1 GRADATION:

| PERCENT OF MIX (BY WEIGHT) | SIZE RANGE (INCHES) |
|---|---|
| 20 | 12–24 |
| 30 | 6–12 |
| 30 | 2–6 |
| 12 | 0.08–2 |
| 8 | <0.08 |

### TYPE 2 GRADATION:

| PERCENT OF MIX (BY WEIGHT) | SIZE RANGE (INCHES) |
|---|---|
| 20 | 24–36 |
| 30 | 16–24 |
| 20 | 6–16 |
| 10 | 2–6 |
| 12 | 0.08–2 |
| 8 | <0.08 |

### TYPE 3 GRADATION:

| PERCENT OF MIX (BY WEIGHT) | SIZE RANGE (INCHES) |
|---|---|
| 20 | 30–42 |
| 30 | 16–30 |
| 20 | 6–16 |
| 10 | 2–6 |
| 12 | 0.08–2 |
| 8 | <0.08 |

### TYPE 4 GRADATION:

| PERCENT OF MIX (BY WEIGHT) | SIZE RANGE (INCHES) |
|---|---|
| 20 | 48–60 |
| 30 | 24–48 |
| 20 | 10–24 |
| 10 | 2–10 |
| 12 | 0.08–2 |
| 8 | <0.08 |

A) PLACE ENGINEERED STREAMBED MATERIAL TO THE LINES, GRADES AND THICKNESSES SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, WATER–JET VOIDS WITHIN ROCK TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. START JETTING AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. CONTINUE JETTING UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. RETAIN ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SO ENTRAINED SEDIMENT CAN SETTLE OUT OR BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK. DISPOSE OF ALL CAPTURED SEDIMENT AT AN APPROVED LOCATION.

## 2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

### TYPE 5 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

### TYPE 6 GRADATION:

| PERCENT OF MIX (BY WEIGHT) | SIZE RANGE (INCHES) |
|---|---|
| 20 | 16–30 |
| 30 | 10–16 |
| 20 | 4–10 |
| 10 | 2–4 |
| 12 | 0.08–2 |
| 8 | <0.08 |

### TYPE 7 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 3 GRADATION.

### TYPE 8 GRADATION:

COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) PLACE FLOODPLAIN ARMOR MATERIAL TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, WATER–JET VOIDS WITHIN ROCK TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. START JETTING AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. CONTINUE JETTING UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. RETAIN ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SO ENTRAINED SEDIMENT CAN SETTLE OUT OR BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK. DISPOSE OF ALL CAPTURED SEDIMENT AT AN APPROVED LOCATION.

## 3 – ROCK SLOPE PROTECTION

A) ROCK SLOPE PROTECTION (RSP) SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS AND MEET THE MATERIAL GRADATIONS SHOWN ON THE DRAWINGS WHERE PROPOSED RSP IS SHOWN.

B) BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION USING STREAM SUBSTRATE. NATIVE STREAMBED MATERIAL MAY BE USED AS STREAM SUBSTRATE IF IT MEETS THE GRADATION REQUIREMENTS FOR STREAM SUBSTRATE.

C) PLACE BACKFILL MATERIAL TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER–JET TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. PLACE GEOTEXTILE FABRIC BELOW ROCK SLOPE PROTECTION.
2. USE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE WILL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.

## 4 – WEIR BOULDERS (CULVERT 7 AND 8 REMOVAL AREAS)

A) WEIR BOULDERS SHALL HAVE A MINIMUM Y–AXIS DIMENSION OF 4 FEET AND A MINIMUM WEIGHT OF 3 TONS.

## 5 – SILL BOULDERS

A) SILL BOULDERS SHALL BE BETWEEN THE D84–D100 OF THE SPECIFIED FLOODPLAIN ARMOR GRADATION AT THE LOCATION OF THE SILL.

## 6 – FLOODPLAIN ROUGHNESS BOULDERS

A) FLOODPLAIN ROUGHNESS BOULDERS SHALL MEET THE D84 (MIN.) OF THE SPECIFIED FLOODPLAIN ARMOR GRADATION AT THE LOCATION OF THE FLOODPLAIN ROUGHNESS BOULDER.

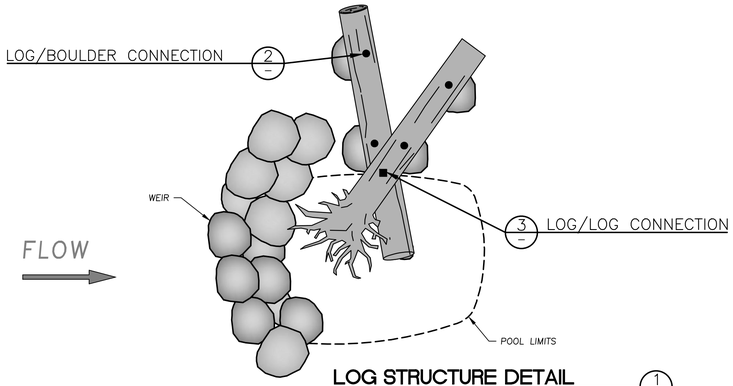
## 7 – BACKING LAYER

A) THE BACKING LAYER SHALL CONSIST OF A 50/50 MIX OF CALTRANS CLASS III RSP AND STREAM SUBSTRATE.

## 8 – STREAM SUBSTRATE

A) NATIVE STREAMBED MATERIAL CAN BE USED AS STREAM SUBSTRATE IF IT MEETS THE FOLLOWING MATERIAL GRADATION. FINAL DETERMINATION WILL BE MADE BY THE ENGINEER.

| US SIEVE SIZE | PERCENT PASSING |
|---|---|
| 12" | 100% |
| 6" | 50–70% |
| 3" | 20–40% |
| No. 10 | 5–10% |

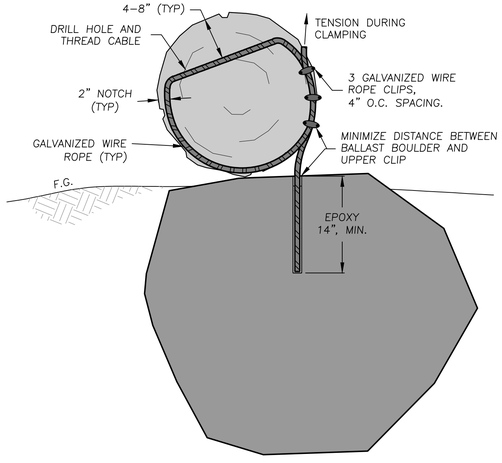



LOG STRUCTURE DETAIL 1
SCALE: NOT TO SCALE
C11, C14, C39

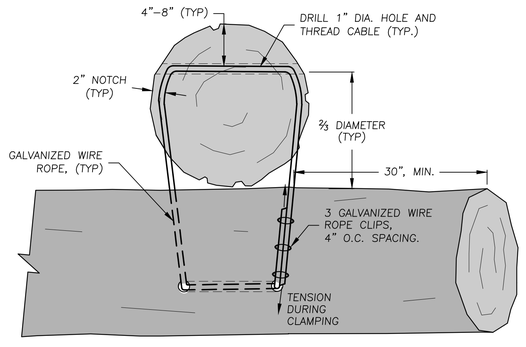
## LOG STRUCTURE NOTES:

1. PLACEMENT LOCATIONS: LOG AND BOULDER LOCATIONS SHOWN ON DRAWINGS ARE APPROXIMATE. EXACT LOCATIONS SHALL BE AS DIRECTED BY THE ENGINEER.
2. CONNECTIONS: CONNECTIONS SHALL CONSIST OF TWO (2) LOG/BOULDER CONNECTIONS AND ONE (1) LOG/LOG CONNECTION PER LOG, AS SHOWN ON DETAILS 2 AND 3, THIS SHT.. OR AS DIRECTED BY THE ENGINEER. TENSION ALL CONNECTIONS PRIOR TO CLAMPING TO REMOVE SLACK AND MINIMIZE MOVEMENT. ALL CONNECTIONS SHALL BE PLACED TO MINIMIZE VISUAL IMPACT.
3. LOGS: LOGS SHALL BE REDWOOD OR FIR. EACH LOG STRUCTURE SHALL CONSIST OF ONE LOG WITH ROOTWAD ATTACHED AND ONE LOG WITHOUT ROOTWAD. ALL LOGS SHALL BE SOUND AND FREE OF SIGNIFICANT DECAY, MEETING THE FOLLOWING CRITERIA:
   A. DIAMETER: 24 – 36 INCH (MIN. 24 INCHES AT ANY POINT)
   B. LENGTH: 20 – 30 FEET
4. BALLAST BOULDERS: BALLAST BOULDERS WILL BE SUB–ROUNDED TO SUB–ANGULAR WITH A MINIMUM WEIGHT OF 2.5 TONS (5,000 POUNDS). PLACE TWO BALLAST BOULDERS PER LOG, MINIMUM.
5. CABLE: ALL CABLE SHALL BE 5/8" GALVANIZED WIRE ROPE WITH A MINIMUM BREAKING STRENGTH OF 25,000 LBS. ALL CABLE TO BE SECURED WITH A MINIMUM OF THREE GALVANIZED WIRE ROPE CLIPS AT EACH END, WITH 4", MIN. SPACING BETWEEN CLAMPS AND 2", MIN. DISTANCE TO CABLE ENDS. CABLE SHALL BE THOROUGHLY CLEANED WITH A SOLUTION OF MURIATIC ACID OR WITH ACETONE TO REMOVE ALL GREASE OR OIL FROM BONDED LENGTH. CABLES SHALL BE TENSIONED PRIOR TO CLAMPING TO REMOVE ALL SLACK FROM CABLE, AFTER EPOXY IS ALLOWED TO SET UP OVERNIGHT PER THE EPOXY NOTES BELOW.
6. HOLE PLACEMENT/PREPARATION: HOLES FOR ANCHORING INTO BOULDERS/ROCK FACE SHALL BE DRILLED WHERE ROCK IS SOUND, WHERE NO FAULTS OR FRACTURES ARE VISIBLE. HOLE DIAMETER SHALL BE NOT MORE THAN 1/8" GREATER THAN THAT OF THE ANCHOR/CABLE. HOLES SHALL BE DRILLED TO ALIGN WITH FINAL ORIENTATION OF TENSILE FORCES IN THE ANCHOR/CABLE, TO MINIMIZE BENDING AT THE ROCK SURFACE. HOLES SHALL BE PROPERLY CLEANED OF ALL DUST AND DEBRIS USING COMPRESSED AIR PRIOR TO INSTALLATION OF CABLE/ANCHOR. THE ENGINEER SHALL INSPECT AND APPROVE ALL HOLES PRIOR TO EPOXY PLACEMENT.
7. EPOXY: FILL THE HOLE APPROXIMATELY 2/3 WITH EPOXY BEFORE INSERTING THE CABLE TO THE BOTTOM OF THE HOLE. ALLOW ADHESIVE TO SET UP OVERNIGHT BEFORE APPLYING TENSION TO CABLE.

   ANCHORING ADHESIVE SHALL BE A TWO–COMPONENT 100% SOLIDS EPOXY BASED SYSTEM SUPPLIED IN MANUFACTURER'S STANDARD CARTRIDGE AND DISPENSED THROUGH A STATIC–MIXING NOZZLE SUPPLIED BY THE MANUFACTURER. EPOXY SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM C–881 SPECIFICATION FOR TYPE I, II, IV, AND V, GRADE 3, CLASS B AND C AND MUST DEVELOP MINIMUM 12,650 PSI COMPRESSIVE YIELD STRENGTH AFTER 7 DAY CURE. EPOXY MUST HAVE A HEAT REFLECTION TEMPERATURE OF A MINIMUM 136 DEGREES FAHRENHEIT (58 DEGREES CELSIUS). ADHESIVE SHALL BE EPOXY–TIE SET FROM SIMPSON STRONG–TIE, DUBLIN, CA, OR APPROVED EQUIVALENT. FILL THE HOLE APPROXIMATELY 2/3 WITH POLYESTER EPOXY RESIN BEFORE INSERTING CABLE TO THE BOTTOM OF THE HOLE. TAKE CARE TO ENSURE HIGH BOND STRENGTH, AND AVOID CONTAMINATION. ALLOW ADHESIVE TO SET UP OVERNIGHT BEFORE APPLYING TENSION TO CABLE.
8. LOG STRUCTURE DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER WILL OBSERVE CONSTRUCTION OF THE LOG STRUCTURES TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS MUST INCLUDE LOG AND BOULDER SELECTION, PLACEMENT, AND BACKFILLING. ANY LOG STRUCTURES CONSTRUCTED WITHOUT THE ENGINEER PRESENT ON–SITE MAY RESULT IN REJECTION OF THE WORK BY THE ENGINEER.




LOG/BOULDER CONNECTION 2
SCALE: 1" = 1'




LOG/LOG CONNECTION 3
SCALE: 1" = 1'


WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
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WWW.WATWAYS.COM


PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

LOG STRUCTURE DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.Z. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13–016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C39

## GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE 2015 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. NOTIFY THE ENGINEER AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

## DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

## EARTHWORK NOTES

1. GRADING SUMMARY:

OUTSIDE RECLAMATION AREA PLAN BOUNDARY
CHANNEL WIDENING AREA:
CUT VOLUME = 8,300 CY
FILL VOLUME= 200 CY
NET (CUT)= 8,100 CY

WITHIN RECLAMATION AREA PLAN BOUNDARY
CHANNEL WIDENING AREA:
CUT VOLUME = 14,000 CY
FILL VOLUME= 1,400 CY
NET (CUT)= 12,600 CY

SEDIMENT FAN AREA:
CUT VOLUME = 5,000 CY
FILL VOLUME= 0 CY
NET (CUT)= 5,000 CY

ROCK PILE AREA:
CUT VOLUME = 420,000 CY
FILL VOLUME= 1,600 CY
NET (CUT)= 418,400 CY

MATERIAL REMOVAL AREA:
CUT VOLUME = 141,000 CY
FILL VOLUME= 1,000 CY
NET (CUT)= 140,000 CY

PROJECT TOTAL
CUT VOLUME = 580,000 CY
FILL VOLUME= 4,000 CY
NET (CUT)= 576,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS WILL BE USED ON SITE, AS APPROPRIATE, FOR RECLAMATION PURPOSES AS DIRECTED BY THE GEOTECHNICAL ENGINEER OR PROJECT GEOLOGIST.

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER OR PROFESSIONAL GEOLOGIST. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

## GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. REMAIN AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM REMOVE ACCUMULATED SEDIMENT AND DEBRIS FROM ALL EROSION CONTROL MEASURES.

10. KEEP IN FORCE ALL EROSION CONTROL DEVICES AND MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

## FIELD ENGINEERING NOTES

### (FOR ROCK PILE AREA AND MATERIAL REMOVAL AREA CONSTRUCTION)

1. GENERAL

THESE DRAWINGS WERE DEVELOPED WITH THE GOAL OF CREATING MORE NATURAL CONDITIONS, WHILE MAINTAINING A RELATIVELY UNIFORM PROFILE GRADIENT WITHIN THE PROPOSED LIMITS OF DISTURBANCE TO IMPROVE CHANNEL STABILITY AND ENHANCE ECOLOGICAL FUNCTION. THE DRAWINGS WERE PREPARED WITHOUT FULL KNOWLEDGE OF SUBSURFACE CONDITIONS, INCLUDING THE ELEVATION OF UNDERLYING BEDROCK OR ALLUVIAL MATERIALS THAT WOULD INDICATE THE LOCATION OF THE PRE-DISTURBANCE CHANNEL PROFILE IN REACHES 18-17 AND 13-11. THE DESIGN APPROACH FOR THESE REACHES WILL EMPLOY FIELD ENGINEERING AND A FIELD DIRECTED CONSTRUCTION APPROACH TO MAXIMIZE CHANNEL STABILITY, WHILE AVOIDING EXCAVATION INTO NATIVE BEDROCK. THE FINAL CONSTRUCTED GEOMETRY WILL BE DIRECTED BY THE ENGINEER IN THE FIELD, PENDING SUBSURFACE CONDITIONS, AS DESCRIBED BELOW.

1.1. THE ROCK PILE AREA (REACHES 13-11) IS EXPECTED TO BE CONSTRUCTED PRIOR TO THE MATERIAL REMOVAL AREA. EXPERIENCE GAINED FROM THE FIELD DIRECTED CONSTRUCTION APPROACH AT THE ROCK PILE AREA WILL BE USED TO REFINE THE DESIGN FOR THE MATERIAL REMOVAL AREA.

2. PROFILE

2.1. GENERAL. THE FINISHED GRADE ELEVATION OF THE FLOWLINE WILL GENERALLY FALL BETWEEN THE UPPER AND LOWER LIMITS SHOWN ON THE DRAWINGS, DEFINED THERE AS THE "GRADING ENVELOPE," EXCEPT WHERE THE LOCATION OF EXISTING BEDROCK REQUIRES DEVIATION. THE LOWER LIMIT OF THE ENVELOPE IS THE OPTIMUM "STRAIGHT GRADE" UNIFORM PROFILE WITHIN THE PROPOSED LIMITS OF WORK. THE UPPER LIMIT OF THE ENVELOPE IS A BEST-FIT LINE BETWEEN IDENTIFIED POINTS OF BEDROCK CONTROL, AS ESTIMATED FROM RECENT SUBSURFACE INVESTIGATIONS. THE CONSTRUCTION WILL ATTEMPT TO FOLLOW THE LOWER LIMIT OF THE ENVELOPE, SUBJECT TO THE CONSTRAINTS SET FORTH BELOW.

2.2. BEDROCK.

A. GENERAL. THE QUALIFICATION OF MATERIAL AS "BEDROCK" WILL BE PERFORMED INITIALLY BY THE PROJECT GEOTECHNICAL ENGINEER. IF THE PROJECT GEOTECHNICAL ENGINEER DETERMINES THAT EXCAVATION TO BEDROCK HAS OCCURRED PRIOR TO REACHING THE LOWEST ELEVATION AT ANY LOCATION WITHIN THE GRADING ENVELOPE, AN INDEPENDENT PROFESSIONAL GEOLOGIST WILL ASSESS AND MAKE THE FINAL DETERMINATION OF THE EXISTENCE AND EXTENT OF ANY SUCH BEDROCK.

B. WHERE BEDROCK IS ENCOUNTERED ABOVE THE LOWER LIMIT OF THE GRADING ENVELOPE, THE PROFILE WILL NOT BE EXCAVATED INTO THE BEDROCK. AN INSPECTION TRENCH WILL BE CONSTRUCTED ACROSS THE CHANNEL, WITHIN THE POTENTIAL CROSS SECTION LIMITS (BETWEEN THE ADJACENT HILL SLOPES), TO ENSURE THAT BEDROCK IS CONTINUOUS. THE CHANNEL ALIGNMENT WILL FOLLOW THE LOW POINT OF THE BEDROCK, TO THE EXTENT THAT THIS IS FEASIBLE WHILE MAINTAINING A GEOMORPHICALLY APPROPRIATE PLANFORM ALIGNMENT, AND WHILE REMAINING WITHIN THE LATERAL LIMITS DESCRIBED BELOW. UPSTREAM OF BEDROCK CONTROL POINTS, THE LOWER LIMIT OF THE PROFILE WILL BE SUBJECT TO THE MINIMUM DESIGN PROFILE GRADIENT, AS SPECIFIED BELOW.

C. MINIMUM DESIGN PROFILE GRADIENT. UPSTREAM OF BEDROCK CONTROLS, THE MINIMUM DESIGN PROFILE GRADE WILL BE SET TO 4%, TO HELP MAINTAIN SEDIMENT TRANSPORT CONTINUITY AND CHANNEL STABILITY.

D. THE CONSTRUCTED PROFILE GRADIENT BETWEEN BEDROCK OUTCROPS WILL NOT EXCEED 12.0%.

E. ALLUVIAL MATERIALS. WHERE THE ORIGINAL "PRE-DISTURBANCE" STREAMBED IS IDENTIFIED BY THE PRESENCE OF SIGNIFICANT ALLUVIAL DEPOSITS, THE DESIGN PROFILE WILL NOT BE CONSTRUCTED BELOW THE ELEVATION OF THESE DEPOSITS, PROVIDED THE SPECIFIED MINIMUM AND MAXIMUM PROFILE GRADE CRITERIA ARE MET. TEMPORARY EXCAVATIONS WILL NOT EXTEND BELOW THE DESIGN PROFILE ANY MORE THAN IS NECESSARY TO CONSTRUCT THE ENGINEERED STREAMBED MATERIAL SHOWN ON THE DESIGN DRAWINGS.

3. CROSS SECTION GEOMETRY

A. ACTIVE CHANNEL. THE LOW FLOW CROSS SECTION GEOMETRY WILL BE INFORMED BY REGIONAL ANALOGS AND REFINED BASED ON THE LOCAL PROFILE GRADIENT WITHIN EACH CONSTRUCTED REACH. CROSS SECTION DETAILS WILL CLOSELY RESEMBLE THE RANGE OF TYPICAL SECTIONS SHOWN ON THE DRAWINGS, EXCEPT WHERE INFLUENCED BY THE PRESENCE OF BEDROCK AS DISCUSSED ABOVE.

B. FLOODPLAIN. THE FLOODPLAIN WIDTHS WILL BE MAXIMIZED WITHIN THE CONSTRAINT OF MAINTAINING THE STABILITY OF THE ADJACENT HILLSIDE AND THE NEED TO ACCOMMODATE ROADS SHOWN ON THE DRAWINGS. THE STABLE DESIGN SLOPE OF THE ADJACENT HILLSIDE WILL BE DETERMINED BY THE GEOTECHNICAL ENGINEER, AND WILL LIKELY VARY BETWEEN 2H:1V AND 1.5H:1V, AS SHOWN ON THE DRAWINGS. EXPOSED BEDROCK MAY ALLOW FOR STEEPER SLOPES, SUBJECT TO APPROVAL OF THE GEOTECHNICAL ENGINEER. WHERE THE FINAL DESIGN PROFILE APPROACHES THE LOWER LIMIT OF THE GRADING ENVELOPE, THE STABILITY OF ADJACENT HILLSIDES WILL DICTATE A NARROWER FLOODPLAIN WIDTH. SLOPE BENCHING MAY BE INCORPORATED TO REDUCE SLOPE LENGTH, CONTROL SURFACE RUNOFF AND HELP PROTECT SLOPES FROM SURFACE EROSION WHILE VEGETATION BECOMES ESTABLISHED.

C. WHERE BEDROCK OUTCROPS CONSTRAIN THE FLOODPLAIN WIDTH, UPSTREAM AND DOWNSTREAM FLOODPLAINS WILL TRANSITION RAPIDLY TO CONFORM TO THOSE RESTRICTIONS AND THEN RETURN TO THE STANDARD FLOODPLAIN WIDTHS AS DESCRIBED ABOVE.

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PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

NOTES

PERMANENTE CREEK
RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## ROCKPILE AREA CONTROL POINTS

| POINT # | DESCRIPTION | ELEV | NORTHING | EASTING |
|---|---|---|---|---|
| 72 | CP SET SPK | 716.22 | 1941334.47 | 6096793.81 |
| 75 | CP SET SPK | 803.09 | 1941619.31 | 6096158.88 |
| 76 | CP SET RBR | 808.85 | 1941680.82 | 6095909.82 |
| 111 | CP SET RBR | 806.80 | 1941671.67 | 6095921.21 |
| 114 | CP SET RBR | 816.20 | 1941779.90 | 6095582.76 |
| 115 | CP SET RBR | 812.88 | 1941879.05 | 6095569.80 |
| 117 | CP SET RBR | 819.89 | 1941892.45 | 6095529.40 |
| 217 | CP SET RBR | 724.29 | 1941371.11 | 6096727.29 |
| 404 | SPK | 806.27 | 1941662.30 | 6095969.08 |
| 405 | RBR | 796.09 | 1941537.79 | 6096266.02 |

## CONCRETE CHANNEL CONTROL POINTS

| POINT # | DESCRIPTION | ELEV | NORTHING | EASTING |
|---|---|---|---|---|
| 10 | MAG NAIL | 510.38 | 1943483.74 | 6101146.44 |
| 12 | 1" IRON PIPE | 529.20 | 1942175.05 | 6099969.01 |
| 17 | REBAR | 485.24 | 1943557.06 | 6100979.06 |
| 18 | REBAR | 490.06 | 1943435.52 | 6100870.89 |
| 19 | REBAR | 498.09 | 1943198.66 | 6100699.22 |
| 20 | REBAR | 508.54 | 1942872.53 | 6100467.68 |
| 21 | MAG NAIL | 521.46 | 1942467.45 | 6100151.60 |
| 22 | SPIKE | 551.31 | 1941760.87 | 6099823.75 |
| 51 | MONUMENT | 478.22 | 1943592.65 | 6101044.38 |
| 52 | REBAR | 483.41 | 1943590.24 | 6101025.98 |
| 53 | REBAR | 515.91 | 1942632.18 | 6100296.75 |
| 54 | SPIKE | 521.30 | 1942452.03 | 6100170.82 |
| 193 | REBAR | 476.72 | 1943711.46 | 6100983.49 |

## OLD CRUSHER FOUNDATION CONTROL POINTS

| POINT # | DESCRIPTION | ELEV | NORTHING | EASTING |
|---|---|---|---|---|
| 165 | CP SET RBR | 1063.33 | 1941953.01 | 6093263.23 |

## CHANNEL WIDENING AREA CONTROL POINTS

| POINT # | DESCRIPTION | ELEV | NORTHING | EASTING |
|---|---|---|---|---|
| 27 | REBAR | 593.54 | 1940695.05 | 6099210.37 |
| 28 | REBAR | 596.51 | 1940561.90 | 6099071.25 |
| 29 | MAG NAIL | 598.00 | 1940385.77 | 6098868.13 |
| 30 | REBAR | 601.51 | 1940365.48 | 6098858.92 |
| 31 | REBAR | 610.23 | 1940446.61 | 6098616.89 |
| 32 | REBAR | 613.75 | 1940462.10 | 6098526.45 |
| 33 | REBAR | 618.26 | 1940475.93 | 6098439.20 |
| 34 | REBAR | 628.65 | 1940479.92 | 6098296.99 |
| 35 | REBAR | 632.45 | 1940501.64 | 6098230.63 |
| 36 | MAG NAIL | 620.81 | 1940463.13 | 6098387.20 |
| 37 | REBAR | 635.48 | 1940558.97 | 6098103.67 |
| 38 | REBAR | 641.70 | 1940495.95 | 6097949.58 |
| 40 | MAG NAIL | 648.83 | 1940405.35 | 6097615.83 |
| 41 | MAG NAIL | 646.63 | 1940383.67 | 6097691.16 |
| 42 | REBAR | 656.48 | 1940451.30 | 6097514.85 |
| 43 | REBAR | 657.09 | 1940492.55 | 6097471.45 |
| 44 | REBAR | 660.96 | 1940560.15 | 6097400.04 |
| 45 | REBAR | 668.01 | 1940655.83 | 6097298.98 |
| 46 | SPIKE | 680.15 | 1940841.82 | 6097231.78 |
| 62 | SPIKE | 569.70 | 1940615.33 | 6099288.05 |
| 63 | SPIKE | 570.71 | 1940570.68 | 6099267.81 |
| 64 | REBAR | 584.77 | 1940545.28 | 6099205.98 |
| 65 | REBAR | 590.89 | 1940439.65 | 6099088.09 |
| 66 | MAG NAIL | 591.86 | 1940396.17 | 6098999.78 |
| 67 | MAG NAIL | 595.38 | 1940388.34 | 6098927.84 |
| 68 | MAG NAIL | 602.87 | 1940400.72 | 6098741.75 |
| 69 | MAG NAIL | 606.61 | 1940410.97 | 6098663.01 |
| 79 | SPIKE | 646.21 | 1940316.73 | 6097727.47 |
| 81 | SPIKE | 694.63 | 1940223.55 | 6097775.38 |
| 82 | REBAR | 649.67 | 1940408.23 | 6097839.94 |
| 83 | REBAR | 637.23 | 1940523.90 | 6098107.56 |
| 84 | REBAR | 621.56 | 1940440.92 | 6098417.10 |
| 215 | REBAR | 646.91 | 1940455.35 | 6097884.82 |
| 218 | REBAR | 677.67 | 1940841.54 | 6097176.51 |
| 219 | REBAR | 680.66 | 1940900.16 | 6097145.81 |
| 314 | REBAR | 637.77 | 1940371.89 | 6097791.16 |
| 400 | REBAR | 576.85 | 1940487.04 | 6099160.53 |
| 401 | REBAR | 607.02 | 1940404.17 | 6098660.54 |
| 402 | REBAR | 609.64 | 1940411.88 | 6098607.86 |
| 403 | REBAR | 615.06 | 1940428.64 | 6098517.03 |
| 406 | REBAR | 629.80 | 1940471.66 | 6098007.66 |
| 410 | REBAR | 653.73 | 1940584.46 | 6097340.83 |
| 411 | REBAR | 661.24 | 1940732.49 | 6097196.50 |
| 412 | REBAR | 664.95 | 1940814.37 | 6097160.96 |
| 413 | REBAR | 683.39 | 1940897.81 | 6097111.72 |

## MATERIAL REMOVAL AREA CONTROL POINTS

| POINT # | DESCRIPTION | ELEV | NORTHING | EASTING |
|---|---|---|---|---|
| 48 | CP SET RBR | 1261.52 | 1942178.50 | 6091840.78 |
| 49 | CP SET RBR | 1227.82 | 1942114.42 | 6092223.57 |
| 150 | CP SET RBR | 1248.81 | 1942121.40 | 6091732.54 |
| 151 | CP SET RBR | 1209.33 | 1942037.70 | 6091938.21 |
| 152 | CP SET RBR | 1193.37 | 1941973.93 | 6092019.31 |
| 153 | CP SET RBR | 1206.00 | 1942064.01 | 6092164.43 |
| 154 | CP SET RBR | 1203.50 | 1942039.62 | 6092197.65 |
| 155 | CP SET RBR | 1174.15 | 1942015.96 | 6092308.67 |
| 156 | CP SET RBR | 1156.71 | 1941993.50 | 6092485.97 |
| 157 | CP SET RBR | 1146.54 | 1941979.84 | 6092548.12 |
| 158 | CP SET RBR | 1107.87 | 1941764.00 | 6092719.31 |
| 159 | CP SET RBR | 1096.94 | 1941783.90 | 6092867.43 |
| 160 | CP SET RBR | 1090.73 | 1941829.03 | 6092915.18 |
| 163 | CP SET RBR | 1071.81 | 1941856.46 | 6093112.11 |
| 165 | CP SET RBR | 1063.33 | 1941953.01 | 6093263.23 |
| 166 | CP SET RBR | 1069.37 | 1941972.57 | 6093285.20 |
| 169 | CP SET RBR | 1247.35 | 1942132.95 | 6091720.89 |
| 171 | CP FD SPK | 1248.13 | 1942159.92 | 6091675.87 |
| 174 | CP SET RBR | 1257.05 | 1942125.94 | 6091344.28 |
| 175 | CP SET SPK | 1256.76 | 1942089.48 | 6091244.14 |

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

CONTROL
POINT
TABLES

PERMANENTE CREEK
RESTORATION PLAN

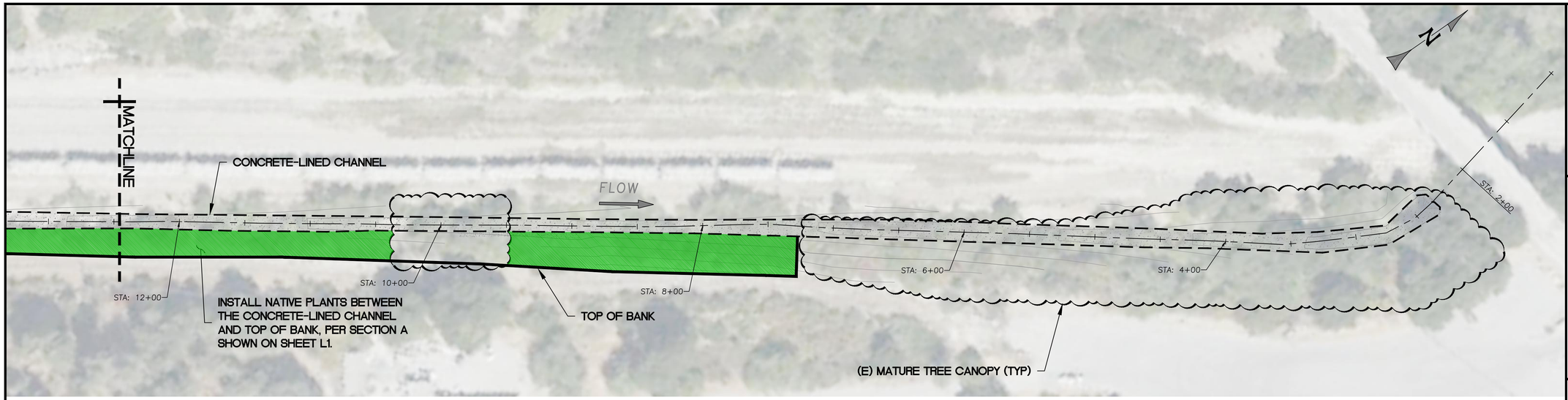
UPDATED 90% DESIGN

SANTA CLARA COUNTY
CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C41




## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

### SUPPLEMENTAL PLANTING NOTES:

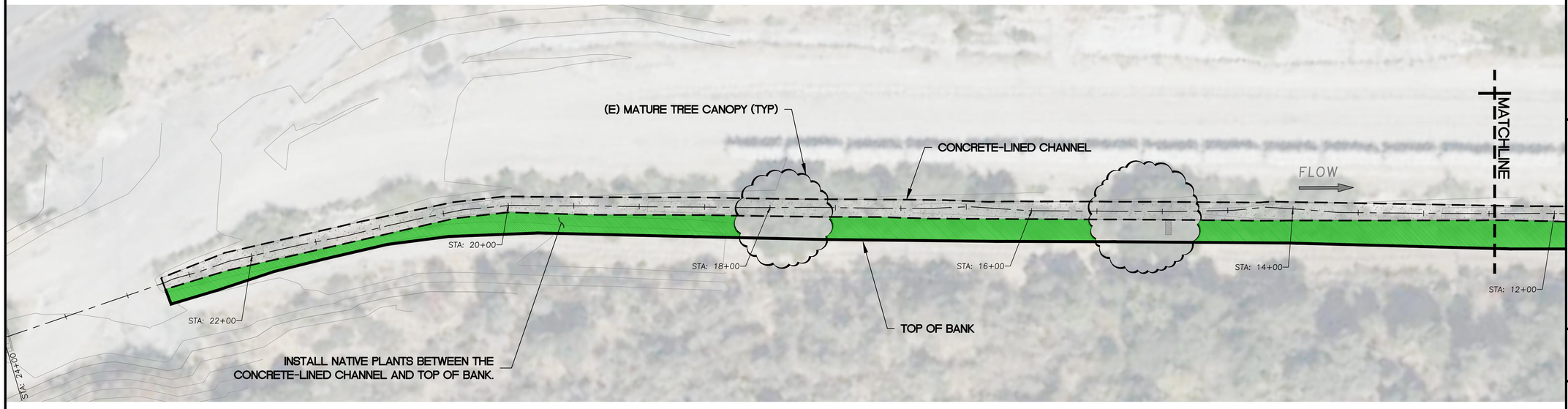
1. PROTECT IN PLACE ALL EXISTING NATIVE TREES AND SHRUBS, INCLUDING EXISTING OAK SEEDLINGS.
2. A QUALIFIED REVEGETATION SPECIALIST SHALL CONFIRM EACH PROPOSED PLANTING LOCATION PRIOR TO EXCAVATION OF PLANTING PITS.
3. PROPOSED PLANT SPECIES CONTAINER SIZE AND SPACING SHALL CONFORM TO TABLE 1. CONCRETE CHANNEL – RIPARIAN PLANTING.
4. CLEAR AND GRUB A THREE-FOOT DIAMETER AREA AT EACH PROPOSED PLANTING LOCATION.
5. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS OR TREES, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
6. INSTALL PLANTINGS, BROWSE PROTECTION AND IRRIGATION IN ACCORDANCE WITH THE CONTAINER PLANTING DETAIL ON SHEET L2
7. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT, AS DETERMINED BY THE REVEGETATION SPECIALIST. USE EXCESS SOIL TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
8. PLACE THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

**TABLE 1. CONCRETE CHANNEL - RIPARIAN PLANTING**

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | QUANTITY |
|---|---|---|---|---|
| California Buckeye | *Aesculus Californica* | Treepot 4 (TP4) | 15 | Container plant quantities will be dependent on the location of existing native species and will be determined at the time of construction. |
| Coast Live Oak | *Quercus Agrifolia* | Treepot 4 (TP4) | 12 | |
| Blue Elderberry | *Sambucus Nigra, SSP. Caerulea* | Treepot 4 (TP4) | 10 | |
| Hollyleaf Cherry | *Prunus Ilicifolia* | Deepot 40 (D-40) | 10 | |
| Coyote Brush | *Baccharis Pillularis* | Deepot 40 (D-40) | 8 | |
| Black Sage | *Salvia Mellifera* | Deepot 60 (D-60) | 5 | |
| California Sagebrush | *Artemisia Californica* | Deepot 40 (D-40) | 3 | |

LEGEND

- RIPARIAN PLANTING ZONE (CONCRETE CHANNEL)
- DESIGN ALIGNMENT (STA: 4+00)
- CONCRETE LINED CHANNEL




## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL REVEGETATION PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

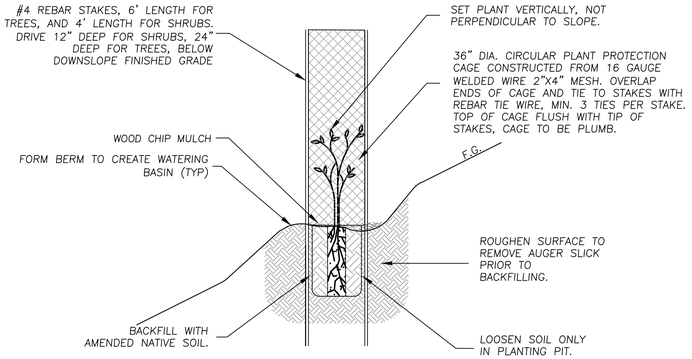
| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.Z. |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

## TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.




CONTAINER PLANTING DETAIL

SCALE: N.T.S.

## SPECIES TO RECEIVE BROWSE PROTECTION CAGES:

| COMMON NAME | SCIENTIFIC NAME |
|---|---|
| CALIFORNIA BUCKEYE | AESCULUS CALIFORNICA |
| MADRONE | ARBUTUS MENZIESII |
| CALIFORNIA SAGE | ARTEMISIA CALIFORNICA |
| HOLLYLEAF CHERRY | PRUNUS ILICIFOLIA |
| COASTAL LIVE OAK | QUERCUS ARGIFOLIA |
| BLUE ELDERBERRY | SAMBUCUS NIGRA SSP. CAERULA |

NOTE: BROWSE PROTECTION CAGES WILL NOT BE INSTALLED AROUND PLANTINGS IN FLOODPLAIN AREAS DUE TO THE LIKELIHOOD THAT CAGES MAY BE INUNDATED AND DAMAGED BY FLOOD FLOWS.

## IRRIGATION NOTES:

ALL CONTAINER PLANTINGS WILL RECEIVE DRIP IRRIGATION. IRRIGATION DETAILS ARE NOT INCLUDED IN THIS DRAWINGS SET AND WILL BE INCLUDED IN THE NEXT DESIGN SUBMITTAL.

### TABLE 2a. FLOODPLAIN PLANTING SEED MIX

**Floodplain Seeding Area:**

**Channel Widening and Rockpile Area (acres): 2.53**

**Material Removal Area (acres): 1.44**

| COMMON NAME | SCIENTIFIC NAME | PLS LBS / ACRE |
|---|---|---|
| California Brome | *Bromus Carinatus* | 10.0 |
| Blue Wildrye | *Elymus Glaucus* | 8.0 |
| Creeping Wildrye | *Elymus Triticoides* | 6.0 |
| Small Fescue | *Festuca Microstachys* | 8.0 |
| Meadow Barley | *Hordeum Brachyantherum* | 6.0 |
| Blue-Eyed Grass | *Sisyrinchium Bellum* | 1.0 |
| Purple Needlegrass | *Stipa Bellum* | 5.0 |
| Tomcat Clover | *Trifolium Willdenovii* | 5.0 |
| Regreen (sterile wheat grass) | *Triticum aestivum* | 40.0 |
| | TOTAL | 89.0 |

Seed mix to be applied to the Floodplain Planting Zones at all project sites where rock is not used as a surface treatment

### TABLE 2b. UPLAND AND RIPARIAN PLANTING SEED MIX

**Upland Seeding Area:**

**Channel Widening and Rockpile Area (acres): 5.57**

**Material Removal Area (acres): 2.18**

**Riparian Seeding Area:**

**Channel Widening and Rockpile Area (acres): 2.43**

**Material Removal Area (acres): 1.25**

| COMMON NAME | SCIENTIFIC NAME | PLS LBS / ACRE |
|---|---|---|
| California Sagebrush | *Artemisia Californica* | 0.5 |
| California Brome | *Bromus Carinatus* | 12.0 |
| Blue Wildrye | *Elymus Glaucus* | 10.0 |
| California Poppy | *Eschscolzia Californica* | 2.0 |
| Deerweed | *Lotus Scoparius* | 3.0 |
| Purple Needlegrass | *Nasella Pulchra* | 5.0 |
| Three Weeks Fescue | *Festuca Microstachys* | 6.0 |
| Tomcat clover | *Trifolium willdenovii* | 5.0 |
| Lupine | *Lupinus Nanus* | 4.0 |
| Regreen (sterile wheat grass) | *Triticum aestivum* | 40.0 |
| | TOTAL | 87.5 |

Seed mix to be applied to the Upland Seedings Zones and the Riparian Planting Zones at all project sites.

### TABLE 3. CHANNEL WIDENING/SEDIMENT REMOVAL AREA - FLOODPLAIN PLANTING (TYPE 1)

**Area (acres): 1.51**

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| Big Leaf Maple | *Acer Macrophylum* | Treepot 4 (TP4) | 25 | 90 |
| White Alder | *Alnus Rhombifolia* | Treepot 4 (TP4) | 20 | 110 |
| Red/Arroyo Willow (Floodplain) | *Salix Laevigata/lasiolepis* | Live Stake | 15 | 290 |
| Red/Arroyo Willow (Vegetated RSP) | *Salix Laevigata/lasiolepis* | Live Stake | 7 | 60 |
| Red/Arroyo Willow (Sed. Removal Area) | *Salix Laevigata/lasiolepis* | Live Stake | 7 | 90 |
| | | | **Total** | **640** |

*Spacing is approximate. Quantity will govern.

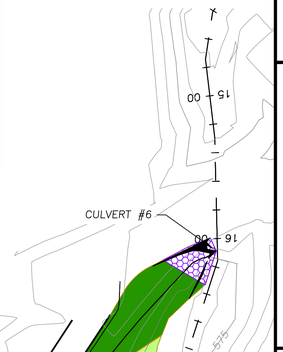
Install Live Willow Stakes at the spacing shown within the vegetated RSP, per Section B, Sheet C11, and Section B, Sheet C18, and within the Engineered Streambed Material at the Sediment Removal Area tributary reach per Detail 1, Sheet C16.

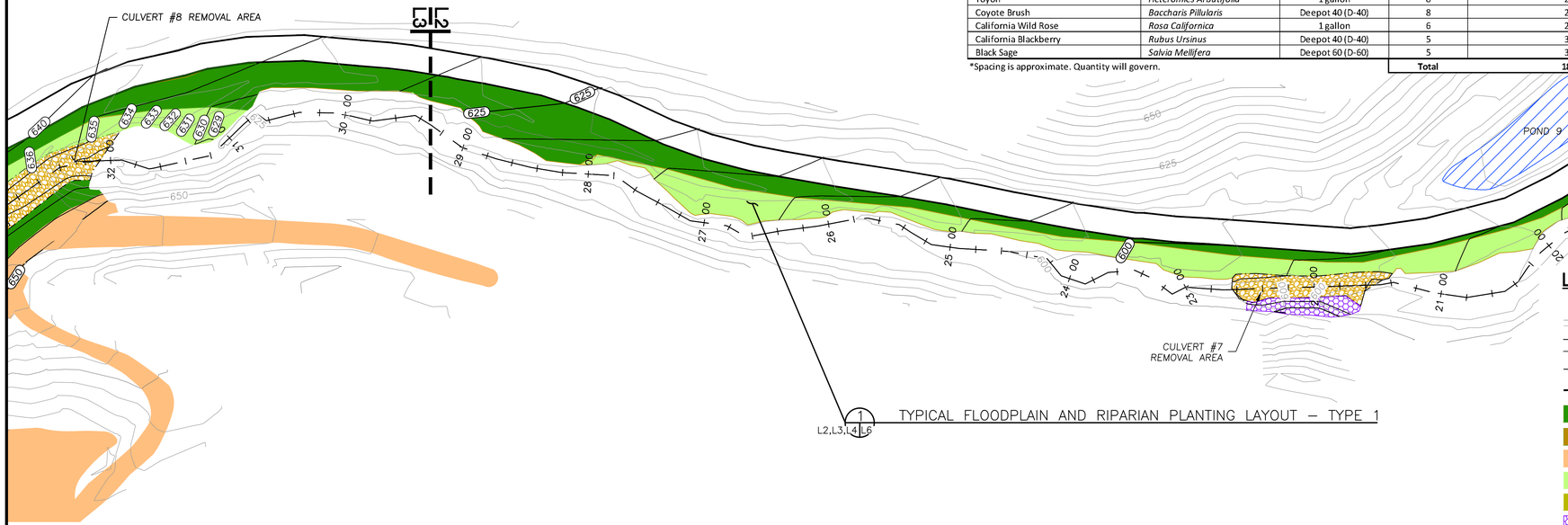
### TABLE 4. CHANNEL WIDENING/SEDIMENT REMOVAL AREA - RIPARIAN PLANTING (TYPE 1)

**Area (acres): 1.37**

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| California Buckeye | *Aesculus Californica* | Treepot 4 (TP4) | 15 | 110 |
| Coast Live Oak | *Quercus Agrifolia* | Treepot 4 (TP4) | 12 | 130 |
| Blue Elderberry | *Sambucus Nigra, SSP. Caerulea* | Treepot 4 (TP4) | 10 | 150 |
| Toyon | *Heteromles Arbutifolia* | 1 gallon | 8 | 220 |
| Coyote Brush | *Baccharis Pillularis* | Deepot 40 (D-40) | 8 | 220 |
| California Wild Rose | *Rosa Californica* | 1 gallon | 6 | 290 |
| California Blackberry | *Rubus Ursinus* | Deepot 40 (D-40) | 5 | 360 |
| Black Sage | *Salvia Mellifera* | Deepot 60 (D-60) | 5 | 360 |
| | | | **Total** | **1840** |

*Spacing is approximate. Quantity will govern.




1 L2,L3,L4,L6 TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1

CHANNEL WIDENING REVEGETATION PLAN

SCALE: 1" = 50'

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (N) CHANNEL ALIGNMENT
- (E) EDGE OF ROAD
- RIPARIAN PLANTING ZONE (TYPE 1)
- RIPARIAN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE
- FLOODPLAIN PLANTING ZONE (TYPE 1)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- VEGETATED RSP
- ENGINEERED STREAM MATERIAL (ESM)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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING REVEGETATION PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

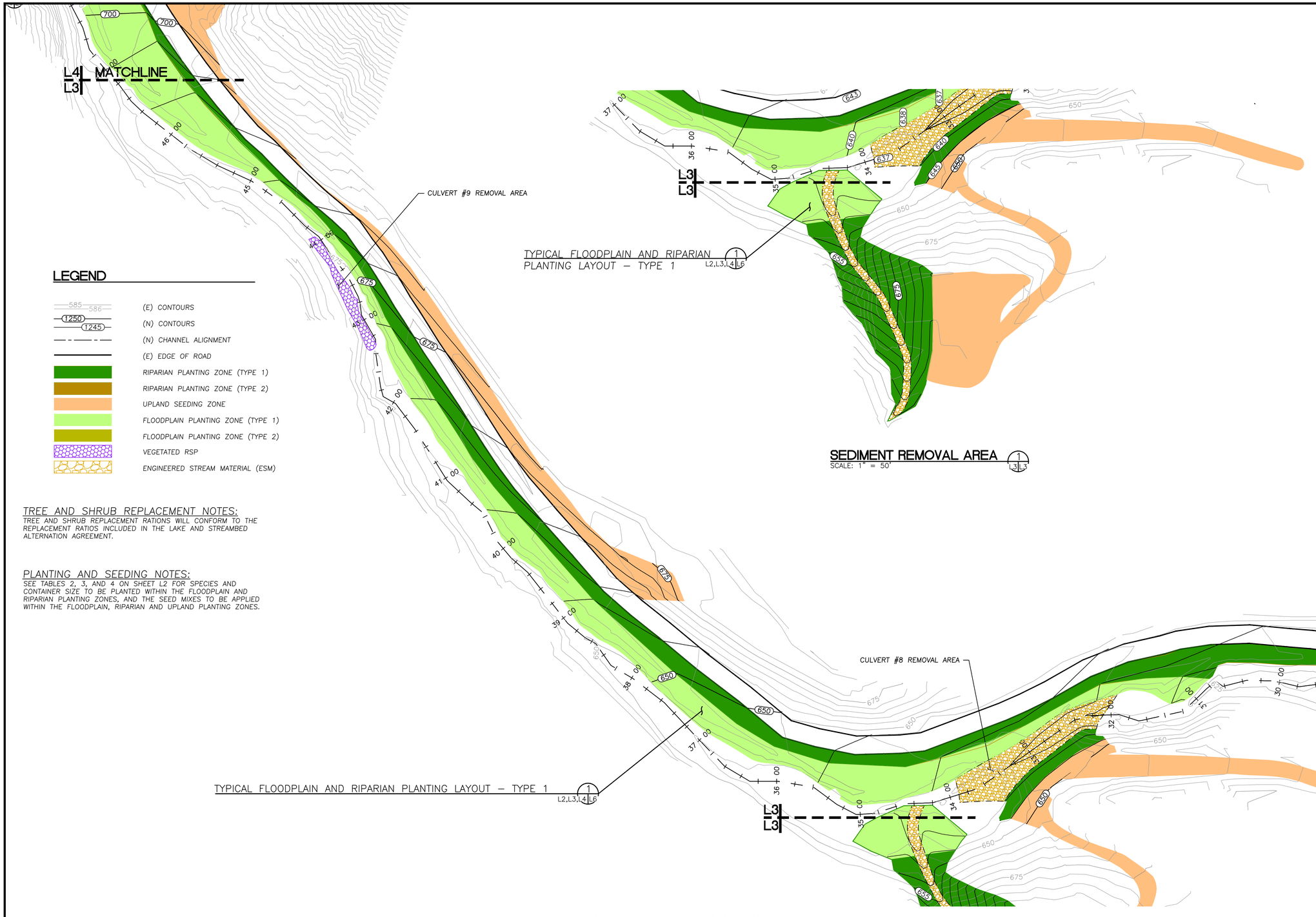
DESIGNED BY: –
DRAWN BY: C.B.H.
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

L2

43 OF 47




TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1 (1) L2,L3,L4,L6

TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1 (1) L2,L3,L4,L6

## SEDIMENT REMOVAL AREA (1) L3

SCALE: 1" = 50'

## TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

## PLANTING AND SEEDING NOTES:

SEE TABLES 2, 3, AND 4 ON SHEET L2 FOR SPECIES AND CONTAINER SIZE TO BE PLANTED WITHIN THE FLOODPLAIN AND RIPARIAN PLANTING ZONES, AND THE SEED MIXES TO BE APPLIED WITHIN THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

## CHANNEL WIDENING REVEGATION PLAN

SCALE: 1" = 50'

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HEIDELBERG CEMENT GROUP

CHANNEL WIDENING REVEGETATION PLAN (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
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| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

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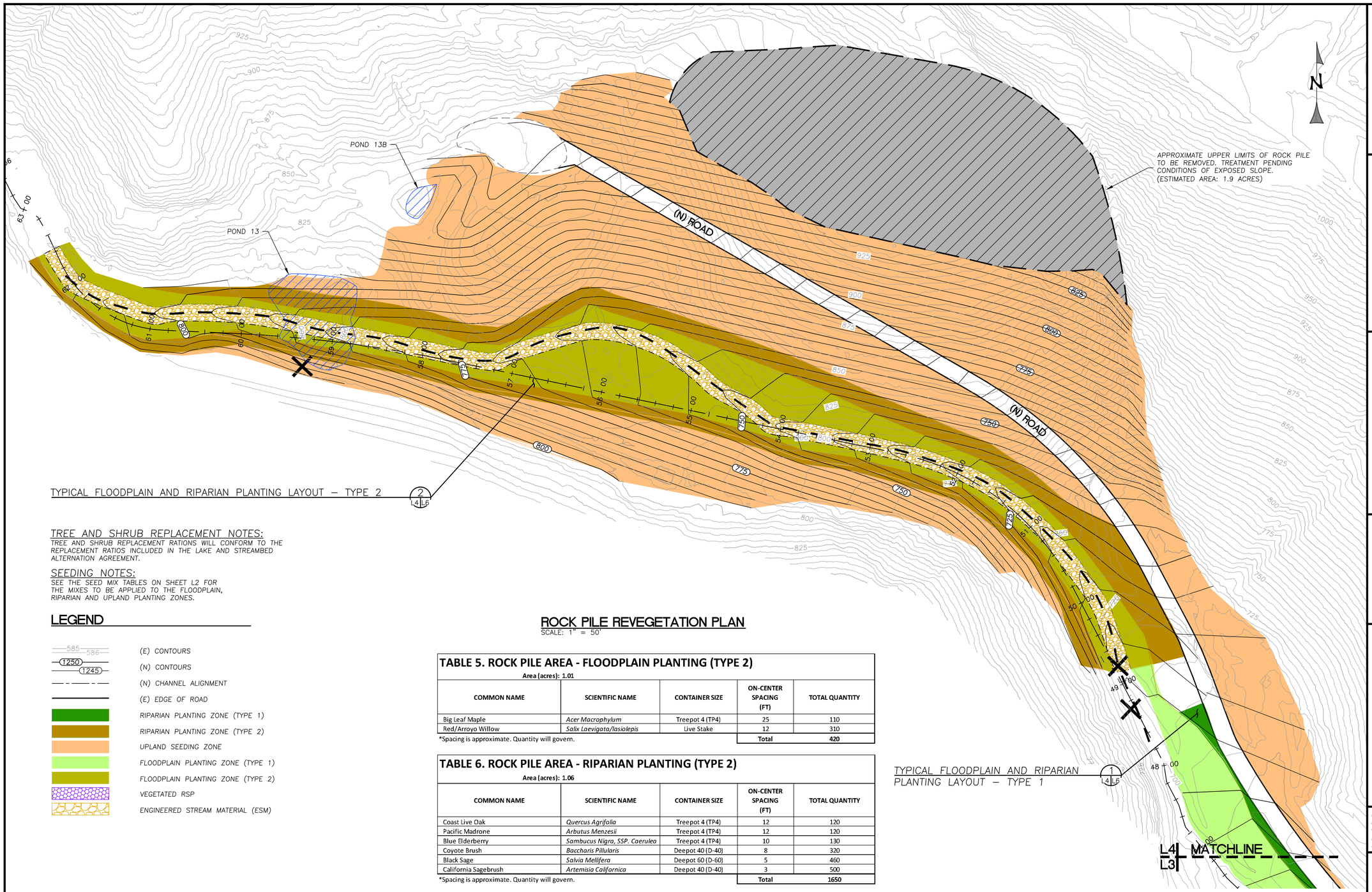


TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 2 (2 / L4 L6)

TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT – TYPE 1 (1 / L4 L6)

## TREE AND SHRUB REPLACEMENT NOTES:

TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

## SEEDING NOTES:

SEE THE SEED MIX TABLES ON SHEET L2 FOR THE MIXES TO BE APPLIED TO THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (N) CHANNEL ALIGNMENT
- (E) EDGE OF ROAD
- RIPARIAN PLANTING ZONE (TYPE 1)
- RIPARIAN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE
- FLOODPLAIN PLANTING ZONE (TYPE 1)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- VEGETATED RSP
- ENGINEERED STREAM MATERIAL (ESM)

## ROCK PILE REVEGETATION PLAN

SCALE: 1" = 50'

**TABLE 5. ROCK PILE AREA - FLOODPLAIN PLANTING (TYPE 2)**

Area (acres): 1.01

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| Big Leaf Maple | *Acer Macrophylum* | Treepot 4 (TP4) | 25 | 110 |
| Red/Arroyo Willow | *Salix Laevigata/lasiolepis* | Live Stake | 12 | 310 |
| | | | Total | 420 |

*Spacing is approximate. Quantity will govern.

**TABLE 6. ROCK PILE AREA - RIPARIAN PLANTING (TYPE 2)**

Area (acres): 1.06

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| Coast Live Oak | *Quercus Agrifolia* | Treepot 4 (TP4) | 12 | 120 |
| Pacific Madrone | *Arbutus Menzesii* | Treepot 4 (TP4) | 12 | 120 |
| Blue Elderberry | *Sambucus Nigra, SSP. Caerulea* | Treepot 4 (TP4) | 10 | 130 |
| Coyote Brush | *Baccharis Pillularis* | Deepot 40 (D-40) | 8 | 320 |
| Black Sage | *Salvia Mellifera* | Deepot 60 (D-60) | 5 | 460 |
| California Sagebrush | *Artemisia Californica* | Deepot 40 (D-40) | 3 | 500 |
| | | | Total | 1650 |

*Spacing is approximate. Quantity will govern.

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

ROCKPILE AREA REVEGEATION PLAN

PERMANENTE CREEK RESTORATION PLAN

UPDATED 90% DESIGN

SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
DATE: 8/26/22
JOB NO.: 13-016

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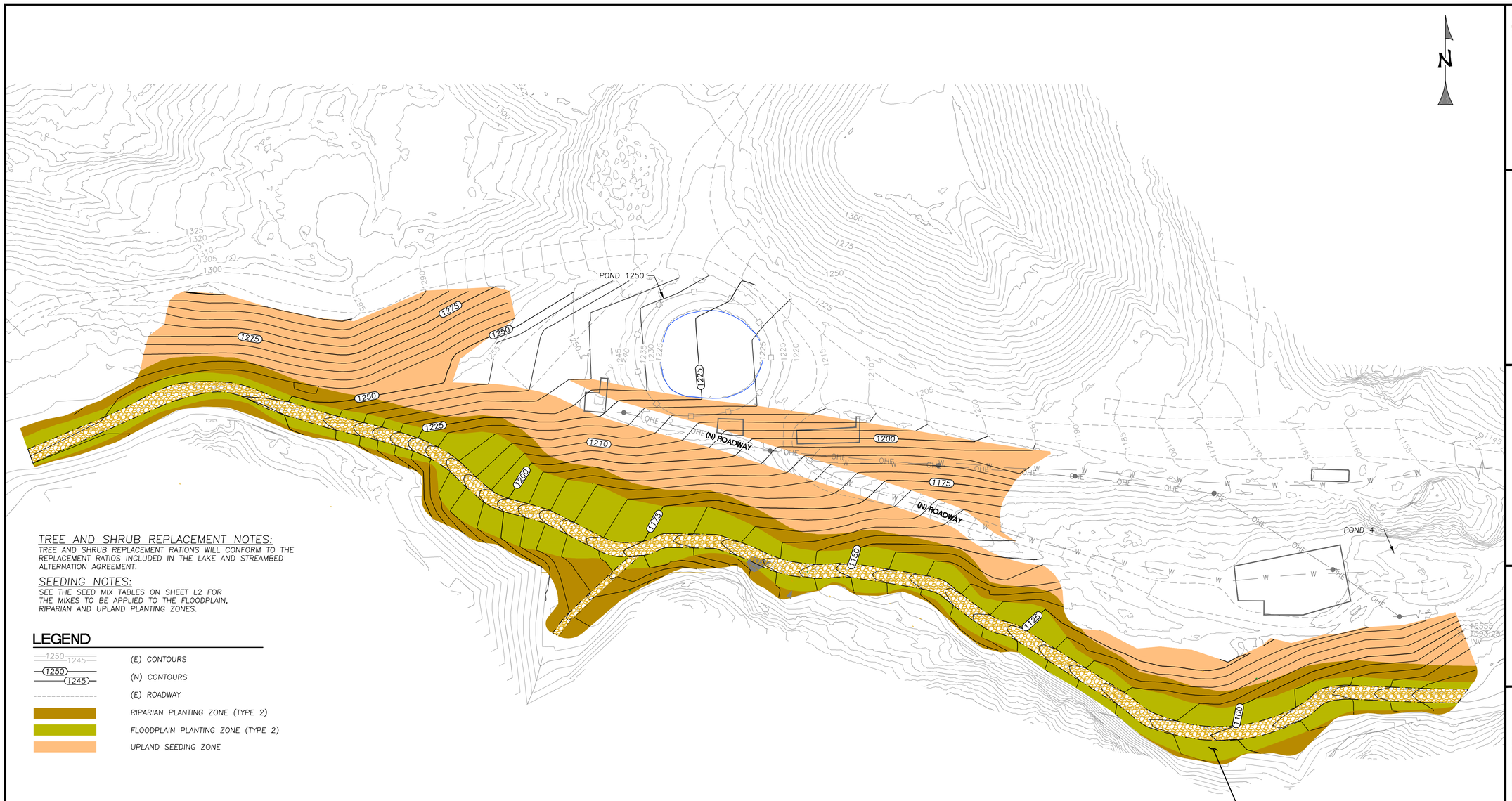
0 1"

L4

45 OF 47




TREE AND SHRUB REPLACEMENT NOTES:
TREE AND SHRUB REPLACEMENT RATIONS WILL CONFORM TO THE REPLACEMENT RATIOS INCLUDED IN THE LAKE AND STREAMBED ALTERNATION AGREEMENT.

SEEDING NOTES:
SEE THE SEED MIX TABLES ON SHEET L2 FOR THE MIXES TO BE APPLIED TO THE FLOODPLAIN, RIPARIAN AND UPLAND PLANTING ZONES.

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) ROADWAY
- RIPARIAN PLANTING ZONE (TYPE 2)
- FLOODPLAIN PLANTING ZONE (TYPE 2)
- UPLAND SEEDING ZONE

**TABLE 7. MATERIAL REMOVAL AREA - FLOODPLAIN PLANTING (TYPE 2)**

Area (acres): 1.44

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| Big Leaf Maple | *Acer Macrophylum* | Treepot 4 (TP4) | 25 | 150 |
| Red/Arroyo Willow | *Salix Laevigata/lasiolepis* | Live Stake | 12 | 440 |
| Red/Arroyo Willow (Tributary) | *Salix Laevigata/lasiolepis* | Live Stake | 7 | 40 |
| | | | **Total** | **590** |

*Spacing is approximate. Quantity will govern.

**TABLE 8. MATERIAL REMOVAL AREA - RIPARIAN PLANTING (TYPE 2)**

Area (acres): 1.25

| COMMON NAME | SCIENTIFIC NAME | CONTAINER SIZE | ON-CENTER SPACING (FT) | TOTAL QUANTITY |
|---|---|---|---|---|
| Coast Live Oak | *Quercus Agrifolia* | Treepot 4 (TP4) | 12 | 140 |
| Pacific Madrone | *Arbutus Menzesii* | Treepot 4 (TP4) | 12 | 140 |
| Blue Elderberry | *Sambucus Nigra, SSP. Caerulea* | Treepot 4 (TP4) | 10 | 150 |
| Coyote Brush | *Baccharis Pillularis* | Deepot 40 (D-40) | 8 | 380 |
| Black Sage | *Salvia Mellifera* | Deepot 60 (D-60) | 5 | 540 |
| California Sagebrush | *Artemisia Californica* | Deepot 40 (D-40) | 3 | 590 |
| | | | **Total** | **1940** |

*Spacing is approximate. Quantity will govern.

2 L5 L6 TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT (TYPE 2)

## MATERIAL REMOVAL AREA REVEGETATION PLAN
SCALE: 1" = 60'

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MATERIAL REMOVAL AREA REVEGETATION PLAN

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

DESIGNED BY: –
DRAWN BY: –
CHECKED BY: M.W.W.
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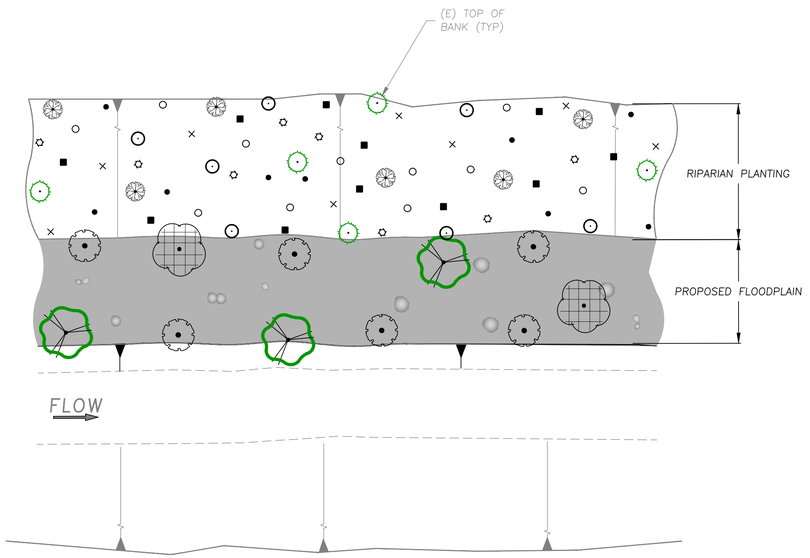
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT - TYPE 1
SCALE: 1" = 10'

(CHANNEL WIDENING AREA)

1 L2,L3,L4,L6

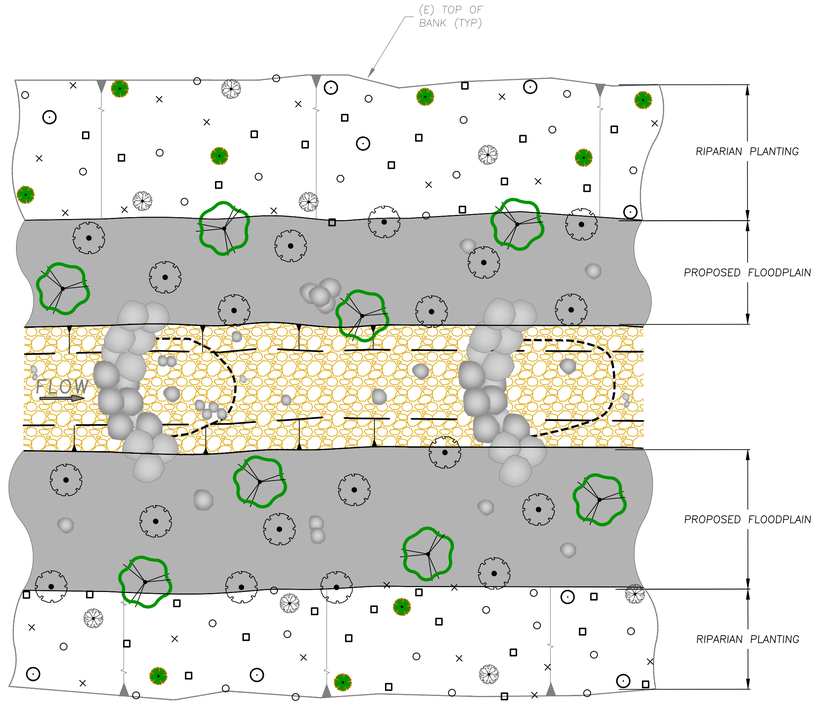
## PLANTING LEGEND - TYPE 1

FLOODPLAIN PLANTING

| BOTANICAL / COMMON NAME |
|---|
| ACER MACROPHYLLUM/BIG LEAF MAPLE |
| ALNUS RHOMBIFOLIA/WHITE ALDER |
| SALIX LAEVIGATA/RED WILLOW |

RIPARIAN PLANTING

- AESCULUS CALIFORNICA/CALIFORNIA BUCKEYE
- QUERCUS AGRIFOLIA/COAST LIVE OAK
- SAMBUCUS NIGRA, SSP. CAERULEA/BLUE ELDERBERRY
- HETEROMLES ARBUTIFOLIA/TOYON
- BACCHARIS PILLULARIS/COYOTE BRUSH
- ROSA CALIFORNICA/CALIFORNIA WILD ROSE
- RUBUS URSINUS/CALIFORNIA BLACKBERRY
- SALVIA MELLIFERA/BLACK SAGE




## TYPICAL FLOODPLAIN AND RIPARIAN PLANTING LAYOUT - TYPE 2
SCALE: 1" = 10'

(ROCK PILE AND MATERIAL REMOVAL AREAS)

2 L4,L5,L6

## PLANTING LEGEND - TYPE 2

FLOODPLAIN PLANTING

| BOTANICAL / COMMON NAME |
|---|
| ACER MACROPHYLLUM/BIG LEAF MAPLE |
| SALIX LAEVIGATA/RED WILLOW |

RIPARIAN PLANTING

- QUERCUS AGRIFOLIA/COAST LIVE OAK
- ARBUTUS MENZESII/PACIFIC MADRONE
- SAMBUCUS NIGRA, SSP. CAERULEA/BLUE ELDERBERRY
- BACCHARIS PILLULARIS/COYOTE BRUSH
- SALVIA MELLIFERA/BLACK SAGE
- ARTEMESIA CALIFORNICA/CALIFORNIA SAGEBRUSH

NOTE:
SEE SHEETS L2 TO L5 FOR THE LOCATION OF PLANTING ZONES AND PLANTING/SEEDING TABLES WITH ON CENTER SPACING, CONTAINER SIZE AND THE NUMBER OF EACH SPECIES TO BE INSTALLED.

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
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WWW.WATWAYS.COM

PRELIMINARY
NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

TYPICAL PLANTING LAYOUTS

PERMANENTE CREEK RESTORATION PLAN
UPDATED 90% DESIGN
SANTA CLARA COUNTY CEQA REVIEW SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | – |
| CHECKED BY: | M.W.W. |
| DATE: | 8/26/22 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

# APPENDIX A

## Fish Passage Design Flow Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 8/29/2017
Calculated by: M.L.B/B.R.S.
Checked by: B.M.Z.

## Exceedence Probability Values for Mean Daily Flows at USGS Gages Near Cupertino

| Percent Exceedence | Annual Exceedance Discharge (cfs) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Gage #11166575 Permanente Creek | | Gage #11166578 West Fork Permanente Creek | | Gage #11169500 Saratoga Creek | | Gage #11164500 San Francisquito Creek | | Gage #11166000 Matadero Creek | |
| | Real Flows (cfs) | Normalized Flows (cfs/sq.mi.) | Real Flows (cfs) | Normalized Flows (cfs/sq.mi.) | Real Flows (cfs) | Normalized Flows (cfs/sq.mi.) | Real Flows (cfs) | Normalized Flows (cfs/sq.mi.) | Real Flows (cfs) | Normalized Flows (cfs/sq.mi.) |
| 95 | 0.00 | 0.00 | 0.00 | 0.00 | 0.36 | 0.04 | 0.15 | 0.00 | 0.00 | 0.00 |
| 90 | 0.00 | 0.00 | 0.00 | 0.00 | 0.49 | 0.05 | 0.29 | 0.01 | 0.00 | 0.00 |
| 10 | 4.00 | 1.04 | 0.82 | 0.27 | 18.00 | 1.95 | 45.00 | 1.20 | 3.50 | 0.48 |
| 5 | 7.30 | 1.89 | 3.49 | 1.17 | 38.80 | 4.21 | 112.75 | 3.01 | 9.90 | 1.36 |

| | Gage #11166575 | Gage #11166578 | Gage #11169500 | Gage #11164500 | Gage #11164500 |
|---|---|---|---|---|---|
| Drainage Area (sq.mi.) | 3.86 | 2.98 | 9.22 | 37.4 | 7.26 |

| Site Name | Location | | Drainage Area ($mi^2$) | Record Length (yrs) | Normalized Exceedance Flows | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 95% ($cfs/mi^2$) | 90% ($cfs/mi^2$) | 10% ($cfs/mi^2$) | 5% ($cfs/mi^2$) |
| PERMANENTE C NR MONTE VISTA CA - 11166575 | 37°20'00" | 122°05'13" | 3.86 | 3 | 0.00 | 0.00 | 1.04 | 1.89 |
| WF PERMANENTE C NR MONTE VISTA CA - 11166578 | 37°19'59" | 122°05'58" | 2.98 | 3 | 0.00 | 0.00 | 0.27 | 1.17 |
| SARATOGA C A SARATOGA CA - 11169500 [1] | 37°15'16" | 122°02'18" | 9.22 | 20 | 0.04 | 0.05 | 1.95 | 4.21 |
| SAN FRANCISQUITO C A STANFORD UNIVERSITY CA - 11164500 [2] | 37°25'24" | 122°11'18" | 37.4 | 20 | 0.00 | 0.01 | 1.20 | 3.01 |
| MATADERO CREEK A PALO ALTO CA 11166000 [3] | 37°25'18" | 122°08'04" | 7.26 | 65 | 0.00 | 0.00 | 0.48 | 1.36 |
| | | | | Average = | 0.01 | 0.01 | 0.99 | 2.33 |

[1] Water is diverted 0.7 miles upstream of gage for municipal use by San Jose Water Works

[2] Flow Slightly regulated by Searsville Lake. Diversions upstream from gage to Los Trancos and Lagunita Canal for irrigation on Stanford Universit

[3] No know regulation or diversion upstream of site

Note: Use the Matadero Creek gage to calculate fish passage design flows because it has an extensive period of record (65 years) and is unregulated. The CDFW, California Salmonid Stream Habitat Restoration Manual requires a gage to have at least 5 years of recorded daily average flows, and preferably more than 10 years for use in calulcating fish passage design flows.

| Legend - Fish Passage Design Flows | |
|---|---|
| Juvenile Salmonid Fish Passage - Low | |
| Adult Non-Anadromous Salmonid Fish Passage - Low | |
| Juvenile Salmonid Fish Passage - High | |
| Adult Non-Anadramous Salmonid Fish Passage - High | |

| Permanente Quarry Watershed Fish Passage Design Flows | | | | |
|---|---|---|---|---|
| Drainage Area ($mi^2$) = | | 3.50 | | |
| Juvenile Low | Adult Non-Anadramous Low | Juvenile High | Adult Non-Adadromous High | |
| 95% (cfs) | 90% (cfs) | 10% (cfs) | 5% (cfs) | |
| 0.00 | 0.00 | 1.69 | 4.77 | Using Matadero Creek Gage |
| 0.00 | 0.00 | 2.09 | 5.16 | Average of 3 unregulated gages |
| 0.03 | 0.04 | 3.46 | 8.15 | Average of all 5 gages |

Location: Pond 14 Bypass Channel through the Concrete Channel

| Permanente Quarry Watershed Fish Passage Design Flows | | | |
|---|---|---|---|
| Drainage Area ($mi^2$) = | | 3.01 | |
| Juvenile Low | Adult Non-Anadromous Low | Juvenile High | Adult Non-Anadromous High |
| 95% (cfs) | 90% (cfs) | 10% (cfs) | 5% (cfs) |
| 0.00 | 0.00 | 1.45 | 4.10 |

Location: Culverts #2 - #7

| Permanente Quarry Watershed Fish Passage Design Flows | | | |
|---|---|---|---|
| Drainage Area ($mi^2$) = | | 2.70 | |
| Juvenile Low | Adult Non-Anadromous Low | Juvenile High | Adult Non-Anadromous High |
| 95% (cfs) | 90% (cfs) | 10% (cfs) | 5% (cfs) |
| 0.00 | 0.00 | 1.30 | 3.68 |

Location: Culvert #8 - Pond 13

| Permanente Quarry Watershed Fish Passage Design Flows | | | |
|---|---|---|---|
| Drainage Area ($mi^2$) = | | 2.02 | |
| Juvenile Low | Adult Non-Anadromous Low | Juvenile High | Adult Non-Anadromous High |
| 95% (cfs) | 90% (cfs) | 10% (cfs) | 5% (cfs) |
| 0.00 | 0.00 | 0.97 | 2.75 |

Location: Materials Removal Area

# APPENDIX B

**Permanente Creek Restoration – Regional Hydraulic Geometry and Analog Channel Assessment Technical Memorandum**

# TECHNICAL MEMORANDUM - REVISED for 90% DESIGN

| | |
|---|---|
| *Prepared by:* | Waterways Consulting, Inc. |
| *Date:* | October 30, 2018 |
| *Re:* | Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment |

## Introduction

Waterways Consulting, Inc. (Waterways) is developing engineering drawings to restore portions of Permanente Creek that flow through the Permanente Quarry (Quarry) property and have been impacted by past mining activities. The proposed approach at two locations (the Rock Pile Area and Material Removal Area[1]) focuses on restoring the channel form to an approximation of the pre-mining channel geometry and providing suitable aquatic habitat for local species, including resident rainbow trout. The Quarry is situated on lands owned by Lehigh Hanson Heidelberg Cement Group on the east side of the Santa Cruz Mountains to the west of Cupertino. Quarry operations over the past century have resulted in significant channelization, the installation of numerous culverts and sedimentation basins, and considerable sediment inputs to Permanente Creek. The altered channel form and high sediment loads resulted in the degradation of the instream aquatic habitat.

The proposed restoration will remove overburden sediment and several culverts, rebuild the affected channel reaches, and restore impacted riparian and aquatic habitats. Restoring Permanente Creek at the Rock Pile and Material Removal Areas requires a complete reconstruction of the streambed. Consequently, there is a need to estimate the appropriate channel morphology to support the restoration design, including active channel widths, depths and pool geometries and spacing.

Regional curves, relating channel dimensions to drainage area, exist for the San Francisco Bay region (Dunne and Leopold 1978) (Figure 1). However, these curves are regional in nature, incorporating data from a range of landscape settings and channel morphologies. For example, channel geometries of the low gradient bottomlands of the Santa Clara Valley will vary from bedrock-controlled streams in the Santa Cruz Mountains that are higher gradient and more influenced by hillslope processes. Given that much of the proposed restoration activities are in higher gradient, confined reaches of Permanente Creek, the appropriateness of the regional curves can be improved by focusing the data on sites with a similar geomorphic setting. Focusing the dataset on sites in the Santa Cruz Mountains could greatly improve the use of the hydraulic geometry curves to constrain expected channel morphologies in the impacted reaches of Permanente Creek. Furthermore, field-based measurements of channel geometry within less impacted reaches of Permanente Creek and in adjacent watersheds that exhibit similar characteristics to Permanente Creek could both provide a test for and improve the quality of the developed relationships.

[1] Although the analogue study was developed to support design efforts for the Rockpile and Material Removal Areas of the Permanente Restoration Project, the results are applicable to other locations within the project area including Culverts #7 and #8 within the Channel Widening Area.

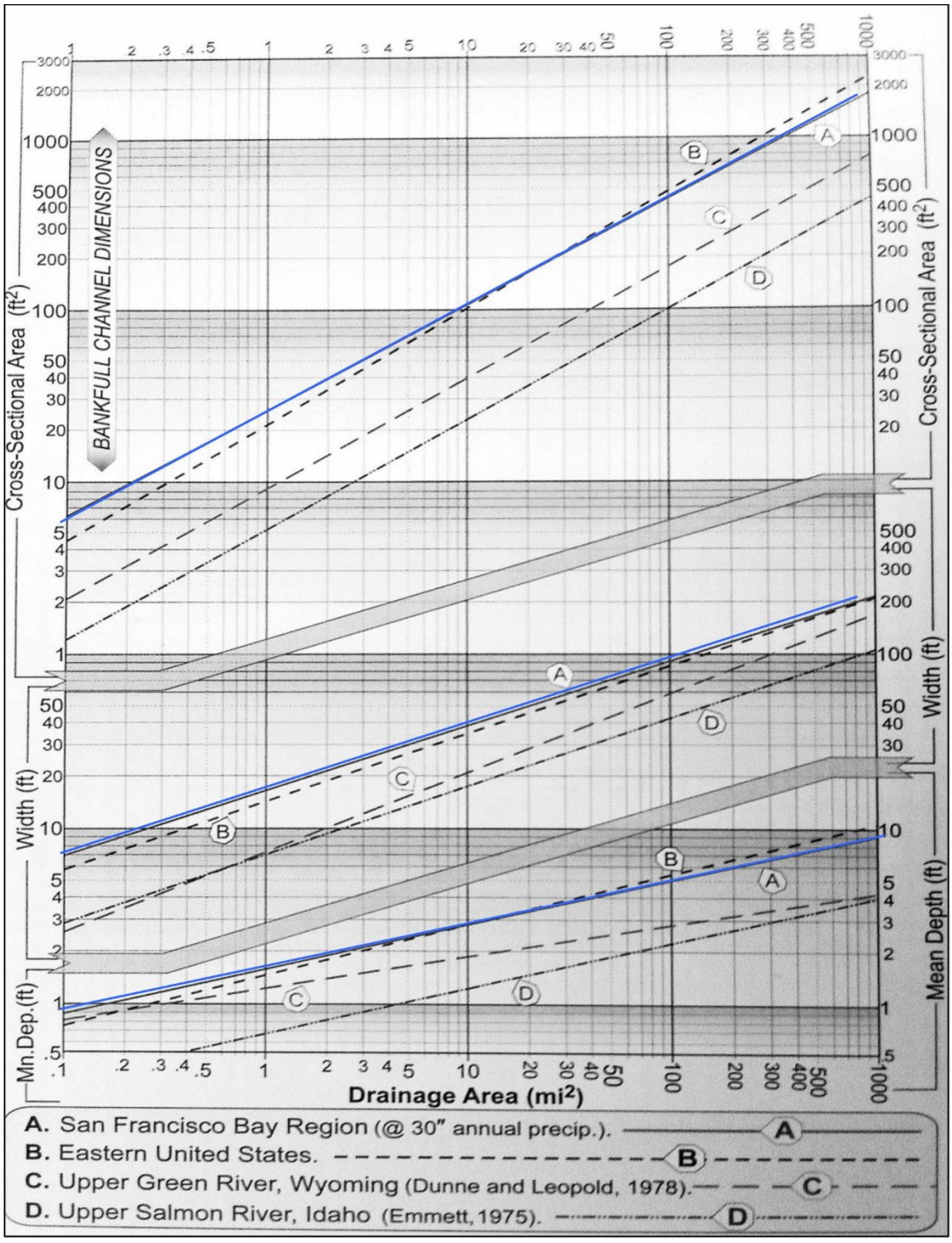



**Figure 1. Regional hydraulic geometry curves produced by Dunne and Leopold (1978) relating drainage area to bankfull depth, width and cross-sectional area. The blue lines highlight the regional curves for the San Francisco Bay Area.**

To create more site-specific curves, Waterways compiled data for the Santa Cruz Mountain sites that were included in the Dunne and Leopold (1978) curves for the San Francisco Bay region, surveyed two analogue stream channels close to the project area that were previously identified as having similar watershed and geomorphic characteristics as Permanente Creek (URS 2011)[2], and surveyed two segments of Reach 20 on Permanente Creek in what was considered a less impacted reach. These data were used to define reach-specific channel dimensions for the restoration effort. In addition, a longitudinal profile surveyed along portions of Permanente Creek where the channel morphology was determined to be more representative of natural conditions, was used to identify an appropriate size and spacing for pools to support the engineering design. This memorandum summarizes the findings of this work.

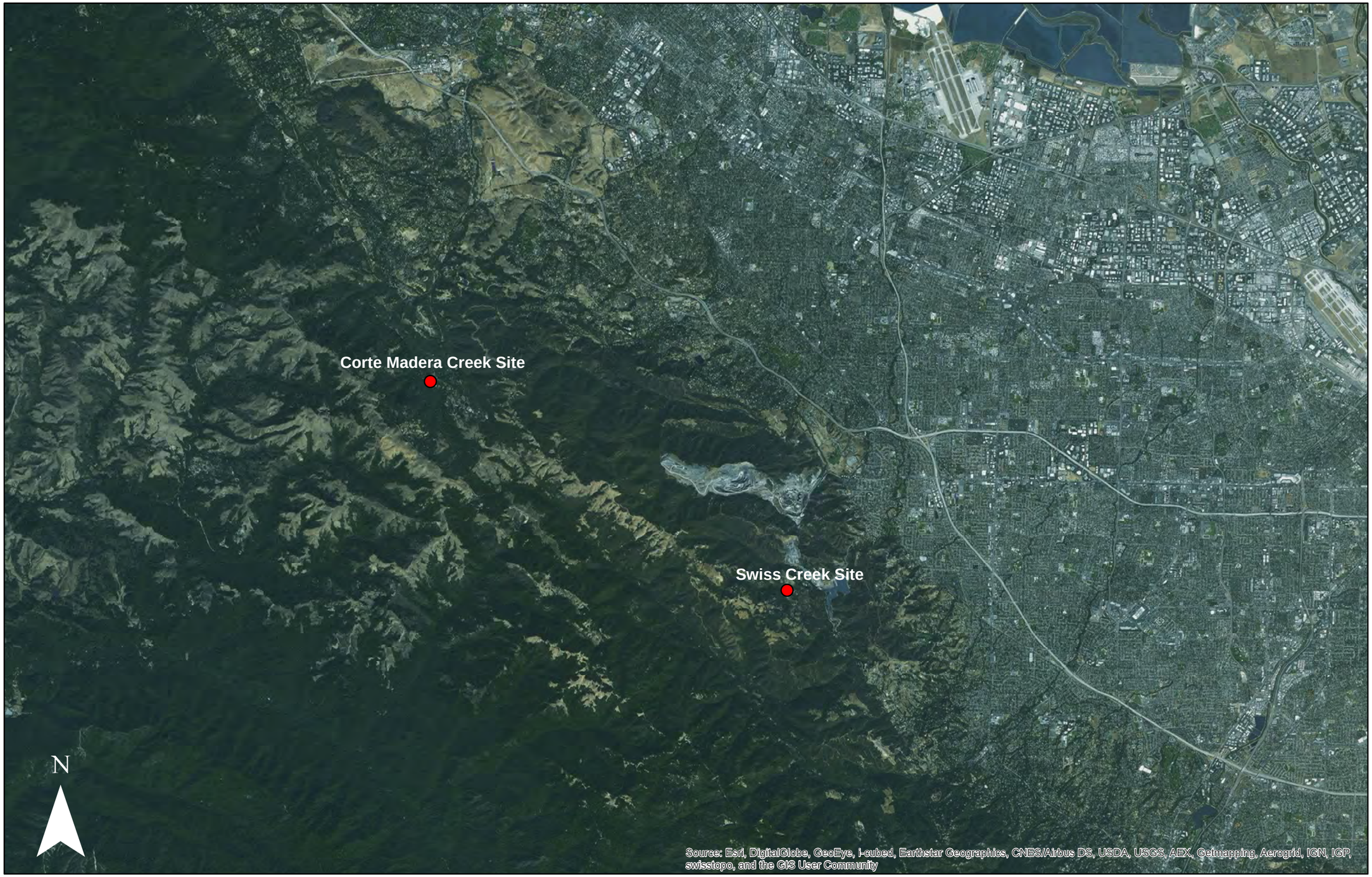
## Study Area

### *Santa Cruz Mountains*

The Santa Cruz Mountains have a complex geologic history, resulting in areas dominated by sandstone, limestone, igneous rocks (e.g., basalt), or metamorphic rocks (e.g., serpentine). The variable geologies result in different rates of erosion and the presence of different types of channel-forming sediment among streams that can be spatially close to each other. For example, Permanente Creek has abundant limestone that forms calcium carbonate precipitates that can bind rocks along the channel bed and banks. On the other hand, Stevens Creek is approximately one and one-half miles southeast of Permanente Creek and does not have limestone, and thus does not exhibit calcium carbonate precipitates.

Santa Cruz Mountain streams tend to be small headwater channels at the higher elevations and larger, alluvial streams at the lower elevations. The higher and mid-elevation streams generally flow through narrow valleys with steep hillslopes that restrict lateral channel movement. The steep hillslopes are susceptible to landslides and debris flows, especially following wildfire events. Entire reaches can be transformed during a debris flow and associated mudflow event. Debris flows can result in mobilization and deposition of sediment and debris across an entire valley bottom, leaving an aggraded valley consisting of an unsorted mix of materials. Subsequent high flows following a debris flow event reworks the aggraded material, with the active channel incising into the relatively uniform post-debris flow floodplain surface. Large roughness elements, including boulders and logs, become exposed as the channel incises into the debris flow surface, influencing the planform of the channel and providing local grade control for both the channel and floodplain. In higher gradient reaches, pools and riffles form in response to randomly spaced roughness elements. Along Permanente creek, debris flows prior to mining operations likely provided large wood and boulders that were incorporated into steep step-pool reaches and lower gradient riffle-pool reaches.

[2] The URS Plan was prepared to comply with the July 27, 1999 Cleanup and Abatement Order – 99-018 issued by the San Francisco Bay Regional Water Quality Control Board by preparation of a report that documented a field reconnaissance of Permanente Creek throughout the quarry facility identifying areas requiring stabilization, prioritizing stabilization activities at candidate sites, and preparing an implementation schedule.




0 3,750 7,500 15,000 22,500 30,000

Feet

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WWW.WATWAYS.COM

Map identifying the location of the surveyed reference reaches for Permanente Creek.

FIGURE

**2**

### *Field Sites*

Waterways reviewed the URS Plan and studied published literature on the Santa Cruz Mountains to determine suitable reference reaches for Permanente Creek. We determined that a reach along Swiss Creek and a reach along Corte Madera Creek were the most appropriate reference reaches for Permanente Creek (Figure 2 and Table 1). The URS Plan described Corte Madera Creek and Swiss Creek as similar in drainage area, slope, and valley shape to Permanente Creek. Both creeks are in the Santa Cruz Mountains, relatively close to Cupertino, with precipitation regimes similar to the Permanente Creek watershed. Corte Madera Creek flows west and Swiss Creek flows east through confined, steep stream valleys, constrained on both sides by steep hillslopes prone to mass wasting and debris flow events. Both reference reaches are bedrock-controlled with a step-pool channel pattern formed by large boulders and other recently delivered colluvial deposits. Swiss Creek exhibited calcium carbonate precipitates within the active channel, similar to the calcium carbonate formations identified in Permanente Creek. In addition to the reference reaches in adjacent watersheds, a less impacted reach (Reach 20) within Permanente Creek was chosen to further support development of regional hydraulic geometries in support of the engineering design effort.

**Table 1. Basin Characteristics for the Field Sites and Permanente Creek.**

| | Swiss Creek | Corte Madera Creek | Permanente Creek |
|---|---|---|---|
| **Average annual precipitation (in)** | 33.8 | 38.6 | 34.2 |
| **Mean basin elevation (ft)** | 1,842 | 1,917 | 1,957 |
| **Dominant geology** | limestone, sandstone | sandstone, shale | limestone, sandstone |
| **Dominant hillslope process** | landslide/debris flow | landslide/debris flow | landslide/debris flow |
| **Average channel slope (%)** | 10.72 | 8.39 | 3.4 - 13.85 |
| **Drainage area (sq. miles)** | 0.8 | 1.4 | 2.7 |

## Analysis Approach

To develop the regional hydraulic geometry relationships, information from the USGS streamflow gage database was compiled for streams in the Santa Cruz Mountains. The focus of this data mining effort was the 1.5-year[3] recurrence discharge because it approximates the channel forming, or bankfull, discharge (Dunne and Leopold, 1978). To evaluate the performance of the curve and provide data for smaller watersheds, which was missing from the USGS dataset, we collected field data from the two adjacent watersheds and within Reach 20 of Permanente Creek with a specific focus on measuring channel geometries at bankfull indicators that were identified in the field.

### *Hydraulic Geometry using existing USGS gage data*

Waterways identified 33 USGS stream gages in the Santa Cruz Mountains, but only 14 of the 33 had sufficient peak flow records to be used in the hydraulic geometry analysis (Table 2). Ideally the gage sites would be limited to the eastern Santa Cruz Mountains near Cupertino and Santa Clara. However, since there are a limited number of gages with sufficient data, the 14 gages Waterways assessed are

[3] Previous iterations of this study focused efforts on the 2-year event. Results of that effort identified disparities between the gage-based analysis and the field-based analysis with the field-based analysis consistently under predicted bankfull widths and depths. This suggested that field-based bankfull indicators occurred at a discharge approximating the 1.5-year event rather than the 2-year event. These results, combined with comments from the reviewers prompted us to redo the analysis with a focus on the 1.5-year event rather than the 2-year event.

**Table 2. USGS gage sites used to develop regional hydraulic geometry curves.**

| Site Name | Location | Period of Record | Drainage Area (sq. miles) | 1.5-Year Flood Discharge (Bankfull) (cfs) | Estimated Bankfull Width (feet) | Estimated Bankfull Cross Sectional Area (sq. feet) | Estimated Bankfull Depth (feet) |
|---|---|---|---|---|---|---|---|
| Llagas Cr above Chesbro Reservoir | 37.1483, -121.7672 | 1971-1982, 2004-2010 | 9.6 | 390 | 25.0 | 132.5 | 5.3 |
| Aptos Creek near Aptos | 37.0020, -121.9050 | 1972-1983 | 10.2 | 185 | 29.3 | 68.7 | 2.3 |
| San Lorenzo River near Boulder Creek | 37.2067, -122.1439 | 1969-1992, 1997 | 6.2 | 105 | 24.7 | 32.9 | 1.3 |
| Bear Creek at Boulder Creek | 37.1278, -122.1158 | 1978-1992, 1997 | 16.0 | 540 | 33.8 | 122.5 | 3.6 |
| Boulder Creek at Boulder Creek | 37.1267, -122.1217 | 1977-1992, 1997 | 11.3 | 680 | 47.4 | 305.2 | 6.4 |
| Zayante Creek at Zayante | 37.0861, -122.0458 | 1958-1992, 1997 | 11.1 | 480 | 28.0 | 103.0 | 3.7 |
| San Lorenzo River at Big Trees | 37.0444, -122.0714 | 1937-2017 | 106.0 | 3700 | 87.5 | 682.0 | 7.8 |
| Carbonera Creek at Scotts Valley | 37.0506, -122.0125 | 1985-2007 | 3.6 | 505 | 26.5 | 117.4 | 4.4 |
| Scott Creek above Little Creek | 37.0642, -122.2283 | 1937-1941, 1959-1973, 1982 | 25.1 | 600 | 43.5 | 145.0 | 3.3 |
| Pescadero Creek near Pescadero | 37.2608, -122.3278 | 1952-2017 | 45.9 | 1350 | 53.0 | 291.5 | 5.5 |
| San Gregorio Creek at San Gregorio | 37.3258, -122.3856 | 1955, 1970-2017 | 50.9 | 1900 | 61.5 | 402.5 | 6.5 |
| Pilarcitos Creek at Half Moon Bay | 37.4666, -122.4331 | 1967-2017 | 27.8 | 450 | 33.0 | 139.0 | 4.2 |
| Redwood Creek at Redwood City | 37.4494, -122.2325 | 1960-1997 | 1.8 | 170 | 13.0 | 41.5 | 3.2 |
| San Franciscquito Creek at Stanford University | 37.4233, -122.1883 | 1931-1941, 1951-2017 | 37.4 | 1000 | 45.5 | 198.5 | 4.4 |
| Saratoga Creek at Saratoga | 37.2544, -122.0383 | 1934-2017 | 9.2 | 255 | 25.6 | 40.2 | 1.6 |

located throughout the eastern and western Santa Cruz Mountains. Despite the slightly wider than ideal geographic range, our gage analysis improves upon the current regional analyses by focusing on a smaller area and limiting gage sites to the Santa Cruz Mountains.

Waterways compiled the existing information available at each of the selected gaging sites, including drainage area, discharge, field measurements of channel width and cross-sectional area, and local channel slope near the gage. We imported the discharge data into HEC-SSP (U.S. Army Corps of Engineers 2010) and developed flood frequency curves (USGS, Bulletin 17b, 1982) for each gage site to estimate the 1.5-year recurrence interval discharge. We then reviewed measurements of channel width and cross-sectional area at each gage site to find measurements that were taken during a high flow event that approximated the 1.5-year recurrence interval discharge. Four of the gaging sites did not have channel width and cross-sectional area data recorded during a 1.5-year event, so we extrapolated based on the available data. We then estimated bankfull depth at each gage site by dividing channel

cross-sectional area by channel width. Banfull width, bankfull depth, and the 1.5-year flood discharge were plotted separately against drainage area. One outlier was identified and removed from the study.

## *Analogue Site Assessment*

Waterways surveyed a 200-foot reach of Corte Madera Creek, located downstream of the Alpine Road Trail culvert, a 171-foot reach of Swiss Creek, located approximately 500 feet upstream from the Peacock Court bridge, and two segments within Reach 20 of Permanente Creek totaling over 300 feet of channel. We chose reach locations that were beyond the influence of instream structures (e.g., culverts, bridges) and were representative of conditions within the reach. We used an auto-level to survey four channel cross section profiles at Corte Madera Creek, three channel cross section profiles at Swiss Creek, two sets of three channel cross-section profiles at Permanente Creek and a longitudinal profile at all four sites. Each channel cross section profile included the expanse of the valley floor and the identification of significant geomorphic features using field indicators, such as bankfull. In most cases, the field indicator used to estimate the bankfull width and depth was the base of mature trees.

Using the survey data, Waterways calculated the bankfull channel width and plotted each cross section to calculate their cross-sectional areas. We then divided each cross-sectional area by the surveyed bankfull width to determine average bankfull depth. We estimated drainage area for each field site using StreamStats (USGS 2012) and calculated channel slopes using the surveyed longitudinal profiles. Channel widths and hydraulic depths were determined for each cross-section and then averaged for each reach, or reach segment, to obtain a single channel width and depth for each creek at the estimated bankfull discharge. Two separate segments were surveyed in Reach 20 of Permanente Creek to identify differences in channel geometry based on differences in local channel slope with one segment having a local channel slope of 4.6% and the other a local channel slope of 8.2%.

## *Hydraulic Geometry Analysis*

Waterway combined the USGS gage site data with the field survey data to determine trends in channel geometry as a function of drainage area. We developed relationships between drainage area and bankfull width, bankfull depth, and the 1.5-year recurrence interval discharge. Trend lines were fit to the data to provide a predictive tool to estimate these parameters at specific restoration sites, most specifically the Rock Pile and Material Removal Areas (Figures 3, 4, and 5). Using the equation for each trend line, we solved for the predicted channel width and depth for specific restoration areas within Permanente Creek based on a drainage area of 2.7 square miles (Culverts 7 and 8), 2.54 square miles (Rock Pile), and 2.02 square miles (Material Removal Area). Table 3 summarizes the results of this analysis.

**Table 3. Channel Dimensions Calculated Using Hydraulic Geometry Relationships**

| Project Site | Drainage Area ($mi^2$) | Predicted Bankfull Width (ft) | Predicted Bankfull Depth (ft) | Cross Sectional Area ($ft^2$) |
|---|---|---|---|---|
| Culvert 7 | 2.70 | 17.9 | 2.3 | 31 |
| Culvert 8 | 2.70 | 17.9 | 2.3 | 31 |
| Rock Pile | 2.54 | 17.5 | 2.3 | 29 |
| Material Removal Area | 2.02 | 16.0 | 2.1 | 25 |

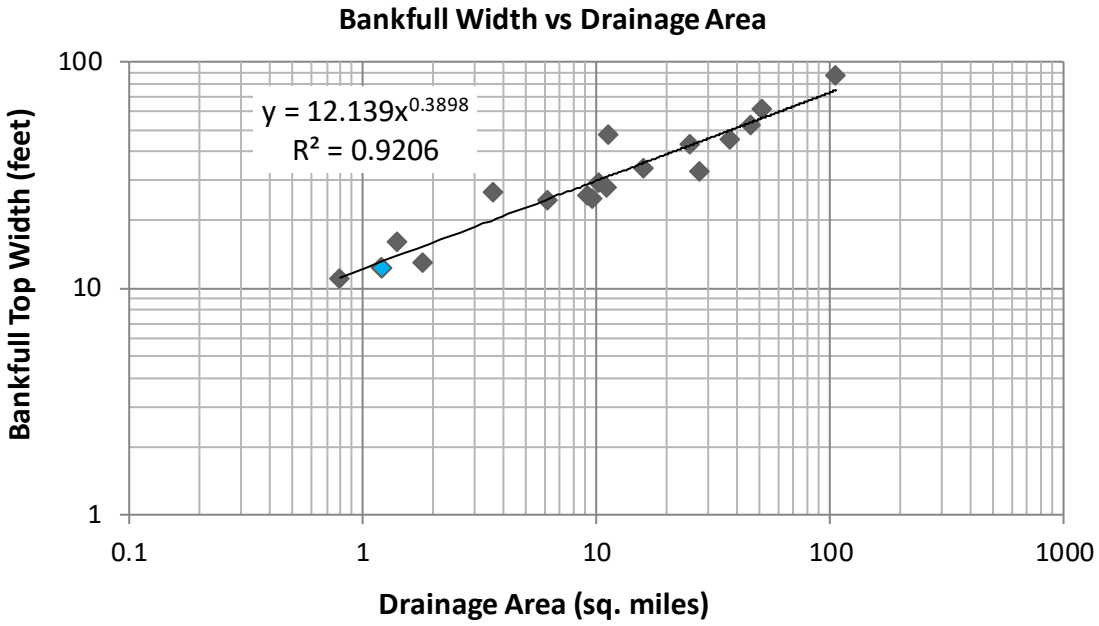


**Figure 3. Bankfull Top Width as a Function of Drainage Area for the Santa Cruz Mountains. The blue marker represents the sites on Permanente Creek in Reach 20.**

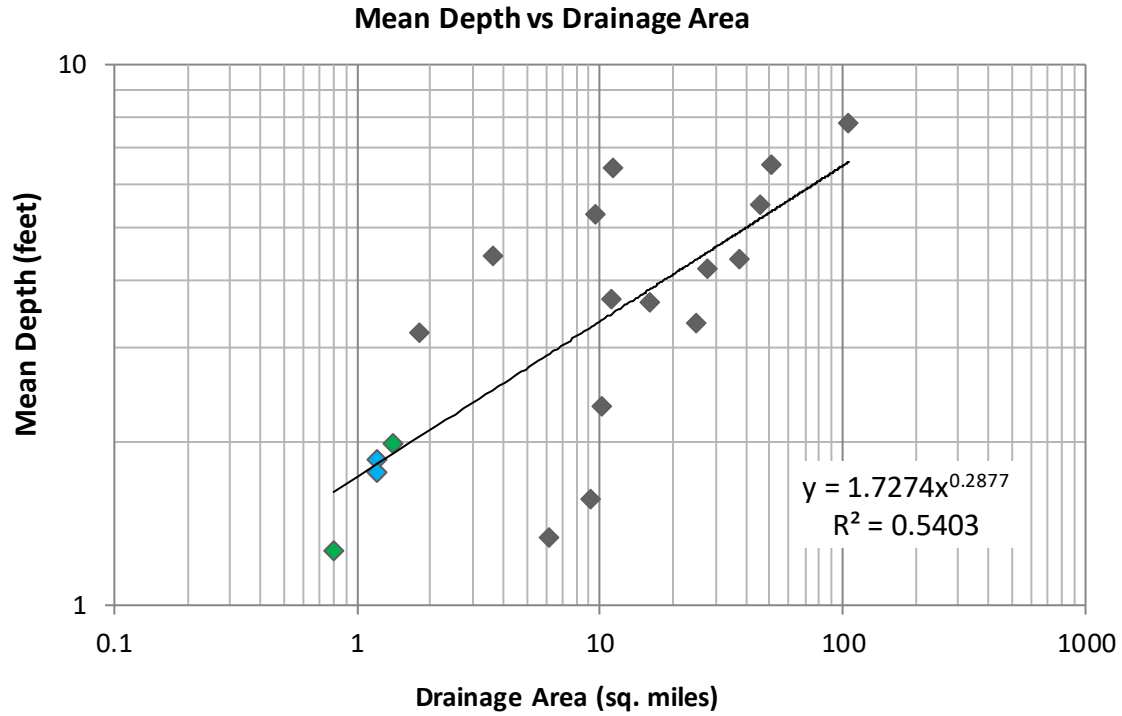


**Figure 4. Bankfull Depth as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.**

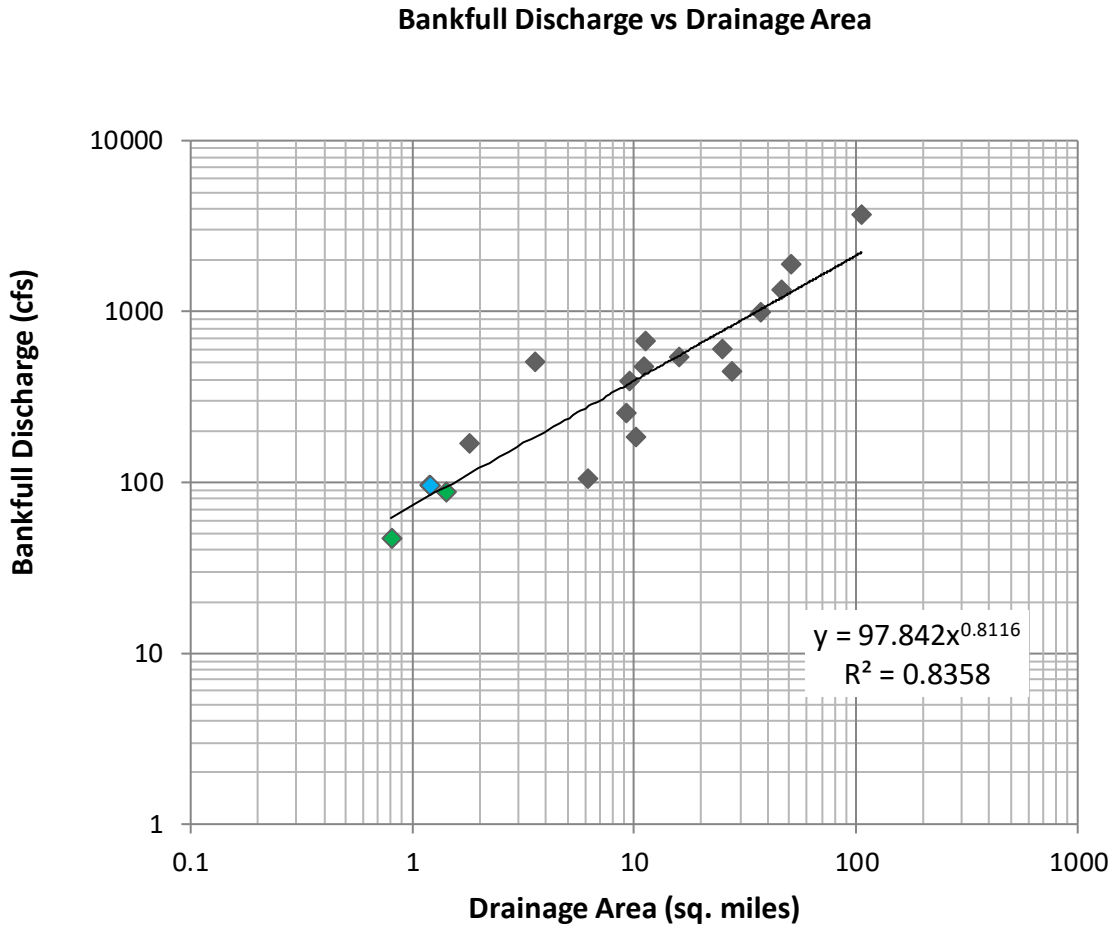


**Figure 5. Bankfull Discharge as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.**

## *Pool Geometry*

An important design parameter for reach-scale restoration of Permanente Creek is pool length and pool spacing. Despite the legacy of impacts to Permanente Creek, it was determined that several reaches (R14-R16 and R20-R21) continued to exhibit naturally formed pool and riffle geometries that encompass a range of channel slopes. These conditions provided an opportunity to measure pool and riffle geometries, locally, to support the design effort, rather than measuring those parameters in other adjacent watersheds which may lack specific characteristics found in Permanente Creek such as the prevalence of calcium carbonate precipitates. Given the inherent variability in pool geometries associated with the debris flow morphology of the channel, it was important to collect data along entire reaches and summarize the information to convey averages and ranges of natural conditions. To convey the range of natural variability, longitudinal profile data was collected along the entire length of the identified reaches within Permanente Creek to calculate pool length and spacing in relation to reach-

scale channel gradients (Table 4). These data were then used to calculate pool statistics for each site-specific restoration area.

**Table 4. Statistics on Pool Length, Depth and Spacing (in feet) By Reach of Permanente Creek.**

| Reach # | Reach Avg Slope | Avg Pool Length (ft) | Median Pool Length (ft) | St. Dev Pool Length (ft) | Avg Pool Depth (ft) | Median Pool Depth (ft) | St. Dev Pool Depth (ft) | Avg Pool Spacing (ft) | Median Pool Spacing (ft) | St. Dev Pool Spacing (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **21** | 5.1% | 13.6 | 11.6 | 6.3 | 0.6 | 0.6 | 0.3 | 211 | 150 | 212 |
| **20** | 5.2% | 11.4 | 11.0 | 4.1 | 0.9 | 1.0 | 0.4 | 106 | 92 | 57 |
| **16** | 7.1% | 15.4 | 14.4 | 6.1 | 0.8 | 0.8 | 0.4 | 76 | 65 | 69 |
| **15** | 11.6% | 10.5 | 9.4 | 2.5 | 0.7 | 0.7 | 0.4 | 58 | 39 | 50 |
| **14** | 6.4% | 8.8 | 8.0 | 3.8 | 0.6 | 0.6 | 0.3 | 31 | 19 | 27 |
| | **4-8% Reaches** | **12.0** | **10.3** | **5.7** | **0.7** | **0.7** | **0.4** | **94** | **55** | **124** |
| | **8-12% Reaches** | **10.5** | **9.4** | **2.5** | **0.7** | **0.7** | **0.4** | **58** | **31** | **50** |

## Results/Discussion

Dunne and Leopold's (1978) regional curves provide a predictive tool to estimate bankfull channel dimensions for Permanente Creek. Use of the Dunne and Leopold regional curves for the entire Bay Area estimated a bankfull width for the Permanente project area of approximately 17 to 25 feet and a bankfull depth of approximately 1.5 to 2.0 feet. Because these curves are regional and include a significant number of gage locations that are in a geomorphic setting that are different from the project area, regional curves that are more specific to the Permanente Creek project area were developed. Utilizing the more focused data set, which includes the USGS sites within the Santa Cruz Mountains and the field-based assessments sites on Permanente, Corte Madera and Swiss Creek, the curves predicted a bankfull width of 17.9 feet for Culverts 7 and 8, 17.5 feet for the Rock Pile Area, and 16.0 feet for the Material Removal Area and a bankfull depth of approximately 2.3 feet for Culverts 7 and 8, 2.3 feet for the Rock Pile Area and 2.1 feet for the Material Removal Area prior to mining-related impacts (Table 3). As expected, the Dunne and Leopold (1978) curves describe a wider and flatter channel, most likely due to the inclusion of lower gradient, unconfined, alluvial channels in the analysis. Table 5 includes ranges of bankfull channel dimensions for the areas where the channel will be reconstructed to provide for some variability and flexibility during construction since large non-uniform materials will be used in channel construction.

Measured channel slopes for Corte Madera and Swiss Creek, 8.4% and 10.7% respectively, are in the range of the design slopes at the Rock Pile and Material Removal Areas along Permanente Creek. Field observations of a step-pool channel morphology at these channel gradients suggest that Permanente Creek likely had a step-pool channel pattern in the steeper reaches prior to mining. This is supported by

the observed conditions in the reaches of Permanente Creek that were identified as having pool and riffle geometry that were representative of natural conditions.

The pool analysis, utilizing the surveyed longitudinal profiles along the more intact reaches of Permanente Creek, suggest that there is an inverse relationship between pool length and spacing relative to channel gradient (Table 4). Furthermore, lower gradient reaches exhibit higher overall pool length and spacing variability than higher gradient reaches. This supports the idea that higher gradient reaches (>8% channel slope) are more characterized by a step-pool morphology, whereas lower gradient reaches (4% to 8% channel slope) exhibit more of a pool-riffle morphology. Pool depth was fairly consistent across all of the evaluated reaches with pools ranging between 0.5 and 2 feet, independent of channel slope. This is likely due to the fact that pool depth may be more a function of the presence of localized roughness elements, and the fact that there are limited opportunities to scour deeper pools due to the composition of the bed material and associated natural armoring.

**Table 5. Proposed Channel Dimensions for Constructed Reaches**

| Project Site | Design Slope (%) | Design Slope Range (%) | Proposed Bankfull Width Min (ft) | Proposed Bankfull Width Max (ft) | Proposed Bankfull Depth Min (ft) | Proposed Bankfull Depth Max (ft) | Cross Sectional Area Min ($ft^2$) | Cross Sectional Area Max ($ft^2$) |
|---|---|---|---|---|---|---|---|---|
| **Culvert 7** | 4.3% | 4%-8% | 16.5 | 20.5 | 2.1 | 2.5 | 28.2 | 34.2 |
| **Culvert 8** | 2.7% | <4% | 18.0 | 22.0 | 1.9 | 2.3 | 28.2 | 34.2 |
| **Rock Pile Area** | Varies | <4% | 17.5 | 21.5 | 1.8 | 2.2 | 26.9 | 32.9 |
| | | 4%-8% | 16.0 | 20.0 | 2.0 | 2.4 | | |
| | | >8% | 15.5 | 18.5 | 2.4 | 2.8 | | |
| **Material Removal Area** | Varies | <4% | 16.0 | 20.0 | 1.7 | 2.1 | 22.5 | 28.5 |
| | | 4%-8% | 14.5 | 18.5 | 1.9 | 2.3 | | |
| | | >8% | 14.0 | 17.0 | 2.3 | 2.7 | | |

## References

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# APPENDIX C

## Seismic Refraction Survey (Bedrock Analysis)

NORCAL GEOPHYSICAL CONSULTANTS, INC.

May 22, 2014

Golder Associates, Inc.
425 Lakeside Drive
Sunnyvale, CA 94085

Subject: Seismic Refraction Survey
Sites 4 and 11
Permanente Quarry
Cupertino, California

NORCAL Job #14-245.15B

Attention: George Wegmann,

This report presents the findings of seismic surveys performed by NORCAL Geophysical Consultants, Inc. for Golder Associates, Inc. at Permanente Quarry in Cupertino, California. The surveys were performed during the period March 4 through 11th, 2014 by NORCAL Professional Geophysicist William J. Henrich, PGp 893. Geologist Jeff Linder and Field Technician Dave Walter of Golder Associates, Inc. provided field assistance throughout the duration of the survey.

## 1.0 SITE DESCRIPTION AND PURPOSE

The seismic surveys were conducted at two locations referred to as Area 11 and Area 4, as shown on Plates 1A and 1B, respectively. Both areas encompass sections of Permanente Creek which drains in a general west to east direction. The area north of the creek has been subjected to accumulations of overburden materials related to quarrying operations. Particle sizes of the mine wastes ranged from sand and gravel size up to boulders that, on the surface, were several feet across. The local bedrock consisted of greywacke (sandstone), greenstone and limestone belonging to the Franciscan Complex.

The purpose of the seismic survey was to determine the thickness of alluvium and alluvium-rock fills at accessible select areas within the stream channel, along parallel haul roads and areas north of the stream channel. This data will be used by others to assess volumes of unconsolidated materials needed to be removed for restoration to the original stream channel grade and configuration as part of a reclamation plan for the quarry.

## 2.0 METHODOLOGY

We collected seismic data using two methods known as seismic refraction (SR) and multi-channel analysis of surface waves (MASW). The SR method was used to determine the compressional (P-) wave velocity of subsurface materials. The P-wave velocity (Vp) of fill, sediments, and rock are dependent on physical properties such as compaction, density, hardness, and induration. However, other factors such as bedding, fracturing, and saturation also affect Vp.

Typically, low Vp is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vp usually indicates dense and highly compacted or saturated sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vp typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the SR methodology is provided in Appendix A.

The MASW method was used to determine both the P-wave and the shear (S-) wave velocity of subsurface materials in areas where limited access precluded the use of the SR method. S-waves typically propagate through earth materials at roughly one-half the velocity of P-waves. However, S-wave velocities are more directly related to the strength of fill, sediments, and rock than P-waves. Furthermore, unlike Vp, S-wave velocity (Vs) is not affected by saturation. Typically, low Vs is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vs usually indicates dense and highly compacted sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vs typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the MASW method is provided in Appendix B.

## 3.0 DATA ACQUISITION

SR surveys were conducted in two locations referred to as the Rock Pile Area (Area 11) and the Material Removal Area (Area 4). The SR surveys were conducted according to the procedures described in Appendix A. MASW soundings were conducted in Area 11 according to the procedures described in Appendix B. The salient features of the data acquisition procedures used in each area are described in the following sections.

### 3.1 AREA 11

In Area 11 we collected SR data from 8-lines ranging in length from 75- to 250-ft. The locations of these lines, labeled Line 1 through Line 8, are shown on Plate 1A. We also conducted two MASW soundings. The locations of the soundings, labeled MASW-9 and MASW-10 are also shown on Plate 1A. Where possible, the SR lines and MASW soundings were located within the stream channel. However, there were some areas where the lines had to be placed on adjacent compacted gravel roads because of the presence of dense vegetation, concrete linings or steel culverts within the channel.

### 3.2 AREA 4

In Area 4, we acquired SR data from 13-lines ranging in length from 125- to 250-ft. The locations and orientations of the SR lines are shown on Plate 1B. The SR lines were positioned within the stream channel and on the northern portions (hill slopes, access roads and parking area) of the site.

## 4.0 DATA PROCESSING

### 4.1 SEISMIC REFRACTION (SR)

The refraction data were processed as described in Appendix A. Elevation data were provided by Waterways Consultants, Inc. at each shot point location within every seismic line. These elevation data were incorporated into the final processed seismic models. Further information regarding specific data input and sample compilations can be found in Appendix A.

### 4.2 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

The MASW data were processed according to the procedures described in Appendix B.

## 5.0 RESULTS

The results of the seismic refraction survey are illustrated by the seismic velocity cross-sections (profiles) shown on Plates 2 through 8. On each profile the vertical axis represents elevation above mean sea level (MSL) and the horizontal axis represents draped survey distance (Station) along each line. Color shaded areas represent the lateral and vertical extent of the seismic layers comprising each profile. Modelled layer depths (thicknesses) as described in the Appendix A were determined beneath each geophone. These data were interpolated/extrapolated beneath each shot point. The relationship between color and seismic velocity is indicated by the color scales plotted to the right of each seismic refraction profile. In order to indicate how velocity varies from line to line within each survey area, the same scale was used for every profile. The results obtained in each area are described in the following sections. Specific results are presented for areas where two or more seismic refraction profiles either cross each other or are in a local proximity. It was useful to group seismic lines in this manner because of common characteristics involving of topography, location or surface conditions.

## 5 .1 AREA 11

### 5.1.1 Lines 1 and 2 (Plate 2)

Lines 1 and 2 were located within the stream channel, just west of a retention pond, as shown on Plate 1A. During the survey, water from remote pumping was actively being discharged to the stream channel above the seismic lines. The profile for Line 1 indicates velocities (Vp) ranging from 1200- to 7200-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1as representing unconsolidated stream deposits and V2 as representing bedrock. The depth to rock ranged from 18- to 25-ft. The Profile for Line 2 indicates velocities (Vp) ranging from 1150- to 2550-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. Given the low velocities of these layers, we interpret both as representing unconsolidated stream deposits. The difference in velocity between the two layers is related to their relative degree of compaction. V2 has a higher velocity than V1 because it is more highly compacted, probably because of the overbearing weight of V1. Line 2 did not detect bedrock because it was a relatively short line length which limited the depth of exploration.

### 5.1.2 Line 3 – 6, MASW Soundings 9 and 10 (Plate 3)

Lines 3 through 5 were located on access roads that parallel the stream channel, as shown on Plate 1A. Line 6 was situated in open, gravel packed area that ranged from 40 to 60-ft north of a subsurface diversion channel. The profiles for Lines 3-6 indicate velocities (Vp) ranging from 2300- to 7800-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated materials, e.g. road fill and/or alluvium. Given the high velocity range of V2 (6850- to7800-ft/sec) we interpret it as representing bedrock. The depths to bedrock ranged from 8- to 35-ft bgs.

MASW Soundings 9 and 10 were located north of Seismic Refraction Line 3, as shown on Plate 1A. The MASW soundings were acquired for the purpose of assessing possible near surface high velocity layers and providing depth to bedrock information further north of the stream channel. The 1D MASW Velocity Models (9 and 10) shown at the top of Plate 3 indicate a near surface high velocity layer (Vs=1500- to 2000-ft/sec) that is 8- to 16-ft thick. We interpret this high velocity layer as representing compacted (by very heavy vehicle loads) road fill. The materials underlying the compacted fill have lower velocities (Vs=500- to1000-fps) and thus constitute a velocity inversion. This velocity inversion, which is typically about 8- to 9-ft thick, is characteristic of alluvium. It is underlain, at depths of 17- to 26-ft bgs by velocities (Vs) of about 1800-ft/sec. We interpret these velocities as being indicative of consolidated bedrock. The bedrock depth indicated by the MASW-9 model (about 17-ft) is more shallow than the depth

indicated by the Line 3 profile (23-ft) at its point of closest approach. Conversely, the bedrock depth indicated by the MASW-10 model (26-ft) is significantly greater than the 5- to 10-ft depth indicated by the Line 3 and Line 4 profiles at their points of closest approach to MASW-10. These factors highlight the erratic nature of the bedrock surface and can be, in part, attributed to the fact that MASW-9 and MASW-10 are 25-ft north of Lines 3 and 4.

Additionally, the MASW soundings were undertaken to provide a constraint on the seismic refraction results in the general area (Seismic Refraction Lines 3 and 4) as the MASW techniques can accommodate shallow velocity inversions in processing. The MASW bedrock depths (17- to 26-ft bgs) derived from MASW analysis thus formed an approximate magnitude range of values. Our seismic refraction results indicated that bedrock depths ranged from 5- to 35-ft bgs which is in the same order of magnitude as the MASW estimate of depths to bedrock in the general area.

### 5.1.3 Lines 7, 8 and 11(Plate 4)

Lines 7, 8 and 11 trend northward, away from the stream channel, as shown on Plate 1A. Lines 7 and 8 cross an uphill section of accumulated mine waste and packed surficial gravel. The local topography was highly variable and steep. Line 11 crosses a gently sloping, open, gravel packed area from the edge of a metal culvert up to point 50-ft distant from the rock discharge pile (Rock Pile). The profiles for Lines 7, 8 and 11indicate velocities ranging from 1850- to 5700-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2, in order of increasing depth and velocity. Because of its relatively low velocity and highly variable thickness, we interpret V1 as representing mine wastes and/or alluvium. We interpret V2 as representing bedrock. Beneath Lines 7 and 8, the depth to rock ranges from less than 10- to over 50-ft. The Time-Distance plot for Line 11 indicated a relatively high velocity V1 layer associated with the road bed. No characteristic higher V2 bedrock velocity layer was detected. Therefore, no modeling results are presented for this line.

## 5.2 AREA 4

### 5.2.1 Lines 12, 13, 14 and 15 (Plate 5)

Lines 12, 13 and 14 were situated within a relative wide section of the stream channel, as shown on Plate 1B. Line 15 was located along a man-made bench that parallels the stream channel, about 20-ft upslope from the channel. The profiles for the four lines indicate velocities (Vp) ranging from about 900- to 3550-ft/sec. Our interpretation of the refraction data resolves this velocity range into three layers labeled V1 through V3 in order of increasing depth and velocity. We interpret the V1 and V2 layers as representing unconsolidated stream deposits and V3 as representing weathered bedrock. The depth to rock (V2/V3 interface) ranges from 7- to 23-ft bgs.

The relatively low velocity of V3 (2800- to 3450-ft/sec) suggests that it comprises a very weak rock like a meta-shale. The profile for Line 15 indicates that bedrock deepens to the east (downstream), reaching a maximum depth of 36-ft-bgs at the east end of the line. This puts it at an elevation of 1190-1192-ft MSL, which corresponds to the bedrock elevations at the west end of Line 12 and the east end of Line 13.

**5.2.2. Lines 16 and 17 (Plate 6)**

Lines 16 and 17 were situated on top of a gravel packed, level parking area, as shown on Plate 1B. The profiles for both lines indicate velocities (Vp) ranging from 1150- to 6200-ft/sec. Our interpretation of the Line 16 and Line 17 data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing fill and alluvium and V2 as representing bedrock. The depth to rock ranges from17- to 23-ft bgs.

**5.2.3 Lines 18, 19, 20 and 21 (Plate 7)**

Lines 18 through 20 were located within the active stream channel, as shown on Plate 1B. However, there was no water in the channel at the time the survey was conducted. Line 21 extended north and upslope from the west end of Line 19. The profiles for these lines indicate velocities (Vp) ranging from 1100- to 4150-ft/sec. Our interpretation of the data resolves this range into three layers labeled V1 through V3 in order of increasing depth and velocity. V2 is absent beneath Line 18 and V3 is absent beneath Line 19. We interpret the combined V1 and V2 layers, with velocities ranging from 1050- to 2650-ft/sec, as representing unconsolidated stream and slope deposits. However, below Lines 19 and 20, the V2 layer could represent decomposed bedrock or dense gravel deposits. In addition, our field observations indicate that, beneath Line 21, V2 could represent mining waste that contains a high percentage of boulder size fill. We interpret theV3 layer as representing bedrock with velocities, where defined, ranging from 3400- to 4150-ft/sec. The depth to rock ranges from about 8- to 32-ft.

**5.2.4 Lines 22, 23 and 24 (Plate 8)**

Line 22 and Line 23 were located on an access road, as shown on Plate 1B. This road leads to Pond 4 (not shown). Line 24 extended southeast and down slope, from the access road towards the stream channel. The profiles for the three lines indicate velocities (Vp) ranging from 1200- to 6700-ft/sec. Our interpretation of the data resolves the velocity range into two layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated stream deposits. We interpret V2 as representing bedrock. Beneath Lines 22 and 23, the computed depths to bedrock ranged from 18- to 30-ft bgs. Beneath Line 24, the depths to bedrock decrease in the down slope direction; ranging from 18-ft bgs near the access road to only 8-ft bgs at the southeast edge of the profile.

## 6.0 STANDARD CARE

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide you with this information.

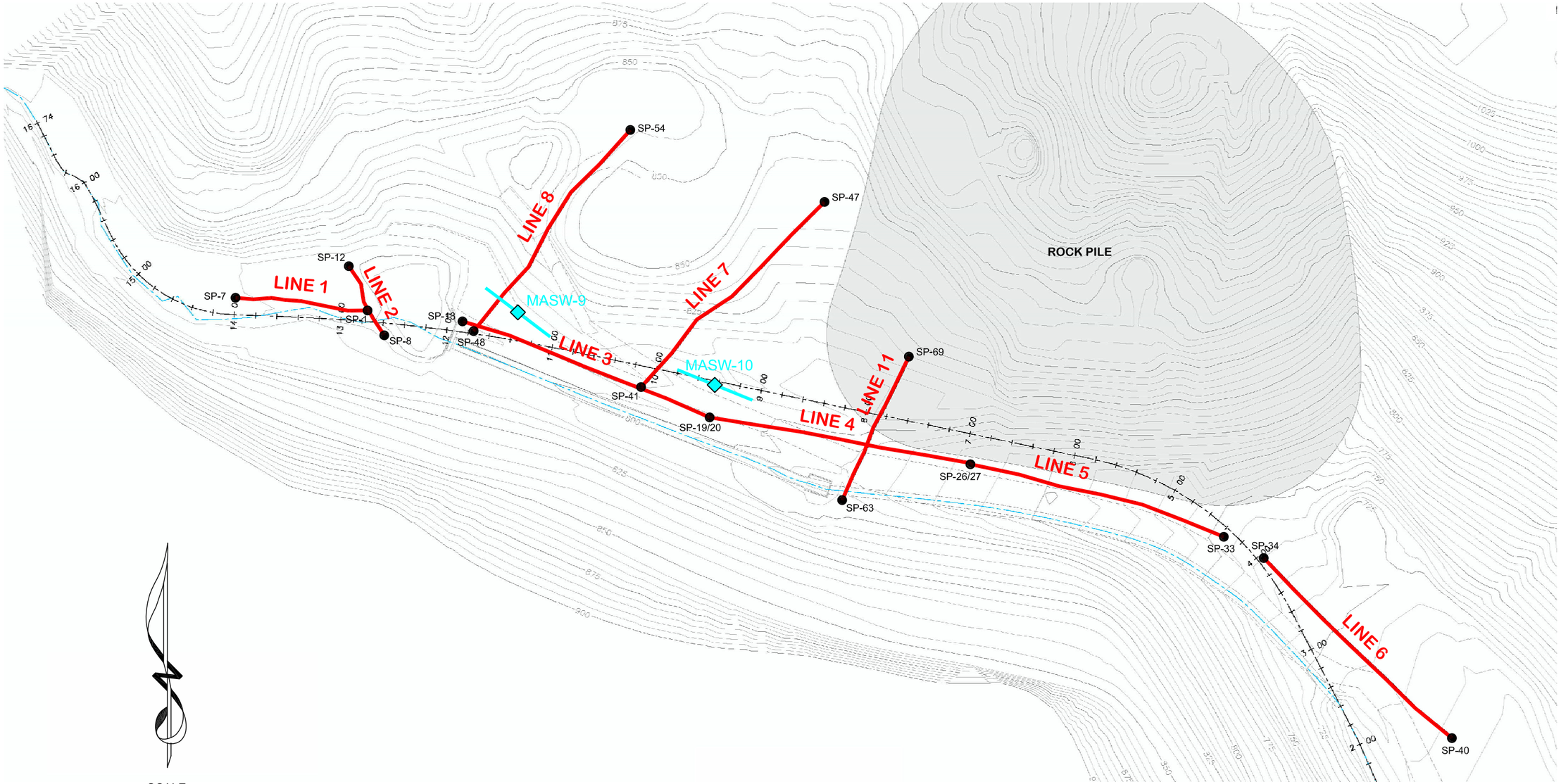
Respectfully,

NORCAL Geophysical Consultants, Inc.

William J Henrich
Professional Geophysicist PGp 893

WEB/tlt

Enclosures: Plates 1A, 1B and 2 through 8
Appendix A - Seismic Refraction (SR)
Appendix B – Multi-channel Analysis of Surface Waves (MASW)




SCALE

0 50 100 200

(1 inch = 100 feet)

## LEGEND

| | |
|---|---|
| | SEISMIC REFRACTION LINE |
| SP-1 | SHOT POINT LOCATION |
| | CENTER POINT OF MASW LINE |

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

# SITE LOCATION MAP
# PERMANENTE QUARRY AREA 11
# SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

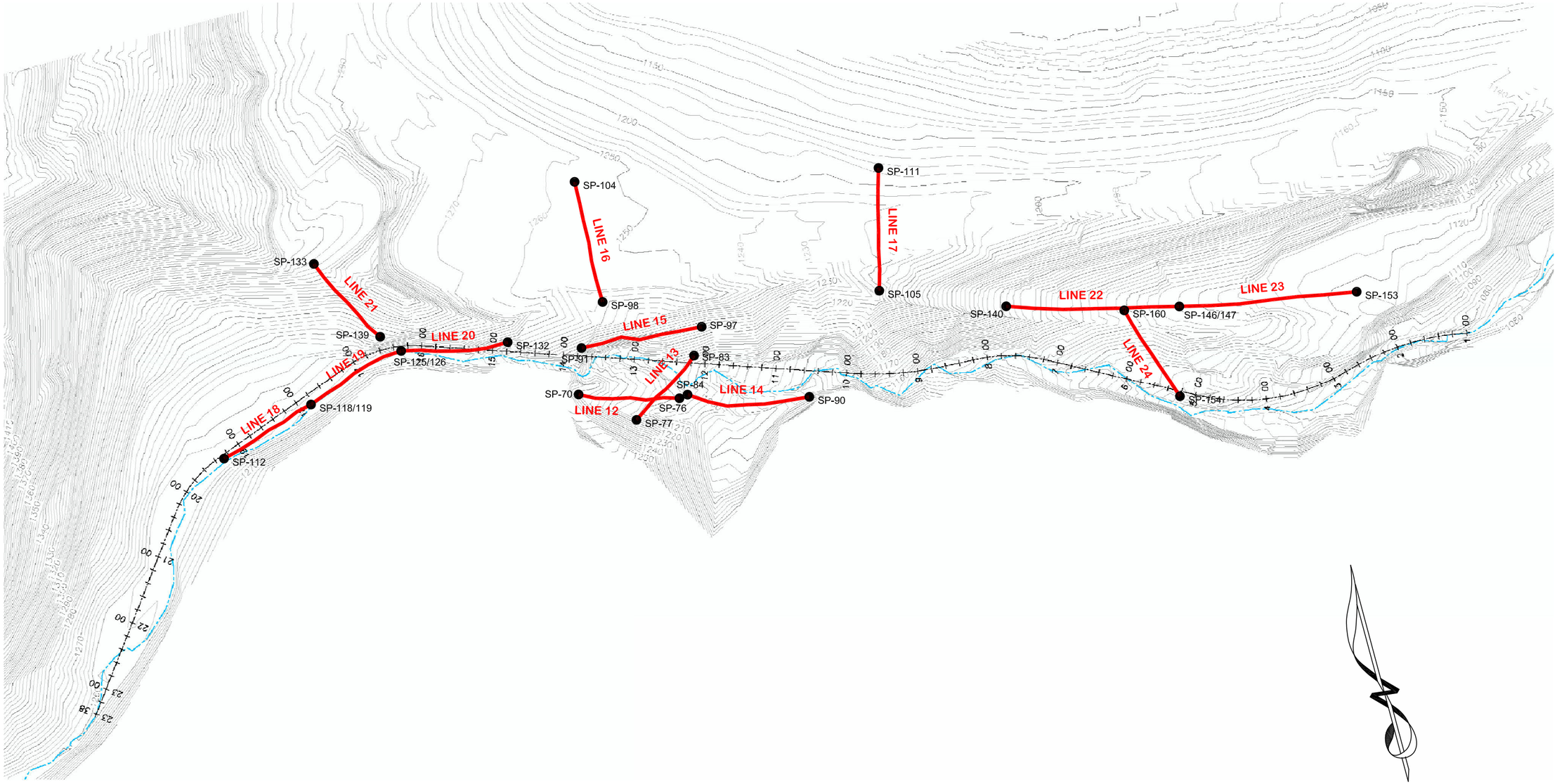
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1A




## LEGEND

| | |
|---|---|
| ——— | SEISMIC REFRACTION LINE |
| ● SP-1 | SHOT POINT LOCATION |

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

# SITE LOCATION MAP
# PERMANENTE QUARRY AREA 4
# SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

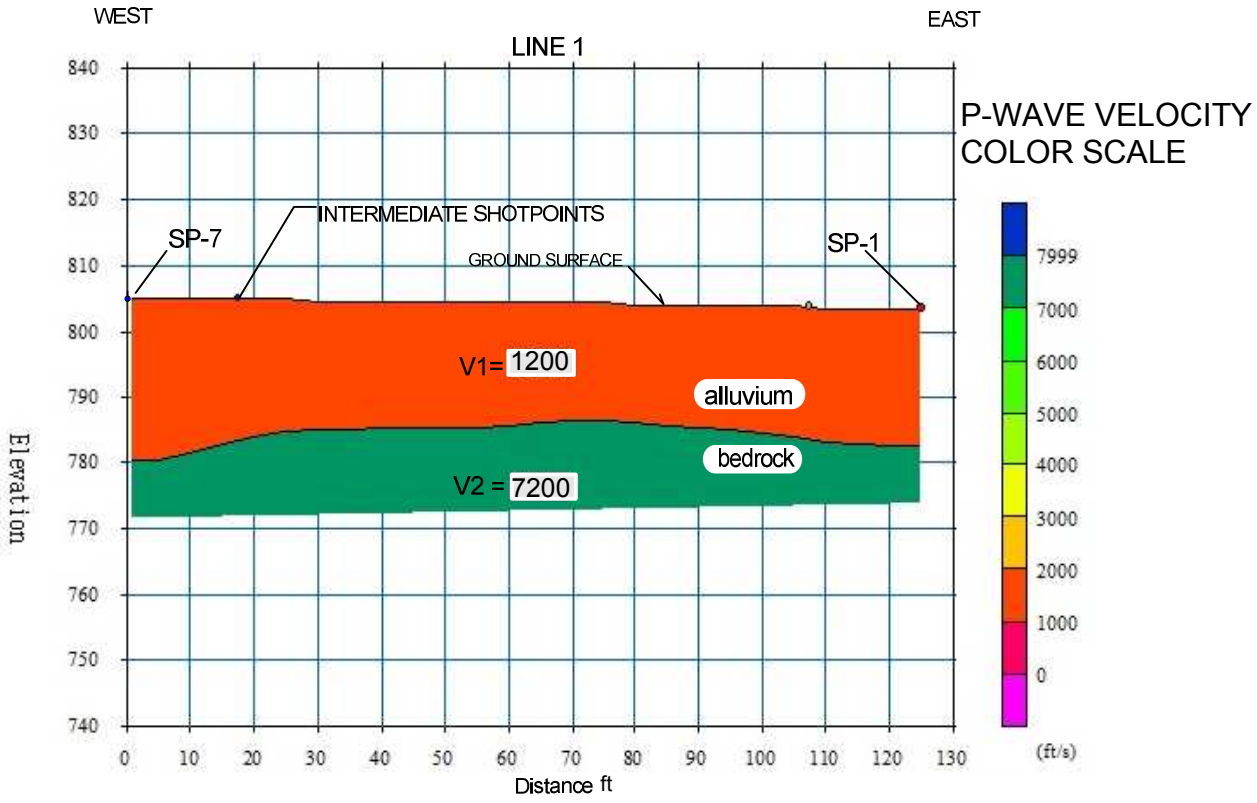
NORCAL GEOPHYSICAL CONSULTANTS INC.

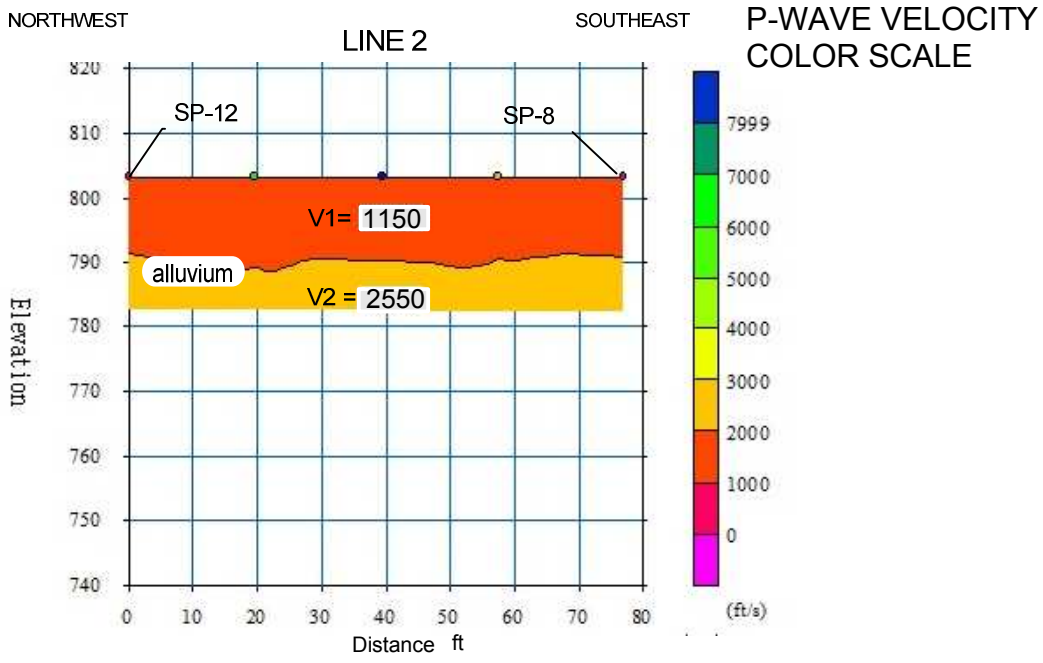
DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1B




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

Horizontal/Vertical Scale 1' = 30 feet

NORCAL

# SEISMIC REFRACTION PROFILES LINES 1 AND 2

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

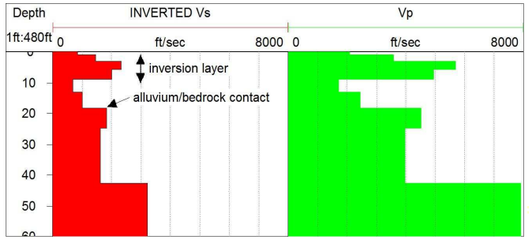
DATE: APRIL, 2014

DRAWN BY: W HENRICH

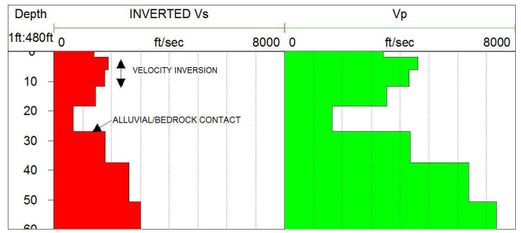
APPROVED BY: WJH

PLATE 2

MASW VELOCITY PROFILE 9

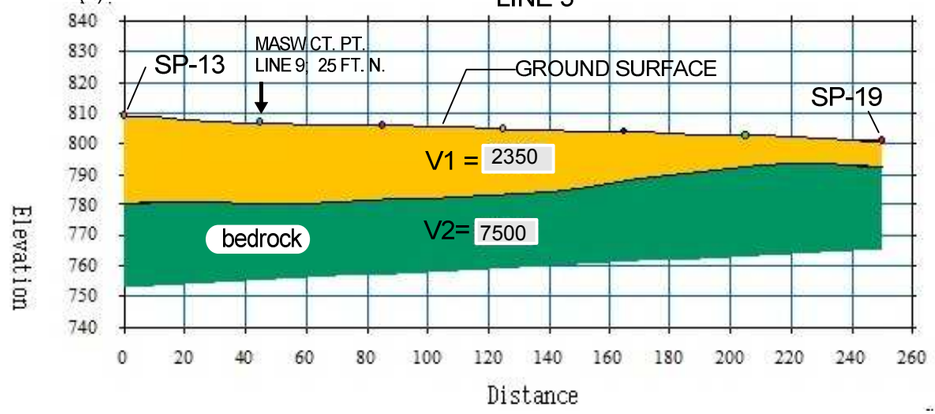



MASW VELOCITY PROFILE 10

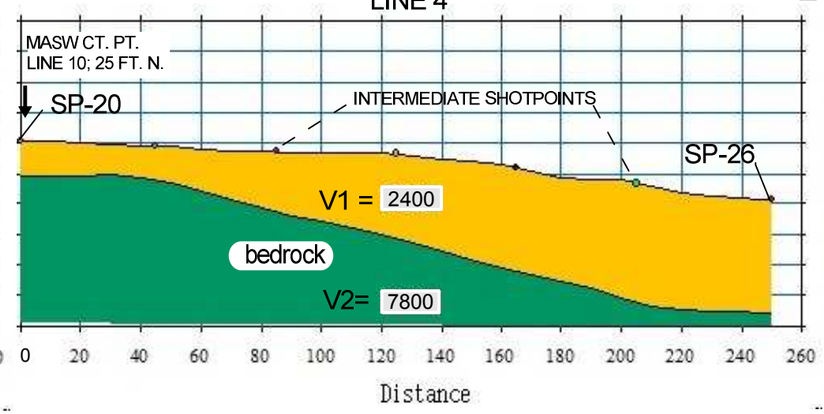



WEST

LINE 3

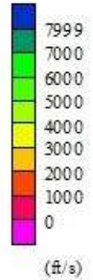



LINE 4



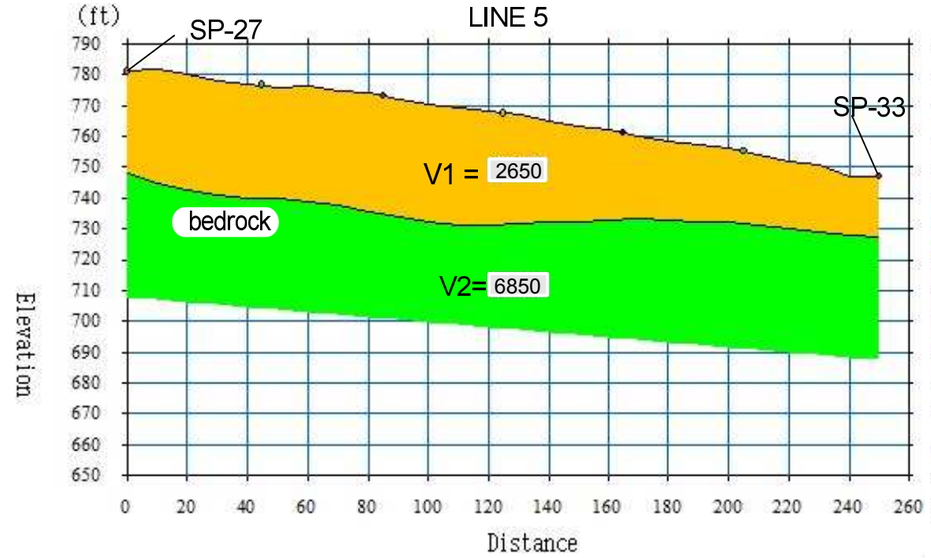

EAST

P-WAVE VELOCITY
COLOR SCALE

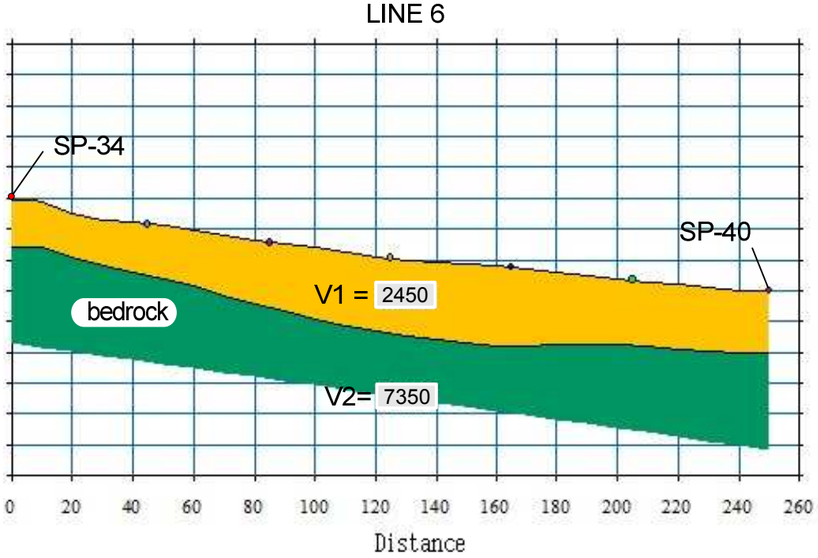



(ft)

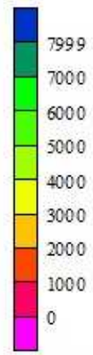
LINE 5




LINE 6




P-WAVE VELOCITY
COLOR SCALE




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: 1" APPROX. EQUALS 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 3, 4, 5 AND 6;
MASW PROFILES 9 AND 10

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

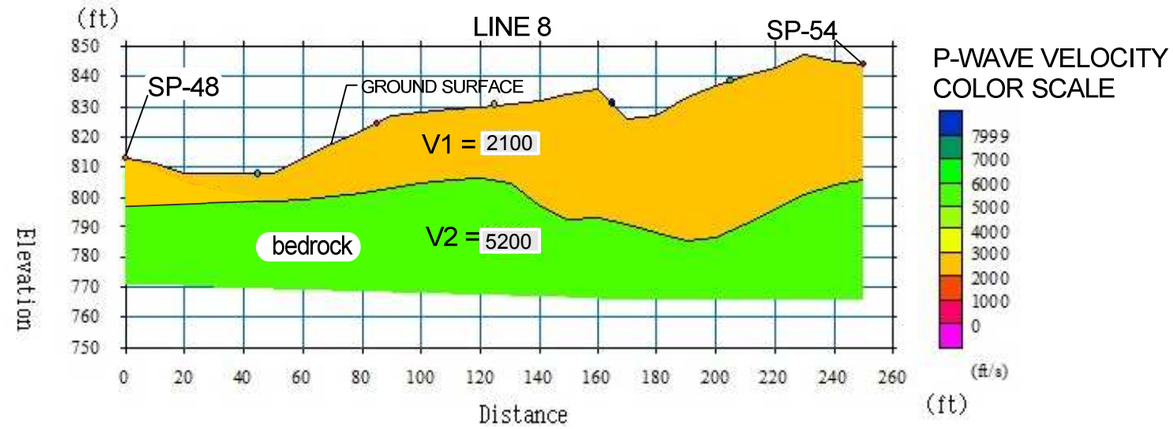
JOB #: 14-245.15B | NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014 | DRAWN BY: W. HENRICH | APPROVED BY: WJH

PLATE 3

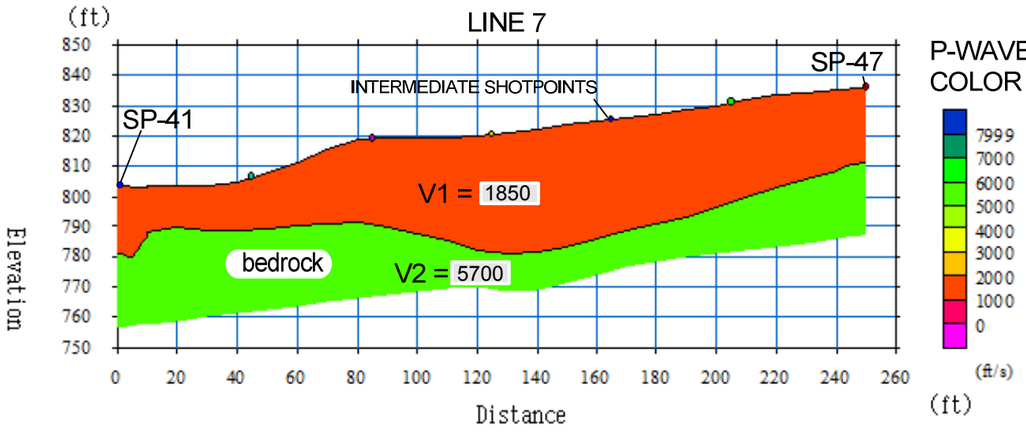
SOUTHWEST

NORTHEAST




P-WAVE VELOCITY COLOR SCALE

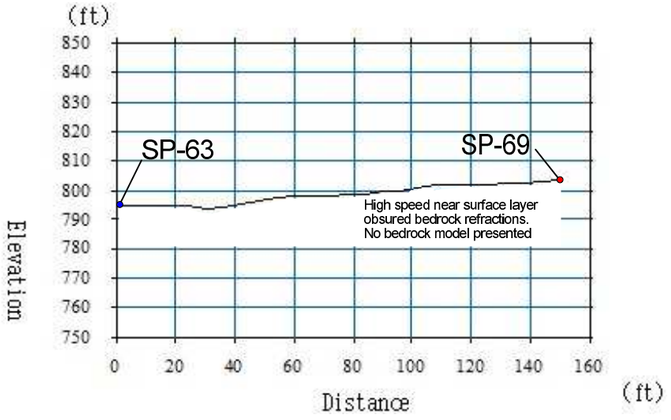



P-WAVE VELOCITY COLOR SCALE




LINE 11




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 7, 8, AND 11

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

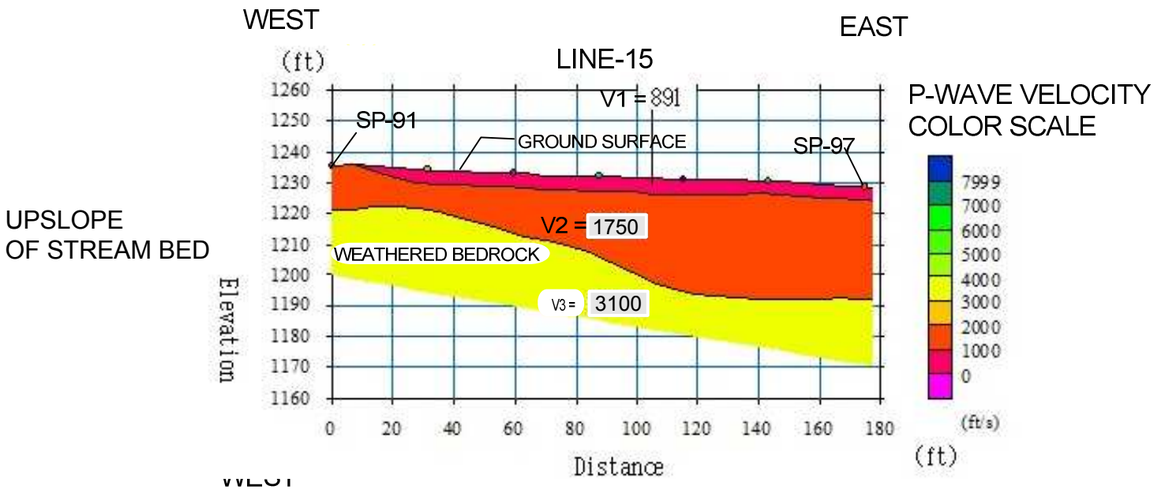
NORCAL GEOPHYSICAL CONSULTANTS INC.

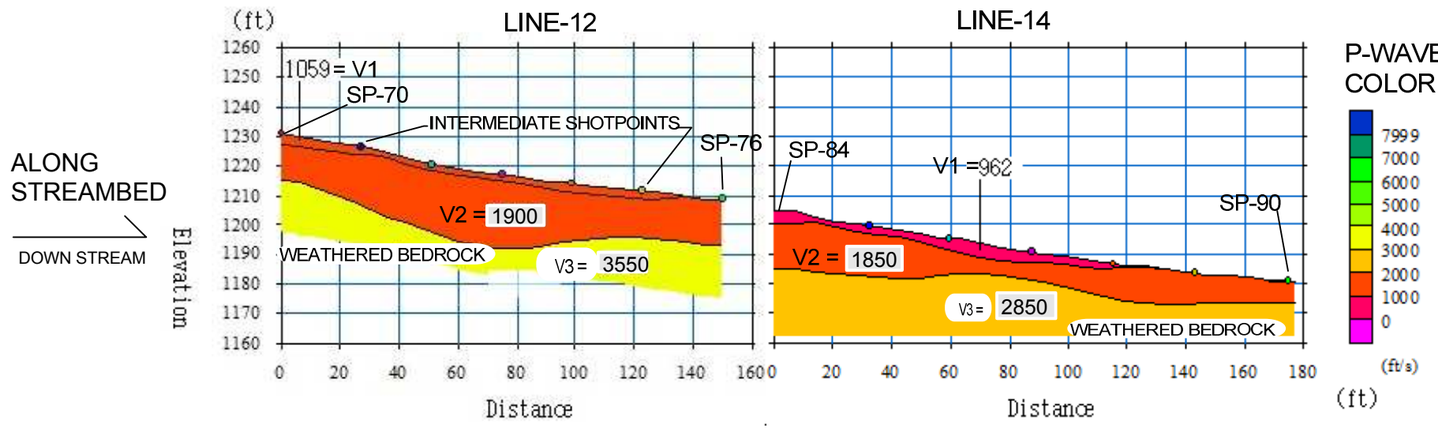
DATE: APRIL, 2014

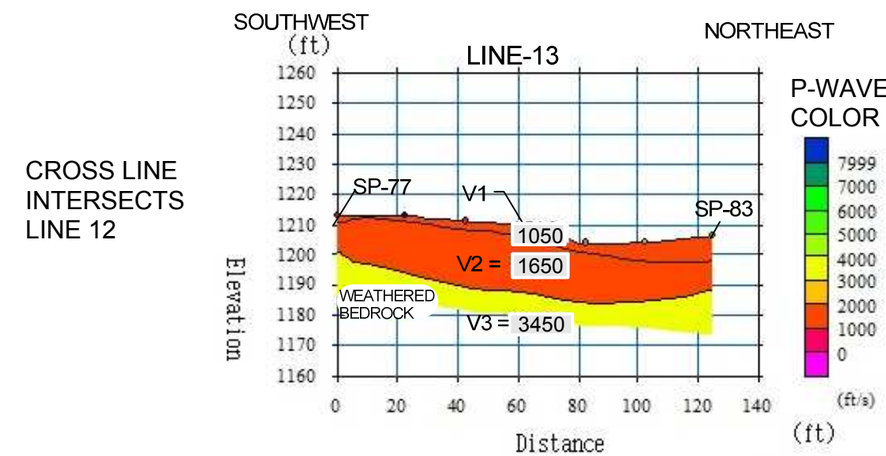
DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 4




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 12, 13, 14, AND 15

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

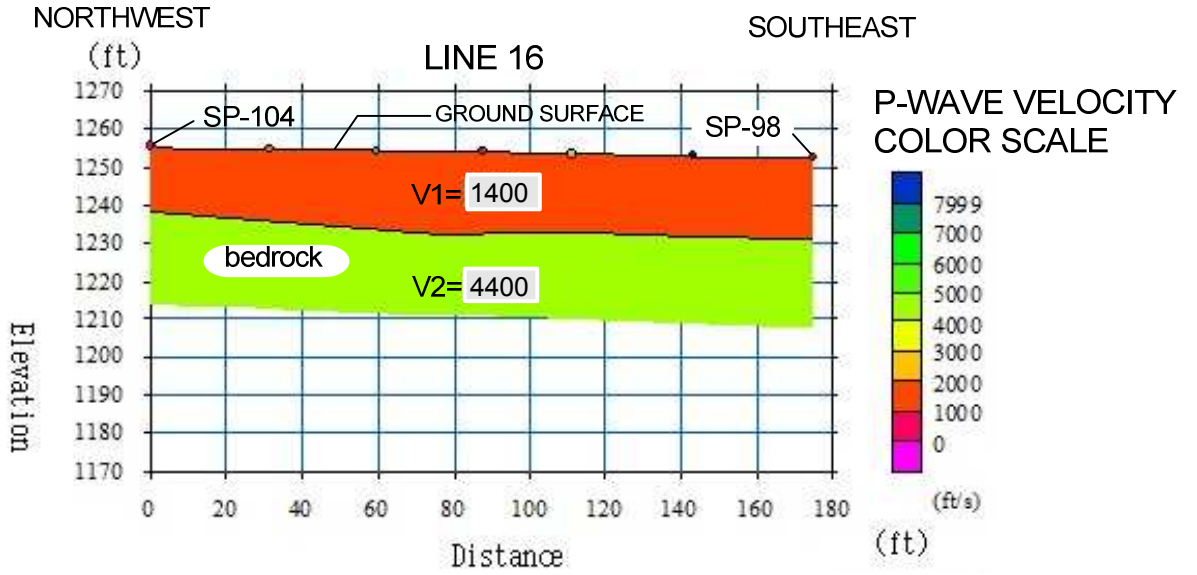
NORCAL GEOPHYSICAL CONSULTANTS INC.

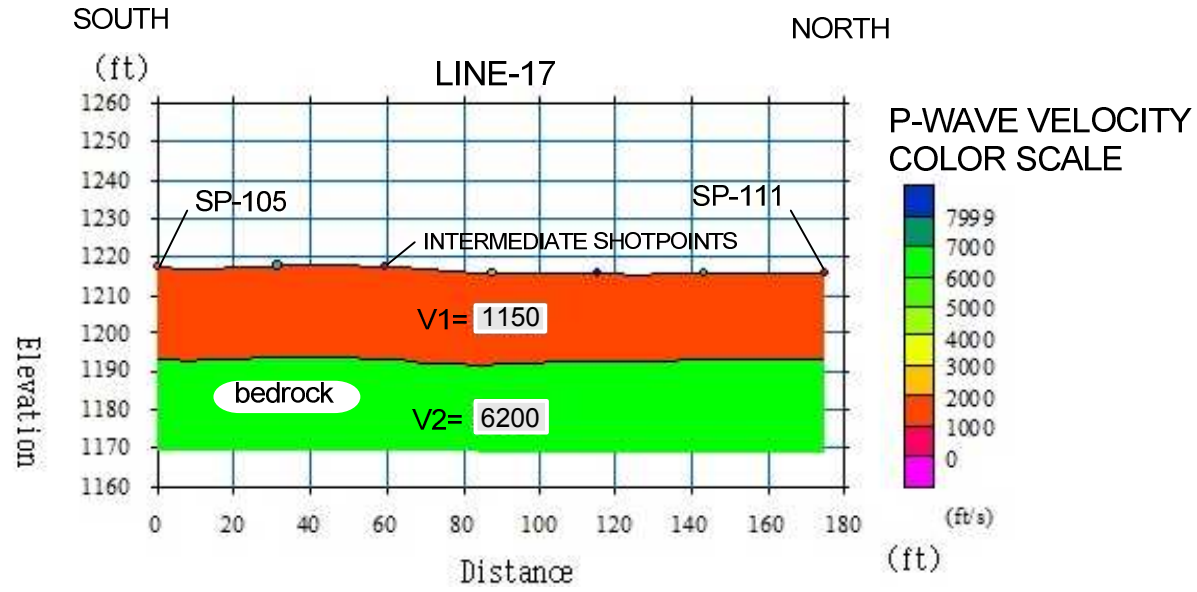
DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE
5




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISMIC REFRACTION
PROFILES LINES 16 AND 17

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

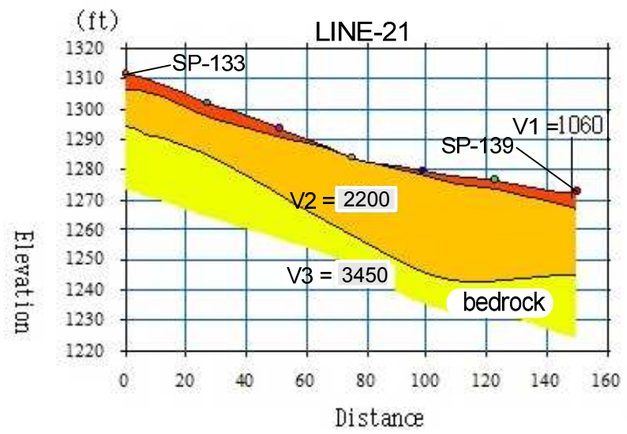
DRAWN BY: W HENRICH

APPROVED BY: WJH

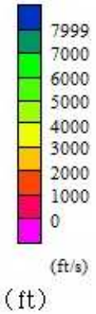
PLATE 6

NORTHWEST

SOUTHEAST




P-WAVE VELOCITY COLOR SCALE

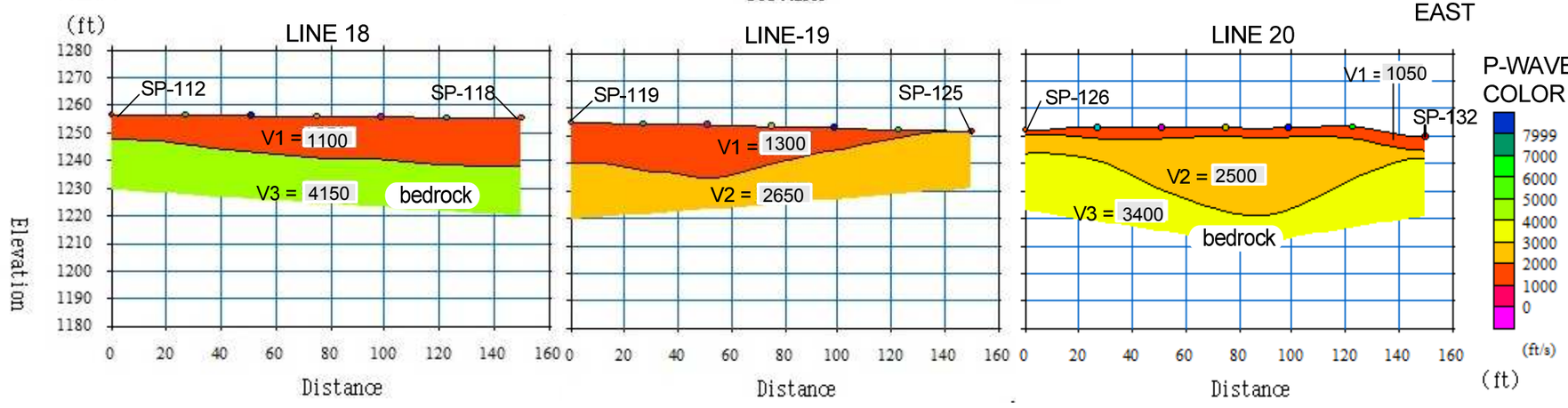



UPSLOPE OF STREAM BED

WEST

EAST

SEISMIC LINES ALONG STREAM BED




P-WAVE VELOCITY COLOR SCALE




DOWNSTREAM

EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 18, 19, 20 AND 21

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

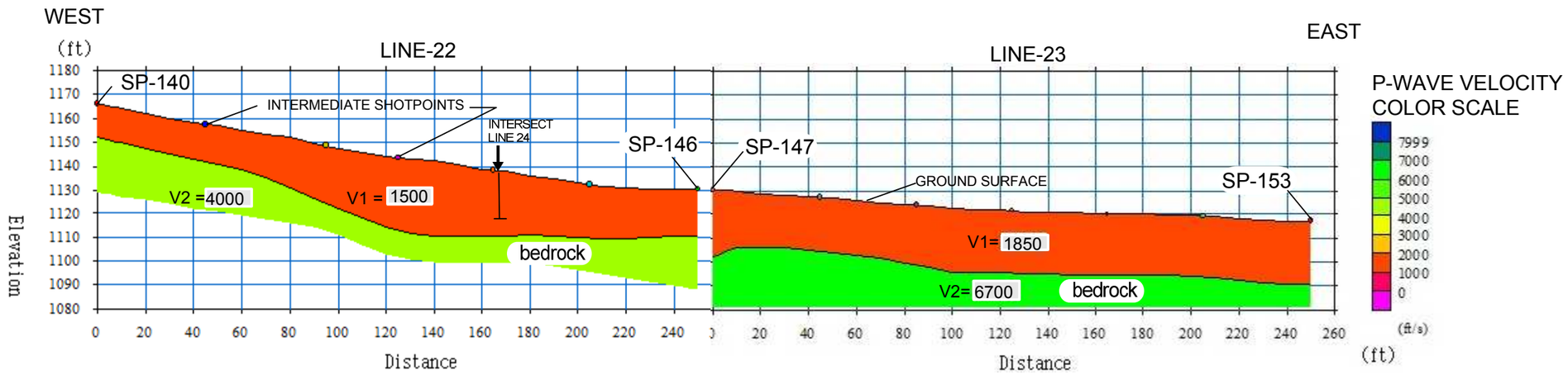
NORCAL GEOPHYSICAL CONSULTANTS INC.

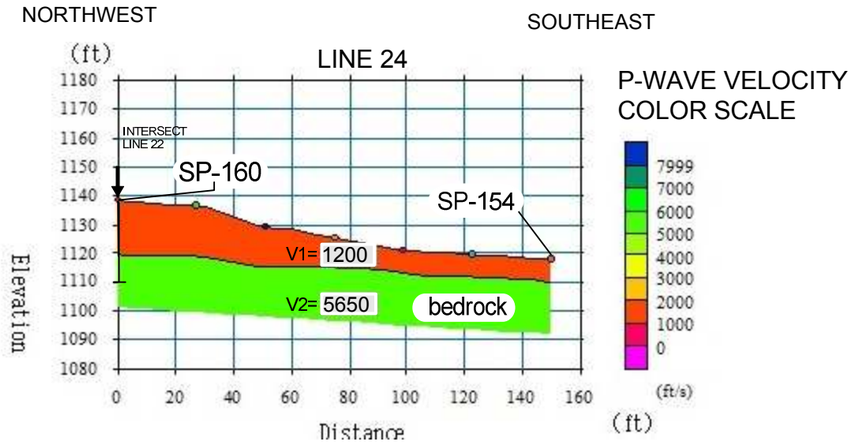
DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 7




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

NORCAL

SEISIMC REFRACTION PROFILES
LINES-22, -23 and -24

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 8

# Appendix A

# SEISMIC REFRACTION (SR)

# SEISMIC REFRACTION (SR)

## 1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances to determine the depth, thickness, and velocity of subsurface seismic layers.

The seismic refraction technique is based on several assumptions. Paramount among these are that seismic velocity:

1) Increases with depth, and,
2) Is uniform within each layer over the length of the given spread.

In cases where these assumptions do not hold, the accuracy of the technique decreases. For example, if a low velocity layer occurs between two layers of higher velocity, the low velocity layer will not be detected and the depth to the underlying high velocity layer will be erroneously large. Also, if the velocity of a seismic layer varies laterally within a spread, those variations will be interpreted as fluctuations in the elevation of the underlying seismic layer.

## 2.0 DATA ACQUISITION/INSTRUMENTATION

Each SR line consisted of 24-geophones and 7-shot points distributed in a collinear array (spread). In most areas, the geophones were coupled to the ground surface by metal spike affixed to the bottom of each geophone case. In areas where the ground surface was too hard to penetrate (e.g. the road) the geophones were mounted on weighted pedestals that coupled them to the ground by their weight. The geophone intervals ranged from 3- to 10-ft depending on access. For each spread, the two end shot points were located one-geophone spacing beyond the end geophone at both ends of the spread. The remaining five shot points were evenly spaced along the spread. This distribution of shot points and geophones yielded total draped line lengths (end-geophone to end-geophone) ranging from 77- to 250-ft. The SR survey was designed to target the upper 15 to 50 feet of geologic material beneath each line, generally consisting of native soil, fill (mine waste) alluvium/stream deposits, weathered and un-weathered bedrock.

Data acquisition was initiated along each SR line by producing seismic energy using a mechanical source. Seismic energy was produced by impacting a metal strike plate on the ground surface with a 12-16 pound sledge hammer. The resulting seismic waveforms are recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph and Mark Products geophones with a natural frequency of 8-Hz. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. There the data were archived for subsequent processing and displayed on the computers LCD screen in the form of seismograms. These were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in a given array (spread).

## 3.0 DATA ANALYSIS

The recorded seismic data were processed using the software package ***SeisImager*** which was written by Oyo Corporation (Japan) and distributed by Geometrics Inc. The first stage of seismic processing included compilation (7 shot points per line) and identification of first arriving P-wave energy. This process was conducted using ***Pickwin, Version 3.2.0.1*** (2004), which is part of the ***SeisImager*** package. A second interactive program ***Plotrefa, Version 2.8.0.1*** (2006) was used to assign geophone travel times, geophone/shot point surface elevations and velocity layer assignments to compute a 2D seismic velocity model based on these inputs. Example Time-Distance graph from a 7 shot point refraction line and inverted seismic layer model are presented in the following figures.

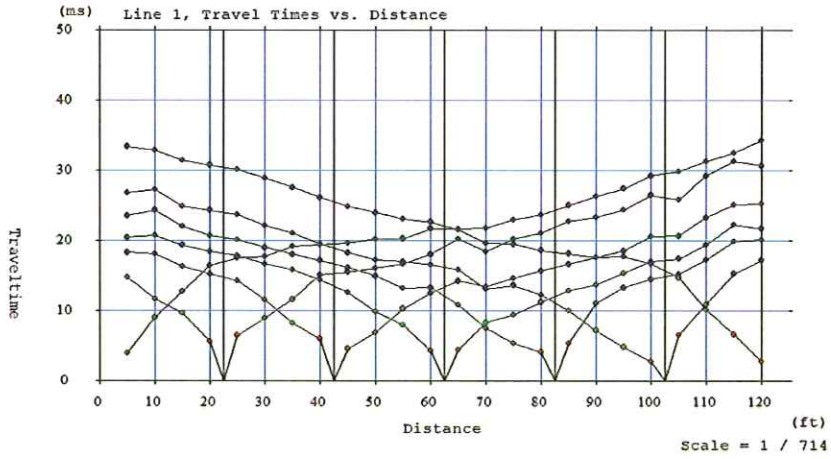



Figure 1 Example SR Time-Distance Graph, 24-geophones; 7 equal spaced shot points

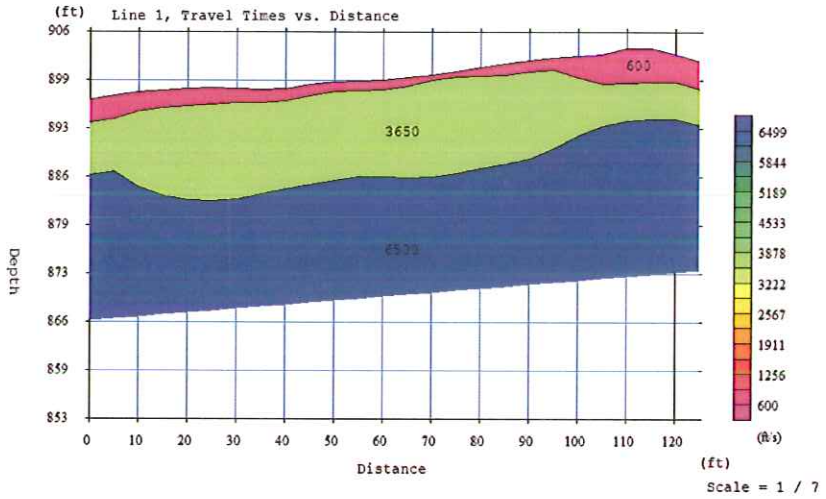



Figure 2 Time-Term Inverted Seismic Velocity Model

For this survey we have chosen an inversion routine that is based on the time-term method. The time-term method employs a combination of linear least squares and delay time analysis to invert the first arrivals into a velocity model. The model can consist of two or three velocity layers depending on the presence of significant line slopes that can be fitted to the first arrival times. Depths to the tops of the velocity layers are calculated below each geophone. For end and interior shot points the depths are extrapolated from the nearest geophone. This inversion as described above produces simplified velocity layers that, though generalized, will provide an adequate, useable characterization of the depth to bedrock.

## 4.0 LIMITATIONS

In general, there are limitations unique to the SR method. These limitations are primarily based on assumptions that are made by the data analysis routine. First, the data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer.

Second, the data analysis routine assumes that the velocity of subsurface materials increase with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected. Due to these and other limitations inherent to the SR method, the results of the SR survey should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally. Other independent data (e.g., surface and borehole geology) should be integrated with SR data to enhance the subsurface interpretation.

# Appendix B

# MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

# MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

## 1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, seismic waves are produced. Those that travel along the ground surface are referred to as ground roll or surface waves. Those that propagate into the earth are referred to as body waves. When a vertical impact seismic energy source is used, the resulting surface waves account for more than two-thirds of the energy that is produced. As a result, surface waves are the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. This is referred to as dispersion. Since surface waves travel at 0.9 times the velocity of S-waves, it is possible to determine subsurface Vs by analyzing the dispersion of surface waves. Furthermore, since S-wave velocities are directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Computer software and processing techniques developed by researchers at the University of Kansas have made it possible to analyze surface waves using a large number of shot points and geophones. This is referred to as multi-channel analysis of surface waves (MASW). Surface wave data are gathered in much the same way as high resolution seismic reflection data. Seismic energy generated by vertical impacts on the ground surface is detected by an array of closely spaced geophones (spread). The energy source and the geophones are sequentially moved along a profile as the survey progresses.

The data gathered from each shot point are analyzed to determine the variation in surface wave velocity versus frequency (dispersion curve). Computer software then inverts the dispersion curve to determine the variation in Vs versus depth. The data gathered from multiple shot points and geophone locations can be collated to produce a two dimensional (2D) cross-section showing the variation in Vs with depth and distance beneath a line.

## 2.0 DATA ACQUISITION/INSTRUMENTATION

Soundings MASW-9 and -10 each comprised an array of 24-geophones distributed at 3-ft intervals in a collinear array (spread). Seismic energy was produced at four shot points on each spread through multiple impacts with a 12-pound sledge hammer against a metal strike plate placed on the ground surface. The shot points were positioned at distances of 3- and 12-ft beyond the end geophones at both ends of each spread. The resulting seismic waveforms were recorded using a Geometrics ***Geode*** 24-channel distributed array seismograph and Oyo ***Geospace*** geophones with a natural frequency of 8-Hz. The seismograph was networked to a field computer where the data were displayed on a LCD screen for QA/QC review and archived for subsequent processing.

## 3.0 DATA ANALYSIS

The MASW data were processed using the software package ***SurfSeis 2.05*** which was developed by the Kansas Geological Survey. Using this software, the data acquired from each shot point were processed to develop an overtone display. This is a color contoured plot that depicts phase velocity as a function of frequency and signal amplitude. The overtone display serves as a guide in nominating the dispersion curve that is used by the inversion routine. However, prior to nominating the dispersion curve, the four overtones were merged into one in order to increase the signal to noise ratio and maximize the continuity of the display. The merged and enhanced overtone was then used as a guide in nominating the dispersion curve used in the inversion process. At the onset of the inversion routine the software created a 1D model comprising 10-layers. Starting values of depth, thickness, Vp, Vs and Poisson's ratio ($\alpha$) were assigned to each layer. The program then proceeded to refine the starting model through an iterative procedure in order to develop a 1D model that provided the best fit to the dispersion curve. In so doing, it was necessary that either Vp or $\alpha$ remain fixed during the inversion process. In this case, we opted to have $\alpha$ remain fixed, at a value of 0.4, so that the final model would provide the best indication of both Vp and Vs as a function of depth. The value of 0.4 was used for $\alpha$ because it is typical of most near surface earth materials.

# APPENDIX D

## Fish Passage Calculations

## Manning's Roughness & Channel Hydraulics using Manning's Equation at a Station

# Manning's Roughness Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 10/30/2018
Calculated by: B.M.Z.
Checked by: B.M.S.

Instructions: Enter variables in RED cells only

**Design equations to determine roughness coefficient of typical roughened channel section at adult fish passage design flows.**

**Culvert #7 Replacement Area Slope = 3.9%**

**Fish Passage Low Flows (Q=2 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.039 | |
| R = | 0.32 | ft |
| d = | 0.38 | ft |
| $D_{84}$ = | 2.3 | ft |
| $D_{50}$ = | 1.2 | ft |
| $d/D_{84}$ = | 0.17 | |

n= 0.22

**Fish Passage High Flow (Q=4.1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.039 | |
| R = | 0.3 | ft |
| d = | 0.36 | ft |
| $D_{84}$ = | 2.3 | ft |
| $D_{50}$ = | 1.2 | ft |
| $d/D_{84}$ = | 0.16 | |

n= 0.22

**Culvert #8 Replacement Area Slope = 2.7%**

**Fish Passage Low Flows (Q=2 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.027 | |
| R = | 0.32 | ft |
| d = | 0.38 | ft |
| $D_{84}$ = | 2 | ft |
| $D_{50}$ = | 1 | ft |
| $d/D_{84}$ = | 0.19 | |

n= 0.18

**Fish Passage High Flow (Q=4.1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.027 | |
| R = | 0.42 | ft |
| d = | 0.49 | ft |
| $D_{84}$ = | 2 | ft |
| $D_{50}$ = | 1 | ft |
| $d/D_{84}$ = | 0.25 | |

n= 0.17

**Rock Pile/Material Removal Area Slope = 12%**

**Fish Passage Low Flows (Q=2 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.12 | |
| R = | 0.34 | ft |
| d = | 0.41 | ft |
| $D_{84}$ = | 3 | ft |
| $D_{50}$ = | 1.5 | ft |
| $d/D_{84}$ = | 0.14 | |

n= 0.39

Use roughness of 0.25 (max from literature)

**Fish Passage High Flow (Q=2.8 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.12 | |
| R = | 0.36 | ft |
| d = | 0.43 | ft |
| $D_{84}$ = | 3 | ft |
| $D_{50}$ = | 1.5 | ft |
| $d/D_{84}$ = | 0.14 | |

n= 0.38

Note:
Julien (2002) reports typical boulder bed stream n-values ranging from 0.25 to 0.04


1.) Bathurst, J.C., 1985, Flow resistance estimation in mountain rivers, Journal of Hydraulic Engineering, ASCE, Vol. 111, No.4

2.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

3.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.

4.) Julien, P.Y. 2002. River Mechanics. Cambridge University Press, Cambridge, United Kingdon

# Manning's Roughness Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 10/30/2018
Calculated by: B.M.Z.
Checked by: B.M.S.

Instructions: Enter variables in RED cells only

**Design equations to determine roughness coefficient of typical roughened channel section at juvenile fish passage design flows.**

**Culvert #7 Replacement Area Slope = 3.9%**

**Fish Passage Low Flows (Q=1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.039 | |
| R = | 0.28 | ft |
| d = | 0.35 | ft |
| $D_{84}$ = | 2.3 | ft |
| $D_{50}$ = | 1.2 | ft |
| $d/D_{84}$ = | 0.15 | |

n= 0.22

**Fish Passage High Flow (Q=1.5 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.039 | |
| R = | 0.32 | ft |
| d = | 0.38 | ft |
| $D_{84}$ = | 2.3 | ft |
| $D_{50}$ = | 1.2 | ft |
| $d/D_{84}$ = | 0.17 | |

n= 0.22

**Culvert #8 Replacement Area Slope = 2.7%**

**Fish Passage Low Flows (Q=1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.027 | |
| R = | 0.26 | ft |
| d = | 0.32 | ft |
| $D_{84}$ = | 2 | ft |
| $D_{50}$ = | 1 | ft |
| $d/D_{84}$ = | 0.16 | |

n= 0.19

**Fish Passage High Flow (Q=1.5 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.027 | |
| R = | 0.29 | ft |
| d = | 0.36 | ft |
| $D_{84}$ = | 2 | ft |
| $D_{50}$ = | 1 | ft |
| $d/D_{84}$ = | 0.18 | |

n= 0.19

**Rock Pile/Material Removal Area Slope = 12%**

**Fish Passage Low Flows (Q=1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.12 | |
| R = | 0.28 | ft |
| d = | 0.34 | ft |
| $D_{84}$ = | 3 | ft |
| $D_{50}$ = | 1.5 | ft |
| $d/D_{84}$ = | 0.11 | |

n= 0.41

Use roughness of 0.25 (max from literature)

**Fish Passage High Flow (Q=1 cfs)**

**Mussetter (1989)**

Equation for steep, boulder conditions

$(8/f)^{0.5} = 1.11\,(d/D_{84})^{0.46}(D_{84}/D_{50})^{-0.85}\,S^{-0.39}$

$n = 0.0926\,R^{1/6}\,f^{1/2}$

Therefore: $\mathbf{n = 0.236\,R^{1/6}\,(d/D_{84})^{-0.46}\,(D_{84}/D_{50})^{0.85}\,S^{0.39}}$

d = hydraulic depth Area/Top Width
S = slope
R = hydraulic radius

Equation developed for:
$d/D_{84}$ range (0.24 to 3.72)
$D_{50}$ range (0.1 to 2.1 feet)
S range (0.54 to 16.8 percent)

| | | |
|---|---|---|
| S = | 0.12 | |
| R = | 0.28 | ft |
| d = | 0.34 | ft |
| $D_{84}$ = | 3 | ft |
| $D_{50}$ = | 1.5 | ft |
| $d/D_{84}$ = | 0.11 | |

n= 0.41

Note:
Julien (2002) reports typical boulder bed stream n-values ranging from 0.25 to 0.04


1.) Bathurst, J.C., 1985, Flow resistance estimation in mountain rivers, Journal of Hydraulic Engineering, ASCE, Vol. 111, No.4

2.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

3.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.

4.) Julien, P.Y. 2002. River Mechanics. Cambridge University Press, Cambridge, United Kingdon

# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult High Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 3.90 |
| N-Value | = 0.200 |

**Calculations**

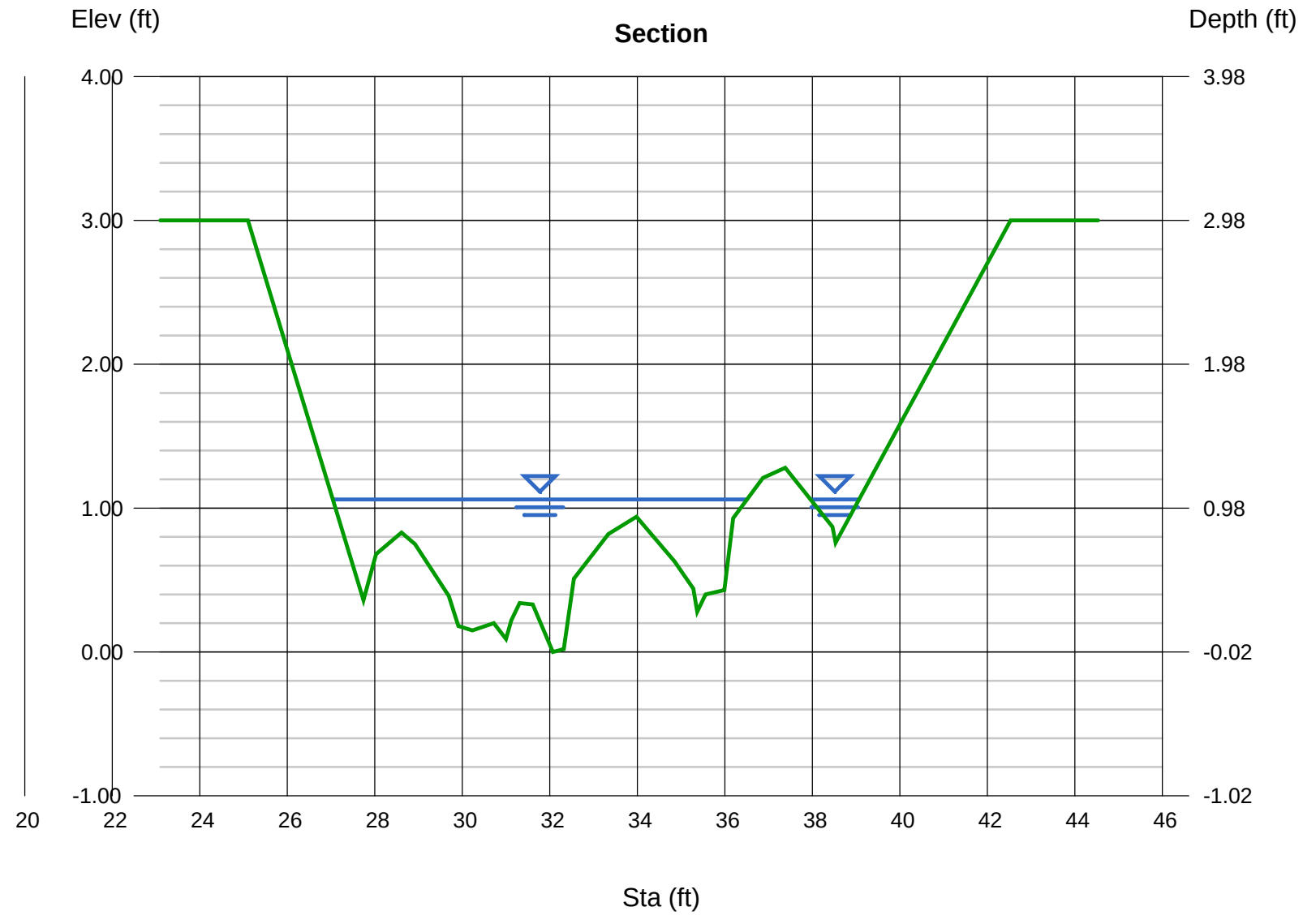
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 4.10 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.04 |
| Q (cfs) | = 4.100 |
| Area (sqft) | = 5.13 |
| Velocity (ft/s) | = 0.80 |
| Wetted Perim (ft) | = 12.56 |
| Crit Depth, Yc (ft) | = 0.57 |
| Top Width (ft) | = 10.57 |
| EGL (ft) | = 1.05 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.200)-(28.03, 0.68, 0.200)-(28.61, 0.83, 0.200)-(28.92, 0.75, 0.200)-(29.69, 0.39, 0.200)-(29.91, 0.18, 0.200)
-(30.23, 0.15, 0.200)-(30.72, 0.20, 0.200)-(31.00, 0.09, 0.200)-(31.12, 0.22, 0.200)-(31.31, 0.34, 0.200)-(31.61, 0.33, 0.200)-(32.32, 0.02, 0.200)
-(32.55, 0.51, 0.200)-(33.34, 0.82, 0.200)-(33.98, 0.94, 0.200)-(34.85, 0.63, 0.200)-(35.28, 0.44, 0.200)-(35.37, 0.28, 0.200)-(35.56, 0.40, 0.200)
-(35.99, 0.43, 0.200)-(36.19, 0.93, 0.200)-(36.87, 1.21, 0.200)-(37.38, 1.28, 0.200)-(38.46, 0.87, 0.200)-(38.53, 0.76, 0.200)-(42.53, 3.00, 0.200)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult Low Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 3.90 |
| N-Value | = 0.220 |

**Calculations**

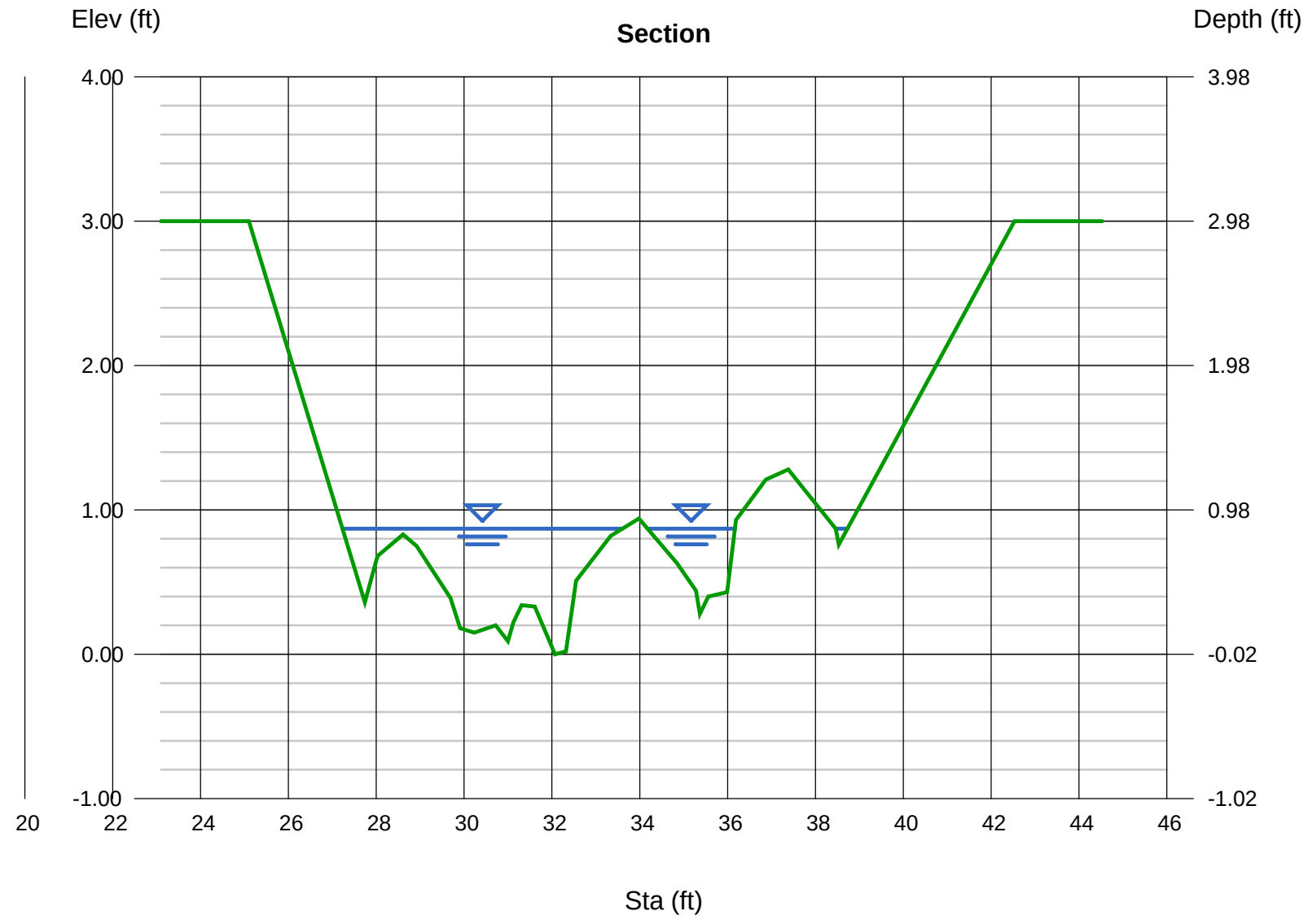
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 2.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.85 |
| Q (cfs) | = 2.000 |
| Area (sqft) | = 3.28 |
| Velocity (ft/s) | = 0.61 |
| Wetted Perim (ft) | = 10.38 |
| Crit Depth, Yc (ft) | = 0.43 |
| Top Width (ft) | = 8.63 |
| EGL (ft) | = 0.86 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.220)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)
-(30.23, 0.15, 0.220)-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)
-(32.55, 0.51, 0.220)-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)
-(35.99, 0.43, 0.220)-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Juvenile High Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 3.90 |
| N-Value | = 0.220 |

**Calculations**

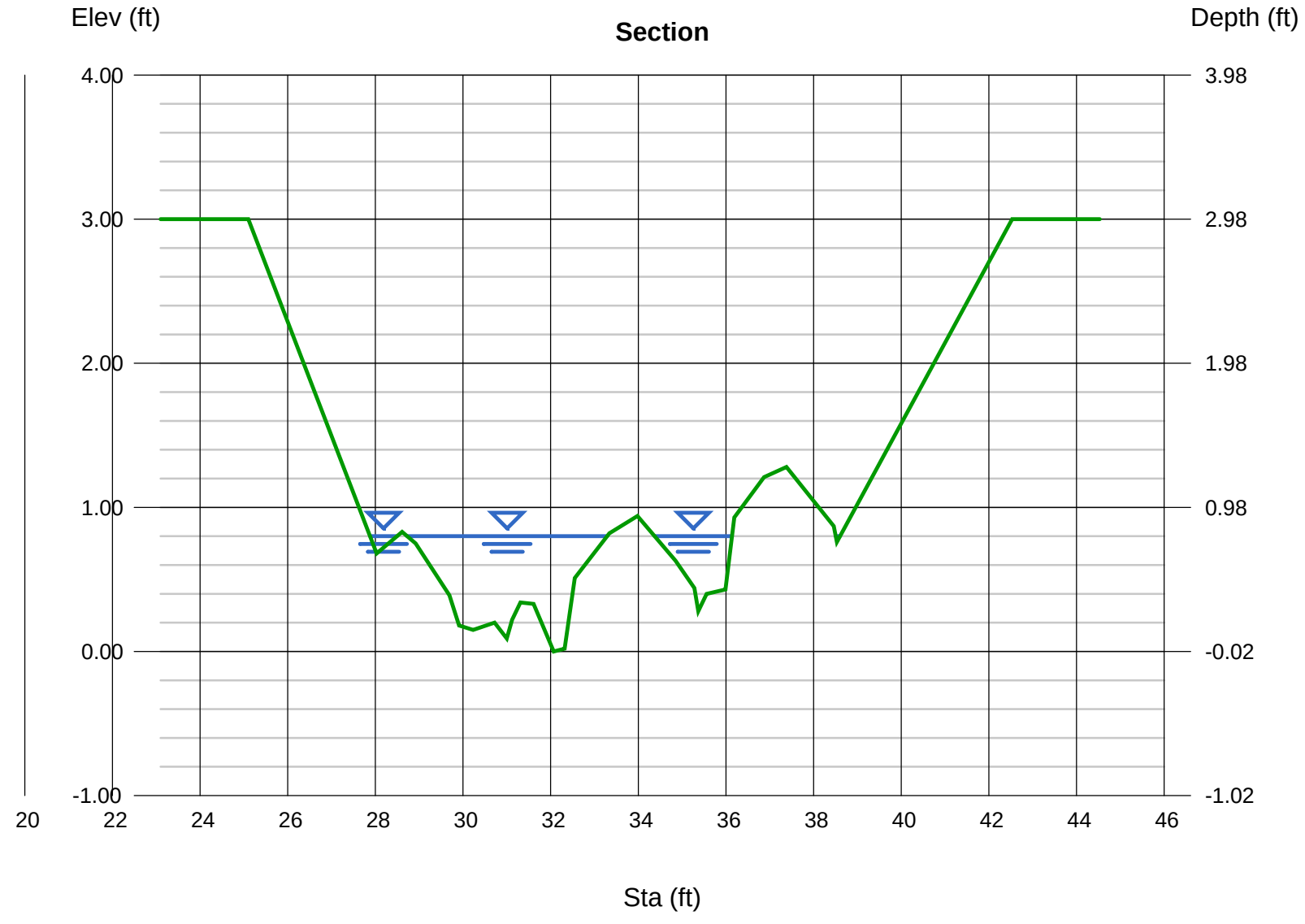
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 1.50 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.78 |
| Q (cfs) | = 1.500 |
| Area (sqft) | = 2.54 |
| Velocity (ft/s) | = 0.59 |
| Wetted Perim (ft) | = 8.34 |
| Crit Depth, Yc (ft) | = 0.38 |
| Top Width (ft) | = 7.04 |
| EGL (ft) | = 0.79 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)-(30.23, 0.15, 0.220)
-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)-(32.55, 0.51, 0.220)
-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)-(35.99, 0.43, 0.220)
-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Juvenile Low Flow at Culvert #7 - Typical Channel (10'-12' Base Width, 3.9% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 3.90 |
| N-Value | = 0.220 |

**Calculations**

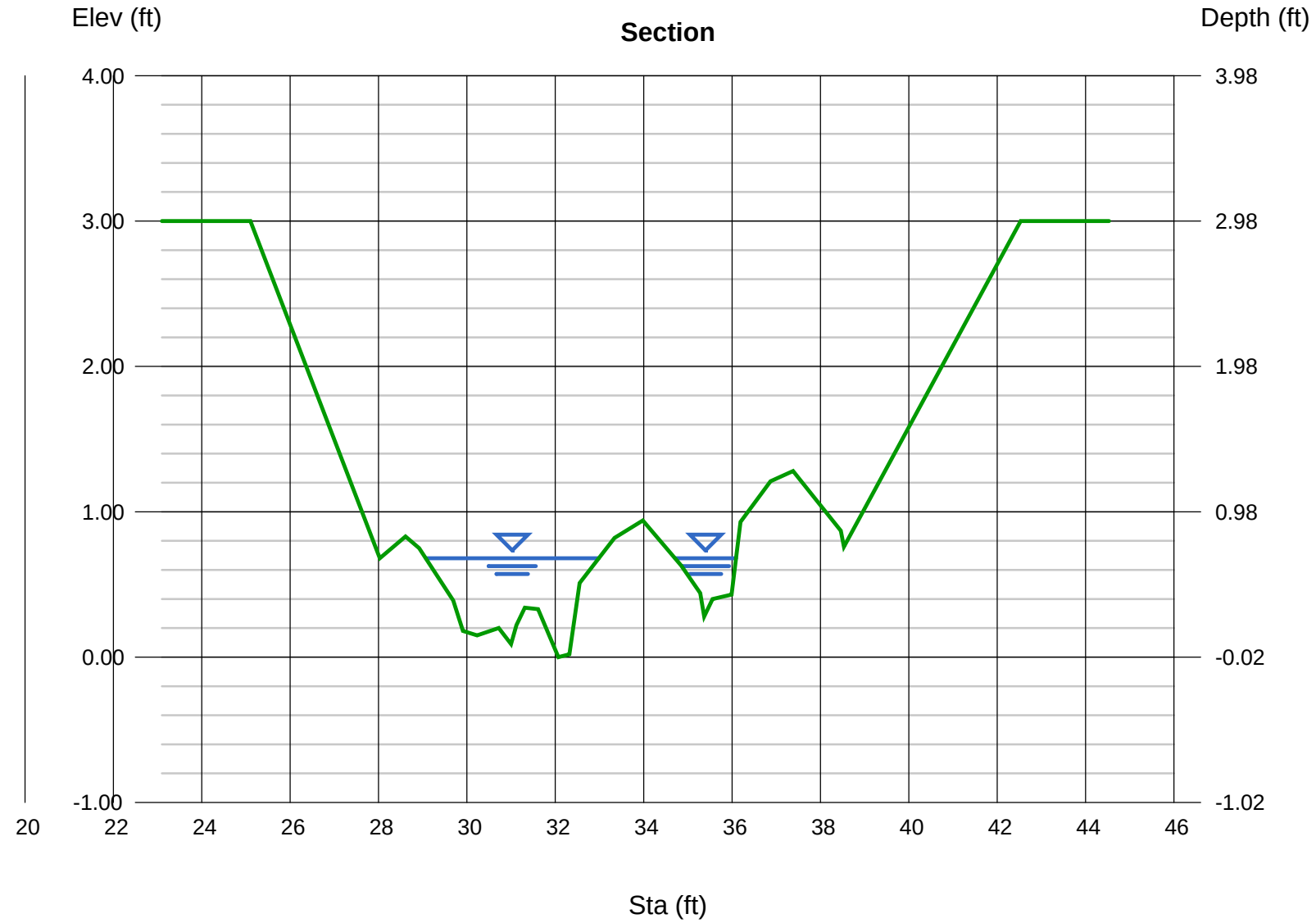
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 1.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.66 |
| Q (cfs) | = 1.000 |
| Area (sqft) | = 1.80 |
| Velocity (ft/s) | = 0.55 |
| Wetted Perim (ft) | = 6.36 |
| Crit Depth, Yc (ft) | = 0.33 |
| Top Width (ft) | = 5.29 |
| EGL (ft) | = 0.66 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(28.03, 0.68, 0.220)-(28.61, 0.83, 0.220)-(28.92, 0.75, 0.220)-(29.69, 0.39, 0.220)-(29.91, 0.18, 0.220)-(30.23, 0.15, 0.220)
-(30.72, 0.20, 0.220)-(31.00, 0.09, 0.220)-(31.12, 0.22, 0.220)-(31.31, 0.34, 0.220)-(31.61, 0.33, 0.220)-(32.32, 0.02, 0.220)-(32.55, 0.51, 0.220)
-(33.34, 0.82, 0.220)-(33.98, 0.94, 0.220)-(34.85, 0.63, 0.220)-(35.28, 0.44, 0.220)-(35.37, 0.28, 0.220)-(35.56, 0.40, 0.220)-(35.99, 0.43, 0.220)
-(36.19, 0.93, 0.220)-(36.87, 1.21, 0.220)-(37.38, 1.28, 0.220)-(38.46, 0.87, 0.220)-(38.53, 0.76, 0.220)-(42.53, 3.00, 0.220)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult High Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 2.70 |
| N-Value | = 0.170 |

**Calculations**

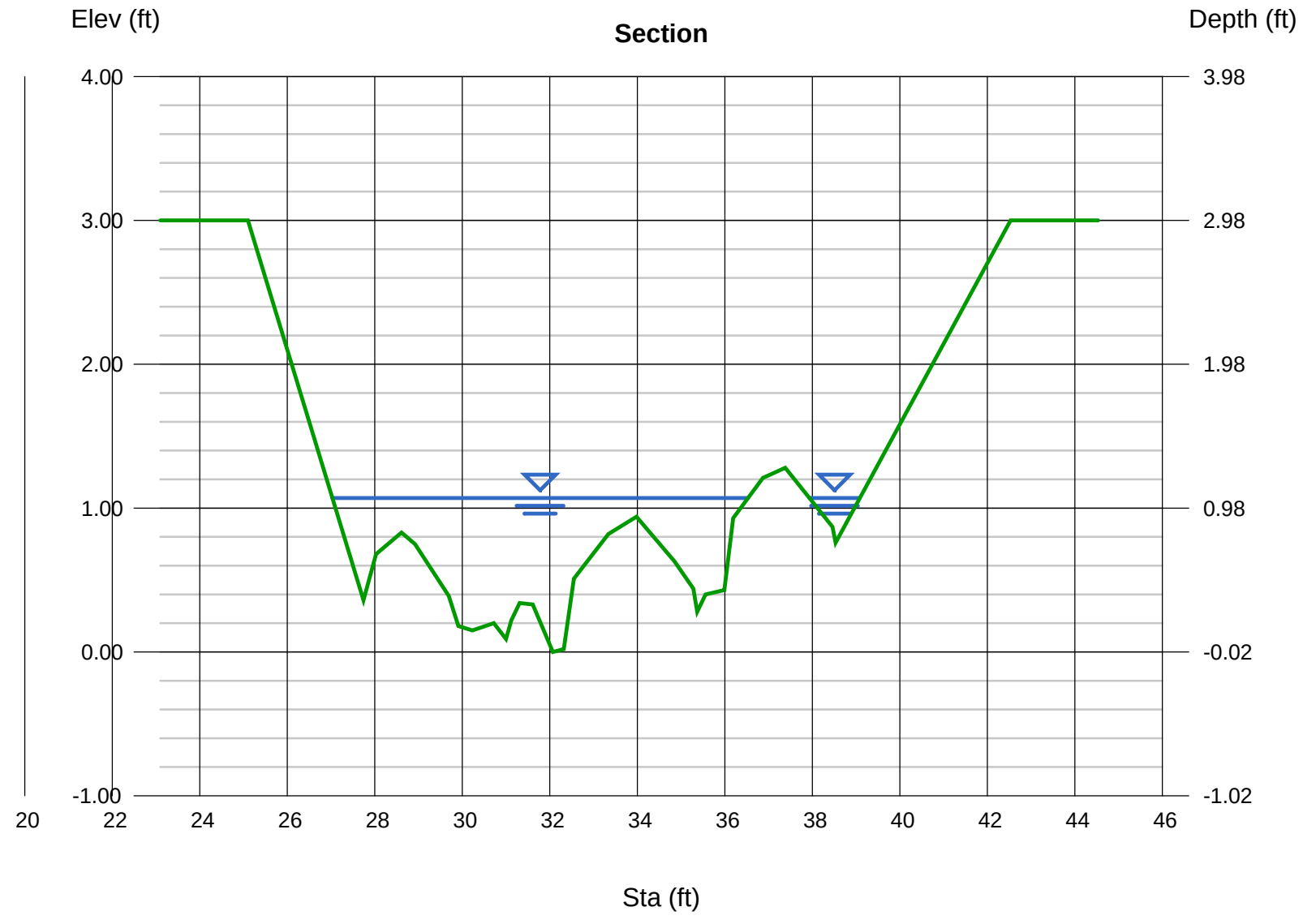
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 4.10 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 1.05 |
| Q (cfs) | = 4.100 |
| Area (sqft) | = 5.23 |
| Velocity (ft/s) | = 0.78 |
| Wetted Perim (ft) | = 12.65 |
| Crit Depth, Yc (ft) | = 0.57 |
| Top Width (ft) | = 10.65 |
| EGL (ft) | = 1.06 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.170)-(28.03, 0.68, 0.170)-(28.61, 0.83, 0.170)-(28.92, 0.75, 0.170)-(29.69, 0.39, 0.170)-(29.91, 0.18, 0.170)
-(30.23, 0.15, 0.170)-(30.72, 0.20, 0.170)-(31.00, 0.09, 0.170)-(31.12, 0.22, 0.170)-(31.31, 0.34, 0.170)-(31.61, 0.33, 0.170)-(32.32, 0.02, 0.170)
-(32.55, 0.51, 0.170)-(33.34, 0.82, 0.170)-(33.98, 0.94, 0.170)-(34.85, 0.63, 0.170)-(35.28, 0.44, 0.170)-(35.37, 0.28, 0.170)-(35.56, 0.40, 0.170)
-(35.99, 0.43, 0.170)-(36.19, 0.93, 0.170)-(36.87, 1.21, 0.170)-(37.38, 1.28, 0.170)-(38.46, 0.87, 0.170)-(38.53, 0.76, 0.170)-(42.53, 3.00, 0.170)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult Low Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 2.70 |
| N-Value | = 0.180 |

**Calculations**

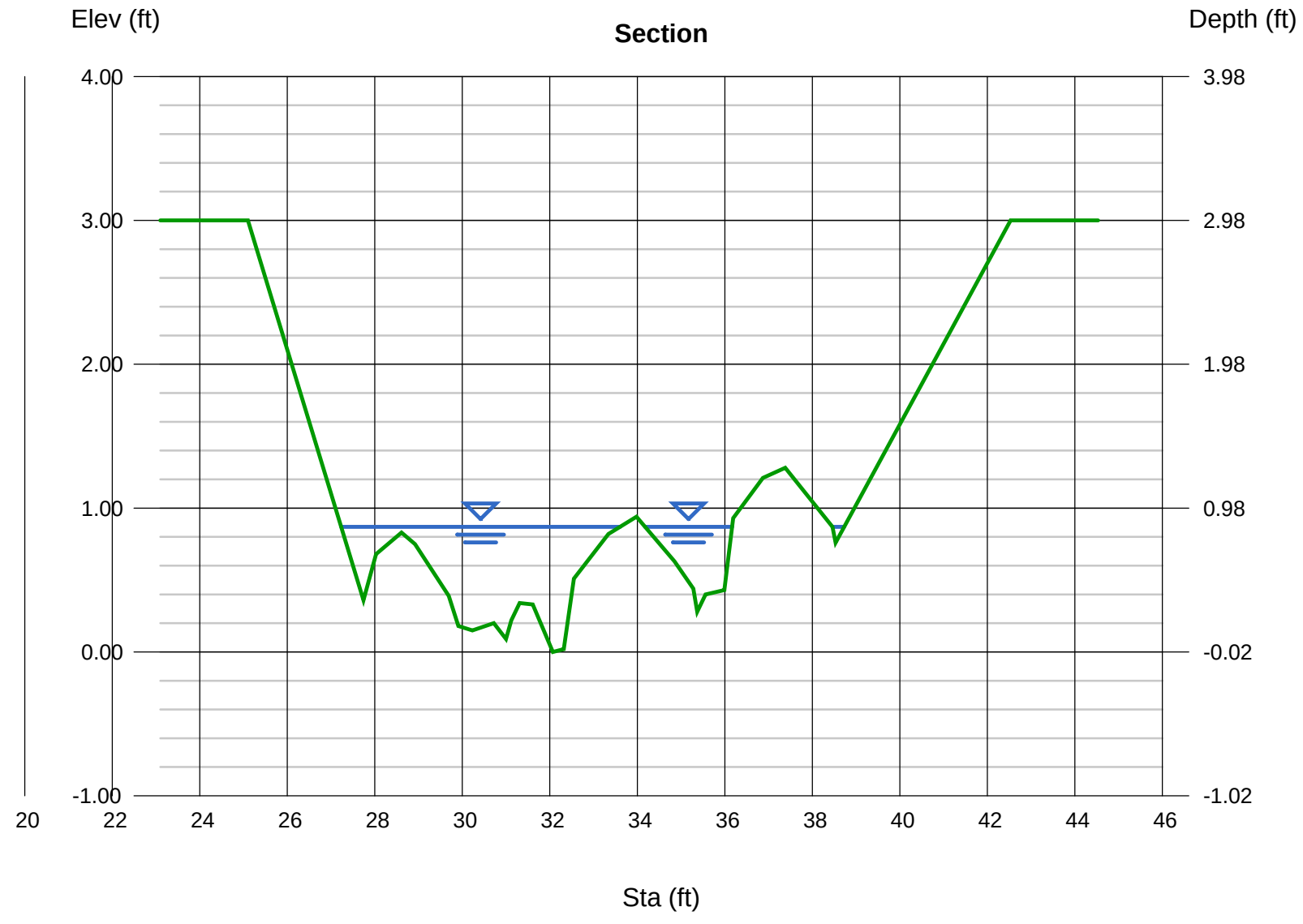
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 2.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.85 |
| Q (cfs) | = 2.000 |
| Area (sqft) | = 3.28 |
| Velocity (ft/s) | = 0.61 |
| Wetted Perim (ft) | = 10.38 |
| Crit Depth, Yc (ft) | = 0.43 |
| Top Width (ft) | = 8.63 |
| EGL (ft) | = 0.86 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.180)-(28.03, 0.68, 0.180)-(28.61, 0.83, 0.180)-(28.92, 0.75, 0.180)-(29.69, 0.39, 0.180)-(29.91, 0.18, 0.180)
-(30.23, 0.15, 0.180)-(30.72, 0.20, 0.180)-(31.00, 0.09, 0.180)-(31.12, 0.22, 0.180)-(31.31, 0.34, 0.180)-(31.61, 0.33, 0.180)-(32.32, 0.02, 0.180)
-(32.55, 0.51, 0.180)-(33.34, 0.82, 0.180)-(33.98, 0.94, 0.180)-(34.85, 0.63, 0.180)-(35.28, 0.44, 0.180)-(35.37, 0.28, 0.180)-(35.56, 0.40, 0.180)
-(35.99, 0.43, 0.180)-(36.19, 0.93, 0.180)-(36.87, 1.21, 0.180)-(37.38, 1.28, 0.180)-(38.46, 0.87, 0.180)-(38.53, 0.76, 0.180)-(42.53, 3.00, 0.180)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Juvenile High Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 2.70 |
| N-Value | = 0.190 |

**Calculations**

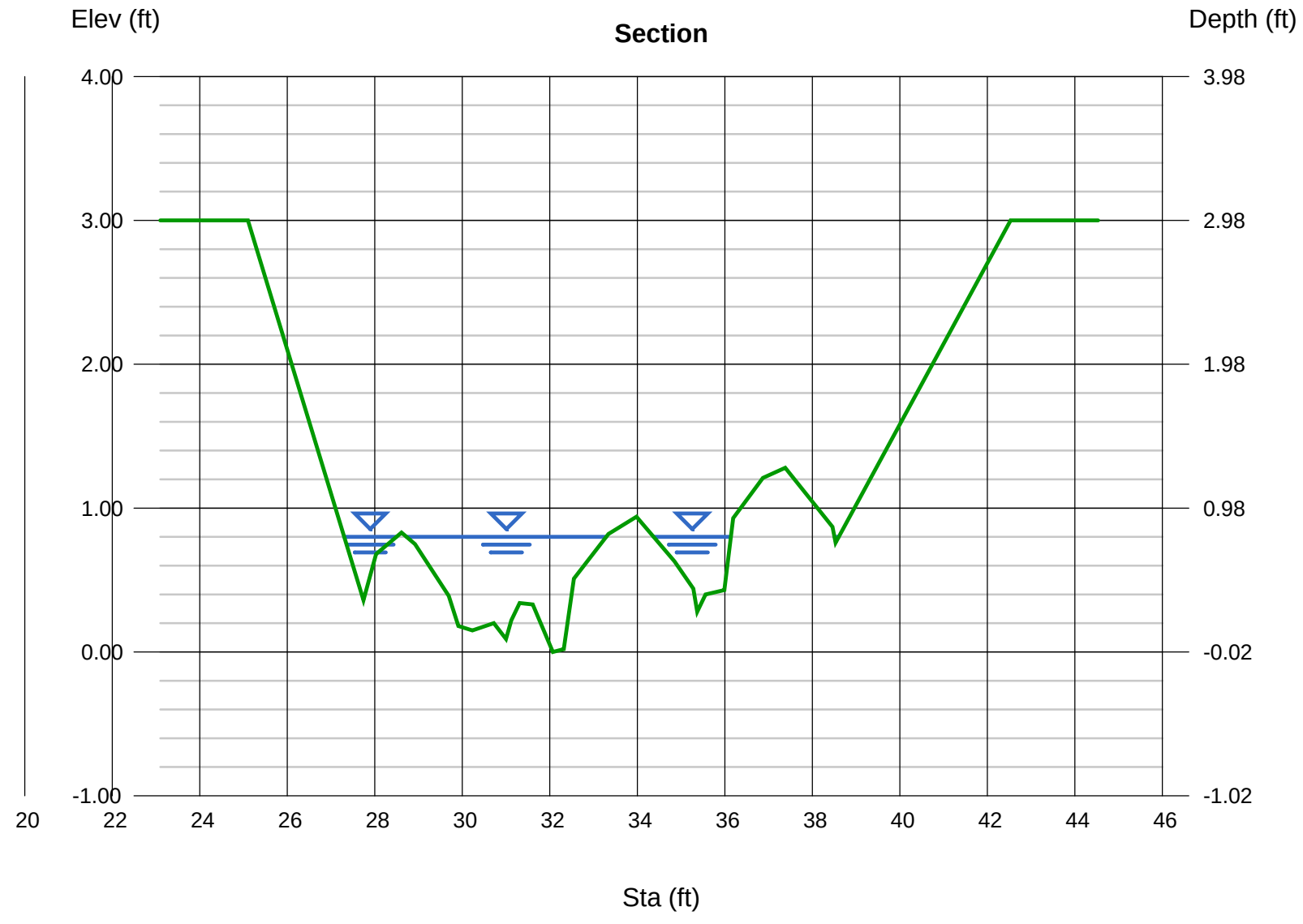
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 1.50 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.78 |
| Q (cfs) | = 1.500 |
| Area (sqft) | = 2.71 |
| Velocity (ft/s) | = 0.55 |
| Wetted Perim (ft) | = 9.20 |
| Crit Depth, Yc (ft) | = 0.38 |
| Top Width (ft) | = 7.62 |
| EGL (ft) | = 0.78 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.190)-(28.03, 0.68, 0.190)-(28.61, 0.83, 0.190)-(28.92, 0.75, 0.190)-(29.69, 0.39, 0.190)-(29.91, 0.18, 0.190)
-(30.23, 0.15, 0.190)-(30.72, 0.20, 0.190)-(31.00, 0.09, 0.190)-(31.12, 0.22, 0.190)-(31.31, 0.34, 0.190)-(31.61, 0.33, 0.190)-(32.32, 0.02, 0.190)
-(32.55, 0.51, 0.190)-(33.34, 0.82, 0.190)-(33.98, 0.94, 0.190)-(34.85, 0.63, 0.190)-(35.28, 0.44, 0.190)-(35.37, 0.28, 0.190)-(35.56, 0.40, 0.190)
-(35.99, 0.43, 0.190)-(36.19, 0.93, 0.190)-(36.87, 1.21, 0.190)-(37.38, 1.28, 0.190)-(38.46, 0.87, 0.190)-(38.53, 0.76, 0.190)-(42.53, 3.00, 0.190)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Juvenile Low Flow at Culvert #8 - Typical Channel (10'-12' Base Width, 2.7% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.02 |
| Slope (%) | = 2.70 |
| N-Value | = 0.190 |

**Calculations**

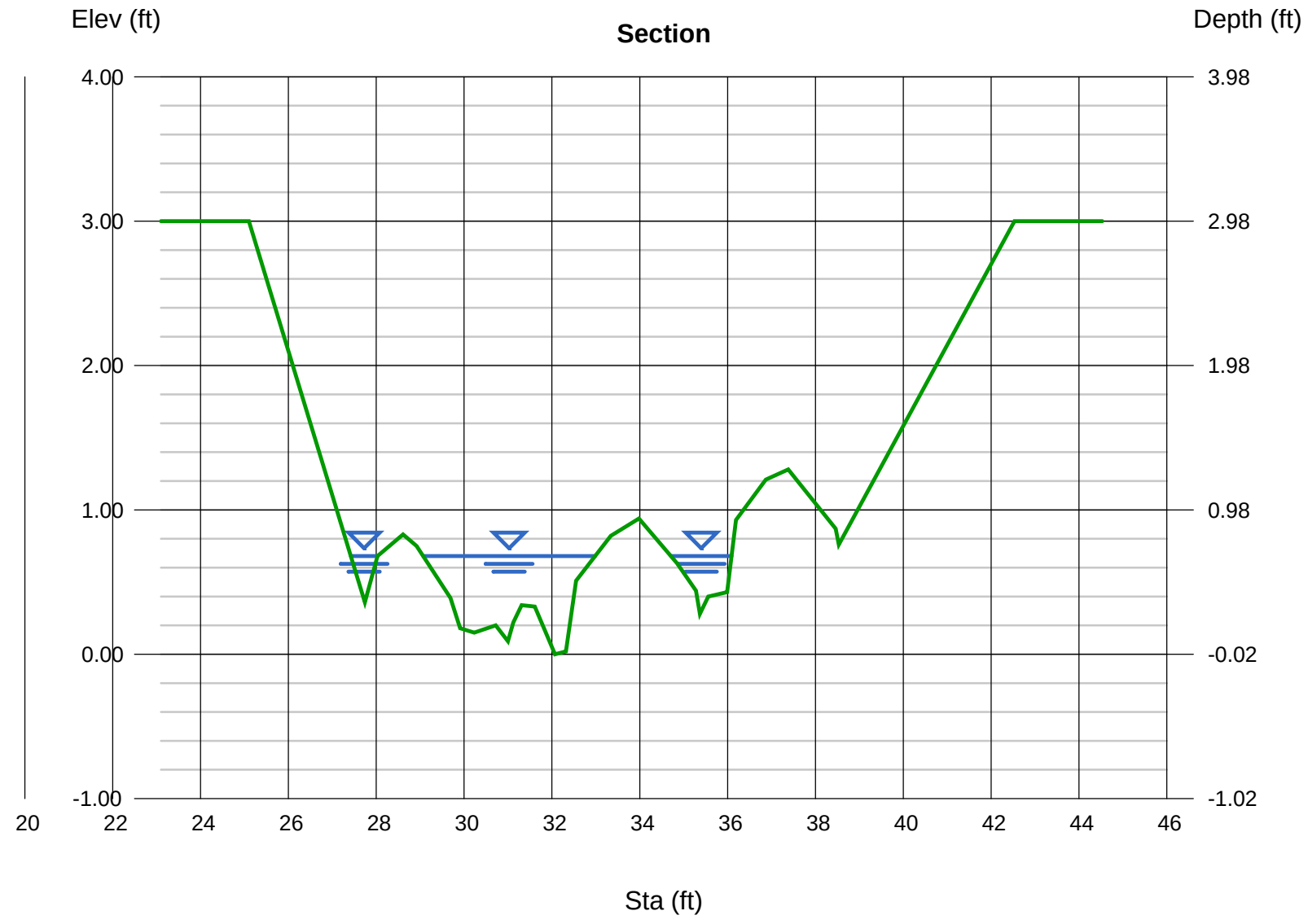
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 1.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.66 |
| Q (cfs) | = 1.000 |
| Area (sqft) | = 1.90 |
| Velocity (ft/s) | = 0.53 |
| Wetted Perim (ft) | = 7.24 |
| Crit Depth, Yc (ft) | = 0.33 |
| Top Width (ft) | = 5.90 |
| EGL (ft) | = 0.66 |

**(Sta, El, n)-(Sta, El, n)...**

( 25.10, 3.00)-(27.74, 0.36, 0.190)-(28.03, 0.68, 0.190)-(28.61, 0.83, 0.190)-(28.92, 0.75, 0.190)-(29.69, 0.39, 0.190)-(29.91, 0.18, 0.190)
-(30.23, 0.15, 0.190)-(30.72, 0.20, 0.190)-(31.00, 0.09, 0.190)-(31.12, 0.22, 0.190)-(31.31, 0.34, 0.190)-(31.61, 0.33, 0.190)-(32.32, 0.02, 0.190)
-(32.55, 0.51, 0.190)-(33.34, 0.82, 0.190)-(33.98, 0.94, 0.190)-(34.85, 0.63, 0.190)-(35.28, 0.44, 0.190)-(35.37, 0.28, 0.190)-(35.56, 0.40, 0.190)
-(35.99, 0.43, 0.190)-(36.19, 0.93, 0.190)-(36.87, 1.21, 0.190)-(37.38, 1.28, 0.190)-(38.46, 0.87, 0.190)-(38.53, 0.76, 0.190)-(42.53, 3.00, 0.190)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult High Flow at Rock Pile/Mat. Rem. Area - Typ. Chnl (9'-10' Base Width, 12% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.01 |
| Slope (%) | = 12.00 |
| N-Value | = 0.250 |

**Calculations**

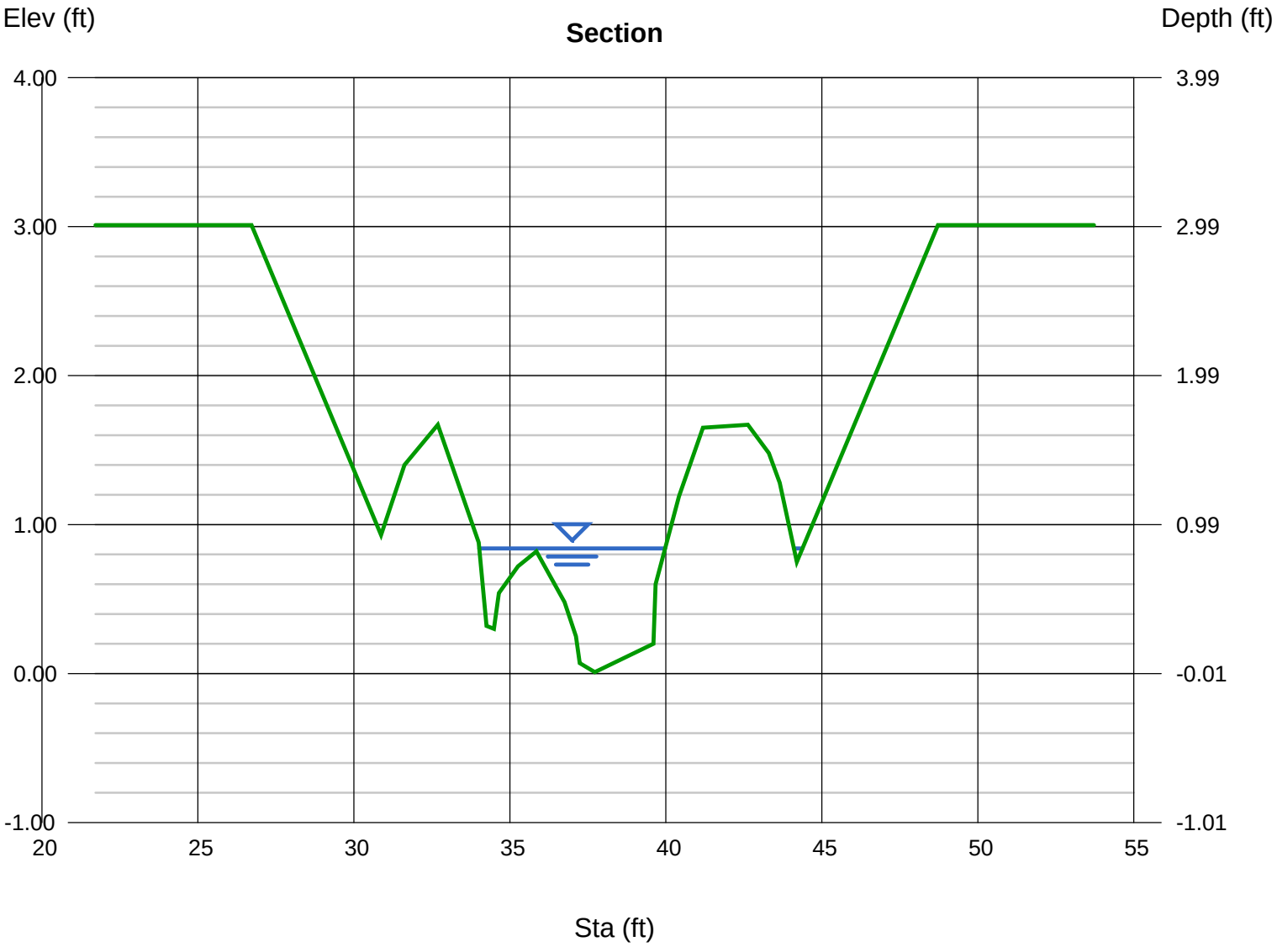
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 2.80 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.83 |
| Q (cfs) | = 2.800 |
| Area (sqft) | = 2.70 |
| Velocity (ft/s) | = 1.04 |
| Wetted Perim (ft) | = 7.45 |
| Crit Depth, Yc (ft) | = 0.43 |
| Top Width (ft) | = 6.23 |
| EGL (ft) | = 0.85 |

**(Sta, El, n)-(Sta, El, n)...**

( 26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Adult Low Flow at Rock Pile/Mat. Rem. Area - Typ. Chnl (9'-10' Base Width, 12% Slope)

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.01 |
| Slope (%) | = 12.00 |
| N-Value | = 0.250 |

**Calculations**

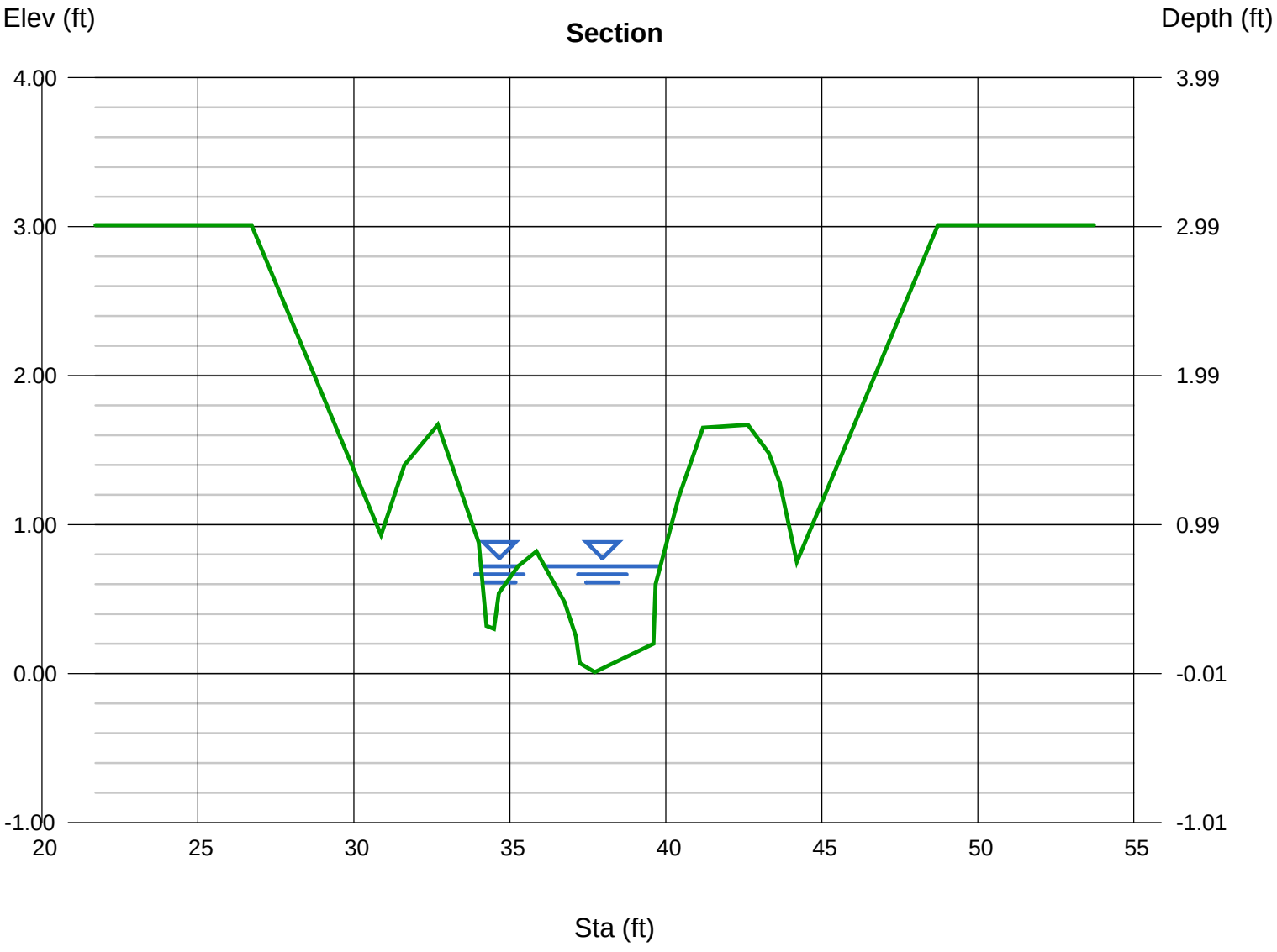
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 2.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.71 |
| Q (cfs) | = 2.000 |
| Area (sqft) | = 2.03 |
| Velocity (ft/s) | = 0.99 |
| Wetted Perim (ft) | = 5.91 |
| Crit Depth, Yc (ft) | = 0.37 |
| Top Width (ft) | = 4.90 |
| EGL (ft) | = 0.73 |

**(Sta, El, n)-(Sta, El, n)...**

( 26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



# Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Friday, Nov 2 2018

## Juvenile High/Low Flow at Rock Pile/Mat. Rem. Area-Typ. Chnl (9'-10' Base Width, 12%

**User-defined**

| | |
|---|---|
| Invert Elev (ft) | = 0.01 |
| Slope (%) | = 12.00 |
| N-Value | = 0.250 |

**Calculations**

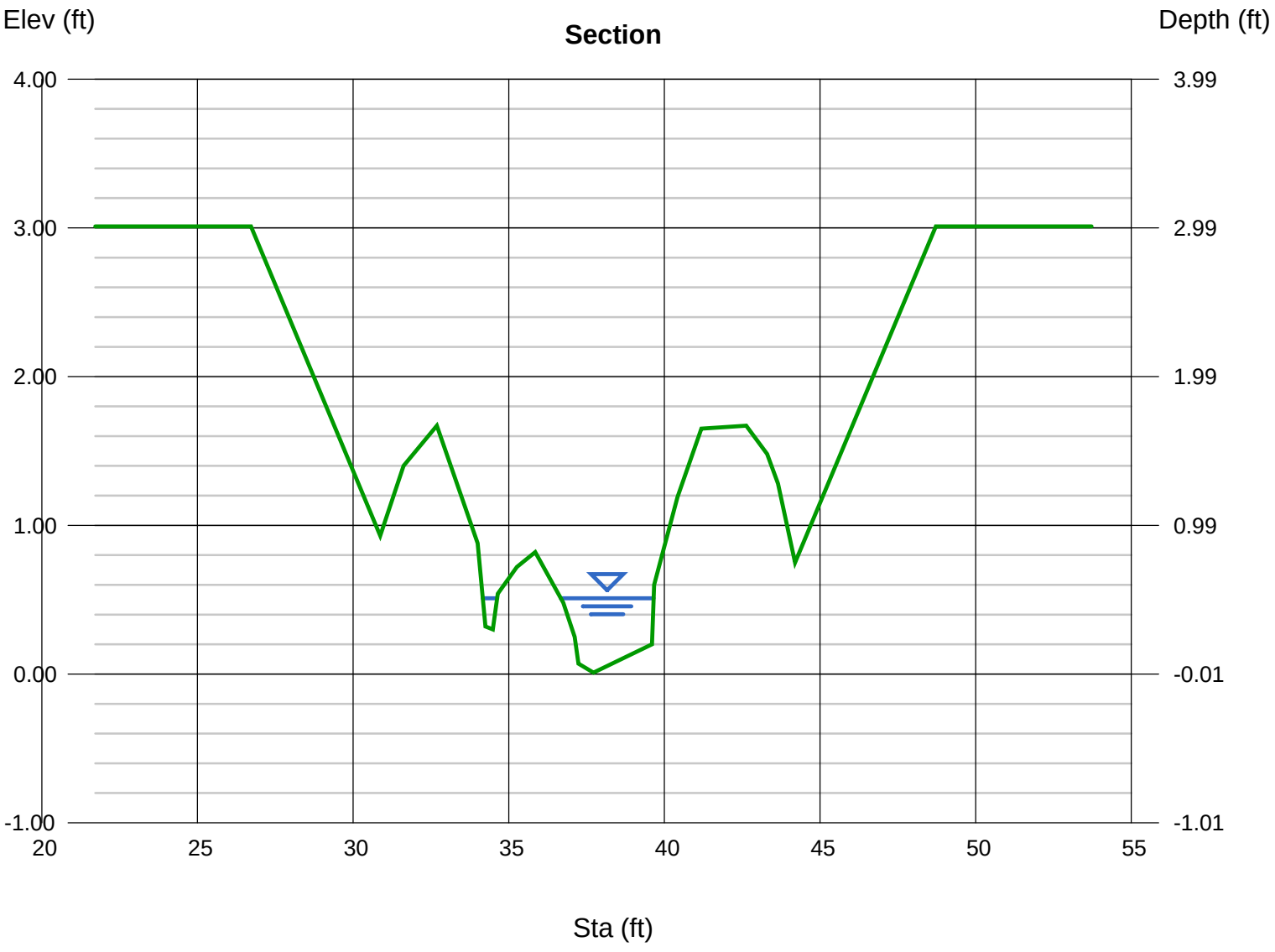
| | |
|---|---|
| Compute by: | Known Q |
| Known Q (cfs) | = 1.00 |

**Highlighted**

| | |
|---|---|
| Depth (ft) | = 0.50 |
| Q (cfs) | = 1.000 |
| Area (sqft) | = 1.16 |
| Velocity (ft/s) | = 0.86 |
| Wetted Perim (ft) | = 4.13 |
| Crit Depth, Yc (ft) | = 0.26 |
| Top Width (ft) | = 3.45 |
| EGL (ft) | = 0.51 |

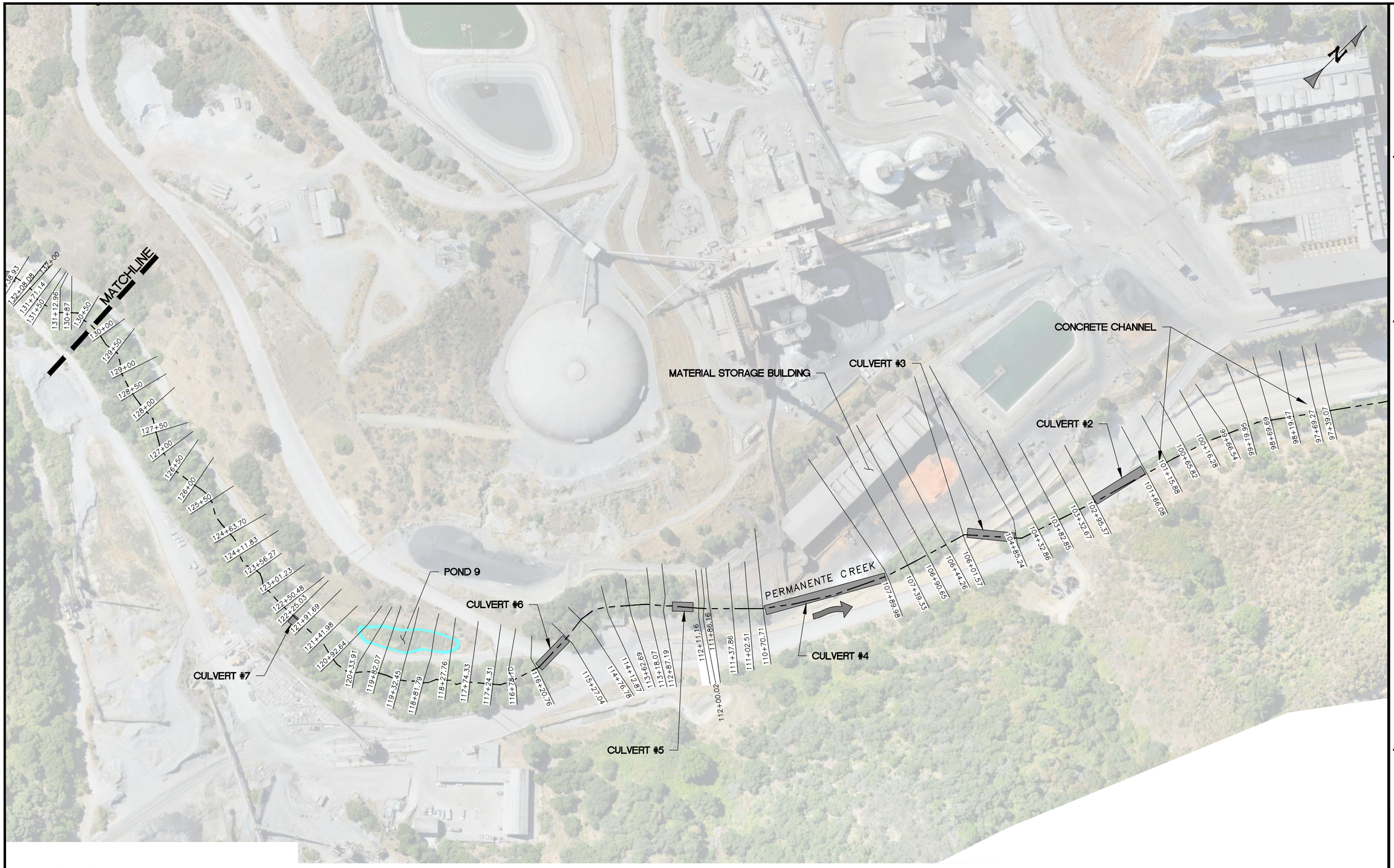
**(Sta, El, n)-(Sta, El, n)...**

( 26.72, 3.01)-(30.87, 0.93, 0.250)-(31.62, 1.40, 0.250)-(32.69, 1.67, 0.250)-(34.00, 0.88, 0.250)-(34.25, 0.32, 0.250)-(34.49, 0.30, 0.250)
-(34.65, 0.54, 0.250)-(35.26, 0.72, 0.250)-(35.85, 0.82, 0.250)-(36.75, 0.48, 0.250)-(37.12, 0.25, 0.250)-(37.24, 0.07, 0.250)-(37.72, 0.01, 0.250)
-(39.60, 0.20, 0.250)-(39.67, 0.60, 0.250)-(40.42, 1.19, 0.250)-(41.19, 1.65, 0.250)-(42.63, 1.67, 0.250)-(43.30, 1.48, 0.250)-(43.65, 1.28, 0.250)
-(44.20, 0.75, 0.250)-(48.72, 3.01, 0.250)



# APPENDIX E

## HEC-RAS Model Results




## LEGEND

HEC-RAS ALIGNMENT

132+00 HEC-RAS CROSS SECTION LOCATION

## HEC-RAS CROSS SECTION OVERVIEW

SCALE: 1"=200'

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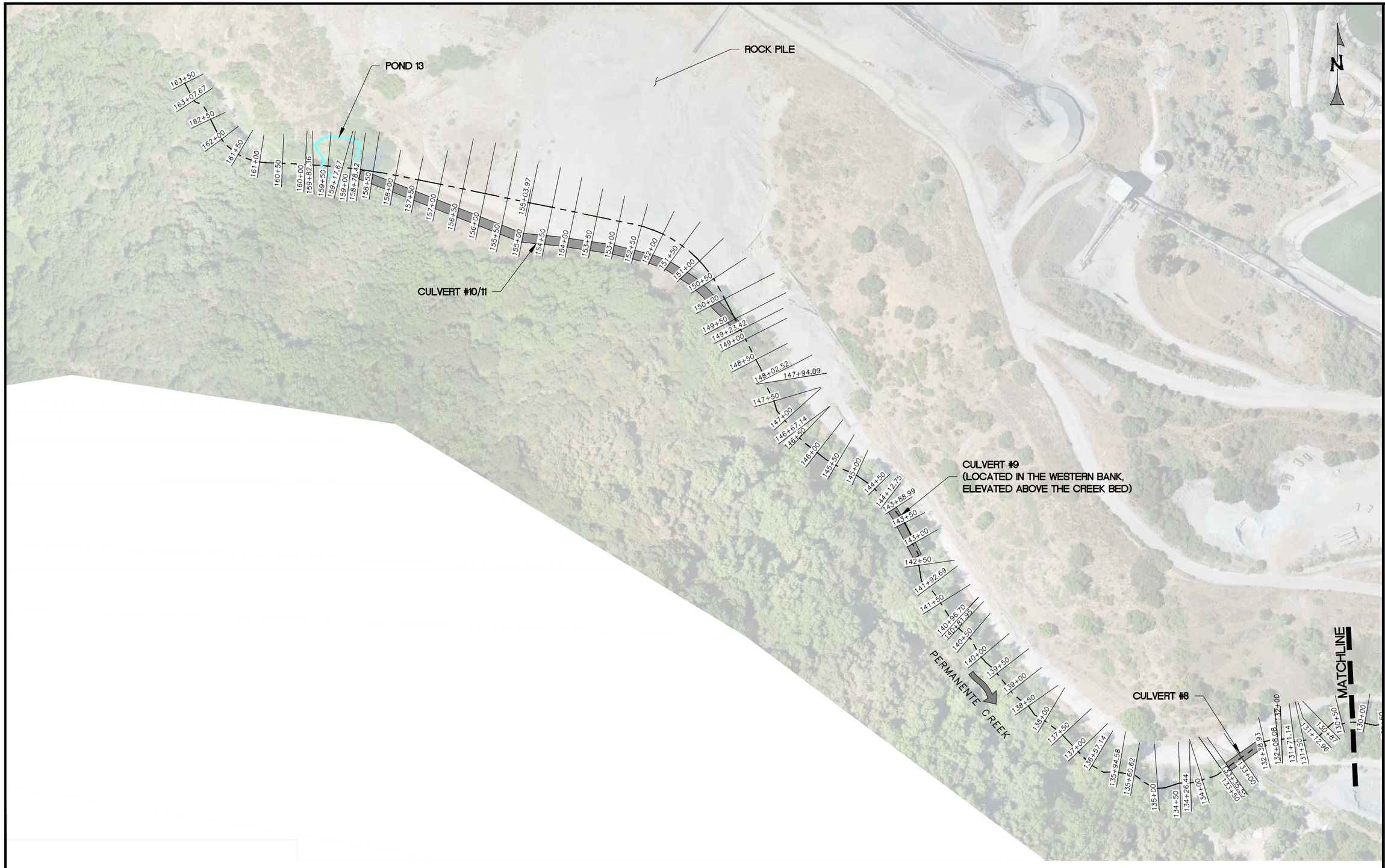
# CHANNEL WIDENING TO ROCK PILE AREA
# HEC-RAS CROSS SECTION OVERVIEW (1 OF 2)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
1.0




## HEC-RAS CROSS SECTION OVERVIEW
SCALE: 1"=200'

### LEGEND

HEC-RAS ALIGNMENT

132+00 HEC-RAS CROSS SECTION LOCATION

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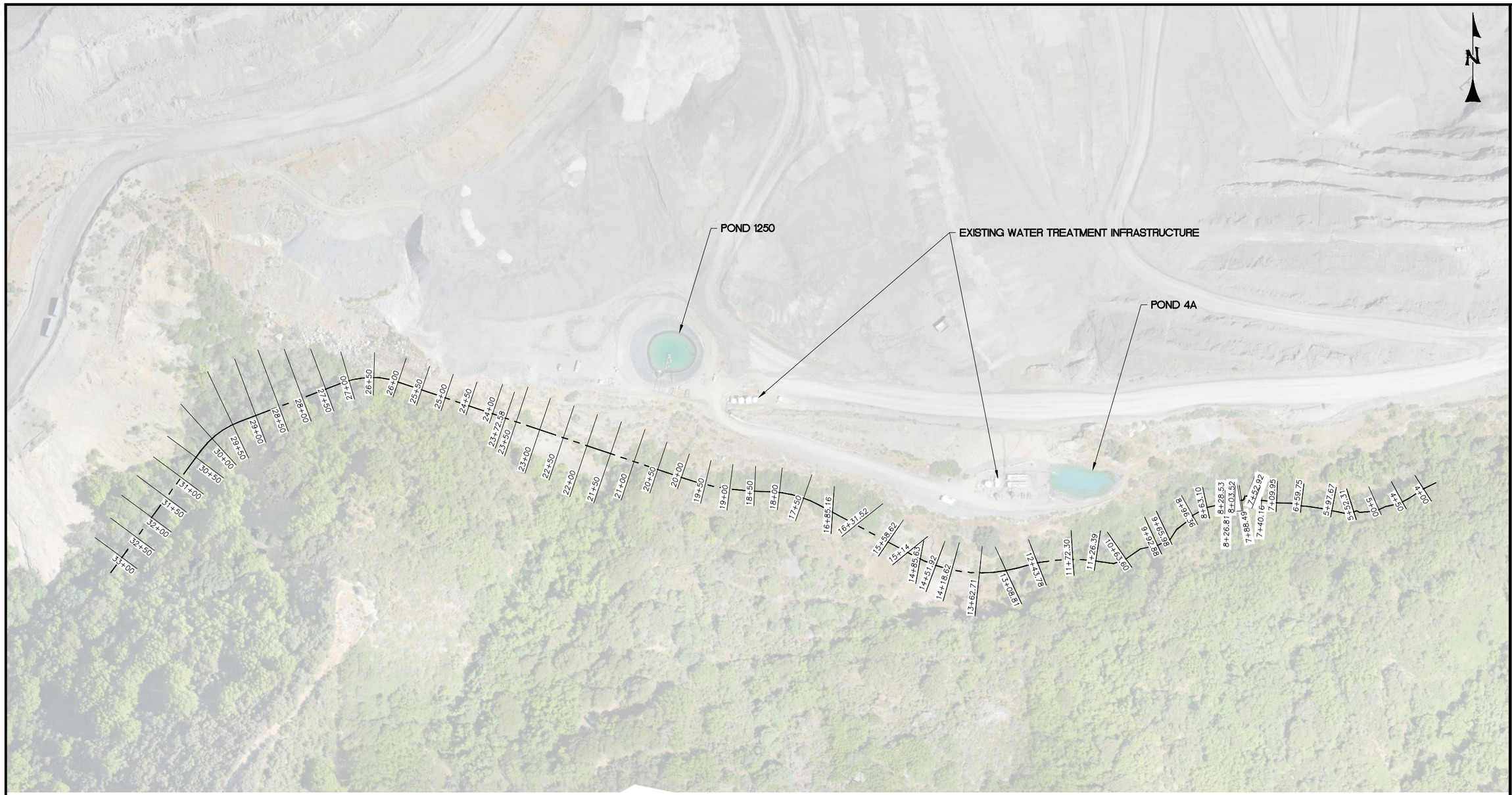
# CHANNEL WIDENING TO ROCK PILE AREA
# HEC-RAS CROSS SECTION OVERVIEW (2 OF 2)

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
2.0




## HEC-RAS CROSS SECTION OVERVIEW

SCALE: 1" = 200'

### LEGEND

- HEC-RAS ALIGNMENT
- 6+40.16 — HEC-RAS CROSS SECTION LOCATION

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# OVERBURDEN REMOVAL AREA
# HEC-RAS CROSS SECTION OVERVIEW

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
3.0

**APPENDIX F. HEC-RAS OUTPUT**
**PERMANENTE CREEK RESTORATION PLAN**
**LIST OF FIGURES AND TABLES**


| FIGURE/TABLE # | DESCRIPTION |
|---|---|
| *EXISTING CONDITIONS* | |
| F1 | CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F2 | CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F3 | CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F4 | MATERIAL REMOVAL AREA (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F5 | MATERIAL REMOVAL AREA (EXISTING CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| *PROPOSED CONDITIONS* | |
| F6 | CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F7 | CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F8 | CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F9 | MATERIAL REMOVAL AREA (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| F10 | MATERIAL REMOVAL AREA (PROPOSED CONDITIONS), 1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES |
| *FISH PASSAGE* | |
| F11 | WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA |
| F12 | WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA |
| F13 | WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA |
| F14 | WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA |
| F15 | VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA |
| F16 | VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA |
| F17 | VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA |
| F18 | VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA |
| **TABLES** | |
| T1 | CHANNEL WIDENING AND ROCK PILE AREAS TABULAR OUTPUT FROM HEC-RAS |
| T2 | MATERIAL REMOVAL AREA TABULAR OUTPUT FROM HEC-RAS |
| T3 | OVERTOPPING FLOW EVALUATION ALONG ANGULAR ROCK VEHICLE BARRIER |
| T4 | SENSITIVITY ANALYSIS: COMPARISON OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS BY 10% |

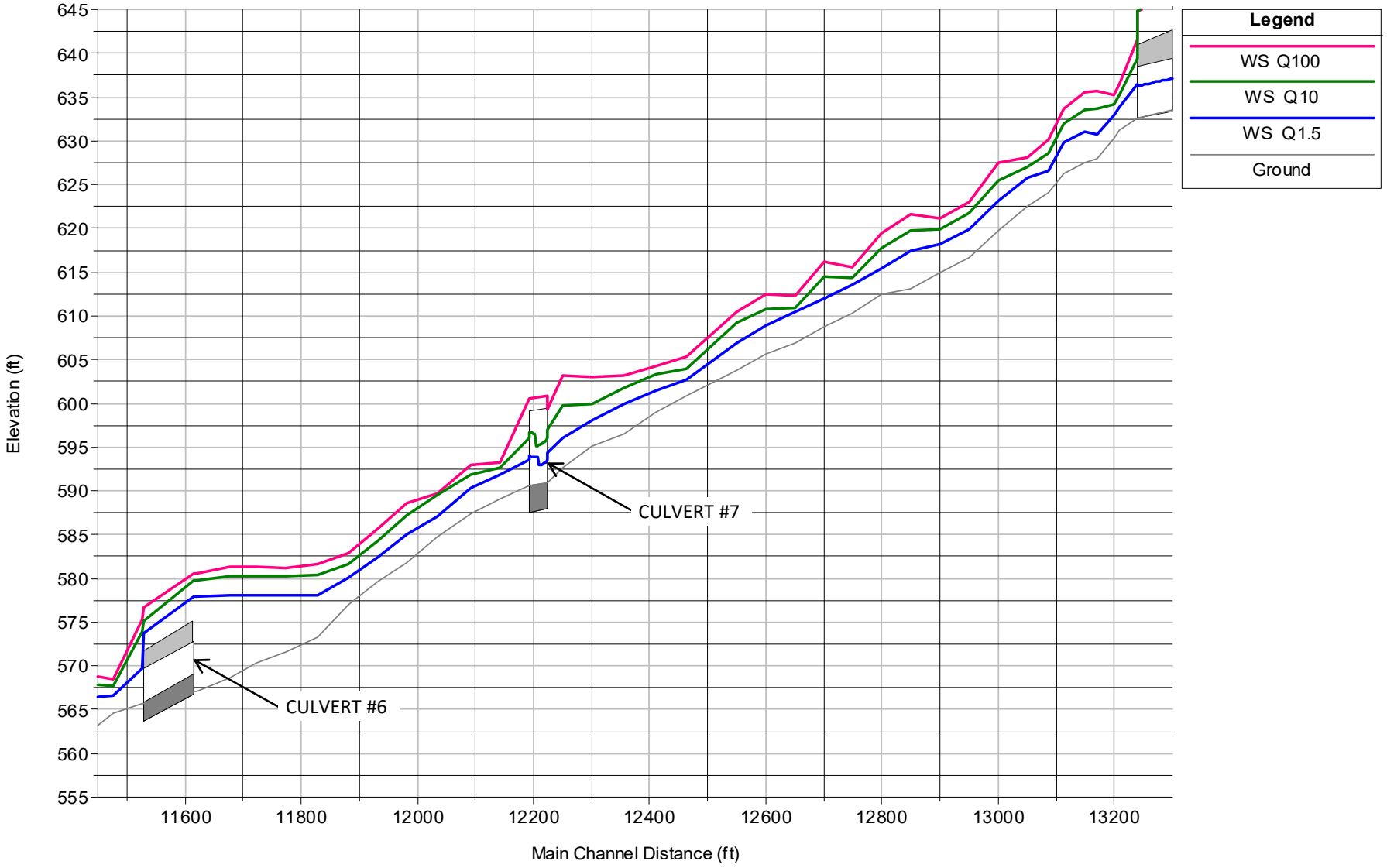
WATERWAYS CONSULTING, INC.

# HEC-RAS MODEL RESULTS

## Existing Conditions

## Channel Widening and Rock Pile Areas

## Material Removal Area




**FIGURE**

**F1**

**CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)**

1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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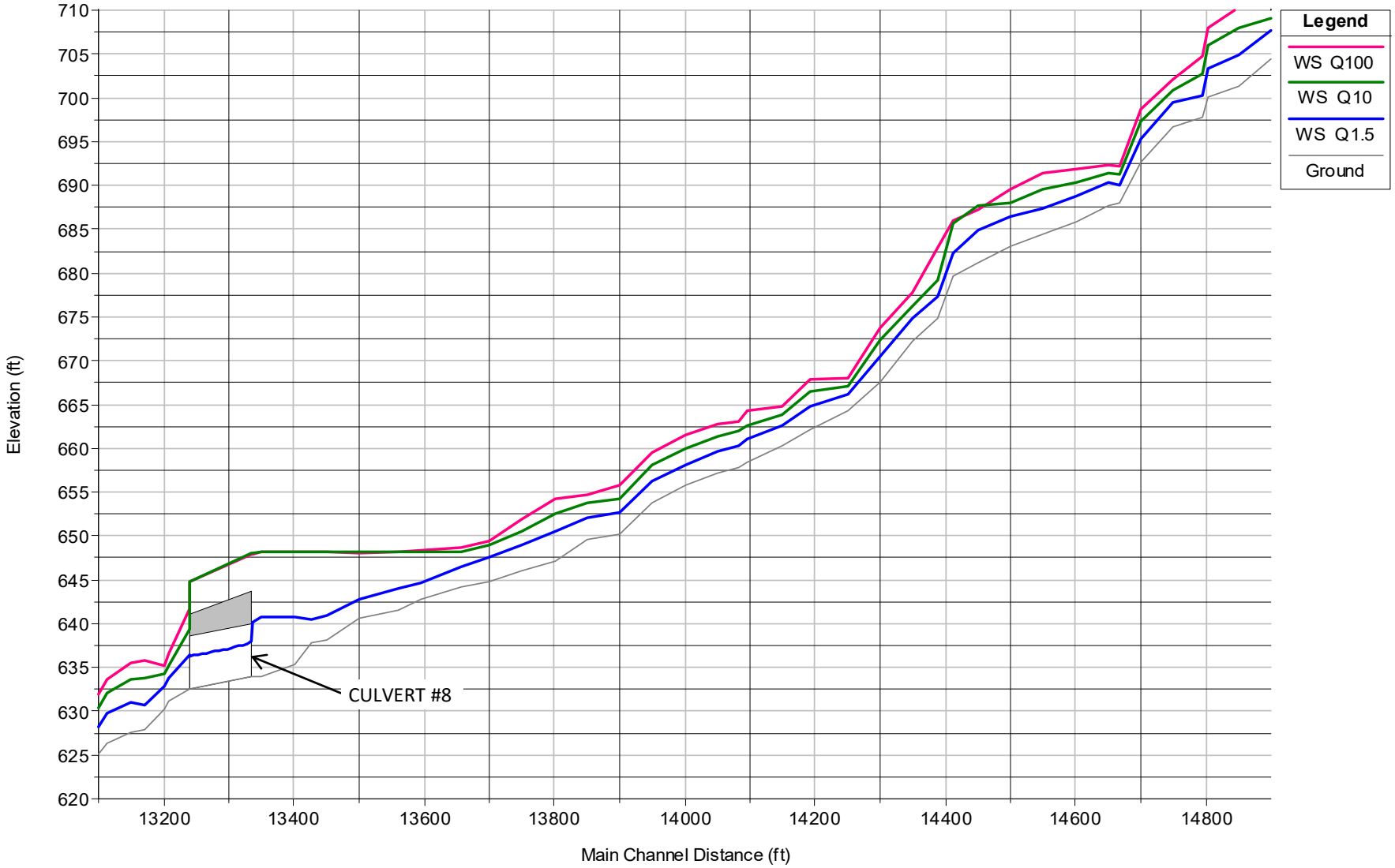


**FIGURE**
**F2**

**CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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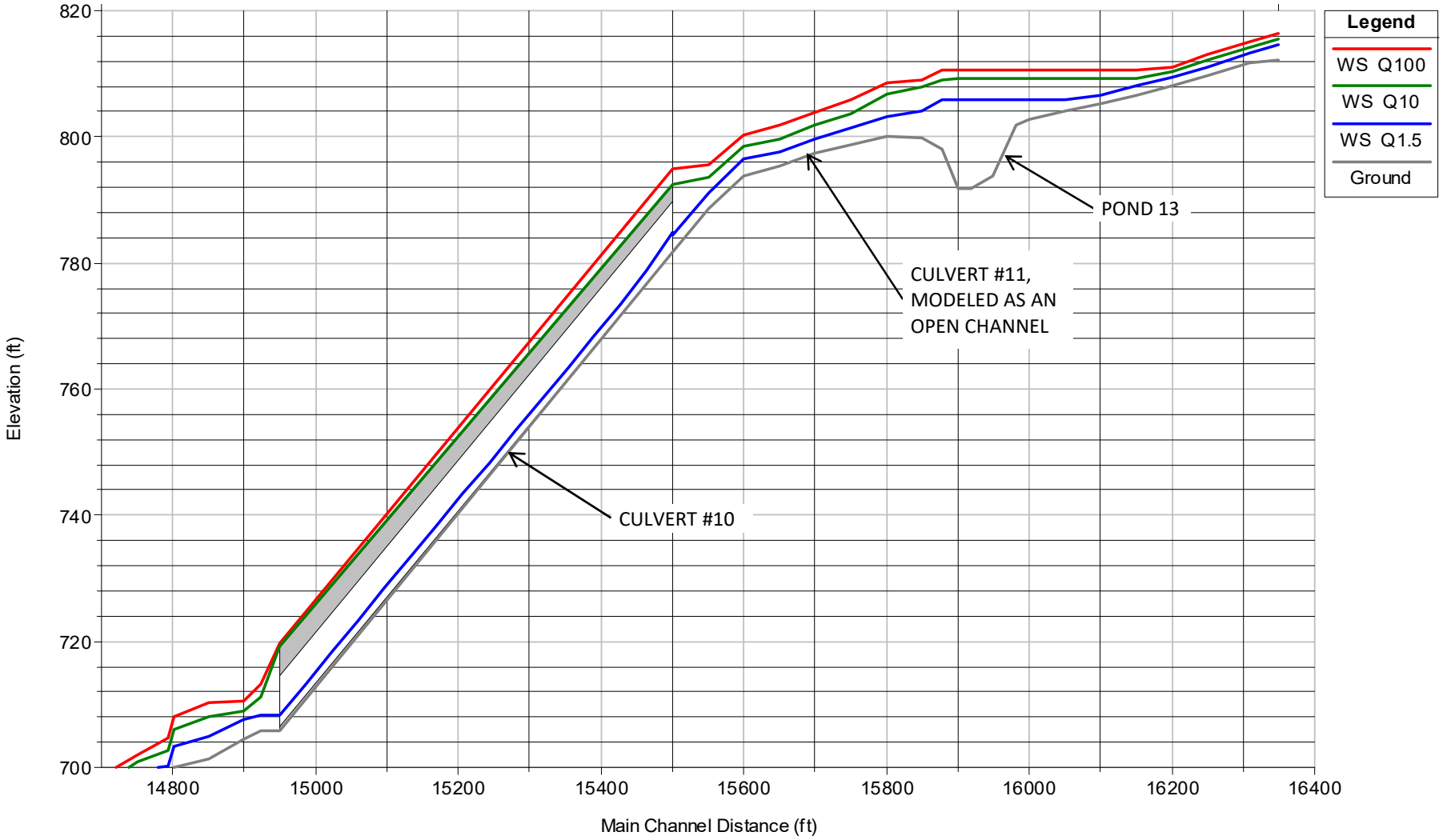


**FIGURE**

**F3**

**CHANNEL WIDENING TO ROCK PILE AREAS (EXISTING CONDITIONS)**

1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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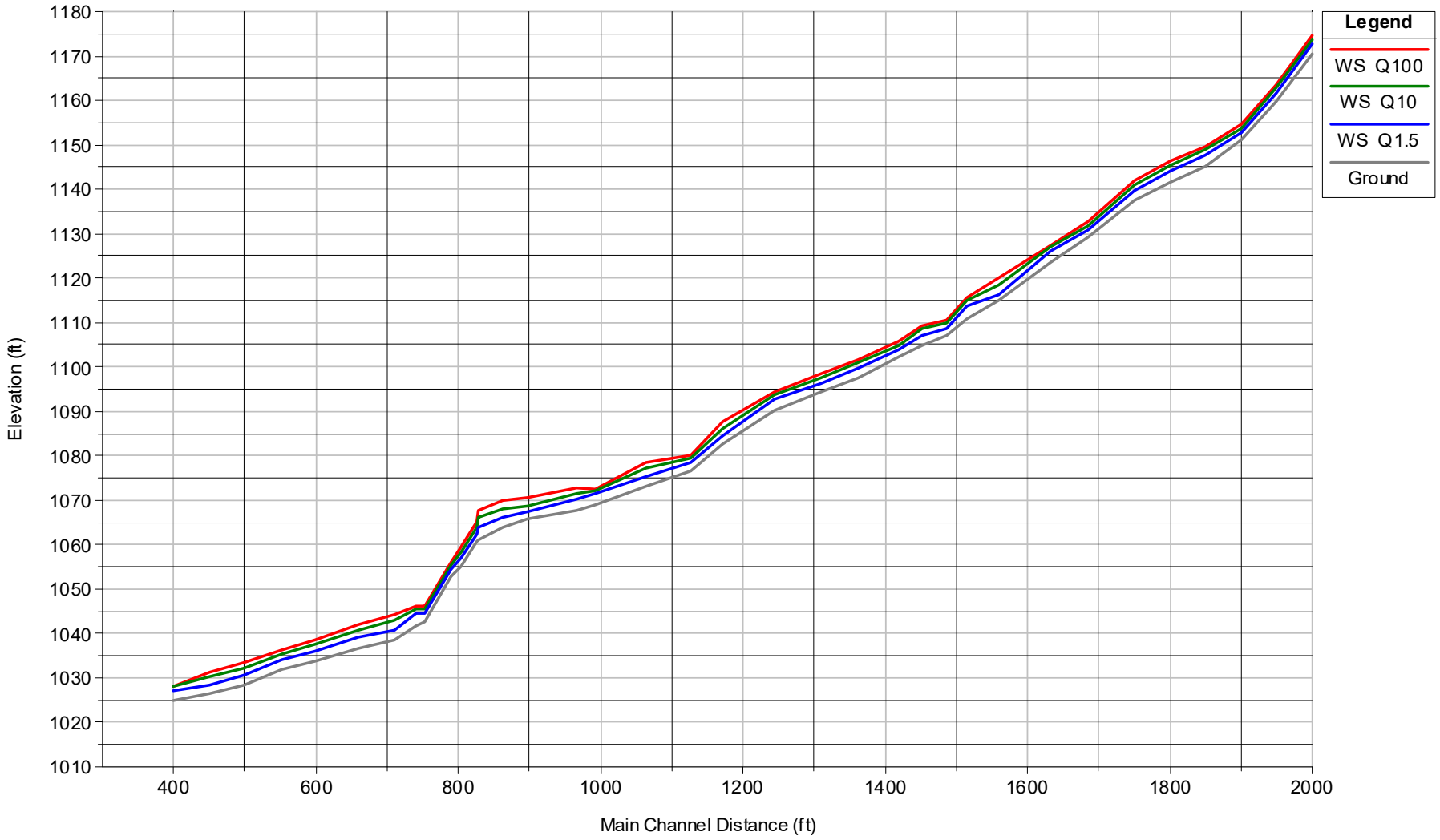


**FIGURE**

**F4**

**MATERIAL REMOVAL AREA (EXISTING CONDITIONS)**

1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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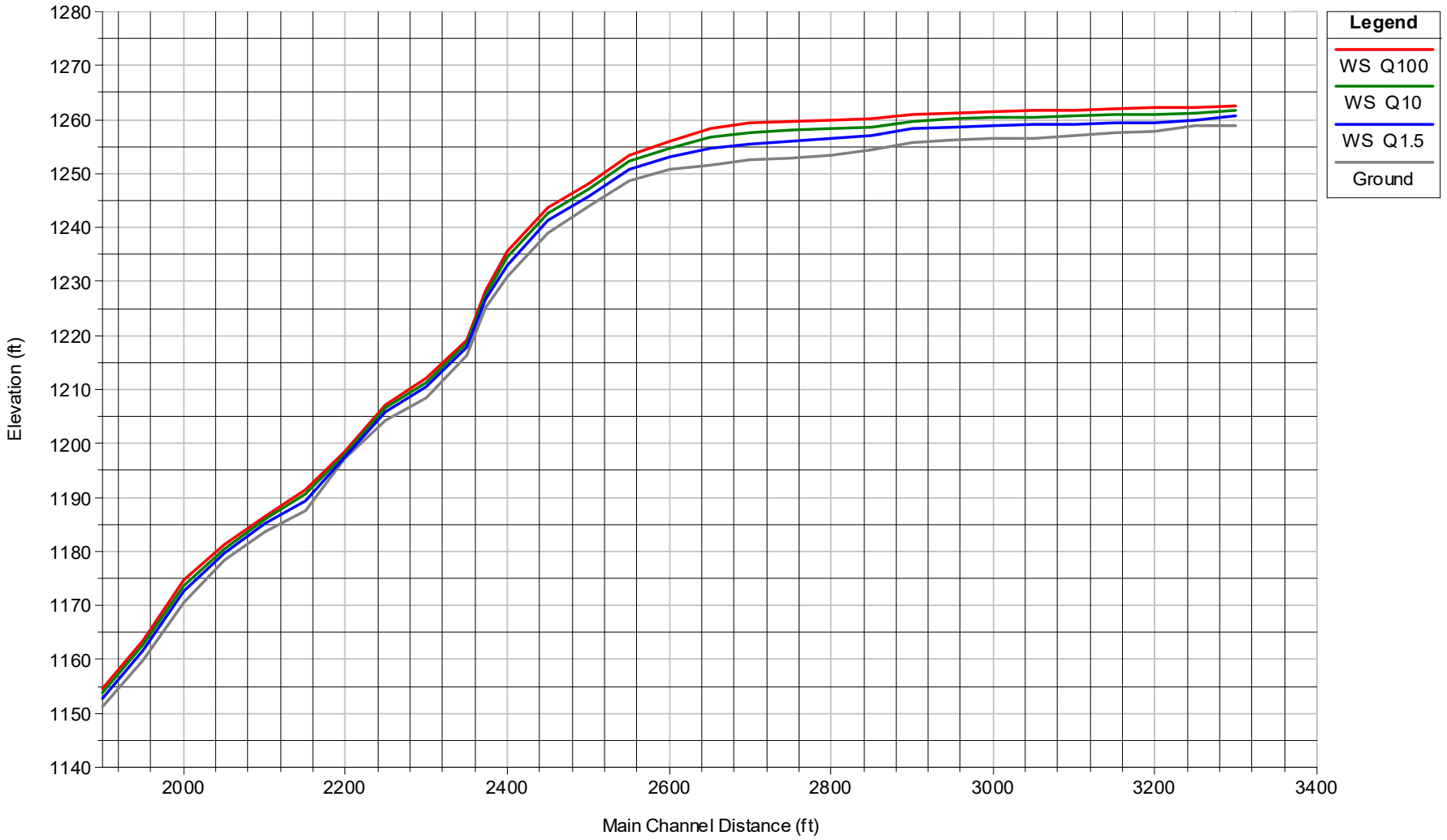


**FIGURE**

**F5**

**MATERIAL REMOVAL AREA (EXISTING CONDITIONS)**

1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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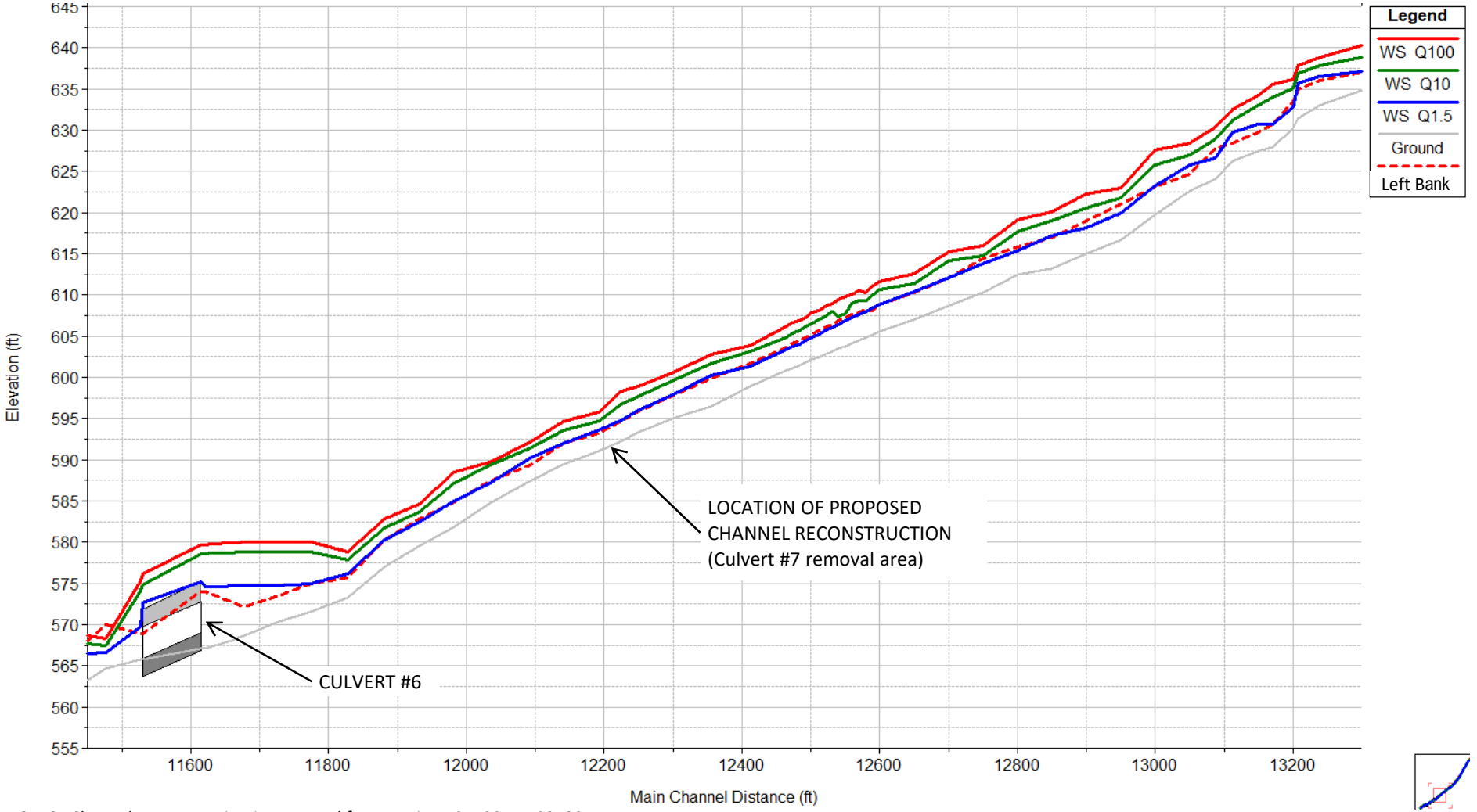
# HEC-RAS MODEL RESULTS

## Proposed Conditions

## Channel Widening and Rock Pile Areas

## Material Removal Area




NOTES: Channel reconstruction is proposed from station 121+80 to 123+00 where Culvert #7 is removed. Left bank is floodplain design elevation.

**FIGURE**
**F6**

**CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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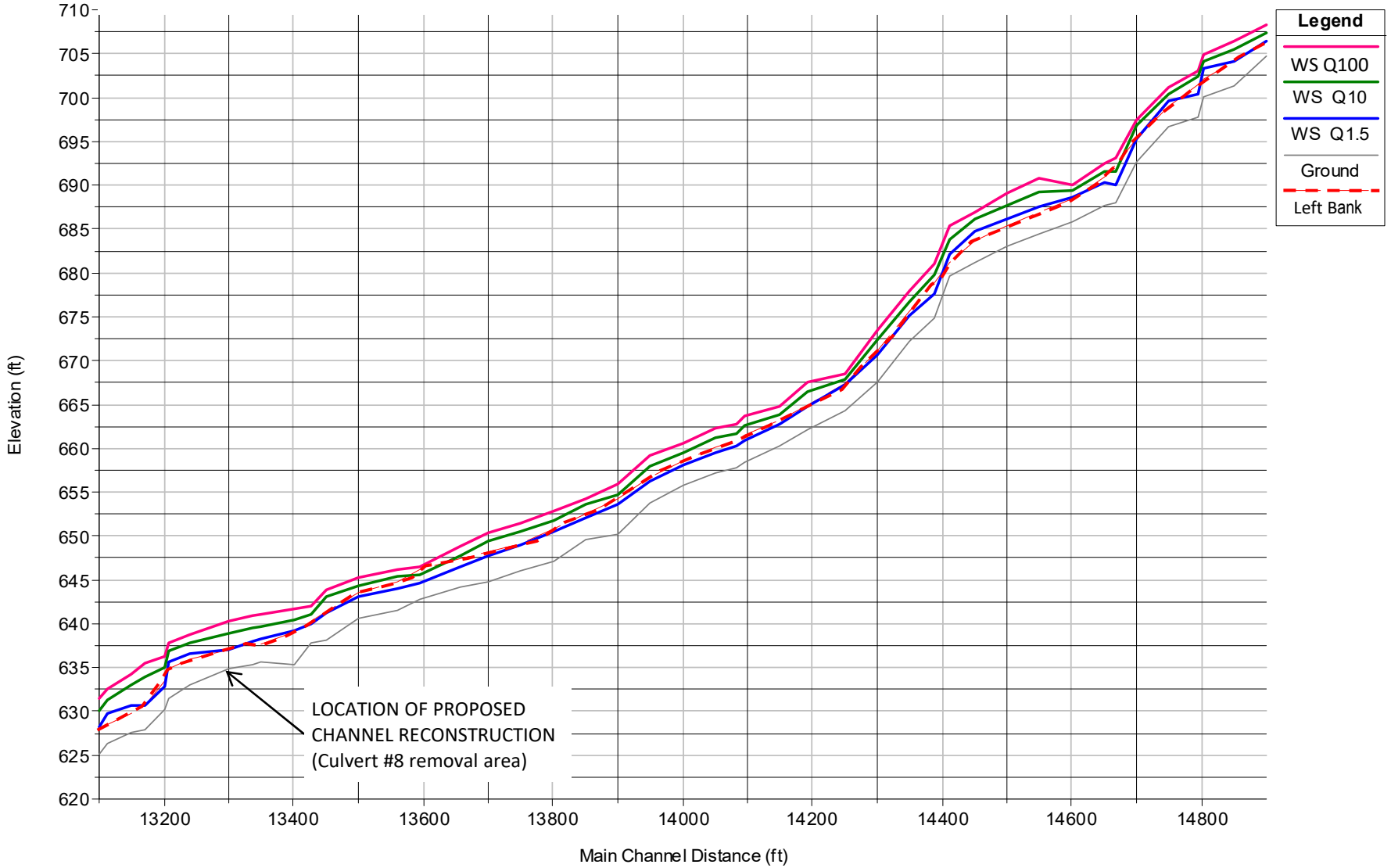


NOTES: Channel reconstruction is proposed from station 132+00 to 134+00 where Culvert #8 is removed. Left bank is floodplain design elevation.

**FIGURE F7**

**CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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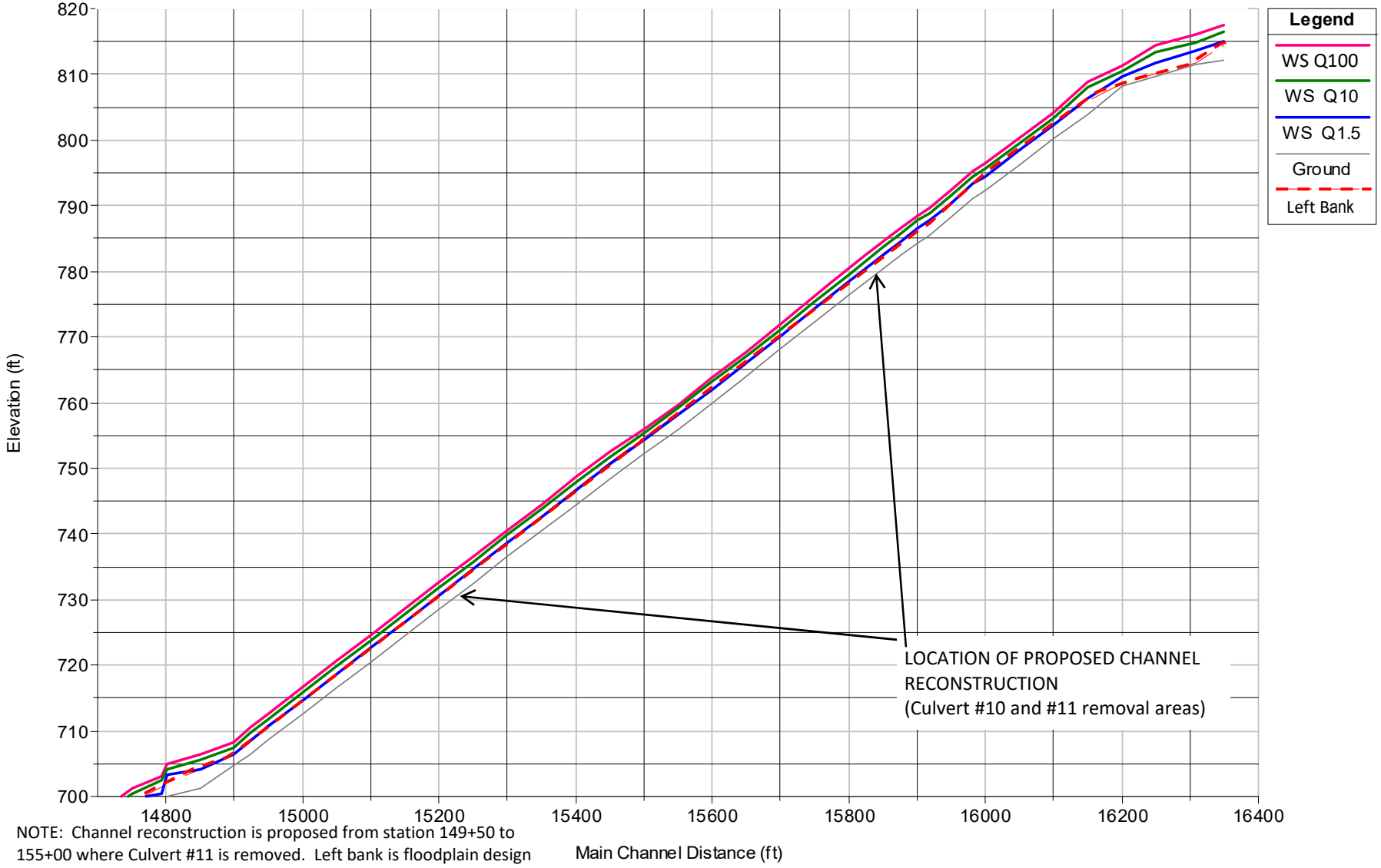


NOTE: Channel reconstruction is proposed from station 149+50 to 155+00 where Culvert #11 is removed. Left bank is floodplain design elevation.

**FIGURE**
**F8**

**CHANNEL WIDENING TO ROCK PILE AREAS (PROPOSED CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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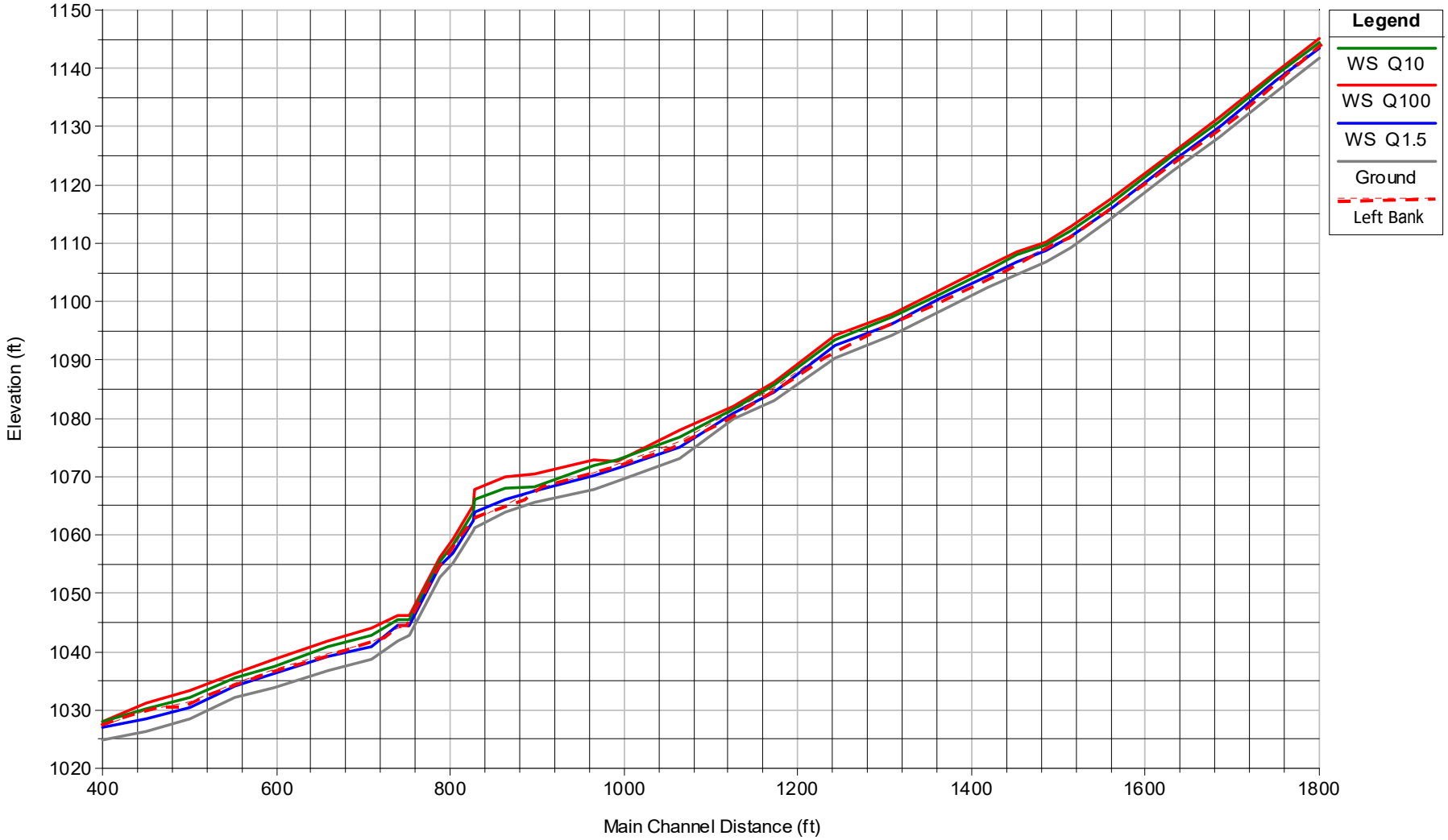


NOTE: Left bank is floodplain design elevation.

**FIGURE**
**F9**

**MATERIAL REMOVAL AREA (PROPOSED CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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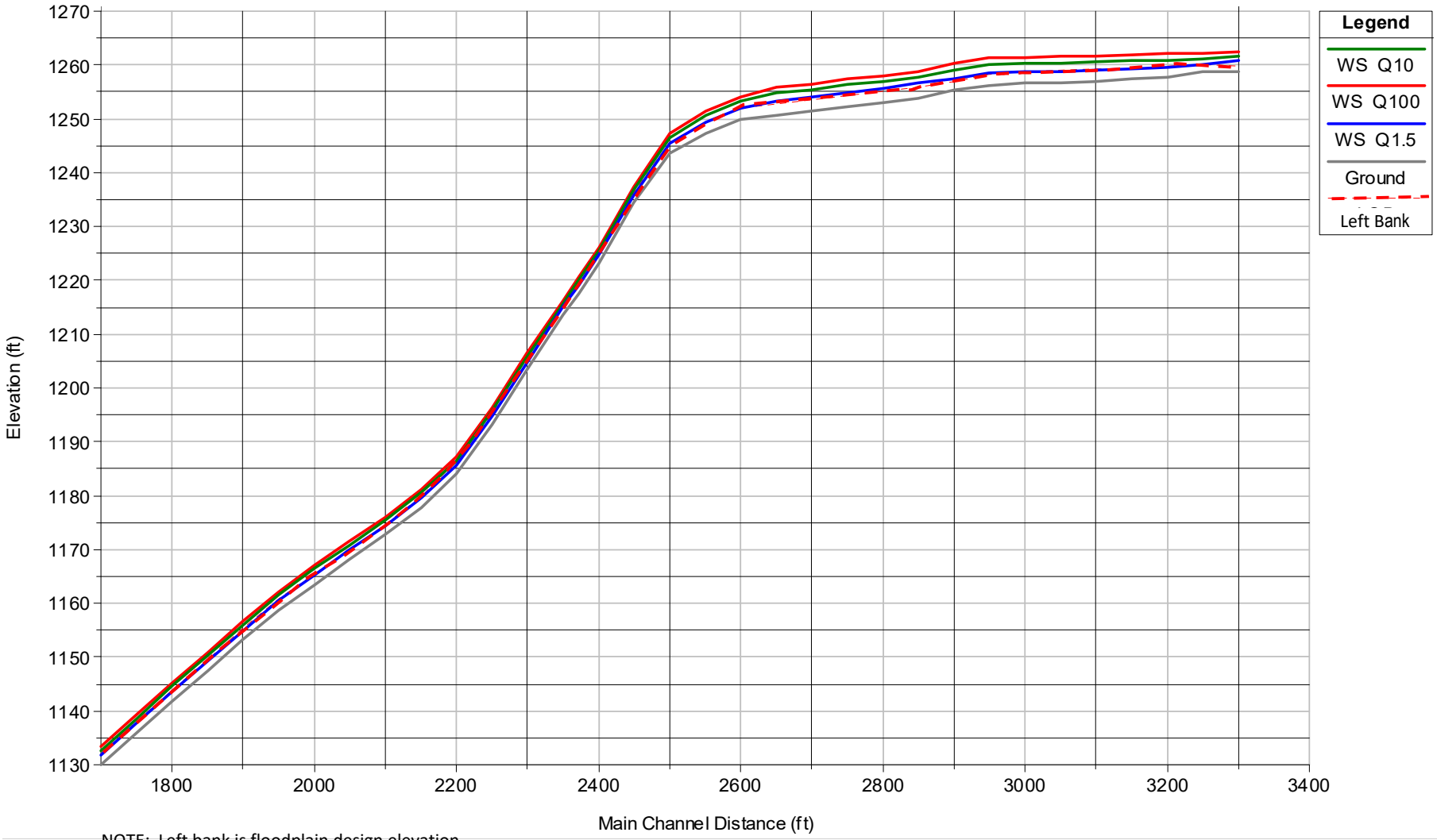


NOTE: Left bank is floodplain design elevation.

**FIGURE**
**F10**

**MATERIAL REMOVAL AREA (PROPOSED CONDITIONS)**
1.5-YEAR, 10-YEAR, & 100-YEAR WATER SURFACE PROFILES

PERMANENTE CREEK

90% SUBMITTAL

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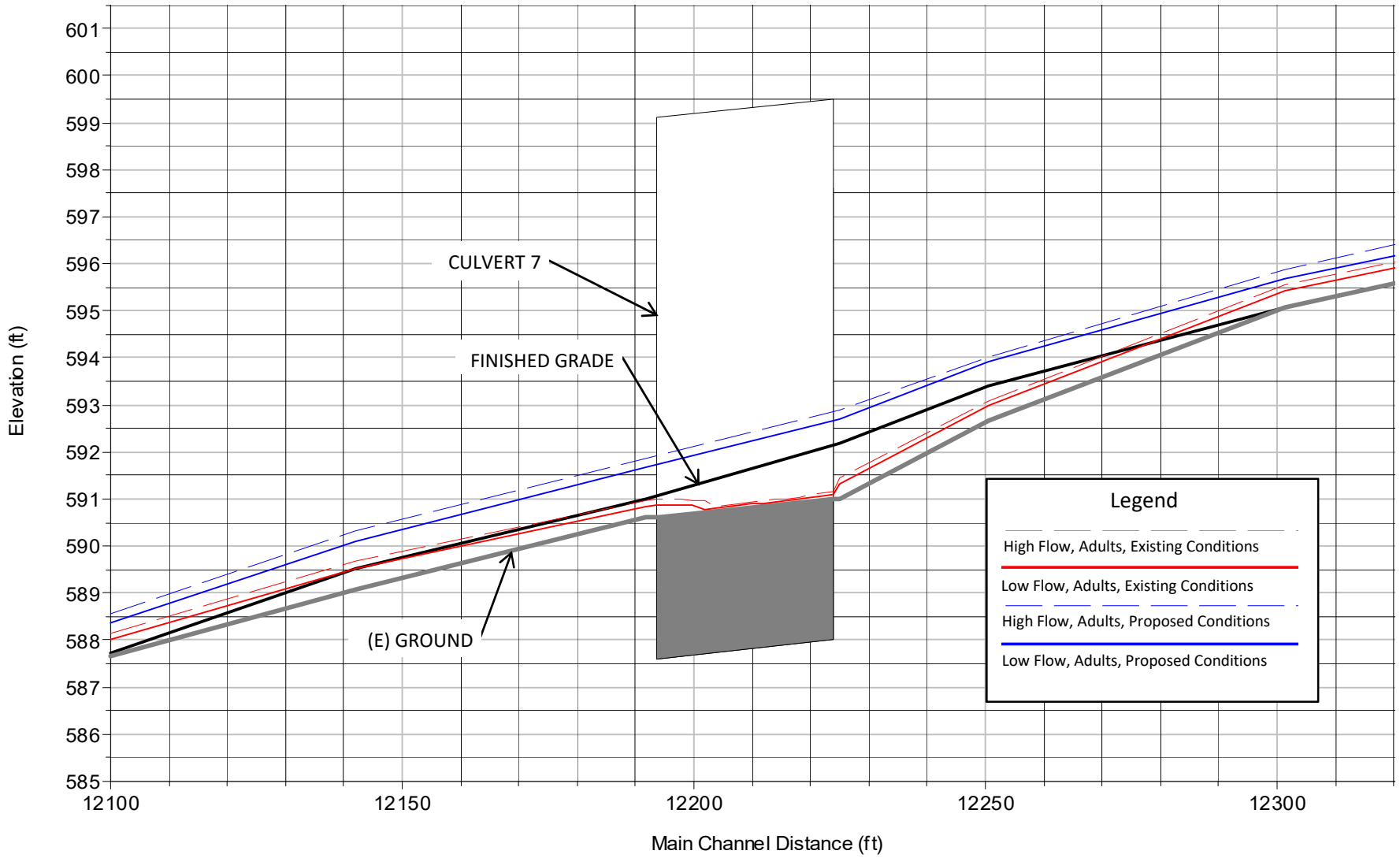
# HEC-RAS MODEL RESULTS

## Fish Passage for Existing and Proposed Conditions

## Culvert #7 and Culvert #8




**FIGURE**

**F11**

WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

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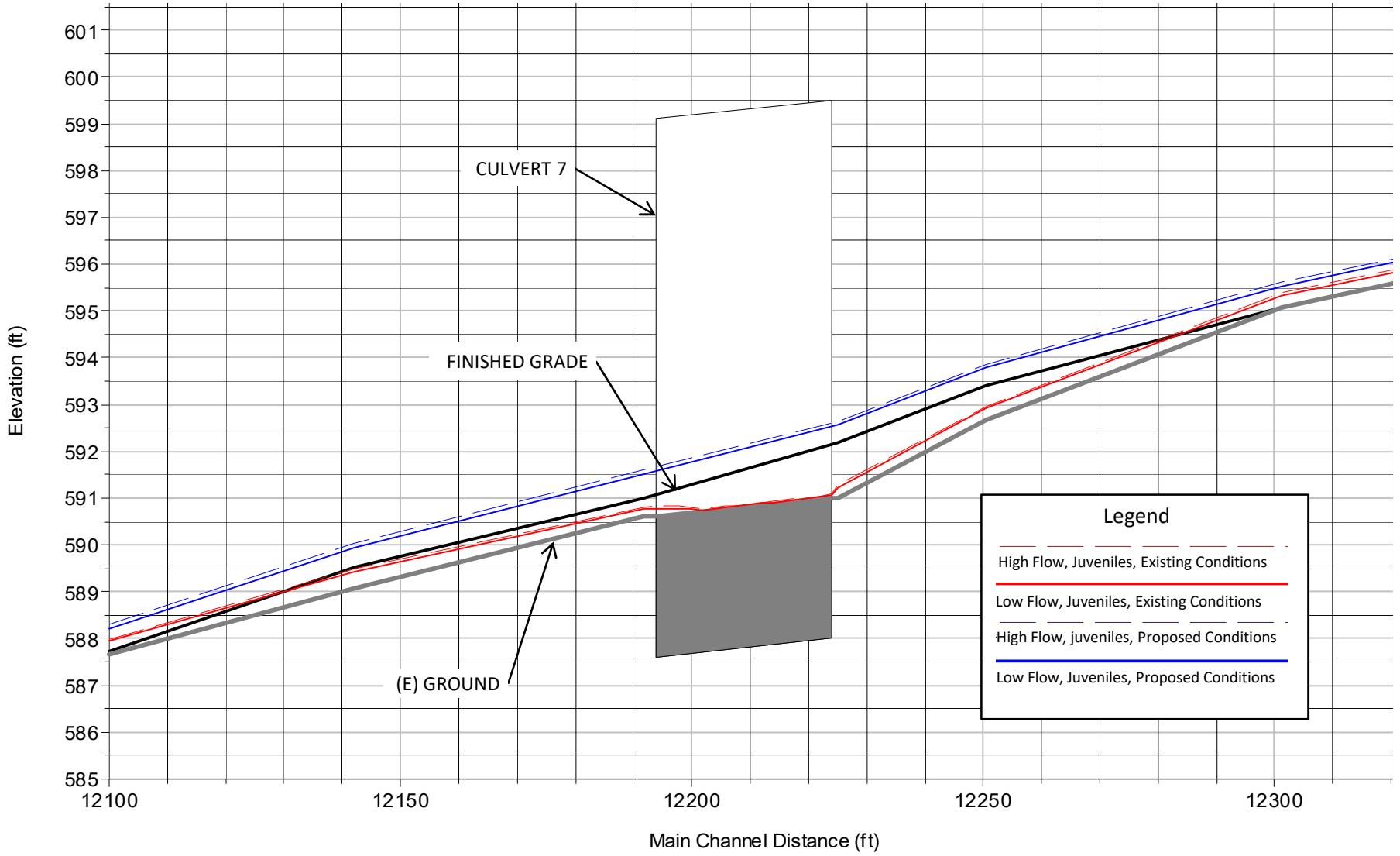



**FIGURE**

**F12**

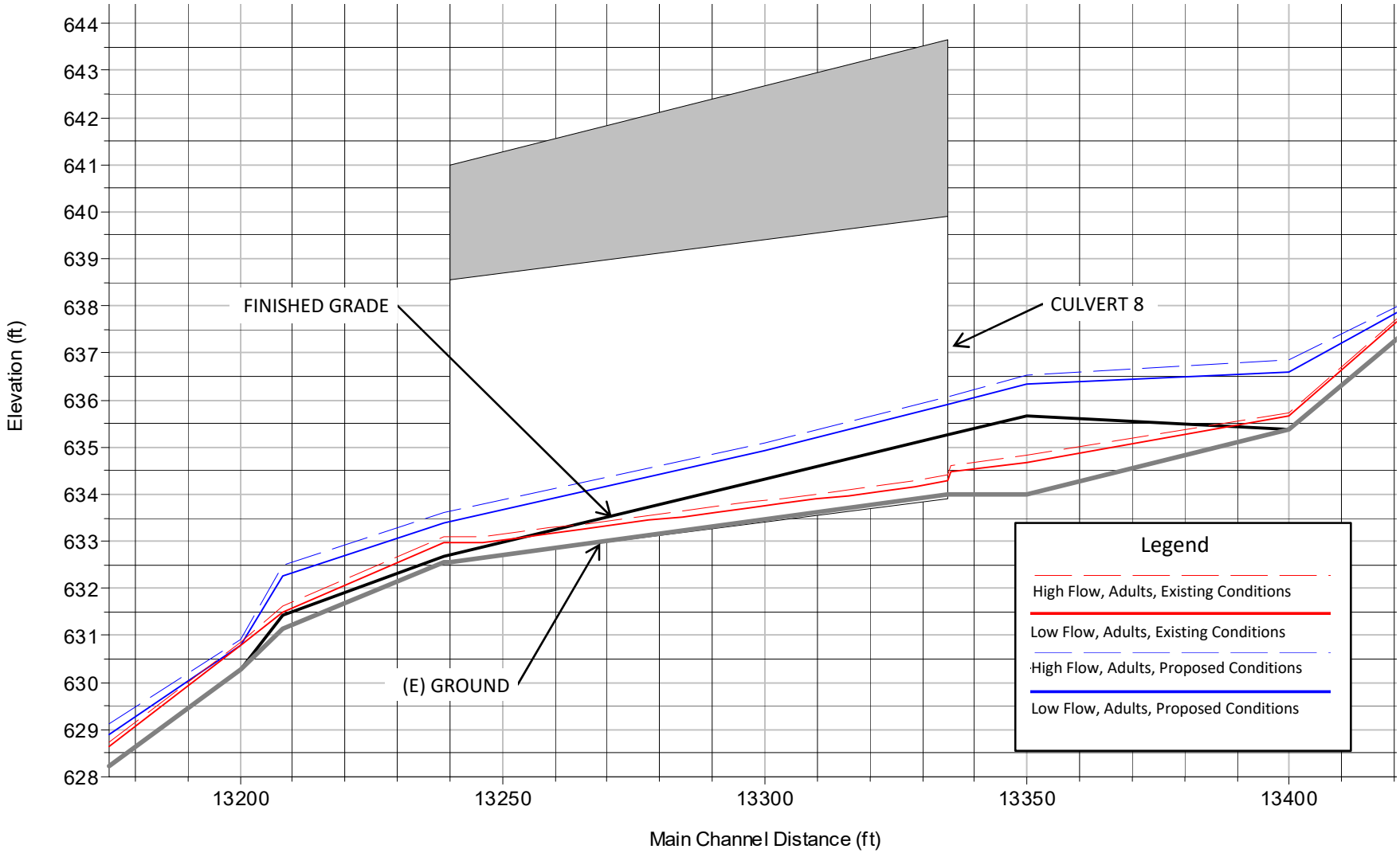
WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

Santa Cruz, CA | watways.com | Portland, OR




**FIGURE**

**F13**

WATER SURFACE PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

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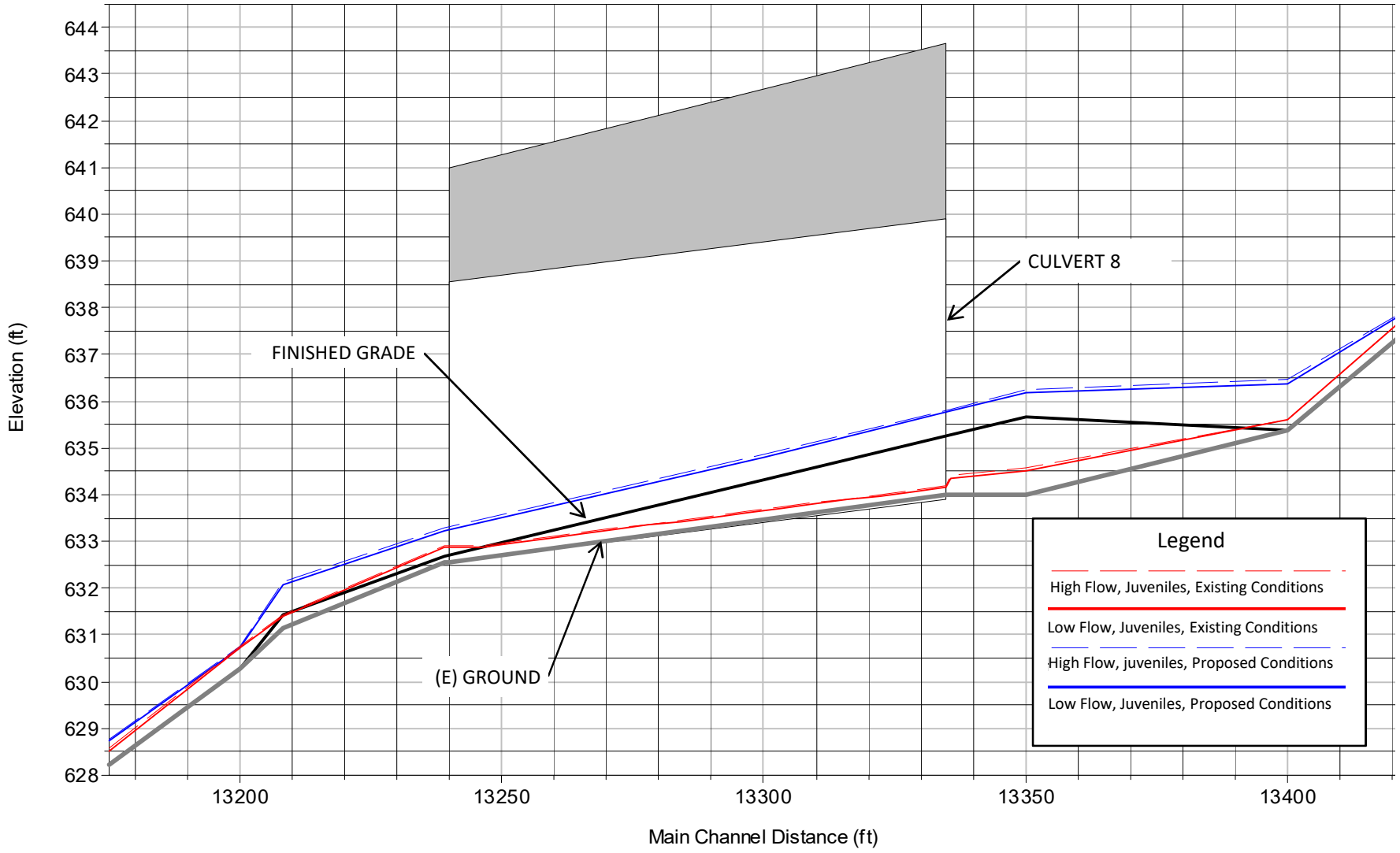


**FIGURE**

**F14**

WATER SURFACE PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

WATERWAYS CONSULTING, INC.

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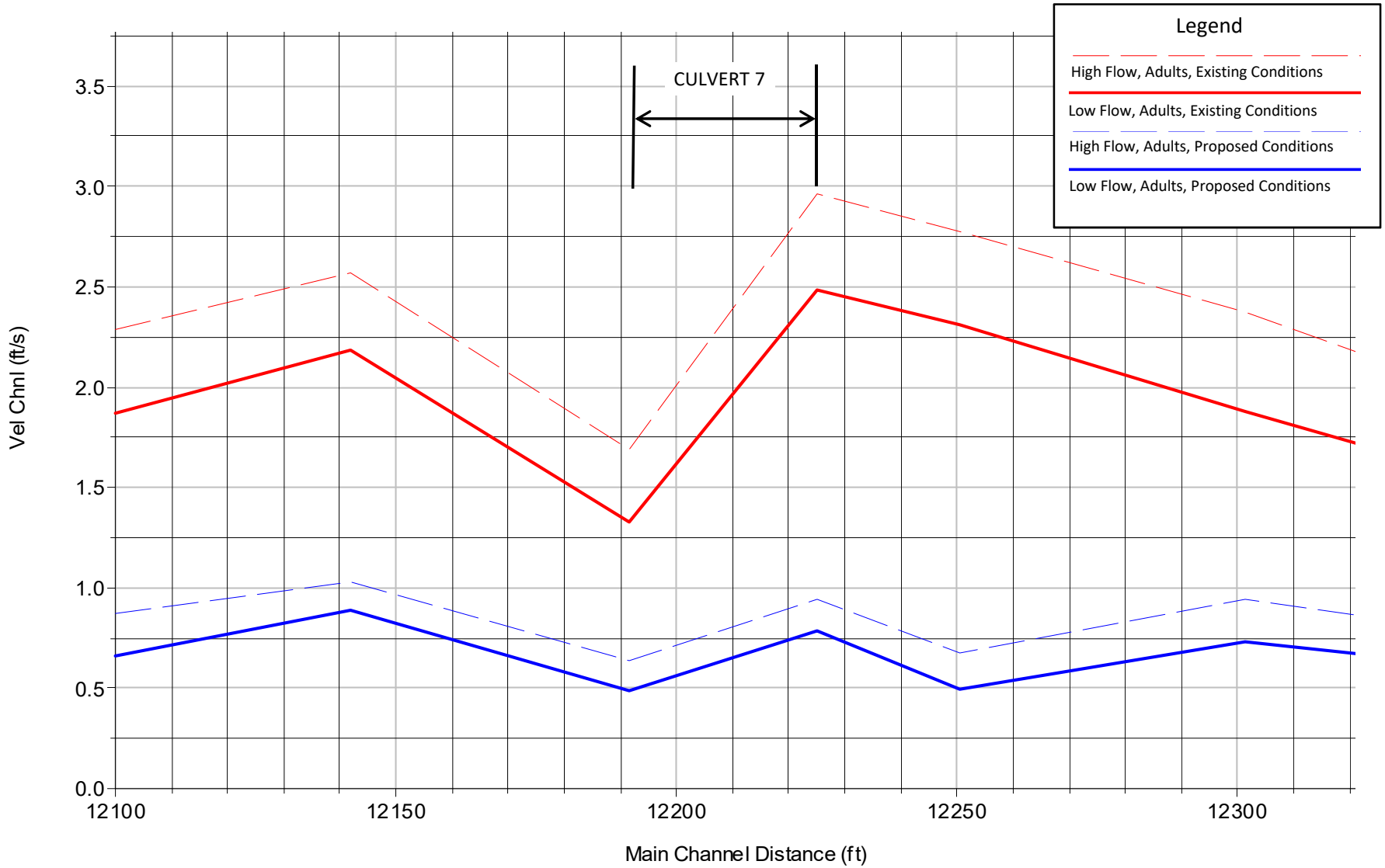


NOTE: Channel reconstruction is proposed from station 121+50 to 122+65 where Culvert #7 is removed.

**FIGURE**

**F15**

VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

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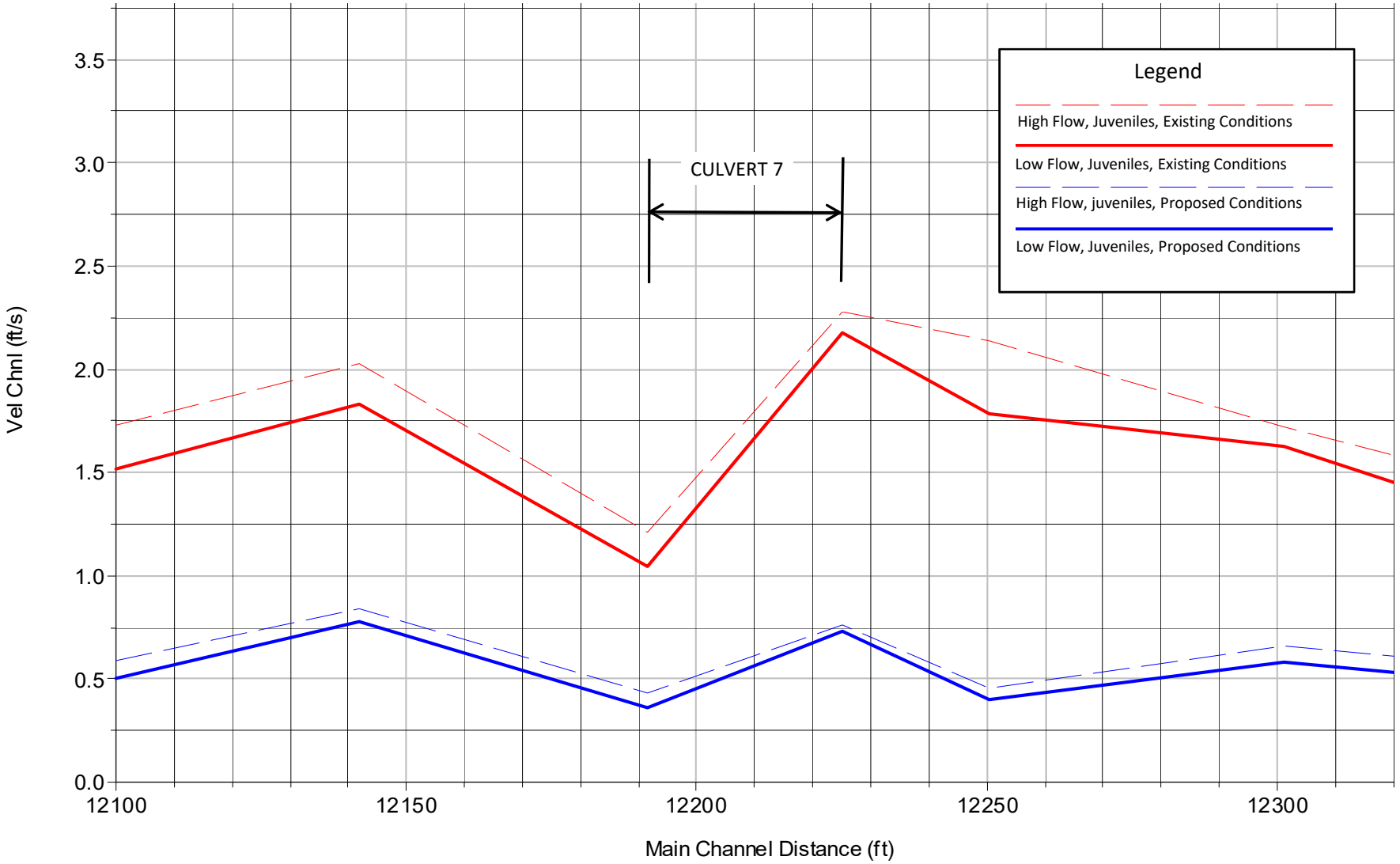


**FIGURE**

**F16**

VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #7, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

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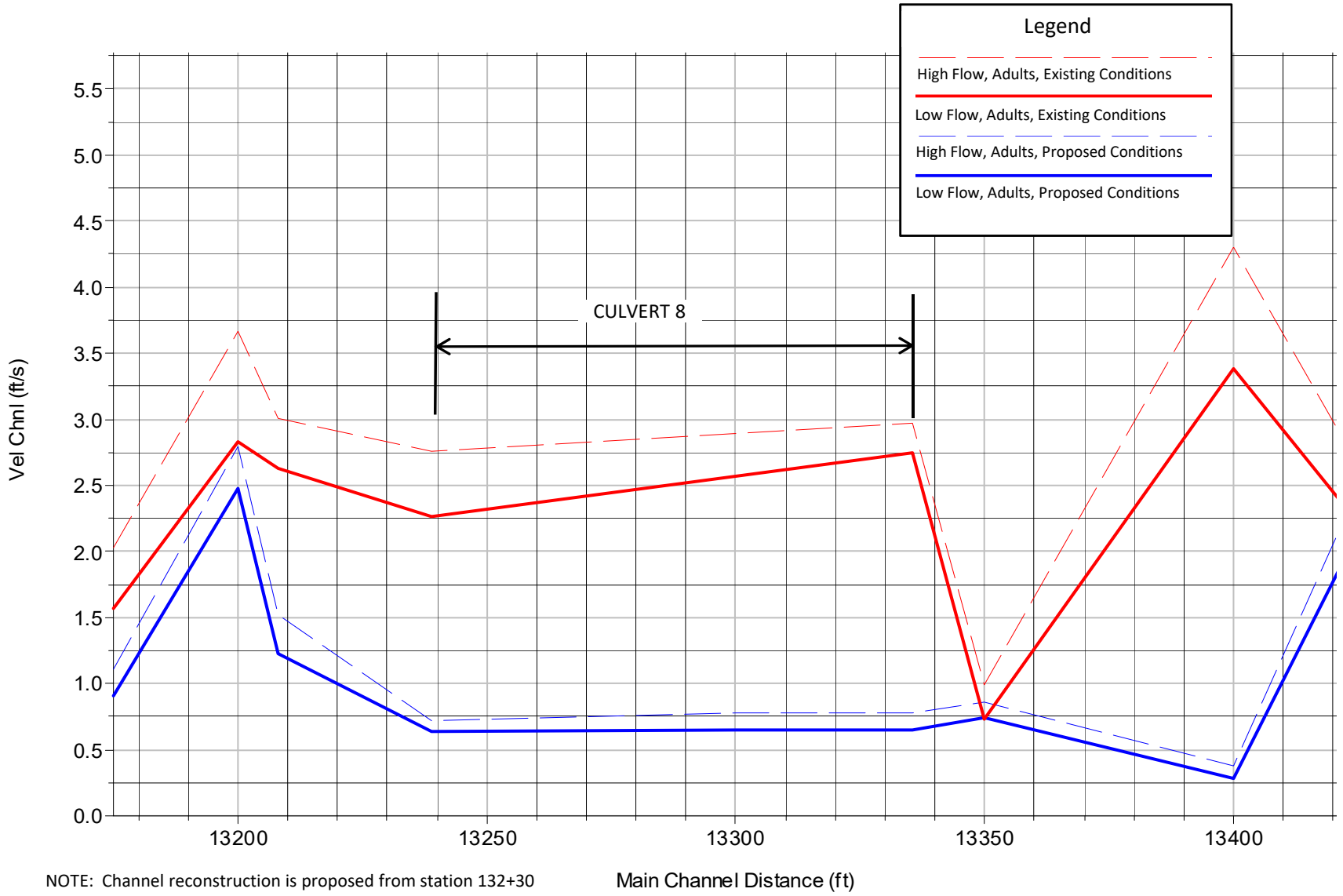


NOTE: Channel reconstruction is proposed from station 132+30 to 133+90 where Culvert #8 is removed.

**FIGURE**

**F17**

VELOCITY PROFILES FOR ADULT NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

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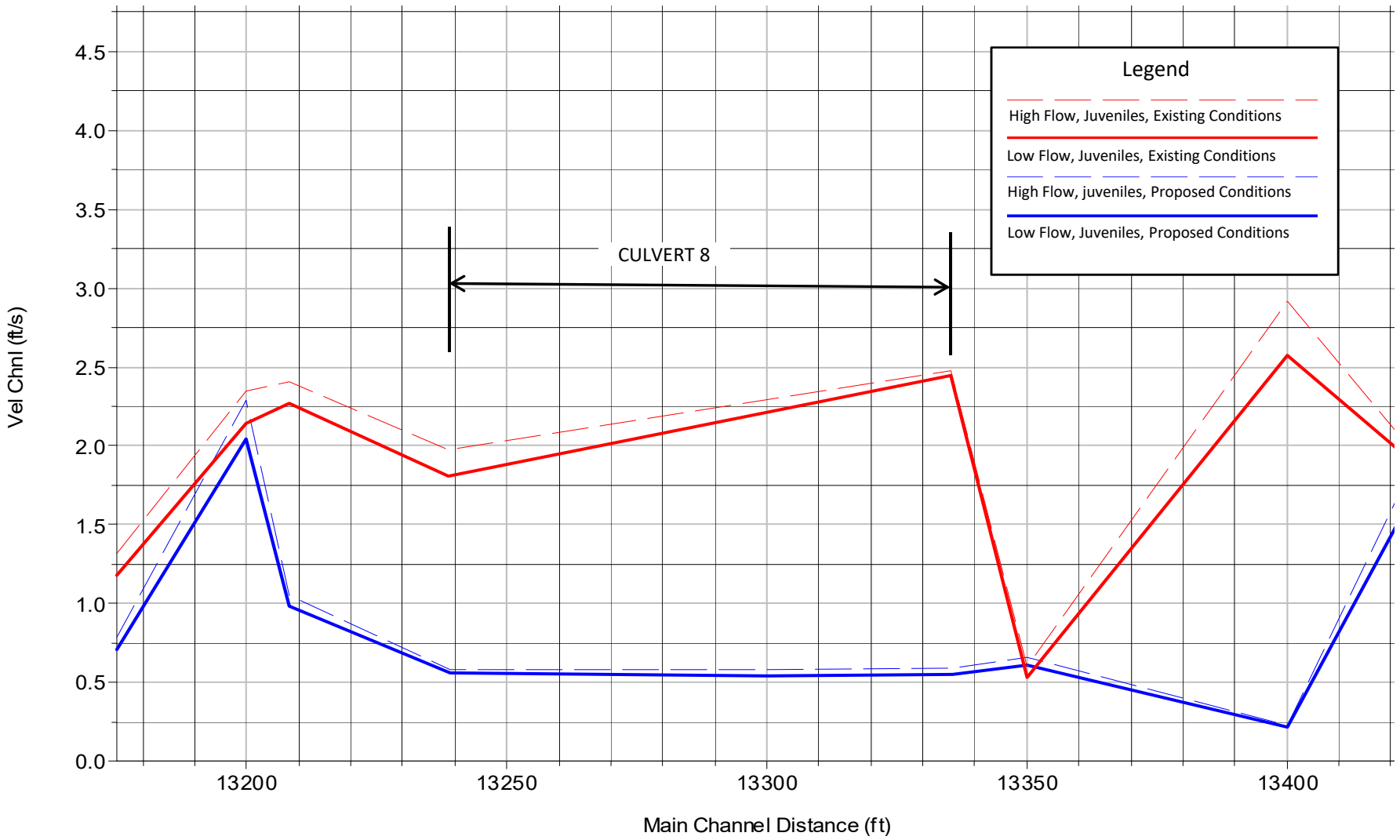


**FIGURE**
**F18**

VELOCITY PROFILES FOR JUVENILE NON-ANADROMOUS SALMONID FISH PASSAGE FLOWS AT CULVERT #8, CHANNEL WIDENING AREA

PERMANENTE CREEK

90% SUBMITTAL

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# HEC-RAS MODEL RESULTS

## Tabular Data

**Channel Widening and Rock Pile Areas Material Removal Area**

**Evaluation of Overtopping Flow along Vehicle Barrier**

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UPSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.015 | | | | | | | | | | | | | |
| | DOWNSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.023 | | | | | | | | | | | | | |
| | 16150 | Q100 | Existing | 1145 | 806.67 | 810.64 | 3.39 | 5.67 | 207 | 60.9 | | 0.05 | 0.10 | 0.05 |
| | 16150 | Q100 | Proposed | 1145 | 803.98 | 808.86 | 2.58 | 10.82 | 151 | 58.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 16150 | Q10 | Existing | 653 | 806.67 | 809.22 | 2.08 | 5.43 | 122 | 58.5 | | 0.05 | 0.10 | 0.05 |
| | 16150 | Q10 | Proposed | 653 | 803.98 | 807.96 | 1.85 | 8.84 | 100 | 54.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 16150 | Q1.5 | Existing | 219 | 806.67 | 808.05 | 0.97 | 4.02 | 55 | 56.4 | | 0.05 | 0.10 | 0.05 |
| | 16150 | Q1.5 | Proposed | 219 | 803.98 | 806.33 | 1.30 | 6.95 | 33 | 25.2 | 0.10 | 0.06 | | 0.05 |
| | 16100 | Q100 | Existing | 1145 | 805.24 | 810.65 | 4.53 | 3.85 | 305 | 67.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16100 | Q100 | Proposed | 1145 | 800.19 | 804.08 | 1.72 | 16.32 | 99 | 57.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 16100 | Q10 | Existing | 653 | 805.24 | 809.20 | 3.22 | 3.17 | 209 | 64.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16100 | Q10 | Proposed | 653 | 800.19 | 803.27 | 1.20 | 14.34 | 55 | 46.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 16100 | Q1.5 | Existing | 219 | 805.24 | 806.55 | 0.74 | 4.98 | 44 | 59.4 | | 0.05 | 0.10 | 0.05 |
| | 16100 | Q1.5 | Proposed | 219 | 800.19 | 802.14 | 1.29 | 9.84 | 22 | 17.3 | | 0.06 | | 0.06 |
| | 16050 | Q100 | Existing | 1145 | 804.14 | 810.62 | 5.31 | 3.27 | 374 | 70.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16050 | Q100 | Proposed | 1145 | 796.29 | 800.40 | 2.15 | 14.6 | 106 | 49.4 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 16050 | Q10 | Existing | 653 | 804.14 | 809.17 | 4.11 | 2.49 | 275 | 66.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16050 | Q10 | Proposed | 653 | 796.29 | 799.66 | 1.50 | 11.96 | 70 | 47.1 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 16050 | Q1.5 | Existing | 219 | 804.14 | 805.94 | 1.26 | 3.01 | 73 | 58.1 | | 0.05 | 0.10 | 0.05 |
| | 16050 | Q1.5 | Proposed | 219 | 796.29 | 798.58 | 1.28 | 7.69 | 29 | 22.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 16000 | Q100 | Existing | 1145 | 802.84 | 810.61 | 5.98 | 2.74 | 450 | 75.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16000 | Q100 | Proposed | 1145 | 792.29 | 796.45 | 2.38 | 14.94 | 97 | 41.0 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 16000 | Q10 | Existing | 653 | 802.84 | 809.16 | 4.79 | 2.01 | 344 | 71.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 16000 | Q10 | Proposed | 653 | 792.29 | 795.55 | 1.65 | 12.77 | 62 | 37.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 16000 | Q1.5 | Existing | 219 | 802.84 | 805.85 | 1.91 | 1.84 | 121 | 63.0 | | 0.05 | 0.10 | 0.05 |
| | 16000 | Q1.5 | Proposed | 219 | 792.29 | 794.29 | 1.32 | 9.45 | 23 | 17.5 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15982.36 | Q100 | Existing | 1145 | 801.83 | 810.60 | 5.48 | 2.68 | 498 | 90.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15982.36 | Q100 | Proposed | 1145 | 791.02 | 795.19 | 2.38 | 14.83 | 100 | 42.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15982.36 | Q10 | Existing | 653 | 801.83 | 809.15 | 4.93 | 1.94 | 378 | 76.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15982.36 | Q10 | Proposed | 653 | 791.02 | 794.35 | 1.70 | 12.23 | 66 | 38.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15982.36 | Q1.5 | Existing | 219 | 801.83 | 805.83 | 2.06 | 1.69 | 139 | 67.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15982.36 | Q1.5 | Proposed | 219 | 791.02 | 793.32 | 1.12 | 7.62 | 29 | 26.4 | | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 15950 | Q100 | Existing | 1145 | 793.81 | 810.62 | 7.88 | 2.88 | 855 | 108.6 | 0.10 | 0.05 | 0.10 | 0.08 |
| | 15950 | Q100 | Proposed | 1145 | 788.29 | 792.29 | 2.24 | 15.54 | 93 | 41.7 | 0.08 | 0.06 | 0.10 | 0.06 |
| | 15950 | Q10 | Existing | 653 | 793.81 | 809.16 | 6.87 | 1.97 | 699 | 101.8 | 0.10 | 0.05 | 0.10 | 0.08 |
| | 15950 | Q10 | Proposed | 653 | 788.29 | 791.50 | 1.59 | 12.89 | 61 | 38.6 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 15950 | Q1.5 | Existing | 219 | 793.81 | 805.85 | 4.67 | 1.1 | 398 | 85.3 | 0.10 | 0.05 | 0.10 | 0.08 |
| | 15950 | Q1.5 | Proposed | 219 | 788.29 | 790.24 | 1.30 | 9.63 | 23 | 17.6 | | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 15917.67 | Q100 | Existing | 1145 | 791.85 | 810.64 | 9.23 | 1.04 | 1153 | 124.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15917.67 | Q100 | Proposed | 1145 | 785.57 | 789.55 | 2.15 | 15.52 | 95 | 44.2 | 0.08 | 0.06 | 0.10 | 0.06 |
| | 15917.67 | Q10 | Existing | 653 | 791.85 | 809.17 | 7.96 | 0.69 | 972 | 122.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15917.67 | Q10 | Proposed | 653 | 785.57 | 788.79 | 1.54 | 12.81 | 63 | 40.7 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 15917.67 | Q1.5 | Existing | 219 | 791.85 | 805.85 | 5.66 | 0.37 | 600 | 106.1 | 0.10 | 0.05 | | 0.05 |
| | 15917.67 | Q1.5 | Proposed | 219 | 785.57 | 787.78 | 1.29 | 8.1 | 27 | 21.1 | 0.10 | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 15900 | Q100 | Existing | 1145 | 791.72 | 810.64 | 9.20 | 1.01 | 1184 | 128.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15900 | Q100 | Proposed | 1145 | 784.31 | 788.49 | 2.31 | 14.49 | 103 | 44.6 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 15900 | Q10 | Existing | 653 | 791.72 | 809.17 | 8.23 | 0.67 | 1000 | 121.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15900 | Q10 | Proposed | 653 | 784.31 | 787.69 | 1.65 | 11.96 | 68 | 41.5 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 15900 | Q1.5 | Existing | 219 | 791.72 | 805.85 | 5.72 | 0.36 | 623 | 109.0 | 0.10 | 0.05 | | 0.05 |
| | 15900 | Q1.5 | Proposed | 219 | 784.31 | 786.49 | 1.38 | 8.31 | 26 | 19.0 | | 0.06 | 0.10 | 0.06 |
| | | | | | | | | | | | | | | |
| **Culvert #11** | 15878.42 | Q100 | Existing | 1145 | 798.16 | 810.56 | 5.09 | 2.74 | 659 | 129.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 15878.42 | Q100 | Proposed | 1145 | 782.58 | 786.73 | 2.29 | 14.91 | 102 | 44.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15878.42 | Q10 | Existing | 653 | 798.16 | 809.13 | 4.11 | 2.01 | 477 | 116.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 15878.42 | Q10 | Proposed | 653 | 782.58 | 785.88 | 1.58 | 12.54 | 65 | 41.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15878.42 | Q1.5 | Existing | 219 | 798.16 | 805.82 | 2.92 | 1.41 | 189 | 64.9 | 0.10 | 0.05 | | 0.05 |
| | 15878.42 | Q1.5 | Proposed | 219 | 782.58 | 784.70 | 1.39 | 8.69 | 25 | 18.1 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert #11 (Half culvert in Existing Conditions modeled as open channel) | 15850 | Q100 | Existing | 1145 | 799.75 | 809.03 | 3.03 | 10.84 | 130 | 42.8 | 0.03 | 0.02 | 0.03 | 0.03 |
| | 15850 | Q100 | Proposed | 1145 | 780.31 | 784.40 | 2.25 | 15.19 | 99 | 44.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15850 | Q10 | Existing | 653 | 799.75 | 807.91 | 2.33 | 9.24 | 85 | 36.7 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15850 | Q10 | Proposed | 653 | 780.31 | 783.59 | 1.57 | 12.63 | 64 | 41.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15850 | Q1.5 | Existing | 219 | 799.75 | 804.06 | 3.22 | 10.15 | 22 | 6.7 | | 0.02 | | 0.02 |
| | 15850 | Q1.5 | Proposed | 219 | 780.31 | 782.46 | 1.42 | 8.47 | 26 | 18.3 | | 0.06 | | 0.06 |
| | 15800 | Q100 | Existing | 1145 | 800.05 | 808.60 | 3.25 | 11.13 | 131 | 40.3 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15800 | Q100 | Proposed | 1145 | 776.33 | 780.46 | 2.30 | 15.15 | 99 | 43.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15800 | Q10 | Existing | 653 | 800.05 | 806.81 | 1.97 | 10.91 | 65 | 32.9 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15800 | Q10 | Proposed | 653 | 776.33 | 779.62 | 1.59 | 12.6 | 64 | 40.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15800 | Q1.5 | Existing | 219 | 800.05 | 803.31 | 2.26 | 10.38 | 21 | 9.3 | | 0.02 | | 0.02 |
| | 15800 | Q1.5 | Proposed | 219 | 776.33 | 778.46 | 1.40 | 8.61 | 25 | 18.2 | | 0.06 | | 0.06 |
| | 15750 | Q100 | Existing | 1145 | 798.71 | 805.99 | 2.45 | 15.87 | 85 | 34.8 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15750 | Q100 | Proposed | 1145 | 772.22 | 776.27 | 2.24 | 15.47 | 95 | 42.4 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 15750 | Q10 | Existing | 653 | 798.71 | 803.77 | 3.69 | 16.2 | 40 | 10.9 | | 0.02 | | 0.02 |
| | 15750 | Q10 | Proposed | 653 | 772.22 | 775.47 | 1.58 | 12.83 | 62 | 39.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15750 | Q1.5 | Existing | 219 | 798.71 | 801.47 | 1.90 | 12.73 | 17 | 9.1 | | 0.02 | | 0.02 |
| | 15750 | Q1.5 | Proposed | 219 | 772.22 | 774.32 | 1.30 | 8.71 | 25 | 19.4 | 0.10 | 0.06 | | 0.06 |
| | 15700 | Q100 | Existing | 1145 | 797.35 | 803.97 | 2.21 | 17.92 | 73 | 32.9 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15700 | Q100 | Proposed | 1145 | 768.08 | 771.95 | 1.82 | 15.16 | 95 | 51.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15700 | Q10 | Existing | 653 | 797.35 | 801.84 | 3.53 | 17.53 | 37 | 10.6 | | 0.02 | | 0.02 |
| | 15700 | Q10 | Proposed | 653 | 768.08 | 771.12 | 1.52 | 12.57 | 57 | 37.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15700 | Q1.5 | Existing | 219 | 797.35 | 799.64 | 1.82 | 13.72 | 16 | 8.8 | | 0.02 | | 0.02 |
| | 15700 | Q1.5 | Proposed | 219 | 768.08 | 769.97 | 1.25 | 8.59 | 25 | 20.4 | | 0.06 | | 0.06 |
| | 15650 | Q100 | Existing | 1145 | 795.45 | 801.87 | 2.52 | 19.34 | 61 | 24.0 | 0.03 | 0.02 | 0.03 | 0.02 |
| | 15650 | Q100 | Proposed | 1145 | 764.00 | 767.80 | 1.51 | 15.2 | 110 | 72.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15650 | Q10 | Existing | 653 | 795.45 | 799.74 | 3.37 | 18.65 | 35 | 10.4 | | 0.02 | | 0.02 |
| | 15650 | Q10 | Proposed | 653 | 764.00 | 767.15 | 1.28 | 12.21 | 69 | 53.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15650 | Q1.5 | Existing | 219 | 795.45 | 797.67 | 1.74 | 14.39 | 15 | 8.8 | | 0.02 | | 0.02 |
| | 15650 | Q1.5 | Proposed | 219 | 764.00 | 766.11 | 0.96 | 8.1 | 28 | 29.2 | 0.10 | 0.06 | | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culvert #11 | 15600 | Q100 | Existing | 1145 | 793.89 | 800.00 | 4.80 | 20.24 | 57 | 11.8 | | 0.02 | | 0.02 |
| | 15600 | Q100 | Proposed | 1145 | 759.91 | 763.88 | 1.44 | 14.58 | 125 | 87.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15600 | Q10 | Existing | 653 | 793.89 | 797.99 | 3.39 | 18.89 | 35 | 10.2 | | 0.02 | | 0.02 |
| | 15600 | Q10 | Proposed | 653 | 759.91 | 763.17 | 1.14 | 12.33 | 72 | 63.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15600 | Q1.5 | Existing | 219 | 793.89 | 795.98 | 1.77 | 14.13 | 15 | 8.8 | | 0.02 | | 0.02 |
| | 15600 | Q1.5 | Proposed | 219 | 759.91 | 761.96 | 1.36 | 8.89 | 25 | 18.2 | | 0.06 | | 0.06 |
| | 15550 | Q100 | Existing | 1145 | 788.69 | 794.69 | 4.59 | 24.88 | 46 | 10.0 | | 0.02 | | 0.02 |
| | 15550 | Q100 | Proposed | 1145 | 756.06 | 759.77 | 1.42 | 14.84 | 127 | 89.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15550 | Q10 | Existing | 653 | 788.69 | 792.75 | 3.26 | 23.27 | 28 | 8.6 | | 0.02 | | 0.02 |
| | 15550 | Q10 | Proposed | 653 | 756.06 | 759.22 | 0.93 | 12.4 | 78 | 84.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15550 | Q1.5 | Existing | 219 | 788.69 | 790.72 | 1.48 | 19.03 | 12 | 7.8 | | 0.02 | | 0.02 |
| | 15550 | Q1.5 | Proposed | 219 | 756.06 | 758.23 | 1.15 | 8.11 | 27 | 23.8 | | 0.06 | 0.10 | 0.05 |
| CULVERT #10 | 15500 | Q100 | Existing | 1145 | 781.80 | 787.68 | 4.37 | 27.6 | 41 | 9.5 | | 0.05 | | 0.05 |
| | 15500 | Q100 | Proposed | 1145 | 752.25 | 755.99 | 1.62 | 13.69 | 128 | 79.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15500 | Q10 | Existing | 653 | 781.80 | 792.44 | 6.09 | 6.77 | 97 | 15.9 | 0.03 | 0.05 | | 0.05 |
| | 15500 | Q10 | Proposed | 653 | 752.25 | 755.28 | 1.14 | 11.98 | 76 | 66.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15500 | Q1.5 | Existing | 219 | 781.80 | 784.21 | 1.55 | 18.67 | 12 | 7.6 | | 0.05 | | 0.05 |
| | 15500 | Q1.5 | Proposed | 219 | 752.25 | 754.24 | 1.19 | 8.65 | 25 | 21.3 | | 0.06 | 0.10 | 0.06 |
| | 15450 | Q100 | Proposed | 1145 | 748.42 | 752.41 | 1.80 | 13.6 | 123 | 68.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15450 | Q10 | Proposed | 653 | 748.42 | 751.62 | 1.40 | 11.51 | 75 | 53.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15450 | Q1.5 | Proposed | 219 | 748.42 | 750.55 | 0.94 | 7.99 | 28 | 29.9 | | 0.06 | 0.10 | 0.05 |
| | 15400 | Q100 | Proposed | 1145 | 744.50 | 748.75 | 1.78 | 14.22 | 118 | 66.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15400 | Q10 | Proposed | 653 | 744.50 | 747.91 | 1.43 | 12 | 70 | 48.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15400 | Q1.5 | Proposed | 219 | 744.50 | 746.62 | 1.34 | 8.71 | 25 | 18.8 | | 0.06 | 0.10 | 0.06 |
| | 15350 | Q100 | Proposed | 1145 | 740.46 | 744.48 | 1.69 | 15.39 | 108 | 64.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15350 | Q10 | Proposed | 653 | 740.46 | 743.71 | 1.33 | 12.91 | 64 | 48.4 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15350 | Q1.5 | Proposed | 219 | 740.46 | 742.60 | 1.41 | 8.54 | 26 | 18.2 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CULVERT #10 | 15300 | Q100 | Proposed | 1145 | 736.48 | 740.50 | 1.96 | 15.08 | 108 | 54.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15300 | Q10 | Proposed | 653 | 736.48 | 739.77 | 1.31 | 12.53 | 68 | 52.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15300 | Q1.5 | Proposed | 219 | 736.48 | 738.62 | 1.41 | 8.57 | 26 | 18.2 | | 0.06 | | 0.06 |
| | 15250 | Q100 | Proposed | 1145 | 732.49 | 736.55 | 2.14 | 14.97 | 104 | 48.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15250 | Q10 | Proposed | 653 | 732.49 | 735.74 | 1.45 | 12.66 | 66 | 45.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15250 | Q1.5 | Proposed | 219 | 732.49 | 734.62 | 1.41 | 8.57 | 26 | 18.2 | | 0.06 | | 0.06 |
| | 15200 | | | Culvert | | | | | | | | | | |
| | 15200 | Q100 | Proposed | 1145 | 728.50 | 732.66 | 2.33 | 14.96 | 101 | 43.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15200 | Q10 | Proposed | 653 | 728.50 | 731.78 | 1.61 | 12.55 | 65 | 40.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15200 | Q1.5 | Proposed | 219 | 728.50 | 730.63 | 1.41 | 8.58 | 26 | 18.1 | | 0.06 | | 0.06 |
| | 15150 | Q100 | Proposed | 1145 | 724.50 | 728.61 | 2.25 | 15.31 | 99 | 43.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15150 | Q10 | Proposed | 653 | 724.50 | 727.79 | 1.58 | 12.64 | 64 | 40.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15150 | Q1.5 | Proposed | 219 | 724.50 | 726.63 | 1.40 | 8.57 | 26 | 18.2 | | 0.06 | | 0.06 |
| | 15100 | Q100 | Proposed | 1145 | 720.52 | 724.63 | 2.21 | 15.28 | 99 | 45.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15100 | Q10 | Proposed | 653 | 720.52 | 723.81 | 1.54 | 12.66 | 64 | 41.4 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15100 | Q1.5 | Proposed | 219 | 720.52 | 722.65 | 1.40 | 8.54 | 26 | 18.3 | | 0.06 | | 0.06 |
| | 15050 | Q100 | Proposed | 1145 | 716.54 | 720.61 | 2.16 | 15.3 | 100 | 46.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15050 | Q10 | Proposed | 653 | 716.54 | 719.79 | 1.52 | 12.66 | 64 | 42.1 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15050 | Q1.5 | Proposed | 219 | 716.54 | 718.65 | 1.40 | 8.57 | 26 | 18.3 | | 0.06 | | 0.06 |
| | 15000 | Q100 | Proposed | 1145 | 712.56 | 716.64 | 2.09 | 15.21 | 103 | 49.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 15000 | Q10 | Proposed | 653 | 712.56 | 715.86 | 1.45 | 12.56 | 66 | 45.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 15000 | Q1.5 | Proposed | 219 | 712.56 | 714.71 | 1.41 | 8.49 | 26 | 18.3 | | 0.06 | | 0.06 |
| | 14950 | Q100 | Proposed | 1145 | 708.59 | 712.63 | 1.98 | 15.17 | 104 | 52.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14950 | Q10 | Proposed | 653 | 708.59 | 711.83 | 1.42 | 12.67 | 64 | 45.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 14950 | Q1.5 | Proposed | 219 | 708.59 | 710.69 | 1.38 | 8.6 | 25 | 18.4 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CULVERT #10 | 14923.42 | Q100 | Existing | 1145 | 705.88 | 713.26 | 4.60 | 13.7 | 101 | 22.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14923.42 | Q100 | Proposed | 1145 | 706.35 | 710.53 | 1.96 | 15.07 | 103 | 52.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14923.42 | Q10 | Existing | 653 | 705.88 | 711.27 | 3.52 | 11.64 | 62 | 17.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14923.42 | Q10 | Proposed | 653 | 706.35 | 709.66 | 1.52 | 12.65 | 62 | 40.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 14923.42 | Q1.5 | Existing | 219 | 705.88 | 708.25 | 1.72 | 11.59 | 19 | 11.0 | | 0.05 | 0.00 | 0.05 |
| | 14923.42 | Q1.5 | Proposed | 219 | 706.35 | 708.43 | 1.35 | 8.73 | 25 | 18.5 | | 0.06 | 0.00 | 0.06 |
| | 14900 | Q100 | Existing | 1145 | 704.46 | 710.45 | 3.64 | 16.92 | 77 | 21.1 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14900 | Q100 | Proposed | 1145 | 704.78 | 708.26 | 2.01 | 15.55 | 95 | 47.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14900 | Q10 | Existing | 653 | 704.46 | 709.03 | 2.85 | 14.05 | 49 | 17.4 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14900 | Q10 | Proposed | 653 | 704.78 | 707.44 | 1.51 | 13 | 59 | 39.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14900 | Q1.5 | Existing | 219 | 704.46 | 707.60 | 2.01 | 8.14 | 27 | 13.6 | | 0.07 | 0.10 | 0.06 |
| | 14900 | Q1.5 | Proposed | 219 | 704.78 | 706.43 | 1.22 | 8.37 | 27 | 21.8 | | 0.06 | 0.10 | 0.06 |
| | 14850 | Q100 | Existing | 1145 | 701.28 | 710.33 | 5.82 | 7.78 | 177 | 30.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14850 | Q100 | Proposed | 1145 | 701.28 | 706.42 | 2.30 | 13.35 | 137 | 59.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14850 | Q10 | Existing | 653 | 701.28 | 707.97 | 4.48 | 6.47 | 112 | 25.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14850 | Q10 | Proposed | 653 | 701.28 | 705.50 | 1.62 | 10.94 | 85 | 52.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14850 | Q1.5 | Existing | 219 | 701.28 | 704.90 | 2.59 | 4.76 | 46 | 17.9 | 0.10 | 0.05 | | 0.05 |
| | 14850 | Q1.5 | Proposed | 219 | 701.28 | 704.19 | 2.09 | 6.63 | 33 | 15.8 | 0.10 | 0.05 | | 0.05 |
| | 14802.52 | Q100 | Existing | 1145 | 700.05 | 708.01 | 4.54 | 14.32 | 121 | 26.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14802.52 | Q100 | Proposed | 1145 | 700.05 | 704.87 | 2.24 | 14.51 | 156 | 69.9 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14802.52 | Q10 | Existing | 653 | 700.05 | 705.97 | 3.48 | 12.2 | 73 | 20.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14802.52 | Q10 | Proposed | 653 | 700.05 | 704.19 | 1.67 | 11.55 | 110 | 65.9 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14802.52 | Q1.5 | Existing | 219 | 700.05 | 703.35 | 2.07 | 8.91 | 28 | 13.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14802.52 | Q1.5 | Proposed | 219 | 700.05 | 703.33 | 0.92 | 6.9 | 55 | 60.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14794.09 | Q100 | Existing | 1145 | 697.70 | 704.67 | 4.03 | 20.6 | 85 | 21.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14794.09 | Q100 | Proposed | 1145 | 697.70 | 703.03 | 1.62 | 17.18 | 127 | 78.5 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14794.09 | Q10 | Existing | 653 | 697.70 | 702.64 | 2.94 | 18.66 | 47 | 16.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14794.09 | Q10 | Proposed | 653 | 697.70 | 702.39 | 1.10 | 14.36 | 80 | 72.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14794.09 | Q1.5 | Existing | 219 | 697.70 | 700.24 | 1.54 | 15.49 | 16 | 10.2 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14794.09 | Q1.5 | Proposed | 219 | 697.70 | 700.47 | 1.72 | 13.69 | 16 | 9.3 | | 0.05 | | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14750 | Q100 | Existing | 1145 | 696.69 | 702.06 | 3.62 | 19.66 | 68 | 18.7 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14750 | Q100 | Proposed | 1145 | 696.69 | 701.15 | 1.83 | 14.8 | 152 | 82.9 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14750 | Q10 | Existing | 653 | 696.69 | 700.81 | 2.82 | 15.62 | 46 | 16.2 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14750 | Q10 | Proposed | 653 | 696.69 | 700.44 | 1.22 | 12.87 | 95 | 78.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14750 | Q1.5 | Existing | 219 | 696.69 | 699.52 | 1.93 | 8.52 | 26 | 13.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14750 | Q1.5 | Proposed | 219 | 696.69 | 699.60 | 0.78 | 7.75 | 37 | 47.3 | 0.10 | 0.05 | 0.10 | 0.03 |
| | | | | | | | | | | | | | | |
| | 14700 | Q100 | Existing | 1145 | 692.71 | 698.67 | 3.44 | 20.19 | 68 | 19.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14700 | Q100 | Proposed | 1145 | 692.71 | 697.47 | 1.78 | 17.4 | 135 | 76.0 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14700 | Q10 | Existing | 653 | 692.71 | 697.33 | 2.74 | 16.38 | 44 | 16.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14700 | Q10 | Proposed | 653 | 692.71 | 696.78 | 1.13 | 15.18 | 83 | 73.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14700 | Q1.5 | Existing | 219 | 692.71 | 695.33 | 1.63 | 12.78 | 17 | 10.6 | | 0.05 | 0.10 | 0.05 |
| | 14700 | Q1.5 | Proposed | 219 | 692.71 | 695.30 | 1.33 | 12.88 | 17 | 13.0 | 0.10 | 0.05 | 0.10 | 0.04 |
| | | | | | | | | | | | | | | |
| | 14667.14 | Q100 | Existing | 1145 | 687.94 | 692.19 | 2.72 | 24.05 | 49 | 18.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14667.14 | Q100 | Proposed | 1145 | 687.94 | 693.05 | 1.24 | 18 | 79 | 63.8 | 0.10 | 0.05 | 0.10 | 0.03 |
| | 14667.14 | Q10 | Existing | 653 | 687.94 | 691.18 | 2.02 | 20.42 | 32 | 15.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14667.14 | Q10 | Proposed | 653 | 687.94 | 691.54 | 2.31 | 17.66 | 37 | 16.2 | | 0.05 | 0.10 | 0.05 |
| | 14667.14 | Q1.5 | Existing | 219 | 687.94 | 689.96 | 1.28 | 14.58 | 15 | 11.7 | | 0.05 | | 0.05 |
| | 14667.14 | Q1.5 | Proposed | 219 | 687.94 | 689.97 | 1.30 | 14.46 | 15 | 11.7 | | 0.05 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 14650 | Q100 | Existing | 1145 | 687.66 | 692.34 | 3.02 | 19.82 | 63 | 20.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14650 | Q100 | Proposed | 1145 | 687.66 | 692.48 | 1.48 | 16.95 | 97 | 65.8 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14650 | Q10 | Existing | 653 | 687.66 | 691.44 | 2.46 | 15.02 | 45 | 18.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14650 | Q10 | Proposed | 653 | 687.66 | 691.62 | 1.52 | 13.51 | 54 | 35.9 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14650 | Q1.5 | Existing | 219 | 687.66 | 690.38 | 1.76 | 8.03 | 27 | 15.6 | 0.00 | 0.05 | 0.10 | 0.05 |
| | 14650 | Q1.5 | Proposed | 219 | 687.66 | 690.38 | 1.74 | 7.95 | 28 | 15.9 | | 0.05 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 14600 | Q100 | Existing | 1145 | 685.80 | 691.86 | 3.48 | 11.94 | 159 | 45.7 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14600 | Q100 | Proposed | 1145 | 685.80 | 689.95 | 1.65 | 16.82 | 125 | 75.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14600 | Q10 | Existing | 653 | 685.80 | 690.29 | 2.72 | 10.21 | 97 | 35.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14600 | Q10 | Proposed | 653 | 685.80 | 689.36 | 1.25 | 13.2 | 82 | 65.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14600 | Q1.5 | Existing | 219 | 685.80 | 688.73 | 1.57 | 6.59 | 46 | 29.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14600 | Q1.5 | Proposed | 219 | 685.80 | 688.68 | 1.18 | 6.59 | 46 | 38.8 | 0.10 | 0.05 | 0.10 | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14550 | Q100 | Existing | 1145 | 684.39 | 691.39 | 4.25 | 10.22 | 172 | 40.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14550 | Q100 | Proposed | 1145 | 684.39 | 690.73 | 3.37 | 7.92 | 257 | 76.4 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14550 | Q10 | Existing | 653 | 684.39 | 689.50 | 2.94 | 9.19 | 101 | 34.5 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14550 | Q10 | Proposed | 653 | 684.39 | 689.30 | 2.35 | 7.35 | 156 | 66.5 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14550 | Q1.5 | Existing | 219 | 684.39 | 687.38 | 1.22 | 7.45 | 34 | 28.1 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14550 | Q1.5 | Proposed | 219 | 684.39 | 687.51 | 0.88 | 6.73 | 44 | 50.1 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14500 | Q100 | Existing | 1145 | 682.99 | 689.58 | 3.82 | 12.58 | 118 | 30.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14500 | Q100 | Proposed | 1145 | 682.99 | 689.05 | 3.04 | 11.41 | 158 | 52.0 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14500 | Q10 | Existing | 653 | 682.99 | 687.95 | 2.89 | 10.67 | 72 | 24.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14500 | Q10 | Proposed | 653 | 682.99 | 687.76 | 2.31 | 9.85 | 97 | 42.2 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14500 | Q1.5 | Existing | 219 | 682.99 | 686.52 | 2.04 | 5.83 | 40 | 19.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14500 | Q1.5 | Proposed | 219 | 682.99 | 686.16 | 1.22 | 6.84 | 38 | 31.3 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 14450 | Q100 | Existing | 1145 | 681.13 | 687.19 | 2.63 | 11 | 145 | 54.9 | 0.04 | 0.05 | 0.10 | 0.04 |
| | 14450 | Q100 | Proposed | 1145 | 681.13 | 686.91 | 2.36 | 14.53 | 121 | 51.3 | 0.09 | 0.07 | 0.10 | 0.07 |
| | 14450 | Q10 | Existing | 653 | 681.13 | 687.75 | 3.09 | 4.95 | 176 | 57.1 | 0.04 | 0.05 | 0.10 | 0.04 |
| | 14450 | Q10 | Proposed | 653 | 681.13 | 686.19 | 2.22 | 11.31 | 88 | 39.8 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 14450 | Q1.5 | Existing | 219 | 681.13 | 684.96 | 2.04 | 9.59 | 34 | 16.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14450 | Q1.5 | Proposed | 219 | 681.13 | 684.70 | 1.43 | 7.77 | 40 | 27.7 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14412.75 | Q100 | Existing | 1145 | 679.63 | 686.06 | 2.97 | 10.82 | 158 | 53.0 | 0.04 | 0.05 | 0.10 | 0.04 |
| | 14412.75 | Q100 | Proposed | 1145 | 679.63 | 685.33 | 2.90 | 13.78 | 135 | 46.6 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 14412.75 | Q10 | Existing | 653 | 679.63 | 685.68 | 3.50 | 13.01 | 87 | 24.7 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14412.75 | Q10 | Proposed | 653 | 679.63 | 683.84 | 2.42 | 13.13 | 78 | 32.5 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 14412.75 | Q1.5 | Existing | 219 | 679.63 | 682.22 | 1.67 | 13.17 | 22 | 12.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14412.75 | Q1.5 | Proposed | 219 | 679.63 | 682.18 | 1.20 | 10.22 | 30 | 25.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14388.99 | Q100 | Existing | 1145 | 674.81 | 682.95 | 4.47 | 16.31 | 101 | 22.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14388.99 | Q100 | Proposed | 1145 | 674.81 | 681.09 | 2.80 | 18.24 | 84 | 29.9 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14388.99 | Q10 | Existing | 653 | 674.81 | 679.24 | 2.60 | 21.62 | 35 | 13.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14388.99 | Q10 | Proposed | 653 | 674.81 | 679.76 | 1.97 | 16.2 | 48 | 24.2 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14388.99 | Q1.5 | Existing | 219 | 674.81 | 677.31 | 1.44 | 17.25 | 13 | 9.1 | 0.10 | 0.05 | | 0.05 |
| | 14388.99 | Q1.5 | Proposed | 219 | 674.81 | 677.58 | 1.64 | 14.11 | 16 | 9.5 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14350 | Q100 | Existing | 1145 | 672.28 | 677.77 | 3.62 | 21.76 | 65 | 18.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14350 | Q100 | Proposed | 1145 | 672.28 | 677.86 | 2.85 | 17.75 | 89 | 31.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14350 | Q10 | Existing | 653 | 672.28 | 676.18 | 2.63 | 19.09 | 39 | 14.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14350 | Q10 | Proposed | 653 | 672.28 | 676.74 | 2.09 | 14.58 | 56 | 26.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 14350 | Q1.5 | Existing | 219 | 672.28 | 674.80 | 1.68 | 11.31 | 20 | 12.2 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14350 | Q1.5 | Proposed | 219 | 672.28 | 675.17 | 1.98 | 9.19 | 25 | 12.7 | | 0.06 | 0.10 | 0.06 |
| | 14300 | Q100 | Existing | 1145 | 667.57 | 673.70 | 3.91 | 23.95 | 71 | 18.2 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14300 | Q100 | Proposed | 1145 | 667.57 | 673.41 | 2.82 | 16.65 | 85 | 30.2 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14300 | Q10 | Existing | 653 | 667.57 | 672.35 | 2.86 | 19.27 | 48 | 16.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14300 | Q10 | Proposed | 653 | 667.57 | 672.39 | 2.08 | 13.67 | 56 | 27.0 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14300 | Q1.5 | Existing | 219 | 667.57 | 670.50 | 1.56 | 13.21 | 20 | 12.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14300 | Q1.5 | Proposed | 219 | 667.57 | 670.71 | 1.69 | 10.26 | 22 | 12.9 | | 0.07 | 0.10 | 0.07 |
| | 14250 | Q100 | Existing | 1145 | 664.33 | 667.97 | 2.42 | 23.4 | 64 | 26.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14250 | Q100 | Proposed | 1145 | 664.33 | 668.56 | 2.01 | 14.07 | 100 | 49.6 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14250 | Q10 | Existing | 653 | 664.33 | 667.17 | 1.79 | 18.78 | 44 | 24.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14250 | Q10 | Proposed | 653 | 664.33 | 667.82 | 1.45 | 11.21 | 64 | 44.2 | 0.10 | 0.07 | 0.10 | 0.05 |
| | 14250 | Q1.5 | Existing | 219 | 664.33 | 666.21 | 0.98 | 11.74 | 21 | 22.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14250 | Q1.5 | Proposed | 219 | 664.33 | 667.24 | 1.84 | 4.98 | 45 | 24.7 | | 0.07 | 0.10 | 0.07 |
| | 14192.69 | Q100 | Existing | 1145 | 662.17 | 667.79 | 3.76 | 12.41 | 108 | 28.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14192.69 | Q100 | Proposed | 1145 | 662.17 | 667.52 | 2.84 | 10.76 | 145 | 50.9 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 14192.69 | Q10 | Existing | 653 | 662.17 | 666.50 | 2.78 | 10.08 | 72 | 26.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14192.69 | Q10 | Proposed | 653 | 662.17 | 666.51 | 1.98 | 8.9 | 95 | 48.0 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14192.69 | Q1.5 | Existing | 219 | 662.17 | 664.78 | 1.42 | 7.24 | 31 | 21.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14192.69 | Q1.5 | Proposed | 219 | 662.17 | 664.80 | 1.42 | 7.14 | 31 | 21.9 | | 0.06 | 0.10 | 0.06 |
| | 14150 | Q100 | Existing | 1145 | 660.23 | 664.78 | 2.89 | 14.67 | 88 | 30.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14150 | Q100 | Proposed | 1145 | 660.23 | 664.76 | 2.18 | 13.09 | 115 | 52.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14150 | Q10 | Existing | 653 | 660.23 | 663.76 | 2.17 | 11.99 | 58 | 27.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14150 | Q10 | Proposed | 653 | 660.23 | 663.85 | 1.40 | 11.14 | 68 | 48.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 14150 | Q1.5 | Existing | 219 | 660.23 | 662.64 | 1.30 | 7.39 | 30 | 23.3 | 0.00 | 0.05 | 0.10 | 0.05 |
| | 14150 | Q1.5 | Proposed | 219 | 660.23 | 662.68 | 1.33 | 7.16 | 31 | 23.6 | | 0.06 | 0.10 | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 14096.7 | Q100 | Existing | 1145 | 658.49 | 664.23 | 4.07 | 11.08 | 178 | 43.8 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14096.7 | Q100 | Proposed | 1145 | 658.49 | 663.75 | 3.04 | 7.9 | 195 | 64.1 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 14096.7 | Q10 | Existing | 653 | 658.49 | 662.61 | 2.64 | 10.04 | 109 | 41.4 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14096.7 | Q10 | Proposed | 653 | 658.49 | 662.59 | 2.03 | 6.91 | 122 | 60.3 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 14096.7 | Q1.5 | Existing | 219 | 658.49 | 661.04 | 1.20 | 7.41 | 46 | 38.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14096.7 | Q1.5 | Proposed | 219 | 658.49 | 660.93 | 1.10 | 5.98 | 42 | 38.3 | | 0.06 | 0.10 | 0.06 |
| | | | | | | | | | | | | | | |
| | 14081.95 | Q100 | Existing | 1145 | 657.82 | 663.13 | 3.51 | 13.48 | 143 | 40.7 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 14081.95 | Q100 | Proposed | 1145 | 657.82 | 662.74 | 2.56 | 10.44 | 151 | 59.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14081.95 | Q10 | Existing | 653 | 657.82 | 661.97 | 2.61 | 10.8 | 98 | 37.5 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 14081.95 | Q10 | Proposed | 653 | 657.82 | 661.70 | 1.84 | 8.95 | 93 | 50.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14081.95 | Q1.5 | Existing | 219 | 657.82 | 660.29 | 1.07 | 8.46 | 37 | 34.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 14081.95 | Q1.5 | Proposed | 219 | 657.82 | 660.34 | 1.12 | 6.49 | 39 | 34.9 | | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 14050 | Q100 | Existing | 1145 | 657.20 | 662.81 | 4.09 | 7.31 | 170 | 41.6 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14050 | Q100 | Proposed | 1145 | 657.20 | 662.24 | 2.94 | 7.47 | 182 | 61.8 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14050 | Q10 | Existing | 653 | 657.20 | 661.30 | 2.94 | 6.22 | 111 | 37.6 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14050 | Q10 | Proposed | 653 | 657.20 | 661.20 | 2.06 | 6.14 | 119 | 57.9 | 0.10 | 0.08 | 0.10 | 0.06 |
| | 14050 | Q1.5 | Existing | 219 | 657.20 | 659.59 | 1.52 | 4.42 | 50 | 33.0 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 14050 | Q1.5 | Proposed | 219 | 657.20 | 659.54 | 1.48 | 4.56 | 48 | 32.7 | | 0.08 | 0.10 | 0.07 |
| | | | | | | | | | | | | | | |
| | 14000 | Q100 | Existing | 1145 | 655.73 | 661.50 | 3.88 | 9.27 | 149 | 38.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14000 | Q100 | Proposed | 1145 | 655.73 | 660.53 | 2.50 | 9.91 | 160 | 64.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14000 | Q10 | Existing | 653 | 655.73 | 659.93 | 2.88 | 7.91 | 93 | 32.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14000 | Q10 | Proposed | 653 | 655.73 | 659.49 | 1.61 | 8.46 | 96 | 59.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 14000 | Q1.5 | Existing | 219 | 655.73 | 658.15 | 1.63 | 5.5 | 42 | 25.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 14000 | Q1.5 | Proposed | 219 | 655.73 | 658.10 | 1.60 | 5.52 | 41 | 25.8 | | 0.06 | 0.10 | 0.06 |
| | | | | | | | | | | | | | | |
| | 13950 | Q100 | Existing | 1145 | 653.77 | 659.47 | 3.79 | 11.89 | 108 | 28.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13950 | Q100 | Proposed | 1145 | 653.77 | 659.13 | 2.83 | 10.79 | 152 | 53.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13950 | Q10 | Existing | 653 | 653.77 | 658.04 | 2.80 | 9.99 | 70 | 24.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13950 | Q10 | Proposed | 653 | 653.77 | 657.98 | 1.88 | 9.33 | 93 | 49.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13950 | Q1.5 | Existing | 219 | 653.77 | 656.29 | 1.56 | 7.24 | 31 | 19.6 | | 0.06 | 0.10 | 0.05 |
| | 13950 | Q1.5 | Proposed | 219 | 653.77 | 656.28 | 1.56 | 7.3 | 30 | 19.4 | | 0.06 | 0.10 | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13900 | Q100 | Existing | 1145 | 650.13 | 655.72 | 3.39 | 15.92 | 80 | 23.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13900 | Q100 | Proposed | 1145 | 650.13 | 655.95 | 2.27 | 14.24 | 110 | 48.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13900 | Q10 | Existing | 653 | 650.13 | 654.30 | 2.60 | 13.75 | 49 | 19.0 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13900 | Q10 | Proposed | 653 | 650.13 | 654.77 | 1.80 | 12.41 | 58 | 32.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13900 | Q1.5 | Existing | 219 | 650.13 | 652.64 | 1.44 | 10.31 | 21 | 14.9 | | 0.05 | 0.10 | 0.05 |
| | 13900 | Q1.5 | Proposed | 219 | 650.13 | 653.66 | 2.25 | 6.27 | 36 | 16.0 | | 0.06 | 0.10 | 0.06 |
| | 13850 | Q100 | Existing | 1145 | 649.64 | 654.70 | 3.27 | 13.44 | 101 | 30.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13850 | Q100 | Proposed | 1145 | 649.64 | 654.19 | 2.19 | 12.04 | 133 | 60.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13850 | Q10 | Existing | 653 | 649.64 | 653.75 | 2.68 | 10.06 | 73 | 27.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13850 | Q10 | Proposed | 653 | 649.64 | 653.59 | 1.70 | 8.87 | 98 | 57.4 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13850 | Q1.5 | Existing | 219 | 649.64 | 651.99 | 1.51 | 7.2 | 31 | 20.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13850 | Q1.5 | Proposed | 219 | 649.64 | 652.00 | 1.46 | 7.03 | 32 | 21.7 | | 0.06 | 0.10 | 0.05 |
| | 13800 | Q100 | Existing | 1145 | 647.10 | 654.19 | 4.54 | 7.15 | 176 | 38.8 | | 0.08 | 0.10 | 0.07 |
| | 13800 | Q100 | Proposed | 1145 | 647.10 | 652.77 | 2.53 | 9.54 | 160 | 63.0 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 13800 | Q10 | Existing | 653 | 647.10 | 652.47 | 3.36 | 6.18 | 114 | 33.8 | | 0.07 | 0.10 | 0.07 |
| | 13800 | Q10 | Proposed | 653 | 647.10 | 651.82 | 1.82 | 7.77 | 103 | 56.5 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 13800 | Q1.5 | Existing | 219 | 647.10 | 650.47 | 1.86 | 4.33 | 52 | 27.9 | | 0.07 | 0.10 | 0.07 |
| | 13800 | Q1.5 | Proposed | 219 | 647.10 | 650.48 | 1.78 | 4.8 | 47 | 26.5 | | 0.07 | 0.10 | 0.06 |
| | 13750 | Q100 | Existing | 1145 | 646.00 | 651.86 | 3.74 | 12.4 | 127 | 34.0 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13750 | Q100 | Proposed | 1145 | 646.00 | 651.41 | 2.50 | 10.62 | 181 | 72.2 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 13750 | Q10 | Existing | 653 | 646.00 | 650.54 | 2.66 | 10.23 | 84 | 31.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13750 | Q10 | Proposed | 653 | 646.00 | 650.49 | 1.78 | 8.82 | 117 | 65.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13750 | Q1.5 | Existing | 219 | 646.00 | 648.91 | 1.23 | 7.14 | 35 | 28.3 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 13750 | Q1.5 | Proposed | 219 | 646.00 | 648.98 | 1.30 | 6.75 | 37 | 28.5 | | 0.05 | 0.10 | 0.05 |
| | 13700 | Q100 | Existing | 1145 | 644.74 | 649.39 | 2.81 | 13.89 | 102 | 36.4 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 13700 | Q100 | Proposed | 1145 | 644.74 | 650.41 | 2.64 | 7.53 | 222 | 83.9 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 13700 | Q10 | Existing | 653 | 644.74 | 649.00 | 2.50 | 9.08 | 88 | 35.1 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 13700 | Q10 | Proposed | 653 | 644.74 | 649.37 | 1.86 | 6.51 | 139 | 74.7 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 13700 | Q1.5 | Existing | 219 | 644.74 | 647.58 | 1.36 | 6.02 | 41 | 30.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13700 | Q1.5 | Proposed | 219 | 644.74 | 647.68 | 1.44 | 5.52 | 45 | 31.0 | | 0.07 | 0.10 | 0.07 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13657.14 | Q100 | Existing | 1145 | 644.12 | 648.73 | 3.13 | 10.53 | 117 | 37.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13657.14 | Q100 | Proposed | 1145 | 644.12 | 648.76 | 2.14 | 9.37 | 154 | 72.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13657.14 | Q10 | Existing | 653 | 644.12 | 648.14 | 2.69 | 7.22 | 96 | 35.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13657.14 | Q10 | Proposed | 653 | 644.12 | 647.71 | 1.45 | 8.28 | 85 | 58.9 | 0.10 | 0.06 | 0.10 | 0.04 |
| | 13657.14 | Q1.5 | Existing | 219 | 644.12 | 646.50 | 1.40 | 5.32 | 42 | 29.9 | | 0.06 | 0.10 | 0.05 |
| | 13657.14 | Q1.5 | Proposed | 219 | 644.12 | 646.46 | 1.37 | 5.5 | 40 | 29.5 | | 0.06 | 0.10 | 0.05 |
| | 13594.58 | Q100 | Existing | 1145 | 642.80 | 648.34 | 4.31 | 6.38 | 228 | 53.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13594.58 | Q100 | Proposed | 1145 | 642.80 | 646.47 | 2.25 | 10.91 | 132 | 58.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13594.58 | Q10 | Existing | 653 | 642.80 | 648.23 | 4.20 | 3.73 | 223 | 52.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13594.58 | Q10 | Proposed | 653 | 642.80 | 645.64 | 1.88 | 8.92 | 90 | 47.9 | | 0.05 | 0.10 | 0.06 |
| | 13594.58 | Q1.5 | Existing | 219 | 642.80 | 644.60 | 1.00 | 5.99 | 43 | 42.4 | | 0.05 | 0.10 | 0.06 |
| | 13594.58 | Q1.5 | Proposed | 219 | 642.80 | 644.60 | 1.00 | 6.04 | 43 | 42.4 | | 0.05 | 0.10 | 0.05 |
| | 13560.62 | Q100 | Existing | 1145 | 641.52 | 648.25 | 5.27 | 6.45 | 298 | 56.6 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13560.62 | Q100 | Proposed | 1145 | 641.52 | 646.15 | 2.30 | 6.64 | 206 | 89.6 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 13560.62 | Q10 | Existing | 653 | 641.52 | 648.21 | 5.23 | 3.71 | 295 | 56.4 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13560.62 | Q10 | Proposed | 653 | 641.52 | 645.35 | 2.00 | 5.06 | 142 | 70.8 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 13560.62 | Q1.5 | Existing | 219 | 641.52 | 644.01 | 1.58 | 4.53 | 76 | 48.4 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13560.62 | Q1.5 | Proposed | 219 | 641.52 | 643.97 | 1.55 | 3.28 | 70 | 45.1 | | 0.07 | 0.10 | 0.07 |
| | 13500 | Q100 | Existing | 1145 | 640.53 | 648.09 | 5.28 | 5.9 | 338 | 64.0 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13500 | Q100 | Proposed | 1145 | 640.53 | 645.20 | 2.10 | 7.24 | 253 | 120.5 | 0.09 | 0.06 | 0.10 | 0.07 |
| | 13500 | Q10 | Existing | 653 | 640.53 | 648.15 | 5.33 | 3.33 | 342 | 64.2 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13500 | Q10 | Proposed | 653 | 640.53 | 644.33 | 1.46 | 6.39 | 155 | 106.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13500 | Q1.5 | Existing | 219 | 640.53 | 642.73 | 1.13 | 6.75 | 49 | 43.1 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13500 | Q1.5 | Proposed | 219 | 640.53 | 643.07 | 1.41 | 4.51 | 66 | 46.7 | | 0.06 | 0.10 | 0.07 |
| | 13450 | Q100 | Existing | 1145 | 638.15 | 648.18 | 3.79 | 3.27 | 566 | 149.5 | 0.03 | 0.05 | 0.10 | 0.05 |
| | 13450 | Q100 | Proposed | 1145 | 638.15 | 643.90 | 1.95 | 9.23 | 211 | 108.3 | 0.09 | 0.05 | 0.10 | 0.05 |
| | 13450 | Q10 | Existing | 653 | 638.15 | 648.18 | 3.79 | 1.86 | 567 | 149.5 | 0.03 | 0.05 | 0.10 | 0.05 |
| | 13450 | Q10 | Proposed | 653 | 638.15 | 643.01 | 1.50 | 8.08 | 127 | 84.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13450 | Q1.5 | Existing | 219 | 638.15 | 640.88 | 1.53 | 7.6 | 29 | 19.2 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13450 | Q1.5 | Proposed | 219 | 638.15 | 641.28 | 1.55 | 7.18 | 31 | 19.7 | | 0.05 | | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13426.44 | Q100 | Existing | 1145 | 637.86 | 648.20 | 4.62 | 2.26 | 651 | 140.7 | 0.03 | 0.06 | 0.10 | 0.05 |
| | 13426.44 | Q100 | Proposed | 1145 | 637.86 | 641.93 | 1.82 | 13.21 | 132 | 72.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13426.44 | Q10 | Existing | 653 | 637.86 | 648.19 | 4.62 | 1.29 | 650 | 140.7 | 0.03 | 0.06 | 0.10 | 0.05 |
| | 13426.44 | Q10 | Proposed | 653 | 637.86 | 641.11 | 1.16 | 11.74 | 75 | 64.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13426.44 | Q1.5 | Existing | 219 | 637.86 | 640.44 | 1.55 | 6.17 | 38 | 24.7 | | 0.06 | 0.10 | 0.06 |
| | 13426.44 | Q1.5 | Proposed | 219 | 637.86 | 639.97 | 1.24 | 8.13 | 27 | 22.1 | | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 13400 | Q100 | Existing | 1145 | 635.37 | 648.21 | 6.39 | 1.93 | 925 | 144.7 | 0.04 | 0.05 | 0.10 | 0.05 |
| | 13400 | Q100 | Proposed | 1145 | 635.37 | 641.71 | 2.77 | 6.44 | 279 | 100.6 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 13400 | Q10 | Existing | 653 | 635.37 | 648.19 | 6.38 | 1.1 | 922 | 144.7 | 0.04 | 0.05 | 0.10 | 0.05 |
| | 13400 | Q10 | Proposed | 653 | 635.37 | 640.49 | 1.74 | 6.07 | 160 | 92.3 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 13400 | Q1.5 | Existing | 219 | 635.37 | 640.73 | 2.37 | 2.22 | 152 | 63.9 | 0.05 | 0.05 | 0.10 | 0.05 |
| | 13400 | Q1.5 | Proposed | 219 | 635.37 | 639.16 | 1.31 | 3.93 | 64 | 48.6 | 0.10 | 0.07 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 13350 | Q100 | Existing | 1145 | 634.00 | 648.19 | 5.92 | 2.45 | 841 | 142.1 | 0.04 | 0.05 | 0.10 | 0.06 |
| | 13350 | Q100 | Proposed | 1145 | 635.68 | 641.10 | 3.14 | 6.73 | 250 | 79.6 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 13350 | Q10 | Existing | 653 | 634.00 | 648.18 | 5.92 | 1.4 | 841 | 142.1 | 0.04 | 0.05 | 0.10 | 0.06 |
| | 13350 | Q10 | Proposed | 653 | 635.68 | 639.73 | 2.05 | 6.28 | 147 | 72.0 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 13350 | Q1.5 | Existing | 219 | 634.00 | 640.71 | 3.98 | 2.1 | 178 | 44.9 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13350 | Q1.5 | Proposed | 219 | 635.68 | 638.31 | 1.04 | 4.89 | 53 | 50.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| CULVERT #8 | 13335.55 | Q100 | Existing | 1145 | 634.01 | 647.84 | 5.15 | 6.27 | 326 | 63.3 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13335.55 | Q100 | Proposed | 1145 | 635.28 | 640.89 | 3.17 | 6.55 | 229 | 72.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13335.55 | Q10 | Existing | 653 | 634.01 | 648.09 | 5.31 | 3.42 | 342 | 64.3 | 0.10 | 0.05 | 0.10 | 0.08 |
| | 13335.55 | Q10 | Proposed | 653 | 635.28 | 639.49 | 2.09 | 6.05 | 134 | 64.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13335.55 | Q1.5 | Existing | 219 | 634.01 | 640.07 | 3.26 | 6.21 | 36 | 11.1 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 13335.55 | Q1.5 | Proposed | 219 | 635.28 | 637.93 | 1.07 | 4.98 | 45 | 41.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 13300 | | | Culvert | | | | | | | | | | |
| | 13300 | Q100 | Proposed | 1145 | 634.82 | 640.28 | 3.40 | 7.51 | 195 | 57.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13300 | Q100 | Proposed | 653 | 634.82 | 638.83 | 2.36 | 6.63 | 117 | 49.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13300 | Q1.5 | Proposed | 219 | 634.82 | 637.09 | 1.57 | 4.94 | 44 | 28.2 | 0.10 | 0.06 | 0.10 | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CULVERT #8 | 13238.93 | Q100 | Existing | 1276 | 632.54 | 641.63 | 4.89 | 15 | 131 | 26.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13238.93 | Q100 | Proposed | 1276 | 633.00 | 638.79 | 3.27 | 9.55 | 164 | 50.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13238.93 | Q10 | Existing | 728 | 632.54 | 639.39 | 3.78 | 12.8 | 78 | 20.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13238.93 | Q10 | Proposed | 728 | 633.00 | 637.89 | 2.73 | 6.98 | 121 | 44.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13238.93 | Q1.5 | Existing | 244 | 632.54 | 636.43 | 2.28 | 9.41 | 29 | 12.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13238.93 | Q1.5 | Proposed | 244 | 633.00 | 636.50 | 1.96 | 3.86 | 65 | 33.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13208.08 | Q100 | Existing | 1276 | 631.15 | 636.50 | 3.15 | 21.83 | 81 | 25.7 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13208.08 | Q100 | Proposed | 1276 | 631.43 | 637.81 | 2.87 | 12.07 | 161 | 56.2 | 0.10 | 0.06 | 0.10 | 0.08 |
| | 13208.08 | Q10 | Existing | 728 | 631.15 | 635.26 | 2.37 | 18.54 | 51 | 21.7 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13208.08 | Q10 | Proposed | 728 | 631.43 | 636.87 | 2.15 | 10.03 | 111 | 51.6 | 0.10 | 0.06 | 0.10 | 0.08 |
| | 13208.08 | Q1.5 | Existing | 244 | 631.15 | 633.86 | 1.36 | 12.55 | 24 | 17.6 | 0.10 | 0.05 | | 0.05 |
| | 13208.08 | Q1.5 | Proposed | 244 | 631.43 | 635.71 | 1.17 | 6.87 | 54 | 46.0 | 0.10 | 0.06 | | 0.06 |
| | 13200 | Q100 | Existing | 1276 | 630.29 | 635.23 | 2.87 | 22.86 | 82 | 28.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13200 | Q100 | Proposed | 1276 | 630.29 | 636.21 | 2.56 | 14.41 | 136 | 53.2 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13200 | Q10 | Existing | 728 | 630.29 | 634.18 | 2.11 | 18.9 | 53 | 25.3 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13200 | Q10 | Proposed | 728 | 630.29 | 635.05 | 1.65 | 12.94 | 78 | 47.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13200 | Q1.5 | Existing | 244 | 630.29 | 632.85 | 1.07 | 12.78 | 22 | 20.9 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 13200 | Q1.5 | Proposed | 244 | 630.29 | 632.78 | 1.57 | 13.41 | 18 | 11.6 | | 0.05 | | 0.05 |
| | 13171.14 | Q100 | Existing | 1276 | 627.89 | 635.77 | 4.93 | 8.9 | 229 | 46.4 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 13171.14 | Q100 | Proposed | 1276 | 627.89 | 635.57 | 3.95 | 7.89 | 244 | 61.8 | 0.08 | 0.05 | 0.10 | 0.06 |
| | 13171.14 | Q10 | Existing | 728 | 627.89 | 633.76 | 3.27 | 8.03 | 139 | 42.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13171.14 | Q10 | Proposed | 728 | 627.89 | 634.00 | 2.82 | 7.3 | 153 | 54.5 | 0.09 | 0.05 | 0.10 | 0.06 |
| | 13171.14 | Q1.5 | Existing | 244 | 627.89 | 630.68 | 1.72 | 10.89 | 22 | 13.0 | | 0.05 | | 0.05 |
| | 13171.14 | Q1.5 | Proposed | 244 | 627.89 | 630.76 | 1.40 | 10.45 | 23 | 16.7 | 0.10 | 0.05 | | 0.04 |
| | 13150 | Q100 | Existing | 1276 | 627.52 | 635.51 | 5.24 | 9.24 | 217 | 41.5 | 0.10 | 0.05 | 0.06 | 0.06 |
| | 13150 | Q100 | Proposed | 1276 | 627.52 | 634.27 | 3.22 | 12 | 185 | 57.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13150 | Q10 | Existing | 728 | 627.52 | 633.57 | 3.71 | 7.87 | 140 | 37.9 | 0.10 | 0.05 | 0.05 | 0.06 |
| | 13150 | Q10 | Proposed | 728 | 627.52 | 633.06 | 2.28 | 9.89 | 119 | 52.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13150 | Q1.5 | Existing | 244 | 627.52 | 631.00 | 1.48 | 6.64 | 49 | 33.2 | 0.10 | 0.05 | 0.05 | 0.05 |
| | 13150 | Q1.5 | Proposed | 244 | 627.52 | 630.75 | 1.56 | 7.88 | 35 | 22.5 | 0.10 | 0.05 | 0.10 | 0.04 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 13112.96 | Q100 | Existing | 1276 | 626.28 | 633.66 | 4.13 | 14.05 | 151 | 36.6 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13112.96 | Q100 | Proposed | 1276 | 626.28 | 632.49 | 2.63 | 14.68 | 151 | 57.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13112.96 | Q10 | Existing | 728 | 626.28 | 632.05 | 3.09 | 11.69 | 96 | 31.2 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 13112.96 | Q10 | Proposed | 728 | 626.28 | 631.27 | 1.98 | 12.74 | 88 | 44.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13112.96 | Q1.5 | Existing | 244 | 626.28 | 629.79 | 1.69 | 8.58 | 35 | 20.9 | 0.09 | 0.05 | 0.10 | 0.05 |
| | 13112.96 | Q1.5 | Proposed | 244 | 626.28 | 629.76 | 1.47 | 8.06 | 36 | 24.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 13087 | Q100 | Existing | 1276 | 624.08 | 630.09 | 3.06 | 17.96 | 88 | 28.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13087 | Q100 | Proposed | 1276 | 624.08 | 630.31 | 2.77 | 16.32 | 112 | 40.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13087 | Q10 | Existing | 728 | 624.08 | 628.62 | 2.10 | 15.98 | 49 | 23.4 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 13087 | Q10 | Proposed | 728 | 624.08 | 628.91 | 1.83 | 14.64 | 60 | 32.9 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 13087 | Q1.5 | Existing | 244 | 624.08 | 626.50 | 1.70 | 13.71 | 18 | 10.5 | | 0.05 | | 0.05 |
| | 13087 | Q1.5 | Proposed | 244 | 624.08 | 626.58 | 1.76 | 13.13 | 19 | 10.6 | | 0.05 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 13050 | Q100 | Existing | 1276 | 622.58 | 628.12 | 3.11 | 17.88 | 92 | 29.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13050 | Q100 | Proposed | 1276 | 622.58 | 628.37 | 3.26 | 16.62 | 100 | 30.5 | 0.10 | 0.05 | 0.06 | 0.05 |
| | 13050 | Q10 | Existing | 728 | 622.58 | 627.09 | 2.38 | 14.06 | 63 | 26.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13050 | Q10 | Proposed | 728 | 622.58 | 627.03 | 2.34 | 14.31 | 62 | 26.4 | 0.10 | 0.05 | 0.05 | 0.05 |
| | 13050 | Q1.5 | Existing | 244 | 622.58 | 625.81 | 1.69 | 8.08 | 33 | 19.5 | 0.10 | 0.05 | | 0.05 |
| | 13050 | Q1.5 | Proposed | 244 | 622.58 | 625.82 | 1.69 | 8.06 | 33 | 19.6 | 0.10 | 0.05 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 13000 | Q100 | Existing | 1276 | 619.73 | 627.46 | 4.16 | 14.19 | 118 | 28.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13000 | Q100 | Proposed | 1276 | 619.73 | 627.61 | 4.23 | 13.62 | 122 | 28.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 13000 | Q10 | Existing | 728 | 619.73 | 625.53 | 3.05 | 12.48 | 69 | 22.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 13000 | Q10 | Proposed | 728 | 619.73 | 625.80 | 3.19 | 11.55 | 75 | 23.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 13000 | Q1.5 | Existing | 244 | 619.73 | 623.11 | 1.91 | 10.11 | 24 | 12.7 | 0.00 | 0.05 | | 0.05 |
| | 13000 | Q1.5 | Proposed | 244 | 619.73 | 623.18 | 1.93 | 9.73 | 25 | 13.0 | 0.10 | 0.06 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 12950 | Q100 | Existing | 1276 | 616.64 | 622.93 | 2.88 | 19.71 | 91 | 31.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12950 | Q100 | Proposed | 1276 | 616.64 | 622.97 | 2.92 | 18.32 | 92 | 31.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12950 | Q10 | Existing | 728 | 616.64 | 621.72 | 2.13 | 16.17 | 55 | 25.8 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 12950 | Q10 | Proposed | 728 | 616.64 | 621.80 | 2.15 | 15.08 | 57 | 26.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12950 | Q1.5 | Existing | 244 | 616.64 | 619.83 | 2.11 | 10.8 | 23 | 10.7 | 0.00 | 0.05 | | 0.05 |
| | 12950 | Q1.5 | Proposed | 244 | 616.64 | 620.00 | 2.15 | 9.99 | 24 | 11.4 | | 0.06 | 0.10 | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12900 | Q100 | Existing | 1276 | 614.95 | 621.19 | 3.13 | 16.54 | 98 | 31.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12900 | Q100 | Proposed | 1276 | 614.95 | 622.29 | 3.94 | 12.67 | 134 | 33.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12900 | Q10 | Existing | 728 | 614.95 | 619.97 | 2.20 | 13.37 | 62 | 27.9 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 12900 | Q10 | Proposed | 728 | 614.95 | 620.61 | 2.70 | 10.96 | 80 | 29.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12900 | Q1.5 | Existing | 244 | 614.95 | 618.18 | 2.25 | 8.47 | 29 | 12.8 | | 0.05 | | 0.05 |
| | 12900 | Q1.5 | Proposed | 244 | 614.95 | 618.17 | 2.24 | 8.54 | 29 | 12.8 | | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 12850 | Q100 | Existing | 1276 | 613.16 | 621.61 | 4.69 | 10.06 | 162 | 34.6 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12850 | Q100 | Proposed | 1276 | 613.16 | 620.04 | 3.30 | 14.04 | 115 | 35.0 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 12850 | Q10 | Existing | 728 | 613.16 | 619.73 | 3.50 | 8.5 | 102 | 29.2 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12850 | Q10 | Proposed | 728 | 613.16 | 619.01 | 2.82 | 10.32 | 82 | 29.1 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 12850 | Q1.5 | Existing | 244 | 613.16 | 617.37 | 2.61 | 5.52 | 45 | 17.2 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12850 | Q1.5 | Proposed | 244 | 613.16 | 617.19 | 2.62 | 5.86 | 42 | 16.0 | 0.09 | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 12800 | Q100 | Existing | 1276 | 612.41 | 619.51 | 4.00 | 12.99 | 132 | 33.1 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12800 | Q100 | Proposed | 1276 | 612.41 | 619.16 | 3.40 | 12.42 | 144 | 42.2 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 12800 | Q10 | Existing | 728 | 612.41 | 617.79 | 3.01 | 11 | 81 | 26.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12800 | Q10 | Proposed | 728 | 612.41 | 617.72 | 2.59 | 10.51 | 89 | 34.3 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 12800 | Q1.5 | Existing | 244 | 612.41 | 615.39 | 2.23 | 8.43 | 29 | 13.0 | | 0.05 | | 0.05 |
| | 12800 | Q1.5 | Proposed | 244 | 612.41 | 615.36 | 2.21 | 8.49 | 29 | 13.0 | | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 12750 | Q100 | Existing | 1276 | 610.30 | 615.61 | 2.85 | 17 | 88 | 30.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12750 | Q100 | Proposed | 1276 | 610.30 | 615.98 | 2.41 | 14.87 | 111 | 46.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12750 | Q10 | Existing | 728 | 610.30 | 614.35 | 2.48 | 14.31 | 53 | 21.2 | | 0.05 | 0.10 | 0.05 |
| | 12750 | Q10 | Proposed | 728 | 610.30 | 614.73 | 2.29 | 12.64 | 62 | 26.9 | 0.08 | 0.06 | 0.10 | 0.05 |
| | 12750 | Q1.5 | Existing | 244 | 610.30 | 613.62 | 2.27 | 6.32 | 39 | 17.0 | | 0.05 | 0.10 | 0.05 |
| | 12750 | Q1.5 | Proposed | 244 | 610.30 | 613.84 | 2.33 | 5.79 | 42 | 18.3 | | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 12700 | Q100 | Existing | 1276 | 608.75 | 616.22 | 3.94 | 12.78 | 143 | 36.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12700 | Q100 | Proposed | 1276 | 608.75 | 615.29 | 3.07 | 11.91 | 163 | 53.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12700 | Q10 | Existing | 728 | 608.75 | 614.45 | 2.65 | 11.13 | 82 | 31.0 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 12700 | Q10 | Proposed | 728 | 608.75 | 614.17 | 2.26 | 9.72 | 107 | 47.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12700 | Q1.5 | Existing | 244 | 608.75 | 612.00 | 2.02 | 8.34 | 30 | 14.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12700 | Q1.5 | Proposed | 244 | 608.75 | 612.05 | 2.05 | 8.23 | 30 | 14.4 | | 0.06 | | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12650 | Q100 | Existing | 1276 | 606.96 | 612.25 | 2.73 | 17.21 | 85 | 31.1 | 0.10 | 0.05 | 0.10 | 0.04 |
| | 12650 | Q100 | Proposed | 1276 | 606.96 | 612.60 | 2.60 | 14.11 | 124 | 47.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12650 | Q10 | Existing | 728 | 606.96 | 610.97 | 2.40 | 14.76 | 50 | 20.7 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12650 | Q10 | Proposed | 728 | 606.96 | 611.40 | 1.71 | 12.32 | 70 | 41.1 | 0.10 | 0.06 | 0.10 | 0.04 |
| | 12650 | Q1.5 | Existing | 244 | 606.96 | 610.52 | 2.48 | 5.87 | 42 | 16.8 | | 0.05 | | 0.05 |
| | 12650 | Q1.5 | Proposed | 244 | 606.96 | 610.45 | 2.23 | 6.03 | 41 | 18.2 | 0.10 | 0.06 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 12600 | Q100 | Existing | 1276 | 605.60 | 612.46 | 3.75 | 9.61 | 170 | 45.4 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 12600 | Q100 | Proposed | 1276 | 605.60 | 611.63 | 2.88 | 11.66 | 162 | 56.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12600 | Q10 | Existing | 728 | 605.60 | 610.82 | 2.49 | 9.01 | 100 | 40.3 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 12600 | Q10 | Proposed | 728 | 605.60 | 610.68 | 2.11 | 9.26 | 111 | 52.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12600 | Q1.5 | Existing | 244 | 605.60 | 608.92 | 1.80 | 7.19 | 34 | 19.0 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 12600 | Q1.5 | Proposed | 244 | 605.60 | 608.83 | 1.87 | 7.63 | 32 | 17.1 | | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 12590.0* | Q100 | Proposed | 1276 | 605.24 | 611.10 | 2.79 | 12.52 | 154 | 55.1 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 12590.0* | Q10 | Proposed | 728 | 605.24 | 610.01 | 1.94 | 10.62 | 97 | 49.9 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 12590.0* | Q1.5 | Proposed | 244 | 605.24 | 608.44 | 1.37 | 7.67 | 33 | 24.0 | 0.09 | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 12580.0* | Q100 | Proposed | 1276 | 604.88 | 610.32 | 2.51 | 13.32 | 133 | 52.8 | 0.09 | 0.06 | 0.10 | 0.07 |
| | 12580.0* | Q10 | Proposed | 728 | 604.88 | 609.37 | 1.79 | 11.21 | 85 | 47.4 | 0.09 | 0.06 | 0.10 | 0.06 |
| | 12580.0* | Q1.5 | Proposed | 244 | 604.88 | 607.96 | 1.32 | 7.86 | 33 | 25.2 | | 0.06 | 0.10 | 0.05 |
| | | | | | | | | | | | | | | |
| | 12570.0* | Q100 | Proposed | 1276 | 604.52 | 610.51 | 2.97 | 11.32 | 164 | 55.1 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12570.0* | Q10 | Proposed | 728 | 604.52 | 609.34 | 2.09 | 9.85 | 103 | 49.2 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12570.0* | Q1.5 | Proposed | 244 | 604.52 | 607.60 | 1.46 | 7.61 | 36 | 25.0 | | 0.06 | 0.10 | 0.06 |
| | | | | | | | | | | | | | | |
| | 12560.0* | Q100 | Proposed | 1276 | 604.16 | 610.00 | 2.90 | 12.06 | 157 | 54.2 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12560.0* | Q10 | Proposed | 728 | 604.16 | 609.00 | 2.13 | 9.94 | 106 | 49.5 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12560.0* | Q1.5 | Proposed | 244 | 604.16 | 607.22 | 1.62 | 7.47 | 39 | 24.0 | | 0.07 | 0.10 | 0.07 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12550 | Q100 | Existing | 1276 | 603.80 | 610.45 | 3.77 | 13.87 | 180 | 47.6 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 12550 | Q100 | Proposed | 1276 | 603.80 | 609.79 | 3.06 | 11.56 | 168 | 54.8 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 12550 | Q10 | Existing | 728 | 603.80 | 609.14 | 2.77 | 11.41 | 120 | 43.3 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12550 | Q10 | Proposed | 728 | 603.80 | 607.73 | 1.57 | 14.16 | 65 | 41.6 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12550 | Q1.5 | Existing | 244 | 603.80 | 606.86 | 1.81 | 8.67 | 41 | 22.9 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12550 | Q1.5 | Proposed | 244 | 603.80 | 606.87 | 1.81 | 7.18 | 42 | 23.0 | | 0.07 | 0.10 | 0.07 |
| | 12540.4* | Q100 | Proposed | 1276 | 603.47 | 609.47 | 3.08 | 11.12 | 169 | 54.9 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 12540.4* | Q10 | Proposed | 728 | 603.47 | 607.34 | 2.03 | 13.83 | 65 | 32.1 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12540.4* | Q1.5 | Proposed | 244 | 603.47 | 606.44 | 1.77 | 7.28 | 41 | 23.0 | | 0.07 | 0.10 | 0.07 |
| | 12530.8* | Q100 | Proposed | 1276 | 603.13 | 608.99 | 3.00 | 11.42 | 162 | 54.2 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12530.8* | Q10 | Proposed | 728 | 603.13 | 607.94 | 2.23 | 9.52 | 109 | 48.7 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12530.8* | Q1.5 | Proposed | 244 | 603.13 | 606.04 | 1.74 | 7.2 | 41 | 23.2 | | 0.07 | 0.10 | 0.07 |
| | 12521.2* | Q100 | Proposed | 1276 | 602.80 | 608.61 | 2.98 | 11.33 | 161 | 54.1 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12521.2* | Q10 | Proposed | 728 | 602.80 | 607.39 | 2.15 | 10.01 | 100 | 46.6 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12521.2* | Q1.5 | Proposed | 244 | 602.80 | 605.65 | 1.73 | 7.11 | 40 | 23.4 | | 0.07 | 0.10 | 0.07 |
| | 12511.6* | Q100 | Proposed | 1276 | 602.47 | 608.15 | 2.93 | 11.49 | 157 | 53.5 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12511.6* | Q10 | Proposed | 728 | 602.47 | 607.01 | 2.20 | 9.76 | 100 | 45.5 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12511.6* | Q1.5 | Proposed | 244 | 602.47 | 605.25 | 1.71 | 7.03 | 40 | 23.5 | | 0.07 | 0.10 | 0.07 |
| | 12502.0* | Q100 | Proposed | 1276 | 602.13 | 607.81 | 2.95 | 11.2 | 159 | 53.8 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12502.0* | Q10 | Proposed | 728 | 602.13 | 606.52 | 2.17 | 9.96 | 96 | 44.2 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12502.0* | Q1.5 | Proposed | 244 | 602.13 | 604.87 | 1.71 | 6.9 | 40 | 23.6 | | 0.07 | 0.10 | 0.07 |
| | 12492.4* | Q100 | Proposed | 1276 | 601.80 | 607.25 | 2.88 | 11.64 | 150 | 52.0 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12492.4* | Q10 | Proposed | 728 | 601.80 | 606.15 | 2.20 | 9.69 | 97 | 44.3 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12492.4* | Q1.5 | Proposed | 244 | 601.80 | 604.50 | 1.72 | 6.71 | 41 | 23.9 | | 0.07 | 0.10 | 0.07 |
| | 12482.8* | Q100 | Proposed | 1276 | 601.47 | 606.92 | 2.92 | 11.24 | 153 | 52.4 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12482.8* | Q10 | Proposed | 728 | 601.47 | 605.63 | 2.18 | 9.95 | 92 | 42.1 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12482.8* | Q1.5 | Proposed | 244 | 601.47 | 604.00 | 1.63 | 7.04 | 39 | 23.6 | | 0.07 | 0.10 | 0.07 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12473.2* | Q100 | Proposed | 1276 | 601.13 | 606.61 | 2.96 | 10.05 | 158 | 53.4 | 0.06 | 0.06 | 0.10 | 0.06 |
| | 12473.2* | Q10 | Proposed | 728 | 601.13 | 605.35 | 2.25 | 8.85 | 97 | 43.1 | 0.06 | 0.06 | 0.10 | 0.06 |
| | 12473.2* | Q1.5 | Proposed | 244 | 601.13 | 603.71 | 1.69 | 6.3 | 41 | 24.3 | | 0.06 | 0.10 | 0.06 |
| | 12463.7 | Q100 | Existing | 1276 | 600.80 | 605.38 | 2.81 | 17.51 | 104 | 36.9 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12463.7 | Q100 | Proposed | 1276 | 600.80 | 606.16 | 2.95 | 10.84 | 155 | 52.7 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12463.7 | Q10 | Existing | 728 | 600.80 | 603.97 | 2.10 | 15.88 | 59 | 27.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12463.7 | Q10 | Proposed | 728 | 600.80 | 604.85 | 2.21 | 9.56 | 93 | 42.3 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 12463.7 | Q1.5 | Existing | 244 | 600.80 | 602.66 | 1.17 | 10.74 | 26 | 22.2 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12463.7 | Q1.5 | Proposed | 244 | 600.80 | 603.41 | 1.74 | 6.12 | 43 | 25.0 | | 0.07 | 0.10 | 0.07 |
| | 12411.83 | Q100 | Existing | 1276 | 598.95 | 604.30 | 3.32 | 14.99 | 133 | 40.1 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12411.83 | Q100 | Proposed | 1276 | 598.95 | 603.86 | 2.54 | 11.59 | 142 | 55.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12411.83 | Q10 | Existing | 728 | 598.95 | 603.29 | 2.64 | 11.37 | 95 | 35.9 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12411.83 | Q10 | Proposed | 728 | 598.95 | 603.18 | 2.20 | 8.45 | 107 | 48.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12411.83 | Q1.5 | Existing | 244 | 598.95 | 601.47 | 1.54 | 7.91 | 40 | 25.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12411.83 | Q1.5 | Proposed | 244 | 598.95 | 601.39 | 1.49 | 6.74 | 37 | 25.1 | | 0.06 | 0.10 | 0.06 |
| | 12356.27 | Q100 | Existing | 1276 | 596.53 | 603.15 | 3.54 | 13.18 | 140 | 39.4 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12356.27 | Q100 | Proposed | 1276 | 596.53 | 602.84 | 2.67 | 9.83 | 172 | 64.4 | 0.08 | 0.07 | 0.10 | 0.06 |
| | 12356.27 | Q10 | Existing | 728 | 596.53 | 601.82 | 2.83 | 10.52 | 91 | 32.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12356.27 | Q10 | Proposed | 728 | 596.53 | 601.71 | 2.30 | 8.6 | 108 | 47.1 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12356.27 | Q1.5 | Existing | 244 | 596.53 | 599.85 | 2.16 | 6.53 | 42 | 19.5 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12356.27 | Q1.5 | Proposed | 244 | 596.53 | 600.24 | 1.57 | 5.15 | 52 | 33.2 | 0.10 | 0.07 | 0.10 | 0.05 |
| | 12301.23 | Q100 | Existing | 1276 | 595.07 | 603.06 | 3.33 | 4.77 | 251 | 75.5 | 0.03 | 0.09 | 0.10 | 0.06 |
| | 12301.23 | Q100 | Proposed | 1276 | 595.07 | 600.66 | 2.47 | 11.31 | 156 | 62.9 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 12301.23 | Q10 | Existing | 728 | 595.07 | 600.00 | 2.84 | 9.92 | 79 | 27.9 | | 0.08 | 0.10 | 0.08 |
| | 12301.23 | Q10 | Proposed | 728 | 595.07 | 599.68 | 2.23 | 9.51 | 103 | 46.4 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 12301.23 | Q1.5 | Existing | 244 | 595.07 | 598.09 | 1.83 | 7.43 | 34 | 18.8 | | 0.08 | 0.10 | 0.08 |
| | 12301.23 | Q1.5 | Proposed | 244 | 595.07 | 597.99 | 1.36 | 7.72 | 33 | 24.6 | 0.10 | 0.08 | 0.10 | 0.06 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12250.48 | Q100 | Existing | 1276 | 592.67 | 603.15 | 5.33 | 2.53 | 458 | 86.1 | 0.04 | 0.08 | 0.10 | 0.06 |
| | 12250.48 | Q100 | Proposed | 1276 | 593.40 | 598.95 | 2.94 | 9.75 | 168 | 57.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12250.48 | Q10 | Existing | 728 | 592.67 | 599.77 | 2.49 | 4.37 | 187 | 75.1 | 0.04 | 0.08 | 0.10 | 0.06 |
| | 12250.48 | Q10 | Proposed | 728 | 593.40 | 597.73 | 2.59 | 7.88 | 111 | 42.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 12250.48 | Q1.5 | Existing | 244 | 592.67 | 596.04 | 1.94 | 5.65 | 44 | 23.0 | | 0.08 | 0.10 | 0.07 |
| | 12250.48 | Q1.5 | Proposed | 244 | 593.40 | 595.99 | 1.85 | 5.41 | 45 | 24.4 | 0.10 | 0.06 | | 0.05 |
| | | | | | | | | | | | | | | |
| | 12225.03 | Q100 | Existing | 1276 | 591.00 | 599.28 | 7.10 | 15.27 | 86 | 16.6 | 0.10 | 0.05 | | 0.05 |
| | 12225.03 | Q100 | Proposed | 1276 | 592.20 | 598.28 | 2.60 | 10.88 | 160 | 61.4 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 12225.03 | Q10 | Existing | 728 | 591.00 | 596.98 | 4.80 | 12.68 | 58 | 14.4 | 0.10 | 0.05 | | 0.05 |
| | 12225.03 | Q10 | Proposed | 728 | 592.20 | 596.77 | 2.41 | 9.75 | 93 | 38.5 | 0.09 | 0.06 | 0.10 | 0.05 |
| | 12225.03 | Q1.5 | Existing | 244 | 591.00 | 594.27 | 2.47 | 8.97 | 27 | 11.5 | | 0.05 | | 0.05 |
| | 12225.03 | Q1.5 | Proposed | 244 | 592.20 | 594.82 | 1.75 | 7.72 | 32 | 18.1 | 0.06 | 0.06 | | 0.05 |
| CULVERT #7 | | | | | | | | | | | | | | |
| | 12200 | | | Culvert | | | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 12191.69 | Q100 | Existing | 1276 | 590.60 | 600.48 | 2.18 | 8.27 | 174 | 80.1 | 0.03 | 0.05 | 0.10 | 0.04 |
| | 12191.69 | Q100 | Proposed | 1276 | 591.00 | 595.72 | 2.84 | 14.61 | 107 | 37.6 | 0.10 | 0.06 | 0.06 | 0.05 |
| | 12191.69 | Q10 | Existing | 728 | 590.60 | 596.02 | 5.03 | 12.72 | 57 | 13.9 | | 0.05 | | 0.05 |
| | 12191.69 | Q10 | Proposed | 728 | 591.00 | 594.68 | 2.01 | 12.24 | 69 | 34.5 | 0.10 | 0.06 | 0.06 | 0.05 |
| | 12191.69 | Q1.5 | Existing | 244 | 590.60 | 593.52 | 2.60 | 8.41 | 29 | 12.1 | | 0.05 | | 0.05 |
| | 12191.69 | Q1.5 | Proposed | 244 | 591.00 | 593.64 | 1.40 | 6.95 | 36 | 26.0 | 0.10 | 0.06 | 0.06 | 0.05 |
| | | | | | | | | | | | | | | |
| | 12141.98 | Q100 | Existing | 1276 | 589.06 | 593.20 | 2.67 | 21.32 | 81 | 30.1 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12141.98 | Q100 | Proposed | 1276 | 589.51 | 594.63 | 3.15 | 12.77 | 158 | 50.1 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12141.98 | Q10 | Existing | 728 | 589.06 | 592.57 | 2.14 | 15.64 | 62 | 28.9 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12141.98 | Q10 | Proposed | 728 | 589.51 | 593.54 | 2.28 | 10.45 | 105 | 46.1 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12141.98 | Q1.5 | Existing | 244 | 589.06 | 591.86 | 1.52 | 7.67 | 42 | 27.5 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12141.98 | Q1.5 | Proposed | 244 | 589.51 | 591.98 | 1.53 | 7.45 | 44 | 28.5 | | 0.06 | 0.10 | 0.07 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 12092.64 | Q100 | Existing | 1276 | 587.42 | 592.96 | 3.42 | 13.43 | 161 | 47.0 | 0.10 | 0.05 | 0.10 | 0.07 |
| | 12092.64 | Q100 | Proposed | 1276 | 587.42 | 592.11 | 2.41 | 14.8 | 154 | 63.8 | 0.10 | 0.06 | 0.10 | 0.07 |
| | 12092.64 | Q10 | Existing | 728 | 587.42 | 591.80 | 2.56 | 10.88 | 109 | 42.7 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12092.64 | Q10 | Proposed | 728 | 587.42 | 591.37 | 1.77 | 11.79 | 108 | 60.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12092.64 | Q1.5 | Existing | 244 | 587.42 | 590.28 | 1.33 | 7.39 | 49 | 36.6 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 12092.64 | Q1.5 | Proposed | 244 | 587.42 | 590.22 | 1.27 | 7.54 | 47 | 36.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 12033.91 | Q100 | Existing | 1276 | 584.73 | 589.70 | 2.99 | 15.51 | 118 | 39.4 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12033.91 | Q100 | Proposed | 1276 | 584.73 | 589.73 | 2.56 | 10.74 | 142 | 55.7 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12033.91 | Q10 | Existing | 728 | 584.73 | 589.56 | 2.88 | 9.23 | 112 | 39.0 | 0.10 | 0.05 | 0.10 | 0.06 |
| | 12033.91 | Q10 | Proposed | 728 | 584.73 | 589.33 | 2.23 | 7.14 | 120 | 53.9 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 12033.91 | Q1.5 | Existing | 244 | 584.73 | 587.10 | 1.08 | 10.31 | 27 | 25.5 | 0.10 | 0.05 | | 0.05 |
| | 12033.91 | Q1.5 | Proposed | 244 | 584.73 | 587.18 | 1.13 | 8.56 | 29 | 25.3 | | 0.06 | | 0.05 |
| | 11982.07 | Q100 | Existing | 1276 | 581.86 | 588.60 | 5.38 | 0.82 | 640 | 119.1 | 0.03 | 0.07 | 0.10 | 0.03 |
| | 11982.07 | Q100 | Proposed | 1276 | 581.86 | 588.50 | 5.55 | 1.01 | 660 | 118.8 | 0.03 | 0.06 | 0.10 | 0.03 |
| | 11982.07 | Q10 | Existing | 728 | 581.86 | 587.20 | 3.40 | 10.81 | 70 | 20.5 | | 0.07 | 0.10 | 0.07 |
| | 11982.07 | Q10 | Proposed | 728 | 581.86 | 587.16 | 2.68 | 10.29 | 86 | 32.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11982.07 | Q1.5 | Existing | 244 | 581.86 | 585.05 | 1.97 | 7.91 | 31 | 15.7 | | 0.06 | | 0.06 |
| | 11982.07 | Q1.5 | Proposed | 244 | 581.86 | 585.05 | 1.92 | 7.92 | 31 | 16.0 | 0.00 | 0.06 | | 0.06 |
| | 11932.45 | Q100 | Existing | 1276 | 579.56 | 585.64 | 3.01 | 14.47 | 126 | 41.8 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 11932.45 | Q100 | Proposed | 1276 | 579.56 | 584.61 | 2.41 | 17.01 | 111 | 46.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11932.45 | Q10 | Existing | 728 | 579.56 | 584.22 | 2.01 | 12.77 | 71 | 35.3 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 11932.45 | Q10 | Proposed | 728 | 579.56 | 583.70 | 1.68 | 14.08 | 71 | 42.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 11932.45 | Q1.5 | Existing | 244 | 579.56 | 582.42 | 1.84 | 8.81 | 28 | 15.1 | | 0.05 | 0.10 | 0.05 |
| | 11932.45 | Q1.5 | Proposed | 244 | 579.56 | 582.42 | 1.84 | 8.8 | 28 | 15.1 | | 0.06 | 0.10 | 0.05 |
| | 11881.79 | Q100 | Existing | 1276 | 576.99 | 582.87 | 3.08 | 15.22 | 104 | 33.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11881.79 | Q100 | Proposed | 1276 | 576.99 | 582.87 | 3.05 | 13.11 | 134 | 43.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11881.79 | Q10 | Existing | 728 | 576.99 | 581.67 | 2.29 | 12.96 | 67 | 29.1 | 0.10 | 0.05 | | 0.05 |
| | 11881.79 | Q10 | Proposed | 728 | 576.99 | 581.72 | 2.28 | 11.14 | 87 | 38.2 | 0.10 | 0.06 | | 0.06 |
| | 11881.79 | Q1.5 | Existing | 244 | 576.99 | 580.17 | 1.80 | 8.87 | 28 | 15.3 | | 0.05 | | 0.05 |
| | 11881.79 | Q1.5 | Proposed | 244 | 576.99 | 580.30 | 1.10 | 7.88 | 36 | 33.3 | 0.10 | 0.06 | | 0.05 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 11827.76 | Q100 | Existing | 1276 | 573.31 | 581.72 | 5.04 | 7.17 | 204.72 | 40.58 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 11827.76 | Q100 | Proposed | 1276 | 573.31 | 578.82 | 2.63 | 15.08 | 109.65 | 41.71 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 11827.76 | Q10 | Existing | 728 | 573.31 | 580.44 | 4.22 | 5.22 | 155.2 | 36.81 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 11827.76 | Q10 | Proposed | 728 | 573.31 | 577.8 | 1.94 | 12.68 | 69.6 | 35.88 | 0.10 | 0.07 | 0.10 | 0.06 |
| | 11827.76 | Q1.5 | Existing | 244 | 573.31 | 578.14 | 2.62 | 3.24 | 78.47 | 29.92 | 0.10 | 0.08 | 0.10 | 0.07 |
| | 11827.76 | Q1.5 | Proposed | 244 | 573.31 | 576.19 | 1.2 | 9.86 | 26.51 | 22.09 | 0.10 | 0.07 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 11774.33 | Q100 | Existing | 1276 | 571.58 | 581.25 | 5.65 | 6.59 | 210.95 | 37.32 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 11774.33 | Q100 | Proposed | 1276 | 571.58 | 580.09 | 4.88 | 5.86 | 285.11 | 58.37 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 11774.33 | Q10 | Existing | 728 | 571.58 | 580.19 | 5.25 | 4.42 | 173.62 | 33.08 | 0.10 | 0.07 | 0.10 | 0.07 |
| | 11774.33 | Q10 | Proposed | 728 | 571.58 | 578.85 | 4.13 | 4.31 | 216.49 | 52.4 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 11774.33 | Q1.5 | Existing | 244 | 571.58 | 578.03 | 4.47 | 2.2 | 111.3 | 24.89 | 0.10 | 0.07 | | 0.07 |
| | 11774.33 | Q1.5 | Proposed | 244 | 571.58 | 575.01 | 2.62 | 5.18 | 47.11 | 17.99 | 0.00 | 0.06 | | 0.06 |
| | | | | | | | | | | | | | | |
| | 11724.31 | Q100 | Existing | 1276 | 570.29 | 581.33 | 6.54 | 4.8 | 353.22 | 54 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11724.31 | Q100 | Proposed | 1276 | 570.29 | 580.05 | 5.79 | 4.15 | 434.04 | 74.97 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 11724.31 | Q10 | Existing | 728 | 570.29 | 580.21 | 5.9 | 3.17 | 295.42 | 50.06 | 0.10 | 0.06 | 0.10 | 0.06 |
| | 11724.31 | Q10 | Proposed | 728 | 570.29 | 578.82 | 4.95 | 2.93 | 345.14 | 69.73 | 0.10 | 0.07 | 0.10 | 0.08 |
| | 11724.31 | Q1.5 | Existing | 244 | 570.29 | 578.03 | 4.59 | 1.51 | 194.5 | 42.39 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 11724.31 | Q1.5 | Proposed | 244 | 570.29 | 574.77 | 1.93 | 3.12 | 98.79 | 51.17 | 0.10 | 0.07 | 0.10 | 0.07 |
| | | | | | | | | | | | | | | |
| | 11678.1 | Q100 | Existing | 1276 | 568.65 | 581.39 | 7.64 | 3.09 | 509.41 | 66.64 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 11678.1 | Q100 | Proposed | 1276 | 568.65 | 580.01 | 5.53 | 3.14 | 534.83 | 96.69 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 11678.1 | Q10 | Existing | 728 | 568.65 | 580.24 | 6.81 | 2.06 | 434.29 | 63.79 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 11678.1 | Q10 | Proposed | 728 | 568.65 | 578.79 | 5.41 | 2.18 | 431.78 | 79.84 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 11678.1 | Q1.5 | Existing | 244 | 568.65 | 578.03 | 5.3 | 0.97 | 300.47 | 56.69 | 0.10 | 0.08 | 0.10 | 0.08 |
| | 11678.1 | Q1.5 | Proposed | 244 | 568.65 | 574.71 | 2.89 | 1.82 | 156.22 | 54.1 | 0.10 | 0.08 | 0.10 | 0.08 |

## TABLE T1. HEC-RAS OUTPUT FOR CHANNEL WIDENING AND ROCK PILE AREAS, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| Culvert | RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CULVERT #6 | 11620.76 | Q100 | Existing | 1276 | 567.07 | 580.48 | 4.63 | 7.86 | 222.97 | 48.14 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 11620.76 | Q100 | Proposed | 1276 | 567.07 | 579.73 | 4.34 | 4.53 | 377.54 | 87.02 | 0.07 | 0.06 | 0.10 | 0.05 |
| | 11620.76 | Q10 | Existing | 728 | 567.07 | 579.85 | 4.25 | 5.06 | 193.21 | 45.41 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 11620.76 | Q10 | Proposed | 728 | 567.07 | 578.63 | 4.15 | 3.18 | 287.12 | 69.27 | 0.10 | 0.06 | 0.10 | 0.04 |
| | 11620.76 | Q1.5 | Existing | 244 | 567.07 | 577.91 | 2.96 | 2.66 | 112.32 | 37.98 | 0.10 | 0.05 | 0.10 | 0.05 |
| | 11620.76 | Q1.5 | Proposed | 244 | 567.07 | 574.59 | 4.04 | 2.14 | 115.9 | 28.69 | 0.10 | 0.06 | 0.10 | 0.05 |
| | 11550 | | | Culvert | | | | | | | | | | |
| | 11527.04 | Q100 | Existing | 1276 | 565.75 | 575.25 | 3.17 | 9.37 | 130 | 41.0 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11527.04 | Q100 | Proposed | 1276 | 565.75 | 575.35 | 3.22 | 9.96 | 134 | 41.5 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11527.04 | Q10 | Existing | 728 | 565.75 | 573.94 | 2.40 | 9.02 | 81 | 33.6 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11527.04 | Q10 | Proposed | 728 | 565.75 | 574.08 | 2.49 | 9.33 | 86 | 34.4 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11527.04 | Q1.5 | Existing | 244 | 565.75 | 569.71 | 3.70 | 10.91 | 22 | 14.6 | | 0.07 | | 0.07 |
| | 11527.04 | Q1.5 | Proposed | 244 | 565.75 | 569.71 | 3.70 | 10.91 | 22 | 14.6 | | 0.07 | | 0.07 |
| | 11476.78 | Q100 | Existing | 1276 | 564.68 | 568.48 | 2.78 | 16.51 | 77 | 27.8 | | 0.07 | 0.03 | 0.07 |
| | 11476.78 | Q100 | Proposed | 1276 | 564.68 | 568.29 | 2.62 | 17.74 | 72 | 27.5 | | 0.07 | 0.03 | 0.07 |
| | 11476.78 | Q10 | Existing | 728 | 564.68 | 567.63 | 2.09 | 13.43 | 54 | 25.9 | | 0.07 | | 0.07 |
| | 11476.78 | Q10 | Proposed | 728 | 564.68 | 567.40 | 1.91 | 15.04 | 48 | 25.3 | | 0.07 | | 0.07 |
| | 11476.78 | Q1.5 | Existing | 244 | 564.68 | 566.64 | 1.29 | 8.14 | 30 | 23.3 | | 0.07 | | 0.07 |
| | 11476.78 | Q1.5 | Proposed | 244 | 564.68 | 566.60 | 1.25 | 8.42 | 29 | 23.2 | | 0.07 | | 0.07 |
| | 11412.87 | Q100 | Existing | 1276 | 561.20 | 569.31 | 4.98 | 6.79 | 190 | 38.2 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11412.87 | Q100 | Proposed | 1276 | 561.20 | 569.29 | 4.97 | 7.27 | 190 | 38.2 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11412.87 | Q10 | Existing | 728 | 561.20 | 568.31 | 4.13 | 4.82 | 153 | 36.9 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11412.87 | Q10 | Proposed | 728 | 561.20 | 568.25 | 4.08 | 5.19 | 151 | 36.9 | 0.10 | 0.07 | 0.03 | 0.06 |
| | 11412.87 | Q1.5 | Existing | 244 | 561.20 | 566.34 | 3.03 | 2.89 | 84 | 27.8 | 0.00 | 0.07 | | 0.07 |
| | 11412.87 | Q1.5 | Proposed | 244 | 561.20 | 566.34 | 3.03 | 2.98 | 84 | 27.8 | 0.10 | 0.07 | | 0.06 |

HEC-RAS RESULTS FOR STATIONS 9739 TO 11363 NOT SHOWN ~ PROPOSED CONDITIONS SIMILAR TO EXISTING CONDITIONS

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UPSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.01 | | | | | | | | | | | | | | |
| DOWNSTREAM BOUNDARY CONDITION = NORMAL DEPTH, SLOPE 0.025 | | | | | | | | | | | | | | |
| 3300 | Q100 | Existing | 858 | 1258.76 | 1262.41 | 2.64 | 1262.07 | 8.13 | 112.84 | 42.66 | 0.1 | 0.06 | 0.1 | 0.058 |
| 3300 | Q10 | Existing | 489 | 1258.76 | 1261.66 | 2.11 | 1261.21 | 6.22 | 82.25 | 39.01 | 0.1 | 0.06 | | 0.059 |
| 3300 | Q1.5 | Existing | 164 | 1258.76 | 1260.76 | 1.41 | 1260.18 | 3.42 | 48.85 | 34.64 | 0.1 | 0.06 | | 0.059 |
| 3250 | Q100 | Existing | 858 | 1258.88 | 1262.29 | 2.87 | | 4.42 | 198.84 | 69.36 | 0.1 | 0.06 | 0.1 | 0.058 |
| 3250 | Q10 | Existing | 489 | 1258.88 | 1261.18 | 1.91 | | 3.96 | 124.34 | 65.17 | 0.1 | 0.06 | | 0.059 |
| 3250 | Q1.5 | Existing | 164 | 1258.88 | 1260 | 0.85 | | 3.26 | 50.29 | 59.3 | | 0.06 | | 0.06 |
| 3200 | Q100 | Existing | 858 | 1257.70 | 1262.18 | 3.41 | | 3.19 | 281.91 | 82.77 | 0.1 | 0.06 | 0.1 | 0.059 |
| 3200 | Q10 | Existing | 489 | 1257.70 | 1261 | 2.4 | | 2.68 | 187.3 | 78.05 | 0.1 | 0.06 | 0.1 | 0.059 |
| 3200 | Q1.5 | Existing | 164 | 1257.70 | 1259.48 | 1.08 | | 2.23 | 74.22 | 68.58 | | 0.06 | 0.1 | 0.06 |
| 3150 | Q100 | Existing | 858 | 1257.43 | 1262.03 | 3.79 | | 3.18 | 270.13 | 71.33 | | 0.06 | | 0.06 |
| 3150 | Q10 | Existing | 489 | 1257.43 | 1260.85 | 2.86 | | 2.58 | 189.18 | 66.08 | | 0.06 | | 0.06 |
| 3150 | Q1.5 | Existing | 164 | 1257.43 | 1259.28 | 1.54 | | 1.81 | 90.83 | 59.09 | | 0.06 | | 0.06 |
| 3100 | Q100 | Existing | 858 | 1257.05 | 1261.75 | 3.81 | | 4 | 214.71 | 56.3 | | 0.06 | 0.1 | 0.059 |
| 3100 | Q10 | Existing | 489 | 1257.05 | 1260.63 | 3.01 | | 3.16 | 154.78 | 51.35 | | 0.06 | | 0.06 |
| 3100 | Q1.5 | Existing | 164 | 1257.05 | 1259.11 | 1.78 | | 2.02 | 81.1 | 45.49 | | 0.06 | | 0.06 |
| 3050 | Q100 | Existing | 858 | 1256.61 | 1261.64 | 3.8 | | 3.13 | 274.38 | 72.16 | 0.1 | 0.06 | 0.1 | 0.06 |
| 3050 | Q10 | Existing | 489 | 1256.61 | 1260.52 | 3.02 | | 2.48 | 197.27 | 65.41 | | 0.06 | | 0.06 |
| 3050 | Q1.5 | Existing | 164 | 1256.61 | 1259.01 | 1.87 | | 1.56 | 105.33 | 56.28 | | 0.06 | | 0.06 |
| 3000 | Q100 | Existing | 858 | 1256.56 | 1261.48 | 3.42 | | 3.27 | 262.25 | 76.65 | | 0.06 | | 0.06 |
| 3000 | Q10 | Existing | 489 | 1256.56 | 1260.37 | 2.68 | | 2.68 | 182.19 | 68 | | 0.06 | | 0.06 |
| 3000 | Q1.5 | Existing | 164 | 1256.56 | 1258.89 | 1.59 | | 1.82 | 89.96 | 56.4 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2950 | Q100 | Existing | 858 | 1256.22 | 1261.29 | 3.18 | | 3.38 | 256.61 | 80.78 | 0.1 | 0.06 | 0.1 | 0.057 |
| 2950 | Q10 | Existing | 489 | 1256.22 | 1260.17 | 2.43 | | 2.85 | 171.72 | 70.61 | | 0.06 | 0.1 | 0.06 |
| 2950 | Q1.5 | Existing | 164 | 1256.22 | 1258.71 | 1.55 | | 2.01 | 81.49 | 52.68 | | 0.06 | | 0.06 |
| 2900 | Q100 | Existing | 858 | 1255.59 | 1260.89 | 2.7 | | 4.44 | 194.8 | 72.24 | 0.1 | 0.06 | | 0.057 |
| 2900 | Q10 | Existing | 489 | 1255.59 | 1259.71 | 2.08 | | 4.12 | 118.63 | 56.91 | | 0.06 | | 0.06 |
| 2900 | Q1.5 | Existing | 164 | 1255.59 | 1258.31 | 1.38 | | 3.13 | 52.39 | 37.96 | | 0.06 | | 0.06 |
| 2850 | Q100 | Existing | 858 | 1254.37 | 1260.09 | 2.56 | | 6.62 | 169.17 | 66.15 | 0.1 | 0.06 | 0.1 | 0.057 |
| 2850 | Q10 | Existing | 489 | 1254.37 | 1258.64 | 1.87 | | 6.39 | 87.14 | 46.66 | 0.1 | 0.06 | 0.1 | 0.054 |
| 2850 | Q1.5 | Existing | 164 | 1254.37 | 1257.1 | 1.2 | | 5.25 | 31.25 | 26.05 | | 0.06 | 0.001 | 0.06 |
| 2800 | Q100 | Existing | 858 | 1253.42 | 1259.88 | 3.22 | | 5.1 | 206.69 | 64.18 | 0.1 | 0.06 | 0.1 | 0.055 |
| 2800 | Q10 | Existing | 489 | 1253.42 | 1258.34 | 2.54 | | 4.46 | 120.56 | 47.42 | 0.1 | 0.06 | 0.1 | 0.053 |
| 2800 | Q1.5 | Existing | 164 | 1253.42 | 1256.39 | 1.67 | | 3.46 | 47.42 | 28.38 | | 0.06 | 0.1 | 0.06 |
| 2750 | Q100 | Existing | 858 | 1252.81 | 1259.67 | 3.5 | | 4.81 | 215.05 | 61.38 | 0.1 | 0.06 | 0.1 | 0.056 |
| 2750 | Q10 | Existing | 489 | 1252.81 | 1258.07 | 2.76 | | 4.18 | 128.51 | 46.59 | 0.1 | 0.06 | | 0.056 |
| 2750 | Q1.5 | Existing | 164 | 1252.81 | 1255.96 | 1.87 | | 3.23 | 50.83 | 27.19 | | 0.06 | | 0.06 |
| 2700 | Q100 | Existing | 858 | 1252.52 | 1259.25 | 4.06 | | 5.44 | 159.62 | 39.27 | 0.1 | 0.06 | 0.1 | 0.057 |
| 2700 | Q10 | Existing | 489 | 1252.52 | 1257.61 | 3.16 | | 4.84 | 101.07 | 31.98 | | 0.06 | | 0.06 |
| 2700 | Q1.5 | Existing | 164 | 1252.52 | 1255.4 | 1.91 | | 3.93 | 41.77 | 21.85 | | 0.06 | | 0.06 |
| 2650 | Q100 | Existing | 858 | 1251.56 | 1258.3 | 4.35 | | 7.49 | 115.02 | 26.47 | | 0.06 | 0.1 | 0.058 |
| 2650 | Q10 | Existing | 489 | 1251.56 | 1256.76 | 3.45 | | 6.31 | 77.51 | 22.49 | | 0.06 | | 0.06 |
| 2650 | Q1.5 | Existing | 164 | 1251.56 | 1254.62 | 2.01 | | 4.7 | 34.86 | 17.38 | | 0.06 | | 0.06 |
| 2600 | Q100 | Existing | 858 | 1250.65 | 1256.05 | 3.63 | 1256.05 | 10.88 | 78.85 | 21.74 | | 0.06 | | 0.06 |
| 2600 | Q10 | Existing | 489 | 1250.65 | 1254.68 | 2.8 | 1254.68 | 9.54 | 51.26 | 18.33 | | 0.06 | | 0.06 |
| 2600 | Q1.5 | Existing | 164 | 1250.65 | 1253.06 | 1.73 | 1252.9 | 6.6 | 24.85 | 14.33 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2550 | Q100 | Existing | 858 | 1248.71 | 1253.43 | 3.44 | 1253.7 | 11.66 | 73.58 | 21.4 | | 0.06 | | 0.06 |
| 2550 | Q10 | Existing | 489 | 1248.71 | 1252.29 | 2.64 | 1252.37 | 9.68 | 50.52 | 19.11 | | 0.06 | | 0.06 |
| 2550 | Q1.5 | Existing | 164 | 1248.71 | 1250.76 | 1.47 | 1250.76 | 6.95 | 23.61 | 16.04 | | 0.06 | | 0.06 |
| 2500 | Q100 | Existing | 858 | 1243.85 | 1248.15 | 2.89 | 1249.25 | 15.25 | 56.26 | 19.48 | | 0.06 | | 0.06 |
| 2500 | Q10 | Existing | 489 | 1243.85 | 1247.02 | 2.14 | 1247.91 | 13.61 | 35.94 | 16.78 | | 0.06 | | 0.06 |
| 2500 | Q1.5 | Existing | 164 | 1243.85 | 1245.71 | 1.17 | 1246.21 | 10.28 | 15.95 | 13.61 | | 0.06 | | 0.06 |
| 2450 | Q100 | Existing | 858 | 1238.99 | 1243.59 | 2.94 | 1244.61 | 15.23 | 59.66 | 20.3 | 0.1 | 0.06 | 0.1 | 0.055 |
| 2450 | Q10 | Existing | 489 | 1238.99 | 1242.61 | 2.31 | 1243.18 | 12.13 | 41.08 | 17.77 | 0.1 | 0.06 | 0.1 | 0.056 |
| 2450 | Q1.5 | Existing | 164 | 1238.99 | 1241.37 | 1.45 | 1241.51 | 7.79 | 21.07 | 14.58 | | 0.06 | | 0.06 |
| 2400 | Q100 | Existing | 858 | 1230.99 | 1235.58 | 2.93 | 1237.3 | 19.06 | 45.01 | 15.34 | | 0.06 | | 0.06 |
| 2400 | Q10 | Existing | 489 | 1230.99 | 1234.45 | 2.23 | 1235.8 | 16.9 | 28.94 | 12.96 | | 0.06 | | 0.06 |
| 2400 | Q1.5 | Existing | 164 | 1230.99 | 1232.93 | 1.19 | 1233.82 | 14.09 | 11.64 | 9.78 | | 0.06 | | 0.06 |
| 2372.58 | Q100 | Existing | 858 | 1225.04 | 1228.16 | 1.82 | 1229.94 | 20.43 | 42.04 | 23.04 | 0.1 | 0.06 | | 0.059 |
| 2372.58 | Q10 | Existing | 489 | 1225.04 | 1227.56 | 1.39 | 1228.77 | 16.99 | 28.78 | 20.72 | | 0.06 | | 0.06 |
| 2372.58 | Q1.5 | Existing | 164 | 1225.04 | 1226.82 | 0.97 | 1227.39 | 11.06 | 14.83 | 15.3 | | 0.06 | | 0.06 |
| 2350 | Q100 | Existing | 858 | 1216.16 | 1219.13 | 1.71 | 1220.94 | 21.65 | 39.63 | 23.16 | | 0.06 | | 0.06 |
| 2350 | Q10 | Existing | 489 | 1216.16 | 1218.57 | 1.26 | 1219.85 | 18.12 | 26.99 | 21.47 | | 0.06 | | 0.06 |
| 2350 | Q1.5 | Existing | 164 | 1216.16 | 1217.77 | 0.73 | 1218.52 | 14.58 | 11.25 | 15.34 | | 0.06 | | 0.06 |
| 2300 | Q100 | Existing | 858 | 1208.34 | 1212.01 | 2.23 | 1212.99 | 14.16 | 60.59 | 27.16 | | 0.06 | | 0.06 |
| 2300 | Q10 | Existing | 489 | 1208.34 | 1211.34 | 1.74 | 1211.92 | 11.36 | 43.05 | 24.8 | | 0.06 | | 0.06 |
| 2300 | Q1.5 | Existing | 164 | 1208.34 | 1210.4 | 1.07 | 1210.62 | 7.58 | 21.63 | 20.22 | | 0.06 | | 0.06 |
| 2250 | Q100 | Existing | 858 | 1204.37 | 1207.1 | 1.85 | 1207.66 | 12.19 | 81.82 | 44.12 | | 0.06 | 0.1 | 0.067 |
| 2250 | Q10 | Existing | 489 | 1204.37 | 1206.5 | 1.41 | 1206.83 | 9.88 | 56.61 | 40.23 | | 0.06 | 0.1 | 0.067 |
| 2250 | Q1.5 | Existing | 164 | 1204.37 | 1205.74 | 0.79 | 1205.84 | 6.47 | 27.92 | 35.28 | | 0.06 | 0.1 | 0.069 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2200 | Q100 | Existing | 858 | 1197.08 | 1198.55 | 1.34 | 1199.19 | 11.18 | 74.07 | 55.34 | | 0.06 | 0.1 | 0.084 |
| 2200 | Q10 | Existing | 489 | 1197.08 | 1198.08 | 1.06 | 1198.55 | 8.17 | 50.54 | 47.69 | | 0.06 | 0.1 | 0.086 |
| 2200 | Q1.5 | Existing | 164 | 1197.08 | 1197.4 | 0.77 | 1197.63 | 3.82 | 23.48 | 30.63 | | 0.06 | 0.1 | 0.093 |
| 2150 | Q100 | Existing | 858 | 1187.44 | 1191.56 | 1.5 | 1192.35 | 12.38 | 79.95 | 53.27 | 0.1 | 0.06 | 0.1 | 0.048 |
| 2150 | Q10 | Existing | 489 | 1187.44 | 1190.67 | 1.69 | 1191.22 | 10.85 | 47.61 | 28.09 | | 0.06 | 0.1 | 0.056 |
| 2150 | Q1.5 | Existing | 164 | 1187.44 | 1189.35 | 1.2 | 1189.64 | 8.52 | 19.25 | 16 | | 0.06 | | 0.06 |
| 2100 | Q100 | Existing | 858 | 1183.52 | 1186.38 | 1.28 | 1187.15 | 13.44 | 77.51 | 60.49 | 0.1 | 0.06 | 0.1 | 0.056 |
| 2100 | Q10 | Existing | 489 | 1183.52 | 1185.92 | 1.08 | 1186.45 | 10.68 | 51.88 | 48 | 0.1 | 0.06 | | 0.056 |
| 2100 | Q1.5 | Existing | 164 | 1183.52 | 1185.32 | 0.84 | 1185.43 | 6.38 | 25.73 | 30.62 | 0.1 | 0.06 | | 0.058 |
| 2050 | Q100 | Existing | 858 | 1178.31 | 1181.28 | 1.98 | 1181.88 | 11.76 | 73.06 | 36.99 | | 0.06 | 0.1 | 0.059 |
| 2050 | Q10 | Existing | 489 | 1178.31 | 1180.6 | 1.43 | 1181.01 | 9.89 | 49.43 | 34.49 | | 0.06 | | 0.06 |
| 2050 | Q1.5 | Existing | 164 | 1178.31 | 1179.75 | 0.73 | 1180.01 | 7.62 | 21.52 | 29.48 | | 0.06 | | 0.06 |
| 2000 | Q100 | Existing | 858 | 1170.64 | 1174.61 | 2.6 | 1175.69 | 15.03 | 57.1 | 21.93 | | 0.06 | | 0.06 |
| 2000 | Q10 | Existing | 489 | 1170.64 | 1173.68 | 1.91 | 1174.47 | 12.98 | 37.67 | 19.72 | | 0.06 | | 0.06 |
| 2000 | Q1.5 | Existing | 164 | 1170.64 | 1172.64 | 1.07 | 1172.98 | 8.88 | 18.48 | 17.25 | | 0.06 | | 0.06 |
| 1950 | Q100 | Existing | 858 | 1159.83 | 1163.56 | 2.18 | 1165.32 | 19.7 | 43.55 | 19.94 | | 0.06 | | 0.06 |
| 1950 | Q10 | Existing | 489 | 1159.83 | 1162.73 | 1.74 | 1164.09 | 17.14 | 28.52 | 16.43 | | 0.06 | | 0.06 |
| 1950 | Q1.5 | Existing | 164 | 1159.83 | 1161.55 | 1.06 | 1162.39 | 13.58 | 12.08 | 11.41 | | 0.06 | | 0.06 |
| 1900 | Q100 | Existing | 858 | 1151.21 | 1154.62 | 2.34 | 1156.21 | 18.28 | 48.93 | 20.91 | 0.1 | 0.06 | 0.1 | 0.055 |
| 1900 | Q10 | Existing | 489 | 1151.21 | 1153.83 | 1.85 | 1154.86 | 14.74 | 33.43 | 18.11 | 0.1 | 0.06 | 0.1 | 0.057 |
| 1900 | Q1.5 | Existing | 164 | 1151.21 | 1152.81 | 1.16 | 1153.26 | 9.73 | 16.85 | 14.53 | | 0.06 | | 0.06 |
| 1850 | Q100 | Existing | 858 | 1145.20 | 1149.59 | 2.38 | 1150.58 | 15.73 | 68.11 | 28.63 | 0.1 | 0.06 | 0.1 | 0.064 |
| 1850 | Q10 | Existing | 489 | 1145.20 | 1148.87 | 1.8 | 1149.47 | 12.27 | 48.32 | 26.79 | 0.1 | 0.06 | 0.1 | 0.061 |
| 1850 | Q1.5 | Existing | 164 | 1145.20 | 1147.76 | 1.07 | 1148.05 | 8.35 | 20.69 | 19.37 | 0.1 | 0.06 | | 0.054 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1800 | Q100 | Existing | 858 | 1141.77 | 1146.45 | 2.7 | 1146.96 | 13.16 | 81.87 | 30.37 | 0.1 | 0.06 | 0.1 | 0.062 |
| 1800 | Q10 | Existing | 489 | 1141.77 | 1145.47 | 1.97 | 1145.82 | 10.94 | 53.58 | 27.21 | 0.1 | 0.06 | 0.1 | 0.061 |
| 1800 | Q1.5 | Existing | 164 | 1141.77 | 1144.32 | 1.04 | 1144.45 | 7.37 | 24.41 | 23.51 | 0.1 | 0.06 | 0.1 | 0.055 |
| 1750 | Q100 | Existing | 858 | 1137.61 | 1141.97 | 2.51 | 1142.93 | 14.81 | 64.68 | 25.8 | 0.1 | 0.06 | 0.1 | 0.059 |
| 1750 | Q10 | Existing | 489 | 1137.61 | 1141.04 | 1.88 | 1141.73 | 12.44 | 42.44 | 22.64 | 0.1 | 0.06 |  | 0.057 |
| 1750 | Q1.5 | Existing | 164 | 1137.61 | 1139.72 | 1.3 | 1140.11 | 9.32 | 17.6 | 13.59 |  | 0.06 |  | 0.06 |
| 1685.16 | Q100 | Existing | 858 | 1129.12 | 1132.69 | 2.34 | 1134.12 | 17.53 | 49.57 | 21.21 | 0.1 | 0.06 | 0.1 | 0.057 |
| 1685.16 | Q10 | Existing | 489 | 1129.12 | 1131.91 | 1.76 | 1132.89 | 14.51 | 33.69 | 19.15 |  | 0.06 |  | 0.06 |
| 1685.16 | Q1.5 | Existing | 164 | 1129.12 | 1130.84 | 1.11 | 1131.36 | 10.33 | 15.87 | 14.27 |  | 0.06 |  | 0.06 |
| 1631.51 | Q100 | Existing | 858 | 1123.59 | 1127.42 | 1.53 | 1128.1 | 15.19 | 96.4 | 62.86 | 0.1 | 0.06 | 0.1 | 0.073 |
| 1631.51 | Q10 | Existing | 489 | 1123.59 | 1126.96 | 1.27 | 1127.36 | 11.67 | 69.52 | 54.9 | 0.1 | 0.06 | 0.1 | 0.069 |
| 1631.51 | Q1.5 | Existing | 164 | 1123.59 | 1126.15 | 0.77 | 1126.38 | 7.99 | 31.03 | 40.14 | 0.1 | 0.06 | 0.1 | 0.059 |
| 1558.62 | Q100 | Existing | 858 | 1114.84 | 1120.21 | 2.6 | 1120.62 | 14.6 | 68.44 | 26.34 | 0.1 | 0.06 | 0.1 | 0.05 |
| 1558.62 | Q10 | Existing | 489 | 1114.84 | 1118.46 | 2.92 | 1119.35 | 13.73 | 35.66 | 12.23 | 0.1 | 0.06 | 0.1 | 0.058 |
| 1558.62 | Q1.5 | Existing | 164 | 1114.84 | 1116.38 | 1.36 | 1117.12 | 12.5 | 13.12 | 9.67 |  | 0.06 |  | 0.06 |
| 1514 | Q100 | Existing | 858 | 1110.83 | 1115.72 | 1.78 | 1117.05 | 15.55 | 59.08 | 33.17 | 0.1 | 0.06 |  | 0.049 |
| 1514 | Q10 | Existing | 489 | 1110.83 | 1115.07 | 2.54 | 1115.72 | 11.38 | 42.99 | 16.94 |  | 0.06 |  | 0.06 |
| 1514 | Q1.5 | Existing | 164 | 1110.83 | 1113.67 | 1.69 | 1113.67 | 7.47 | 21.96 | 12.96 |  | 0.06 |  | 0.06 |
| 1485.63 | Q100 | Existing | 858 | 1106.93 | 1110.66 | 2.33 | 1112.03 | 16.99 | 50.5 | 21.64 |  | 0.06 |  | 0.06 |
| 1485.63 | Q10 | Existing | 489 | 1106.93 | 1109.79 | 1.59 | 1110.85 | 15.19 | 32.2 | 20.2 |  | 0.06 |  | 0.06 |
| 1485.63 | Q1.5 | Existing | 164 | 1106.93 | 1108.5 | 1.14 | 1109.44 | 13.39 | 12.25 | 10.73 |  | 0.06 |  | 0.06 |
| 1451.92 | Q100 | Existing | 858 | 1104.87 | 1109.36 | 2.38 | 1109.81 | 11.76 | 85.48 | 35.91 |  | 0.06 | 0.1 | 0.059 |
| 1451.92 | Q10 | Existing | 489 | 1104.87 | 1108.65 | 1.74 | 1108.8 | 9.07 | 60.36 | 34.71 |  | 0.06 | 0.1 | 0.052 |
| 1451.92 | Q1.5 | Existing | 164 | 1104.87 | 1107.17 | 1.41 | 1107.17 | 6.81 | 24.08 | 17.05 |  | 0.06 |  | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1418.62 | Q100 | Existing | 858 | 1102.17 | 1105.89 | 1.85 | 1106.79 | 13.78 | 65.04 | 35.23 | | 0.06 | 0.1 | 0.053 |
| 1418.62 | Q10 | Existing | 489 | 1102.17 | 1104.96 | 1.7 | 1105.75 | 12.62 | 38.75 | 22.85 | | 0.06 | | 0.06 |
| 1418.62 | Q1.5 | Existing | 164 | 1102.17 | 1103.89 | 1.08 | 1104.3 | 9.27 | 17.7 | 16.39 | | 0.06 | | 0.06 |
| 1362.71 | Q100 | Existing | 858 | 1097.54 | 1101.8 | 2.45 | 1102.32 | 11.52 | 74.46 | 30.4 | | 0.06 | | 0.06 |
| 1362.71 | Q10 | Existing | 489 | 1097.54 | 1101.05 | 2 | 1101.27 | 9.2 | 53.15 | 26.51 | | 0.06 | | 0.06 |
| 1362.71 | Q1.5 | Existing | 164 | 1097.54 | 1099.83 | 1.26 | 1099.86 | 6.61 | 24.82 | 19.63 | | 0.06 | | 0.06 |
| 1308.81 | Q100 | Existing | 858 | 1094.21 | 1098.37 | 2.04 | 1099.03 | 12.35 | 86.75 | 42.61 | 0.1 | 0.06 | 0.1 | 0.056 |
| 1308.81 | Q10 | Existing | 489 | 1094.21 | 1097.47 | 1.6 | 1097.87 | 10.49 | 53.48 | 33.49 | 0.1 | 0.06 | 0.1 | 0.054 |
| 1308.81 | Q1.5 | Existing | 164 | 1094.21 | 1096.35 | 1.08 | 1096.49 | 7.19 | 22.96 | 21.35 | 0.1 | 0.06 | 0.1 | 0.057 |
| 1243.78 | Q100 | Existing | 858 | 1090.38 | 1094.43 | 2.43 | 1094.92 | 11.75 | 74.51 | 30.63 | 0.1 | 0.06 | 0.1 | 0.057 |
| 1243.78 | Q10 | Existing | 489 | 1090.38 | 1093.74 | 1.88 | 1093.93 | 9.12 | 53.92 | 28.72 | 0.001 | 0.06 | 0.1 | 0.059 |
| 1243.78 | Q1.5 | Existing | 164 | 1090.38 | 1092.66 | 1.18 | 1092.66 | 6.25 | 26.24 | 22.27 | | 0.06 | | 0.06 |
| 1172.3 | Q100 | Existing | 858 | 1082.54 | 1087.59 | 2.84 | 1088.92 | 14.59 | 58.92 | 20.72 | 0.1 | 0.06 | | 0.057 |
| 1172.3 | Q10 | Existing | 489 | 1082.54 | 1086.22 | 2.4 | 1087.14 | 13.68 | 35.76 | 14.87 | | 0.06 | | 0.06 |
| 1172.3 | Q1.5 | Existing | 164 | 1082.54 | 1084.48 | 1.34 | 1085.17 | 11.83 | 13.86 | 10.32 | | 0.06 | | 0.06 |
| 1126.39 | Q100 | Existing | 858 | 1076.73 | 1080.07 | 2.3 | 1081.49 | 17.54 | 48.91 | 21.23 | | 0.06 | | 0.06 |
| 1126.39 | Q10 | Existing | 489 | 1076.73 | 1079.36 | 1.68 | 1080.32 | 14.33 | 34.13 | 20.29 | | 0.06 | | 0.06 |
| 1126.39 | Q1.5 | Existing | 164 | 1076.73 | 1078.53 | 1.1 | 1078.88 | 8.84 | 18.55 | 16.94 | | 0.06 | | 0.06 |
| 1063.6 | Q100 | Existing | 858 | 1073.21 | 1078.42 | 2.94 | 1078.42 | 10.92 | 92.8 | 31.59 | 0.1 | 0.06 | 0.1 | 0.055 |
| 1063.6 | Q10 | Existing | 489 | 1073.21 | 1077.11 | 2.3 | 1077.11 | 9.38 | 56.17 | 24.43 | 0.1 | 0.06 | 0.1 | 0.054 |
| 1063.6 | Q1.5 | Existing | 164 | 1073.21 | 1075.47 | 1.51 | 1075.47 | 7.04 | 23.3 | 15.4 | | 0.06 | | 0.06 |
| 992.88 | Q100 | Existing | 858 | 1069.14 | 1072.5 | 1.72 | 1073.46 | 14.5 | 59.57 | 34.73 | 0.1 | 0.06 | 0.1 | 0.058 |
| 992.88 | Q10 | Existing | 489 | 1069.14 | 1072.05 | 1.39 | 1072.59 | 10.99 | 44.49 | 32.03 | | 0.06 | | 0.06 |
| 992.88 | Q1.5 | Existing | 164 | 1069.14 | 1071.39 | 1.01 | 1071.47 | 6.44 | 25.48 | 25.16 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 965.98 | Q100 | Existing | 858 | 1067.81 | 1072.71 | 2.48 | 1072.71 | 9.87 | 121.43 | 48.96 | 0.1 | 0.06 | 0.1 | 0.061 |
| 965.98 | Q10 | Existing | 489 | 1067.81 | 1071.68 | 1.74 | 1071.68 | 8.5 | 73.54 | 42.28 | 0.1 | 0.06 | 0.1 | 0.055 |
| 965.98 | Q1.5 | Existing | 164 | 1067.81 | 1070.18 | 1.61 | 1070.04 | 6.38 | 25.69 | 15.95 | | 0.06 | | 0.06 |
| 896.36 | Q100 | Existing | 858 | 1065.69 | 1070.42 | 3.27 | 1069.71 | 8.01 | 120.03 | 36.7 | 0.1 | 0.06 | 0.1 | 0.058 |
| 896.36 | Q10 | Existing | 489 | 1065.69 | 1068.53 | 1.79 | 1068.73 | 9.13 | 55.1 | 30.85 | 0.1 | 0.06 | 0.1 | 0.055 |
| 896.36 | Q1.5 | Existing | 164 | 1065.69 | 1067.52 | 1.3 | 1067.4 | 5.76 | 28.49 | 21.89 | | 0.06 | | 0.06 |
| 863.1 | Q100 | Existing | 858 | 1063.94 | 1070.05 | 4.28 | | 8.47 | 149.47 | 34.93 | 0.1 | 0.06 | 0.1 | 0.07 |
| 863.1 | Q10 | Existing | 489 | 1063.94 | 1068.02 | 2.86 | 1067.36 | 8.07 | 84.22 | 29.42 | 0.1 | 0.06 | 0.1 | 0.069 |
| 863.1 | Q1.5 | Existing | 164 | 1063.94 | 1065.99 | 1.25 | 1065.99 | 7.03 | 30.01 | 24.07 | 0.1 | 0.06 | 0.1 | 0.064 |
| 828.53 | Q100 | Existing | 858 | 1061.14 | 1067.83 | 3.5 | 1067.83 | 13.64 | 96.69 | 27.66 | 0.1 | 0.06 | 0.1 | 0.061 |
| 828.53 | Q10 | Existing | 489 | 1061.14 | 1066.1 | 3 | 1066.1 | 11.53 | 57.82 | 19.26 | 0.1 | 0.06 | 0.1 | 0.061 |
| 828.53 | Q1.5 | Existing | 164 | 1061.14 | 1063.94 | 1.65 | 1064.04 | 8.67 | 22.8 | 13.85 | 0.1 | 0.06 | 0.1 | 0.058 |
| 826.84 | Q100 | Existing | 858 | 1060.76 | 1065.18 | 2.97 | 1066.62 | 17.16 | 51.18 | 17.23 | 0.1 | 0.06 | 0.1 | 0.055 |
| 826.84 | Q10 | Existing | 489 | 1060.76 | 1063.92 | 2.35 | 1065.01 | 15.17 | 32.23 | 13.7 | | 0.06 | | 0.06 |
| 826.84 | Q1.5 | Existing | 164 | 1060.76 | 1062.44 | 1.18 | 1063.12 | 12.12 | 13.54 | 11.44 | | 0.06 | | 0.06 |
| 803.52 | Q100 | Existing | 858 | 1055.18 | 1059.39 | 3 | 1061.57 | 21.35 | 43.46 | 14.47 | 0.1 | 0.06 | 0.1 | 0.053 |
| 803.52 | Q10 | Existing | 489 | 1055.18 | 1058.21 | 2.25 | 1059.74 | 18.16 | 27.63 | 12.26 | 0.1 | 0.06 | 0.1 | 0.055 |
| 803.52 | Q1.5 | Existing | 164 | 1055.18 | 1056.86 | 1.31 | 1057.62 | 12.8 | 12.81 | 9.77 | | 0.06 | | 0.06 |
| 788.49 | Q100 | Existing | 858 | 1052.86 | 1056.12 | 2.37 | 1058.14 | 21.75 | 41.1 | 17.33 | 0.1 | 0.06 | 0.1 | 0.056 |
| 788.49 | Q10 | Existing | 489 | 1052.86 | 1055.39 | 1.78 | 1056.71 | 17.31 | 28.76 | 16.2 | 0.1 | 0.06 | 0.1 | 0.057 |
| 788.49 | Q1.5 | Existing | 164 | 1052.86 | 1054.56 | 1.08 | 1055.04 | 10.3 | 15.93 | 14.75 | | 0.06 | 0.1 | 0.06 |
| 752.92 | Q100 | Existing | 858 | 1042.81 | 1046.27 | 1.89 | 1048.21 | 23.5 | 43.7 | 23.15 | 0.1 | 0.06 | | 0.06 |
| 752.92 | Q10 | Existing | 489 | 1042.81 | 1045.56 | 1.49 | 1047.09 | 19.36 | 28.64 | 19.25 | 0.1 | 0.06 | | 0.057 |
| 752.92 | Q1.5 | Existing | 164 | 1042.81 | 1044.45 | 0.97 | 1045.36 | 14.49 | 11.41 | 11.71 | 0.1 | 0.06 | | 0.057 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 740.16 | Q100 | Existing | 858 | 1041.85 | 1046.1 | 2.35 | 1047.54 | 17.98 | 55.96 | 23.82 | 0.1 | 0.06 | 0.1 | 0.057 |
| 740.16 | Q10 | Existing | 489 | 1041.85 | 1045.37 | 1.83 | 1046.25 | 13.86 | 39.41 | 21.49 | 0.1 | 0.06 | 0.1 | 0.055 |
| 740.16 | Q1.5 | Existing | 164 | 1041.85 | 1044.44 | 1.28 | 1044.6 | 7.87 | 21.25 | 16.6 | 0.1 | 0.06 | 0.1 | 0.055 |
| 709.95 | Q100 | Existing | 858 | 1038.62 | 1044.11 | 2.77 | 1045.02 | 14.59 | 62.93 | 22.69 | 0.1 | 0.06 | 0.1 | 0.052 |
| 709.95 | Q10 | Existing | 489 | 1038.62 | 1042.93 | 2.83 | 1043.48 | 12.09 | 40.45 | 14.27 |  | 0.06 |  | 0.06 |
| 709.95 | Q1.5 | Existing | 164 | 1038.62 | 1040.92 | 1.5 | 1041.42 | 10.48 | 15.64 | 10.42 |  | 0.06 |  | 0.06 |
| 659.75 | Q100 | Existing | 858 | 1036.65 | 1042.11 | 3.38 | 1042.22 | 11.68 | 76.31 | 22.58 | 0.1 | 0.06 | 0.1 | 0.054 |
| 659.75 | Q10 | Existing | 489 | 1036.65 | 1040.84 | 2.79 | 1040.84 | 9.64 | 50.84 | 18.25 | 0.1 | 0.06 | 0.1 | 0.058 |
| 659.75 | Q1.5 | Existing | 164 | 1036.65 | 1039.05 | 1.65 | 1039.05 | 7.35 | 22.31 | 13.53 |  | 0.06 |  | 0.06 |
| 597.67 | Q100 | Existing | 858 | 1033.94 | 1038.55 | 3.36 | 1039.05 | 13.03 | 67.19 | 19.97 | 0.1 | 0.06 | 0.1 | 0.056 |
| 597.67 | Q10 | Existing | 489 | 1033.94 | 1037.53 | 2.58 | 1037.72 | 10.31 | 47.57 | 18.42 | 0.1 | 0.06 | 0 | 0.059 |
| 597.67 | Q1.5 | Existing | 164 | 1033.94 | 1036.13 | 1.64 | 1036.04 | 6.75 | 24.31 | 14.84 |  | 0.06 |  | 0.06 |
| 552.31 | Q100 | Existing | 858 | 1032.03 | 1036.48 | 3.07 | 1036.85 | 12.21 | 74.45 | 24.26 | 0.1 | 0.06 | 0.1 | 0.055 |
| 552.31 | Q10 | Existing | 489 | 1032.03 | 1035.48 | 2.44 | 1035.56 | 9.64 | 51.77 | 21.24 | 0.1 | 0.06 | 0.1 | 0.056 |
| 552.31 | Q1.5 | Existing | 164 | 1032.03 | 1033.95 | 1.53 | 1033.95 | 7.03 | 23.33 | 15.28 |  | 0.06 |  | 0.06 |
| 500 | Q100 | Existing | 858 | 1028.47 | 1033.33 | 3.07 | 1033.96 | 13.38 | 68.21 | 22.21 | 0.1 | 0.06 | 0.1 | 0.053 |
| 500 | Q10 | Existing | 489 | 1028.47 | 1032.06 | 2.53 | 1032.45 | 11.37 | 43.37 | 17.14 | 0.1 | 0.06 | 0 | 0.058 |
| 500 | Q1.5 | Existing | 164 | 1028.47 | 1030.49 | 1.51 | 1030.67 | 8.25 | 19.89 | 13.14 |  | 0.06 |  | 0.06 |
| 450 | Q100 | Existing | 858 | 1026.39 | 1031.14 | 2.67 | 1031.65 | 11.75 | 77.1 | 28.86 | 0.1 | 0.06 | 0 | 0.054 |
| 450 | Q10 | Existing | 489 | 1026.39 | 1030.2 | 2.45 | 1030.2 | 9.22 | 53.28 | 21.73 | 0.1 | 0.06 |  | 0.057 |
| 450 | Q1.5 | Existing | 164 | 1026.39 | 1028.49 | 1.56 | 1028.49 | 7.14 | 22.96 | 14.71 |  | 0.06 |  | 0.06 |
| 400 | Q100 | Existing | 858 | 1024.77 | 1028.21 | 2.06 | 1028.76 | 12.22 | 83.15 | 40.38 | 0.1 | 0.06 | 0.1 | 0.06 |
| 400 | Q10 | Existing | 489 | 1024.77 | 1028.15 | 2.01 | 1027.89 | 7.15 | 80.82 | 40.25 | 0.1 | 0.06 | 0.1 | 0.06 |
| 400 | Q1.5 | Existing | 164 | 1024.77 | 1027 | 1.09 | 1026.74 | 4.79 | 36.71 | 33.79 | 0.1 | 0.06 | 0 | 0.055 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3300 | Q100 | Proposed | 858 | 1258.76 | 1262.38 | 2.62 | 1262.10 | 8.57 | 111 | 42.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3300 | Q10 | Proposed | 489 | 1258.76 | 1261.63 | 2.08 | 1261.22 | 6.52 | 81 | 38.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3300 | Q1.5 | Proposed | 164 | 1258.76 | 1260.75 | 1.40 | 1260.18 | 3.51 | 48 | 34.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3250 | Q100 | Proposed | 858 | 1258.88 | 1262.32 | 2.90 | | 4.45 | 201 | 69.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3250 | Q10 | Proposed | 489 | 1258.88 | 1261.15 | 1.88 | | 4.08 | 122 | 65.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3250 | Q1.5 | Proposed | 164 | 1258.88 | 1260.00 | 0.85 | | 3.27 | 50 | 59.3 | | 0.06 | 0.10 | 0.06 |
| 3200 | Q100 | Proposed | 858 | 1257.70 | 1262.22 | 3.44 | | 3.15 | 286 | 83.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3200 | Q10 | Proposed | 489 | 1257.70 | 1260.96 | 2.37 | | 2.72 | 184 | 77.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3200 | Q1.5 | Proposed | 164 | 1257.70 | 1259.43 | 1.05 | | 2.35 | 71 | 67.5 | | 0.06 | 0.10 | 0.06 |
| 3150 | Q100 | Proposed | 858 | 1257.43 | 1262.05 | 3.81 | | 3.48 | 272 | 71.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3150 | Q10 | Proposed | 489 | 1257.43 | 1260.80 | 2.82 | | 2.82 | 186 | 65.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3150 | Q1.5 | Proposed | 164 | 1257.43 | 1259.19 | 1.46 | | 1.98 | 86 | 58.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3100 | Q100 | Proposed | 858 | 1257.05 | 1261.75 | 3.81 | | 4.54 | 215 | 56.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3100 | Q10 | Proposed | 489 | 1257.05 | 1260.55 | 2.95 | | 3.57 | 151 | 51.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3100 | Q1.5 | Proposed | 164 | 1257.05 | 1258.98 | 1.67 | | 2.29 | 75 | 45.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3050 | Q100 | Proposed | 858 | 1256.61 | 1261.66 | 3.81 | | 3.59 | 276 | 72.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3050 | Q10 | Proposed | 489 | 1256.61 | 1260.45 | 2.96 | | 2.82 | 192 | 65.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3050 | Q1.5 | Proposed | 164 | 1256.61 | 1258.86 | 1.75 | | 1.77 | 97 | 55.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3000 | Q100 | Proposed | 858 | 1256.56 | 1261.49 | 3.43 | | 3.78 | 263 | 76.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3000 | Q10 | Proposed | 489 | 1256.56 | 1260.28 | 2.62 | | 3.07 | 176 | 67.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 3000 | Q1.5 | Proposed | 164 | 1256.56 | 1258.70 | 1.45 | | 2.14 | 79 | 54.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2950 | Q100 | Proposed | 858 | 1256.22 | 1261.35 | 3.22 | | 3.32 | 262 | 81.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2950 | Q10 | Proposed | 489 | 1256.22 | 1260.10 | 2.39 | | 2.94 | 166 | 69.6 | | 0.06 | 0.10 | 0.06 |
| 2950 | Q1.5 | Proposed | 164 | 1256.22 | 1258.42 | 1.36 | | 2.46 | 67 | 49.1 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2900 | Q100 | Proposed | 858 | 1255.40 | 1260.41 | 2.52 | | 7.89 | 168 | 66.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2900 | Q10 | Proposed | 489 | 1255.40 | 1259.06 | 1.90 | 1258.66 | 7.26 | 91 | 47.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2900 | Q1.5 | Proposed | 164 | 1255.40 | 1257.52 | 1.29 | | 5.21 | 34 | 26.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2850 | Q100 | Proposed | 858 | 1253.92 | 1258.70 | 2.69 | 1258.70 | 10.49 | 110 | 40.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2850 | Q10 | Proposed | 489 | 1253.92 | 1257.84 | 2.16 | 1257.59 | 8.04 | 77 | 35.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2850 | Q1.5 | Proposed | 164 | 1253.92 | 1256.59 | 1.31 | | 4.95 | 37 | 28.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2800 | Q100 | Proposed | 858 | 1253.07 | 1258.02 | 2.72 | 1257.50 | 8.36 | 156 | 57.3 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2800 | Q10 | Proposed | 489 | 1253.07 | 1256.98 | 1.95 | | 7.11 | 99 | 51.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2800 | Q1.5 | Proposed | 164 | 1253.07 | 1255.73 | 0.97 | | 4.88 | 40 | 41.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2750 | Q100 | Proposed | 858 | 1252.22 | 1257.52 | 3.01 | | 7.01 | 192 | 63.7 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2750 | Q10 | Proposed | 489 | 1252.22 | 1256.37 | 2.09 | | 6.1 | 122 | 58.1 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2750 | Q1.5 | Proposed | 164 | 1252.22 | 1254.89 | 0.88 | 1254.41 | 4.86 | 41 | 46.8 | 0.10 | 0.06 | 0.10 | 0.04 |
| 2700 | Q100 | Proposed | 858 | 1251.38 | 1256.47 | 2.97 | | 8.48 | 147 | 49.3 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2700 | Q10 | Proposed | 489 | 1251.38 | 1255.42 | 2.12 | | 7.03 | 97 | 45.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2700 | Q1.5 | Proposed | 164 | 1251.38 | 1254.06 | 1.11 | | 4.82 | 40 | 36.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2650 | Q100 | Proposed | 858 | 1250.58 | 1255.80 | 3.11 | | 7.82 | 163 | 52.3 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2650 | Q10 | Proposed | 489 | 1250.58 | 1254.73 | 2.21 | | 6.48 | 109 | 49.0 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2650 | Q1.5 | Proposed | 164 | 1250.58 | 1253.40 | 1.11 | | 4.38 | 47 | 42.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2600 | Q100 | Proposed | 858 | 1249.76 | 1254.13 | 2.53 | 1254.13 | 10.31 | 119 | 46.9 | 0.10 | 0.06 | 0.10 | 0.07 |
| 2600 | Q10 | Proposed | 489 | 1249.76 | 1253.27 | 1.80 | 1253.27 | 8.47 | 80 | 44.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2600 | Q1.5 | Proposed | 164 | 1249.76 | 1252.04 | 0.87 | 1252.04 | 6.32 | 28 | 32.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2550 | Q100 | Proposed | 858 | 1247.32 | 1251.43 | 2.28 | 1251.86 | 12.19 | 96 | 42.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2550 | Q10 | Proposed | 489 | 1247.32 | 1250.54 | 1.51 | 1250.95 | 10.49 | 60 | 39.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2550 | Q1.5 | Proposed | 164 | 1247.32 | 1249.40 | 1.35 | 1249.54 | 7.32 | 22 | 16.6 | 0.00 | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2500 | Q100 | Proposed | 858 | 1243.63 | 1247.22 | 1.92 | 1248.05 | 14.54 | 80 | 41.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2500 | Q10 | Proposed | 489 | 1243.63 | 1246.53 | 1.33 | 1247.15 | 12.03 | 52 | 39.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2500 | Q1.5 | Proposed | 164 | 1243.63 | 1245.55 | 1.13 | 1245.88 | 8.27 | 20 | 17.6 | 0.10 | 0.06 | | 0.06 |
| 2450 | Q100 | Proposed | 858 | 1234.43 | 1237.46 | 1.34 | 1238.89 | 19.89 | 56 | 41.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2450 | Q10 | Proposed | 489 | 1234.43 | 1236.83 | 1.01 | 1238.00 | 17.16 | 32 | 31.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2450 | Q1.5 | Proposed | 164 | 1234.43 | 1235.81 | 0.91 | 1236.67 | 13.62 | 12 | 13.2 | | 0.06 | | 0.06 |
| 2400 | Q100 | Proposed | 858 | 1223.18 | 1226.18 | 1.35 | 1227.59 | 19.94 | 56 | 41.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2400 | Q10 | Proposed | 489 | 1223.18 | 1225.66 | 0.93 | 1226.71 | 16.15 | 35 | 37.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2400 | Q1.5 | Proposed | 164 | 1223.18 | 1224.81 | 1.09 | 1225.42 | 10.5 | 16 | 14.4 | | 0.06 | | 0.06 |
| 2372.58 | Q100 | Proposed | 858 | 1217.59 | 1220.73 | 1.23 | 1222.11 | 19.4 | 59 | 48.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2372.58 | Q10 | Proposed | 489 | 1217.59 | 1220.08 | 1.12 | 1221.29 | 16.2 | 34 | 30.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2372.58 | Q1.5 | Proposed | 164 | 1217.59 | 1219.09 | 1.00 | 1219.73 | 11.57 | 14 | 14.1 | | 0.06 | | 0.06 |
| 2350 | Q100 | Proposed | 858 | 1213.54 | 1216.14 | 1.02 | 1217.32 | 19.4 | 64 | 62.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2350 | Q10 | Proposed | 489 | 1213.54 | 1215.74 | 0.82 | 1216.63 | 15.64 | 41 | 50.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2350 | Q1.5 | Proposed | 164 | 1213.54 | 1215.10 | 1.00 | 1215.64 | 9.95 | 16 | 16.5 | | 0.06 | | 0.06 |
| 2300 | Q100 | Proposed | 858 | 1203.29 | 1206.52 | 1.30 | 1207.73 | 17.55 | 67 | 51.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2300 | Q10 | Proposed | 489 | 1203.29 | 1205.87 | 1.13 | 1206.88 | 14.94 | 39 | 34.3 | | 0.06 | 0.10 | 0.05 |
| 2300 | Q1.5 | Proposed | 164 | 1203.29 | 1204.81 | 1.00 | 1205.49 | 11.56 | 14 | 14.2 | | 0.06 | | 0.06 |
| 2250 | Q100 | Proposed | 858 | 1193.29 | 1196.26 | 0.90 | 1197.40 | 19.43 | 67 | 74.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2250 | Q10 | Proposed | 489 | 1193.29 | 1195.78 | 0.73 | 1196.83 | 16.07 | 37 | 50.2 | 0.10 | 0.06 | 0.10 | 0.04 |
| 2250 | Q1.5 | Proposed | 164 | 1193.29 | 1194.90 | 1.07 | 1195.50 | 10.76 | 15 | 14.3 | | 0.06 | | 0.06 |
| 2200 | Q100 | Proposed | 858 | 1184.02 | 1187.10 | 1.04 | 1188.24 | 17.77 | 72 | 68.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2200 | Q10 | Proposed | 489 | 1184.02 | 1186.55 | 0.89 | 1187.53 | 15.01 | 40 | 44.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2200 | Q1.5 | Proposed | 164 | 1184.02 | 1185.59 | 1.04 | 1186.24 | 10.85 | 15 | 14.5 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2150 | Q100 | Proposed | 858 | 1177.80 | 1181.22 | 1.16 | 1182.09 | 15.28 | 89 | 76.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2150 | Q10 | Proposed | 489 | 1177.80 | 1180.65 | 0.93 | 1181.47 | 12.71 | 51 | 55.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2150 | Q1.5 | Proposed | 164 | 1177.80 | 1179.68 | 1.25 | 1180.00 | 8.5 | 19 | 15.5 | | 0.06 | | 0.06 |
| 2100 | Q100 | Proposed | 858 | 1172.74 | 1175.88 | 1.17 | 1176.70 | 14.62 | 88 | 75.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2100 | Q10 | Proposed | 489 | 1172.74 | 1175.34 | 0.86 | 1176.05 | 12.39 | 51 | 58.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2100 | Q1.5 | Proposed | 164 | 1172.74 | 1174.39 | 1.08 | 1174.78 | 8.83 | 19 | 17.1 | | 0.06 | | 0.06 |
| 2050 | Q100 | Proposed | 858 | 1168.07 | 1171.44 | 1.51 | 1172.07 | 13.45 | 99 | 65.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2050 | Q10 | Proposed | 489 | 1168.07 | 1170.88 | 0.97 | 1171.41 | 11.37 | 62 | 64.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2050 | Q1.5 | Proposed | 164 | 1168.07 | 1170.01 | 1.01 | 1170.34 | 7.78 | 21 | 21.1 | 0.10 | 0.06 | | 0.05 |
| 2000 | Q100 | Proposed | 858 | 1163.49 | 1167.21 | 1.79 | 1167.91 | 13.62 | 90 | 50.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 2000 | Q10 | Proposed | 489 | 1163.49 | 1166.47 | 1.14 | 1167.09 | 11.79 | 54 | 47.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| 2000 | Q1.5 | Proposed | 164 | 1163.49 | 1165.32 | 1.20 | 1165.67 | 8.91 | 18 | 15.3 | | 0.06 | | 0.06 |
| 1950 | Q100 | Proposed | 858 | 1158.77 | 1162.03 | 1.38 | 1162.91 | 15.36 | 85 | 61.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1950 | Q10 | Proposed | 489 | 1158.77 | 1161.49 | 0.98 | 1162.15 | 12.76 | 53 | 54.2 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1950 | Q1.5 | Proposed | 164 | 1158.77 | 1160.69 | 1.26 | 1161.10 | 8.22 | 20 | 15.9 | | 0.06 | | 0.06 |
| 1900 | Q100 | Proposed | 858 | 1153.17 | 1156.53 | 1.52 | 1157.39 | 14.94 | 83 | 54.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1900 | Q10 | Proposed | 489 | 1153.17 | 1155.91 | 1.03 | 1156.62 | 12.72 | 50 | 48.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1900 | Q1.5 | Proposed | 164 | 1153.17 | 1154.87 | 1.12 | 1155.43 | 9.71 | 17 | 15.1 | | 0.06 | | 0.06 |
| 1850 | Q100 | Proposed | 858 | 1147.50 | 1150.88 | 1.42 | 1151.77 | 15.4 | 82 | 58.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1850 | Q10 | Proposed | 489 | 1147.50 | 1150.31 | 0.91 | 1151.04 | 12.93 | 50 | 54.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1850 | Q1.5 | Proposed | 164 | 1147.50 | 1149.37 | 1.23 | 1149.68 | 8.58 | 19 | 15.6 | | 0.06 | | 0.06 |
| 1800 | Q100 | Proposed | 858 | 1141.76 | 1145.13 | 1.51 | 1146.07 | 15.6 | 79 | 52.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1800 | Q10 | Proposed | 489 | 1141.76 | 1144.52 | 0.96 | 1145.29 | 13.28 | 48 | 49.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1800 | Q1.5 | Proposed | 164 | 1141.76 | 1143.50 | 1.15 | 1144.00 | 9.58 | 17 | 14.9 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1750 | Q100 | Proposed | 858 | 1135.99 | 1139.36 | 1.52 | 1140.33 | 15.66 | 78 | 51.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1750 | Q10 | Proposed | 489 | 1135.99 | 1138.75 | 1.02 | 1139.49 | 13.16 | 48 | 47.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1750 | Q1.5 | Proposed | 164 | 1135.99 | 1137.81 | 1.21 | 1138.20 | 8.89 | 18 | 15.3 | | 0.06 | | 0.06 |
| 1685.16 | Q100 | Proposed | 858 | 1128.19 | 1131.58 | 1.58 | 1132.59 | 16.02 | 74 | 47.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1685.16 | Q10 | Proposed | 489 | 1128.19 | 1130.92 | 1.13 | 1131.76 | 13.5 | 45 | 39.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1685.16 | Q1.5 | Proposed | 164 | 1128.19 | 1129.89 | 1.14 | 1130.40 | 9.66 | 17 | 14.8 | | 0.06 | | 0.06 |
| 1631.51 | Q100 | Proposed | 858 | 1122.32 | 1125.56 | 1.33 | 1126.45 | 15.32 | 82 | 61.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1631.51 | Q10 | Proposed | 489 | 1122.32 | 1125.04 | 0.97 | 1125.72 | 12.59 | 51 | 52.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1631.51 | Q1.5 | Proposed | 164 | 1122.32 | 1124.13 | 1.03 | 1124.49 | 8.46 | 19 | 18.9 | 0.10 | 0.06 | | 0.06 |
| 1558.62 | Q100 | Proposed | 858 | 1114.01 | 1117.50 | 1.70 | 1118.41 | 15.2 | 78 | 46.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1558.62 | Q10 | Proposed | 489 | 1114.01 | 1116.82 | 1.12 | 1117.55 | 13 | 48 | 42.8 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1558.62 | Q1.5 | Proposed | 164 | 1114.01 | 1115.76 | 1.15 | 1116.21 | 9.56 | 17 | 14.9 | | 0.06 | | 0.06 |
| 1514 | Q100 | Proposed | 858 | 1109.32 | 1112.91 | 1.71 | 1113.88 | 15.07 | 74 | 43.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1514 | Q10 | Proposed | 489 | 1109.32 | 1112.18 | 1.31 | 1112.94 | 12.59 | 45 | 34.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1514 | Q1.5 | Proposed | 164 | 1109.32 | 1111.18 | 1.23 | 1111.48 | 8.36 | 20 | 16.0 | | 0.06 | | 0.06 |
| 1485.63 | Q100 | Proposed | 858 | 1106.89 | 1110.30 | 1.70 | 1111.18 | 14.68 | 77 | 45.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1485.63 | Q10 | Proposed | 489 | 1106.89 | 1109.68 | 1.24 | 1110.32 | 11.84 | 50 | 40.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1485.63 | Q1.5 | Proposed | 164 | 1106.89 | 1108.70 | 1.20 | 1109.00 | 8.09 | 20 | 16.9 | | 0.06 | | 0.06 |
| 1451.92 | Q100 | Proposed | 858 | 1104.73 | 1108.63 | 1.80 | 1109.10 | 12.05 | 104 | 57.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1451.92 | Q10 | Proposed | 489 | 1104.73 | 1108.00 | 1.23 | 1108.36 | 9.76 | 68 | 55.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1451.92 | Q1.5 | Proposed | 164 | 1104.73 | 1106.88 | 1.31 | 1106.88 | 6.73 | 24 | 18.6 | 0.00 | 0.06 | 0.10 | 0.06 |
| 1418.62 | Q100 | Proposed | 858 | 1102.38 | 1106.14 | 1.53 | 1106.82 | 13.34 | 98 | 64.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1418.62 | Q10 | Proposed | 489 | 1102.38 | 1105.46 | 1.08 | 1106.07 | 11.42 | 57 | 53.0 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1418.62 | Q1.5 | Proposed | 164 | 1102.38 | 1104.32 | 1.26 | 1104.58 | 8.26 | 20 | 15.8 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1362.71 | Q100 | Proposed | 858 | 1098.39 | 1101.88 | 1.61 | 1102.55 | 13.54 | 94 | 58.0 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1362.71 | Q10 | Proposed | 489 | 1098.39 | 1101.26 | 1.11 | 1101.80 | 11.37 | 59 | 53.3 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1362.71 | Q1.5 | Proposed | 164 | 1098.39 | 1100.43 | 1.08 | 1100.63 | 7.28 | 23 | 21.0 | 0.10 | 0.06 | | 0.05 |
| 1308.81 | Q100 | Proposed | 858 | 1094.26 | 1097.98 | 1.59 | 1098.64 | 13.08 | 101 | 63.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1308.81 | Q10 | Proposed | 489 | 1094.26 | 1097.33 | 1.07 | 1097.86 | 11.07 | 61 | 57.7 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1308.81 | Q1.5 | Proposed | 164 | 1094.26 | 1096.17 | 1.25 | 1096.46 | 8.37 | 20 | 15.6 | | 0.06 | | 0.06 |
| 1243.78 | Q100 | Proposed | 858 | 1090.31 | 1094.19 | 1.90 | 1094.65 | 12.16 | 104 | 54.9 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1243.78 | Q10 | Proposed | 489 | 1090.31 | 1093.44 | 1.34 | 1093.88 | 10.36 | 65 | 48.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1243.78 | Q1.5 | Proposed | 164 | 1090.31 | 1092.53 | 0.82 | 1092.58 | 6.58 | 26 | 31.9 | 0.10 | 0.06 | 0.10 | 0.04 |
| 1172.3 | Q100 | Proposed | 858 | 1082.95 | 1086.32 | 1.69 | 1087.43 | 16.58 | 68 | 40.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1172.3 | Q10 | Proposed | 489 | 1082.95 | 1085.64 | 1.10 | 1086.52 | 14.18 | 41 | 37.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1172.3 | Q1.5 | Proposed | 164 | 1082.95 | 1084.44 | 0.98 | 1085.20 | 12.18 | 13 | 13.7 | | 0.06 | | 0.06 |
| 1126.39 | Q100 | Proposed | 858 | 1079.82 | 1082.07 | 1.84 | 1082.73 | 12.26 | 72 | 39.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1126.39 | Q10 | Proposed | 489 | 1079.82 | 1081.55 | 1.38 | 1081.91 | 9.54 | 52 | 37.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 1126.39 | Q1.5 | Proposed | 164 | 1079.82 | 1080.93 | 0.88 | 1080.95 | 5.55 | 30 | 33.7 | | 0.06 | | 0.06 |
| 1063.6 | Q100 | Proposed | 858 | 1073.21 | 1077.95 | 2.64 | 1078.43 | 12.45 | 80 | 30.1 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1063.6 | Q10 | Proposed | 489 | 1073.21 | 1076.78 | 2.11 | 1077.13 | 10.66 | 48 | 22.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| 1063.6 | Q1.5 | Proposed | 164 | 1073.21 | 1075.11 | 1.28 | 1075.47 | 9.11 | 18 | 14.1 | | 0.06 | | 0.06 |
| 992.88 | Q100 | Proposed | 858 | 1069.14 | 1072.71 | 1.89 | 1073.46 | 12.96 | 67 | 35.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 992.88 | Q10 | Proposed | 489 | 1069.14 | 1072.99 | 2.12 | 1072.59 | 6.46 | 77 | 36.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 992.88 | Q1.5 | Proposed | 164 | 1069.14 | 1071.52 | 1.09 | 1071.48 | 5.68 | 29 | 26.5 | | 0.06 | | 0.06 |
| 965.98 | Q100 | Proposed | 858 | 1067.81 | 1072.86 | 2.51 | 1072.86 | 9.99 | 116 | 46.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 965.98 | Q10 | Proposed | 489 | 1067.81 | 1071.80 | 1.75 | 1071.80 | 8.58 | 69 | 39.6 | 0.10 | 0.06 | 0.10 | 0.05 |
| 965.98 | Q1.5 | Proposed | 164 | 1067.81 | 1070.17 | 1.60 | 1070.04 | 6.45 | 25 | 15.9 | | 0.06 | | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 896.36 | Q100 | Proposed | 858 | 1065.69 | 1070.43 | 3.31 | 1069.68 | 7.91 | 121 | 36.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 896.36 | Q10 | Proposed | 489 | 1065.69 | 1068.37 | 1.75 | 1068.67 | 9.68 | 52 | 29.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 896.36 | Q1.5 | Proposed | 164 | 1065.69 | 1067.52 | 1.28 | 1067.39 | 5.6 | 29 | 22.9 | | 0.06 | | 0.06 |
| 863.1 | Q100 | Proposed | 858 | 1063.94 | 1070.05 | 4.28 | | 8.47 | 149 | 34.9 | 0.10 | 0.06 | 0.10 | 0.07 |
| 863.1 | Q10 | Proposed | 489 | 1063.94 | 1068.02 | 2.86 | 1067.36 | 8.07 | 84 | 29.4 | 0.10 | 0.06 | 0.10 | 0.07 |
| 863.1 | Q1.5 | Proposed | 164 | 1063.94 | 1065.99 | 1.25 | 1065.99 | 7.03 | 30 | 24.1 | 0.10 | 0.06 | 0.10 | 0.06 |
| 828.53 | Q100 | Proposed | 858 | 1061.14 | 1067.82 | 3.49 | 1067.82 | 13.64 | 97 | 27.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 828.53 | Q10 | Proposed | 489 | 1061.14 | 1066.10 | 3.00 | 1066.10 | 11.53 | 58 | 19.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 828.53 | Q1.5 | Proposed | 164 | 1061.14 | 1063.93 | 1.64 | 1064.04 | 8.69 | 23 | 13.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 826.84 | Q100 | Proposed | 858 | 1060.76 | 1065.18 | 2.97 | 1066.62 | 17.16 | 51 | 17.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 826.84 | Q10 | Proposed | 489 | 1060.76 | 1063.93 | 2.35 | 1065.01 | 15.17 | 32 | 13.7 | | 0.06 | | 0.06 |
| 826.84 | Q1.5 | Proposed | 164 | 1060.76 | 1062.44 | 1.18 | 1063.12 | 12.12 | 14 | 11.4 | | 0.06 | | 0.06 |
| 803.52 | Q100 | Proposed | 858 | 1055.18 | 1059.39 | 3.00 | 1061.57 | 21.35 | 43 | 14.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 803.52 | Q10 | Proposed | 489 | 1055.18 | 1058.21 | 2.25 | 1059.74 | 18.16 | 28 | 12.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 803.52 | Q1.5 | Proposed | 164 | 1055.18 | 1056.86 | 1.31 | 1057.62 | 12.8 | 13 | 9.8 | | 0.06 | | 0.06 |
| 788.49 | Q100 | Proposed | 858 | 1052.86 | 1056.13 | 2.37 | 1058.17 | 21.73 | 41 | 17.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 788.49 | Q10 | Proposed | 489 | 1052.86 | 1055.40 | 1.78 | 1056.73 | 17.26 | 29 | 16.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 788.49 | Q1.5 | Proposed | 164 | 1052.86 | 1054.57 | 1.09 | 1055.05 | 10.25 | 16 | 14.7 | | 0.06 | | 0.06 |
| 752.92 | Q100 | Proposed | 858 | 1042.81 | 1046.27 | 1.89 | 1048.21 | 23.47 | 44 | 23.2 | 0.10 | 0.06 | | 0.06 |
| 752.92 | Q10 | Proposed | 489 | 1042.81 | 1045.56 | 1.49 | 1047.09 | 19.34 | 29 | 19.3 | 0.10 | 0.06 | | 0.06 |
| 752.92 | Q1.5 | Proposed | 164 | 1042.81 | 1044.45 | 0.97 | 1045.36 | 14.49 | 11 | 11.7 | 0.10 | 0.06 | | 0.06 |
| 740.16 | Q100 | Proposed | 858 | 1041.85 | 1046.09 | 2.35 | 1047.54 | 17.96 | 56 | 23.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 740.16 | Q10 | Proposed | 489 | 1041.85 | 1045.36 | 1.84 | 1046.24 | 13.86 | 39 | 21.4 | 0.10 | 0.06 | 0.10 | 0.06 |
| 740.16 | Q1.5 | Proposed | 164 | 1041.85 | 1044.43 | 1.28 | 1044.59 | 7.88 | 21 | 16.6 | 0.10 | 0.06 | 0.10 | 0.06 |

## TABLE T2. HEC-RAS OUTPUT FOR MATERIAL REMOVAL AREA, EXISTING AND PROPOSED CONDITIONS
## PERMANENTE CREEK RESTORATION PLAN

| RiverSta | Profile | Plan | QTotal (cfs) | MinChEl (ft) | W.S.Elev (ft) | HydrDepth (ft) | CritW.S. (ft) | VelChnl (ft/s) | FlowArea (sqft) | TopWidth (ft) | Manning LOB -- | Manning Chan -- | Manning ROB -- | Manning avg -- |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 709.95 | Q100 | Proposed | 858 | 1038.62 | 1044.52 | 3.14 | 1045.49 | 16.2 | 73 | 23.1 | 0.10 | 0.06 | 0.10 | 0.05 |
| 709.95 | Q10 | Proposed | 489 | 1038.62 | 1043.03 | 2.89 | 1044.09 | 13.89 | 42 | 14.5 | 0.10 | 0.06 | 0.10 | 0.05 |
| 709.95 | Q1.5 | Proposed | 164 | 1038.62 | 1040.94 | 1.51 | 1041.46 | 10.98 | 16 | 10.5 | 0.10 | 0.06 | 0.00 | 0.06 |
| 659.75 | Q100 | Proposed | 858 | 1036.65 | 1041.33 | 3.07 | 1042.21 | 14.45 | 60 | 19.6 | 0.10 | 0.06 | 0.10 | 0.06 |
| 659.75 | Q10 | Proposed | 489 | 1036.65 | 1040.57 | 2.62 | 1040.84 | 10.62 | 46 | 17.6 | 0.00 | 0.06 | 0.00 | 0.06 |
| 659.75 | Q1.5 | Proposed | 164 | 1036.65 | 1039.05 | 1.65 | 1039.05 | 7.35 | 22 | 13.5 |  | 0.06 |  | 0.06 |
| 597.67 | Q100 | Proposed | 858 | 1033.94 | 1039.05 | 3.73 | 1039.05 | 11.44 | 77 | 20.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 597.67 | Q10 | Proposed | 489 | 1033.94 | 1037.72 | 2.73 | 1037.72 | 9.61 | 51 | 18.7 | 0.10 | 0.06 | 0.10 | 0.06 |
| 597.67 | Q1.5 | Proposed | 164 | 1033.94 | 1036.13 | 1.64 | 1036.04 | 6.75 | 24 | 14.8 |  | 0.06 |  | 0.06 |
| 552.31 | Q100 | Proposed | 858 | 1032.03 | 1036.19 | 2.90 | 1036.85 | 13.26 | 68 | 23.3 | 0.10 | 0.06 | 0.10 | 0.06 |
| 552.31 | Q10 | Proposed | 489 | 1032.03 | 1035.31 | 2.32 | 1035.56 | 10.29 | 48 | 20.8 | 0.10 | 0.06 | 0.10 | 0.06 |
| 552.31 | Q1.5 | Proposed | 164 | 1032.03 | 1033.95 | 1.53 | 1033.95 | 7.03 | 23 | 15.3 |  | 0.06 |  | 0.06 |
| 500 | Q100 | Proposed | 858 | 1028.47 | 1033.48 | 3.13 | 1033.96 | 12.86 | 72 | 22.9 | 0.10 | 0.06 | 0.10 | 0.05 |
| 500 | Q10 | Proposed | 489 | 1028.47 | 1032.18 | 2.60 | 1032.45 | 10.87 | 46 | 17.5 | 0.10 | 0.06 | 0.10 | 0.06 |
| 500 | Q1.5 | Proposed | 164 | 1028.47 | 1030.49 | 1.51 | 1030.67 | 8.25 | 20 | 13.1 |  | 0.06 |  | 0.06 |
| 450 | Q100 | Proposed | 858 | 1026.39 | 1031.01 | 2.63 | 1031.65 | 12.26 | 73 | 27.8 | 0.10 | 0.06 |  | 0.05 |
| 450 | Q10 | Proposed | 489 | 1026.39 | 1030.20 | 2.45 | 1030.20 | 9.22 | 53 | 21.7 | 0.10 | 0.06 |  | 0.06 |
| 450 | Q1.5 | Proposed | 164 | 1026.39 | 1028.49 | 1.56 | 1028.49 | 7.14 | 23 | 14.7 |  | 0.06 |  | 0.06 |
| 400 | Q100 | Proposed | 858 | 1024.77 | 1028.14 | 2.00 | 1028.58 | 10.89 | 81 | 40.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 400 | Q10 | Proposed | 489 | 1024.77 | 1028.11 | 1.97 | 1027.79 | 6.31 | 79 | 40.2 | 0.10 | 0.06 | 0.10 | 0.06 |
| 400 | Q1.5 | Proposed | 164 | 1024.77 | 1027.07 | 1.12 | 1026.76 | 4.23 | 39 | 34.9 |  | 0.06 | 0.10 | 0.06 |

**Project:** Permanente Creek Restoration Project
**Project #:** 13-016
**Date:** 10/28/19
**By:** D.R.
**Checked by:** B.M.Z.
**Location:** Channel Widening Area

## Table T3
## Overtopping Flow Evaluation along Angular Rock Vehicle Barrier

**Purpose: Evaluate areas where the 100-year flood overtops the bank adjacent to the access road and determine if the proposed 4 to 8 inch angular rock vehicle barrier will remain stable.**

| HEC-RAS Station | Road Edge Elevation (ft) | 100-yr WSE (ft) | Depth at Road Edge (ft) | Velocity at Road Edge (ft/s) | Energy Slope (ft/ft) | Shear Stress (calculated) (lbs/sf) | Notes |
|---|---|---|---|---|---|---|---|
| 145+50 and upstream | 691.0 | 690.6 | -- | -- | -- | -- | road above 100-yr WSE |
| 145+00 | 688.0 | 689.1 | 1.1 | 2.2 | 0.019 | 1.3 | |
| 144+50 | 685.7 | 686.9 | 1.2 | 5.0 | 0.060 | 4.5 | Maximum shear |
| 144+12.75 | 684.4 | 685.3 | 0.9 | 4.3 | 0.039 | 2.2 | |
| 143+88.99 to 135+94 | -- | -- | -- | -- | | | road above 100-yr WSE |
| 135+60.62 | 645.7 | 646.2 | 0.5 | 1.1 | 0.017 | 0.5 | |
| 135+00 | 644.2 | 645.2 | 1.0 | 4.4 | 0.017 | 1.1 | |
| 134+50 | 642.5 | 643.9 | 1.4 | 4.9 | 0.016 | 1.4 | |
| 134+26 to 124+82.8 | -- | -- | -- | -- | -- | -- | road above 100-yr WSE |
| 124+63.7 | 605.9 | 606.2 | 0.3 | 2.4 | 0.037 | 0.7 | shallow |
| 124+11.83 | -- | -- | -- | -- | -- | -- | road above 100-yr WSE |
| 123+56.27 | 601.2 | 602.8 | 1.6 | 3.5 | 0.025 | 2.5 | |
| 123+01.23 | 600 | 600.3 | 0.3 | 3.4 | 0.047 | 0.9 | shallow |
| 122+50.48 to 117+24.31 | -- | -- | -- | -- | -- | -- | road above 100-yr WSE |
| 116+78.1 | 579.7 | 580.0 | 0.3 | 0.3 | 0.001 | 0.0 | shallow |
| 116+20.76 | 578.3 | 579.8 | 1.5 | 0.8 | 0.005 | 0.4 | Just upstream of culvert |

**Notes:**

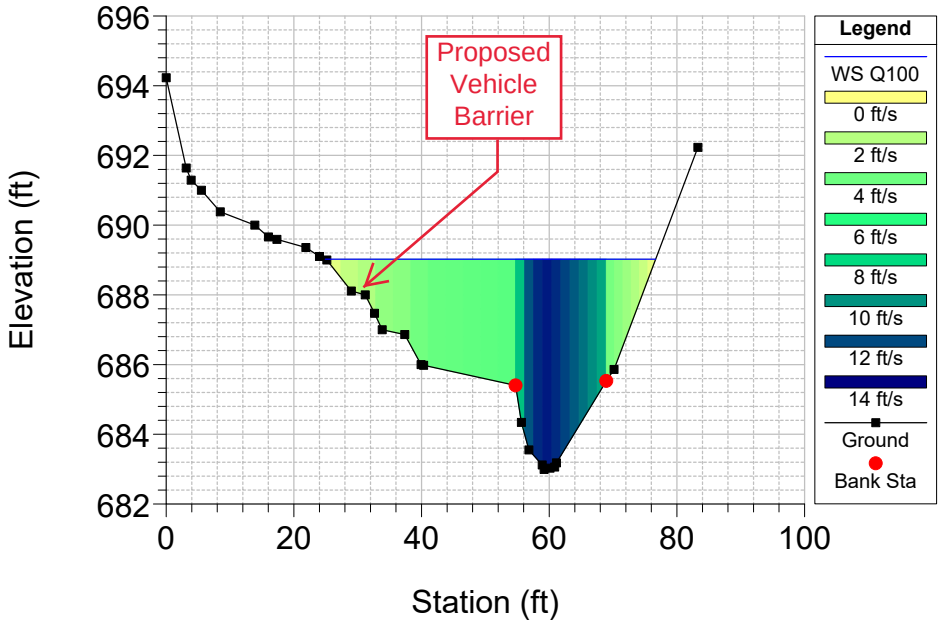
*The maximum permissible velocity of a 6-inch diameter rock is 10 ft/s and the maximum permissible shear stress is 2.5 lb/ft$^2$

*The maximum permissible velocity of a 12-inch diameter rock is 13 ft/s and the maximum permissible shear stress is 5.1 lb/ft$^2$

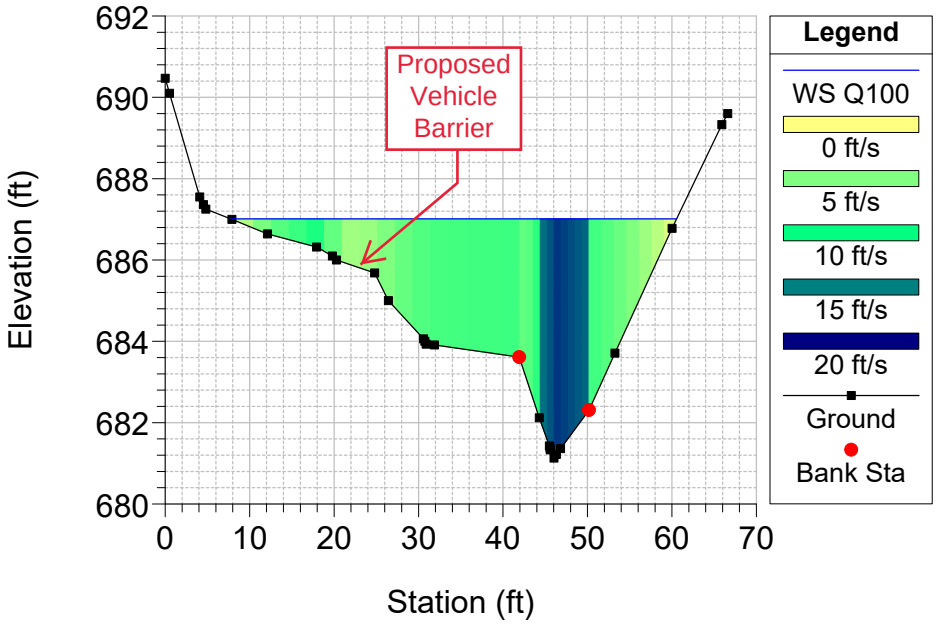
Use 10 to 16-inch diameter rock to constructe the vehicle barrier from Sta. 144+25 to 144+75.

*Source: Fischenich, Craig. May 2001. Stability Thresholds for Stream Restoration Materials. USAE Research and Development Center, Environmental Laboratory. Vicksburg Mississippi.

River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 14500




River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 14450

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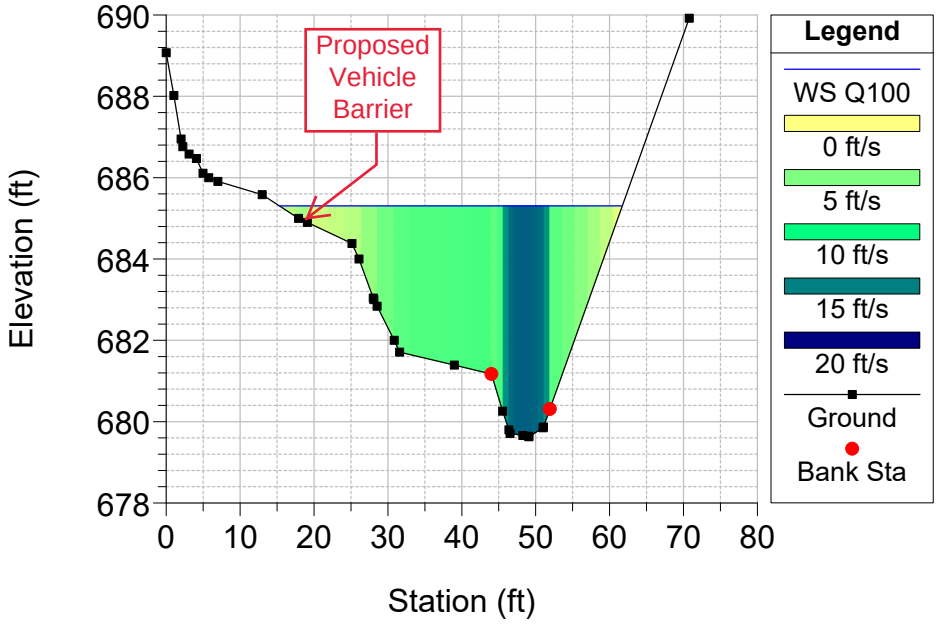


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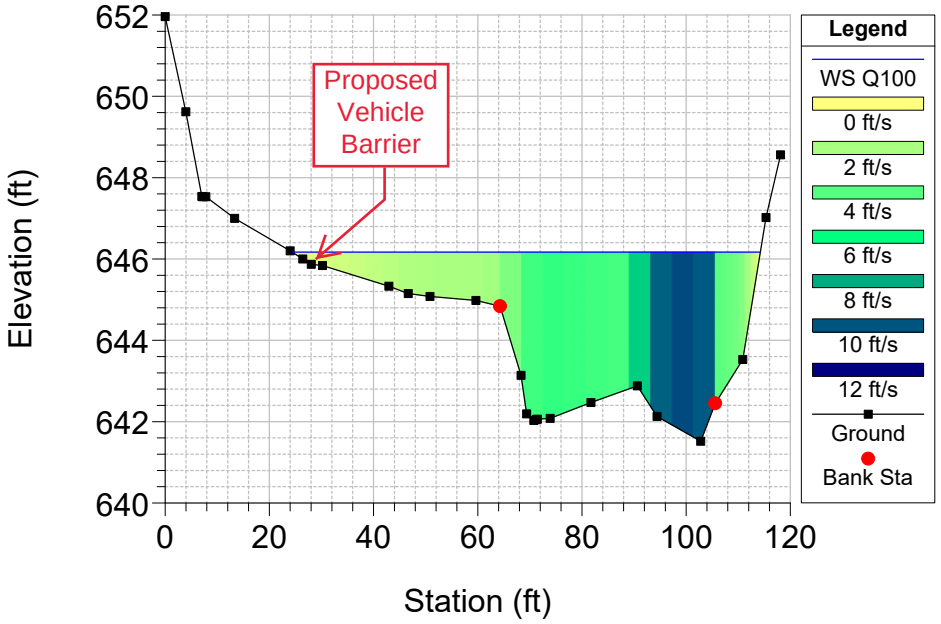
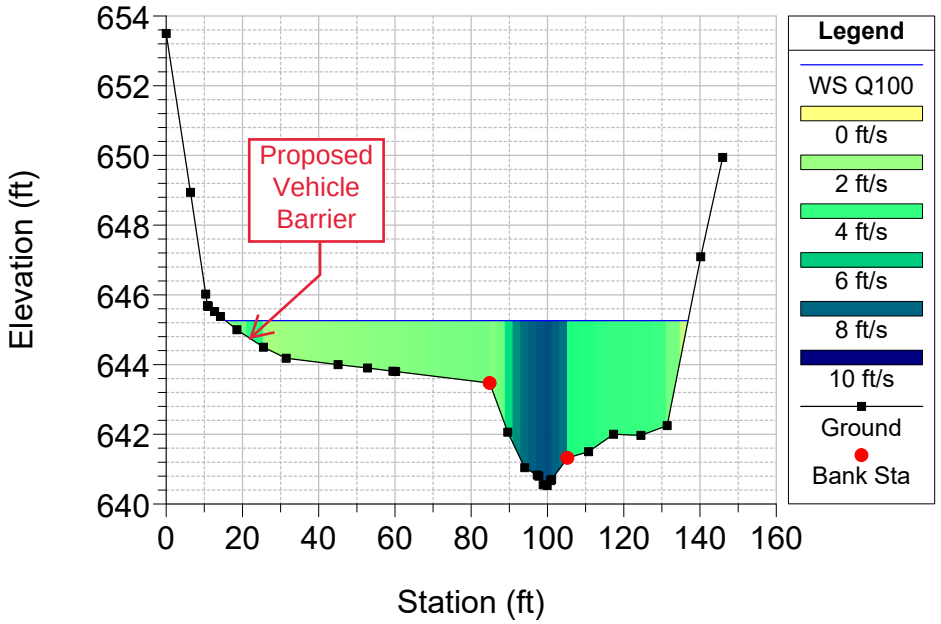


River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 13500

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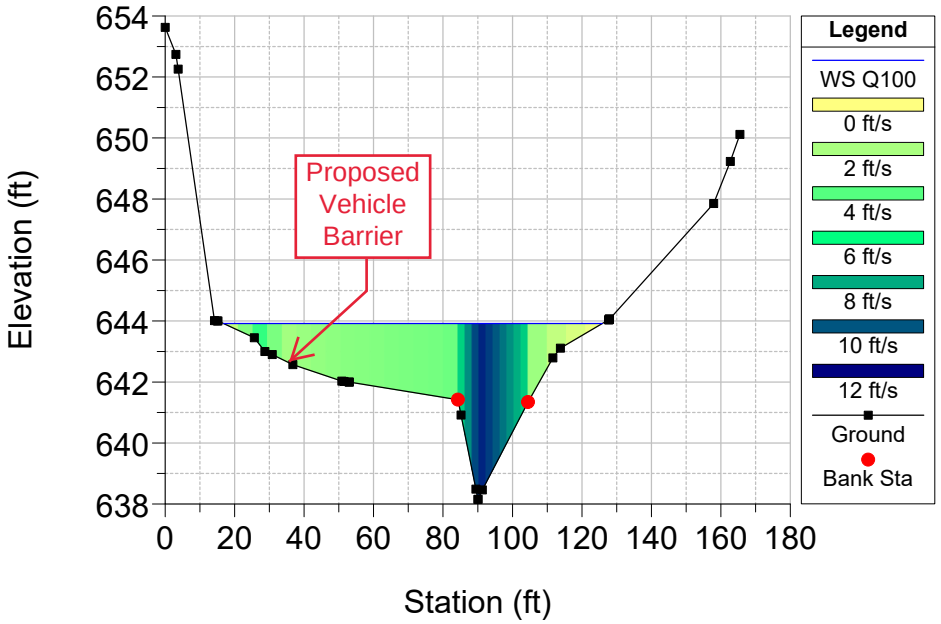


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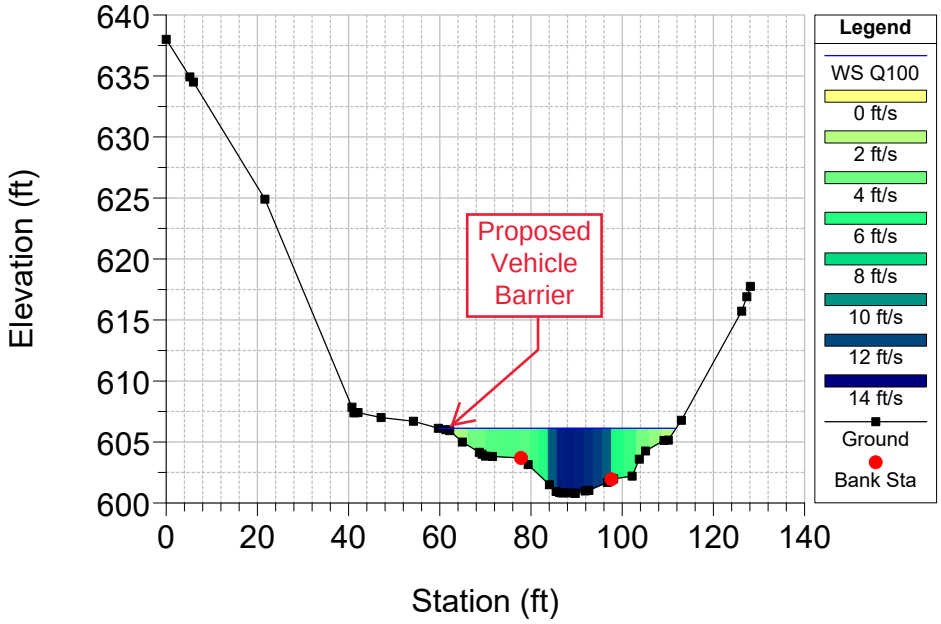


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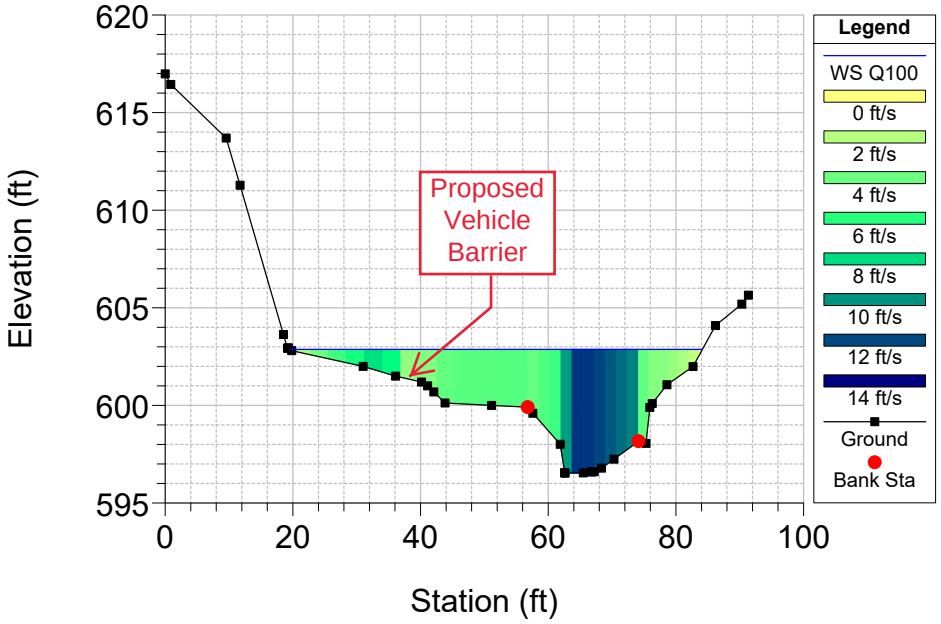

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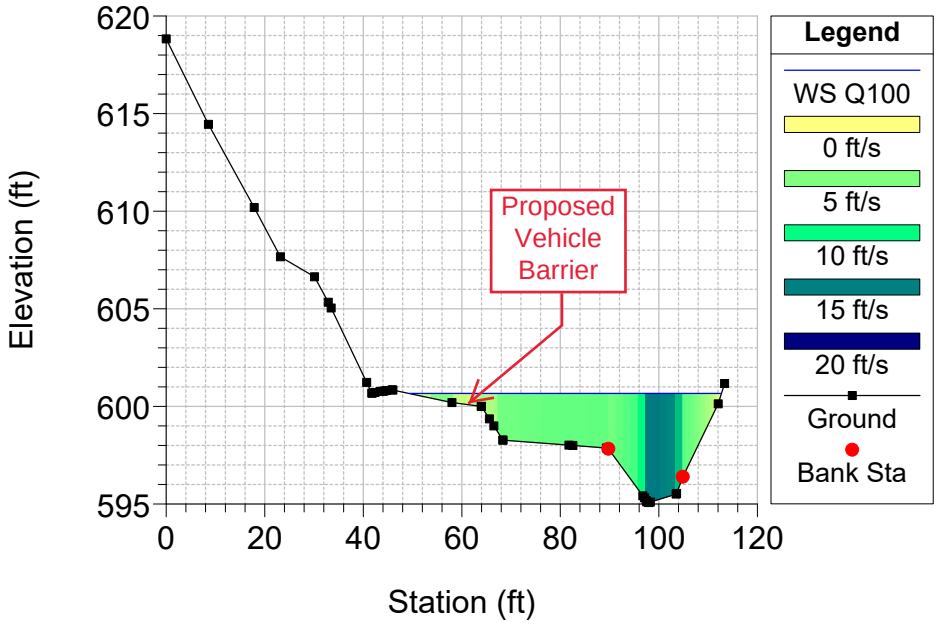
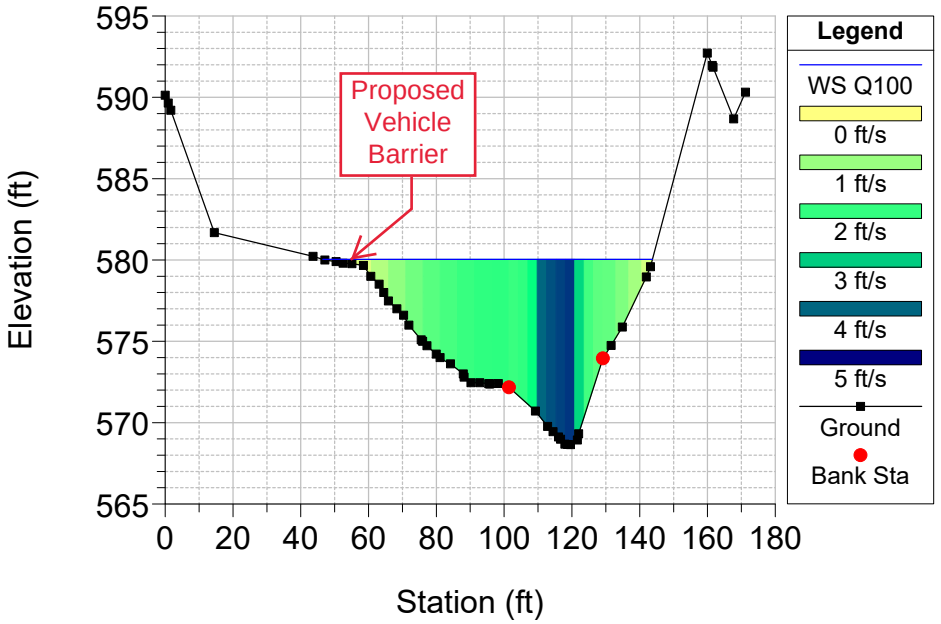



River = Permanente Creek Reach = HEC-RAS ALIGN_4- RS = 11678.1

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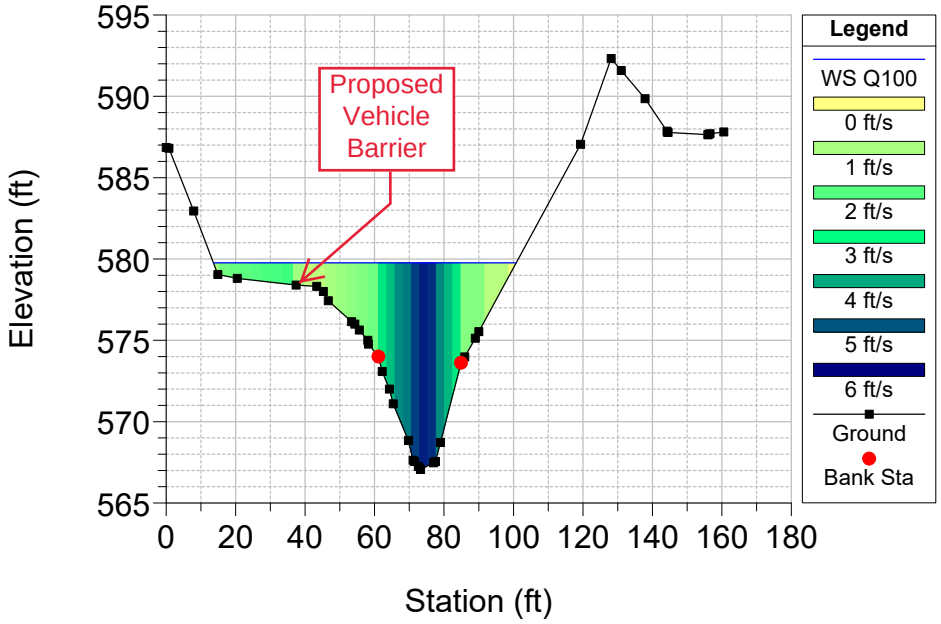

**TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%**
**PERMANENTE CREEK RESTORATION PLAN**

| | Water Surface Elevations | | | Water Surface Elevations | | | Water Surface Elevations | | | Differences between Sensitivity Trial and Design * | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEC-RAS | 1.5-YR Proposed Conditions | | | 10-YR Proposed Conditions | | | 100-YR Proposed Conditions | | | 1.5-YR Water Surface | | 10-YR Water Surface | | 100-YR Water Surface | |
| STATION | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% |
| 16350.0 | 815.0 | 815.1 | 815.0 | 816.4 | 816.5 | 816.2 | 817.5 | 817.7 | 817.3 | 0.07 | -0.06 | 0.14 | -0.15 | 0.20 | -0.21 |
| 16307.7 | 813.5 | 813.6 | 813.4 | 814.9 | 815.1 | 814.8 | 816.1 | 816.3 | 815.9 | 0.11 | -0.12 | 0.17 | -0.16 | 0.21 | -0.21 |
| 16250.0 | 811.8 | 811.8 | 811.7 | 813.3 | 813.4 | 813.1 | 814.4 | 814.5 | 814.2 | 0.05 | -0.03 | 0.06 | -0.18 | 0.11 | -0.22 |
| 16200.0 | 809.7 | 809.8 | 809.5 | 810.5 | 810.8 | 810.5 | 811.4 | 811.6 | 811.4 | 0.14 | -0.15 | 0.23 | 0.01 | 0.21 | 0.00 |
| 16150.0 | 806.3 | 806.3 | 806.3 | 808.0 | 808.0 | 807.8 | 808.9 | 808.9 | 808.7 | 0.00 | 0.00 | 0.02 | -0.17 | 0.05 | -0.17 |
| 16100.0 | 802.1 | 802.3 | 802.0 | 803.3 | 803.4 | 803.2 | 804.1 | 804.1 | 804.1 | 0.16 | -0.15 | 0.09 | -0.03 | 0.06 | -0.02 |
| 16050.0 | 798.6 | 798.6 | 798.5 | 799.7 | 799.8 | 799.5 | 800.4 | 800.6 | 800.2 | 0.06 | -0.08 | 0.13 | -0.16 | 0.17 | -0.19 |
| 16000.0 | 794.3 | 794.4 | 794.2 | 795.6 | 795.6 | 795.4 | 796.5 | 796.6 | 796.3 | 0.11 | -0.09 | 0.09 | -0.11 | 0.12 | -0.15 |
| 15982.4 | 793.3 | 793.4 | 793.2 | 794.4 | 794.5 | 794.2 | 795.2 | 795.3 | 795.0 | 0.10 | -0.15 | 0.13 | -0.14 | 0.15 | -0.15 |
| 15950.0 | 790.2 | 790.3 | 790.2 | 791.5 | 791.6 | 791.4 | 792.3 | 792.4 | 792.2 | 0.05 | -0.04 | 0.09 | -0.11 | 0.11 | -0.12 |
| 15917.7 | 787.8 | 787.9 | 787.6 | 788.8 | 788.9 | 788.7 | 789.6 | 789.7 | 789.4 | 0.13 | -0.14 | 0.12 | -0.12 | 0.13 | -0.14 |
| 15900.0 | 786.5 | 786.6 | 786.4 | 787.7 | 787.8 | 787.6 | 788.5 | 788.7 | 788.3 | 0.06 | -0.09 | 0.13 | -0.14 | 0.17 | -0.17 |
| 15878.5 | 784.7 | 784.8 | 784.6 | 785.9 | 786.0 | 785.8 | 786.7 | 786.9 | 786.6 | 0.10 | -0.10 | 0.09 | -0.12 | 0.12 | -0.15 |
| 15850.0 | 782.5 | 782.6 | 782.4 | 783.6 | 783.7 | 783.5 | 784.4 | 784.5 | 784.3 | 0.09 | -0.10 | 0.10 | -0.12 | 0.12 | -0.14 |
| 15800.0 | 778.5 | 778.6 | 778.4 | 779.6 | 779.7 | 779.5 | 780.5 | 780.6 | 780.3 | 0.09 | -0.10 | 0.11 | -0.12 | 0.14 | -0.15 |
| 15750.0 | 774.3 | 774.4 | 774.2 | 775.5 | 775.6 | 775.4 | 776.3 | 776.4 | 776.1 | 0.09 | -0.10 | 0.10 | -0.12 | 0.13 | -0.13 |
| 15700.0 | 770.0 | 770.1 | 769.9 | 771.1 | 771.3 | 771.0 | 772.0 | 772.1 | 771.8 | 0.08 | -0.09 | 0.13 | -0.14 | 0.14 | -0.16 |
| 15650.0 | 766.1 | 766.2 | 766.0 | 767.2 | 767.2 | 767.1 | 767.8 | 767.9 | 767.7 | 0.09 | -0.10 | 0.08 | -0.10 | 0.10 | -0.11 |
| 15600.0 | 762.0 | 762.1 | 761.9 | 763.2 | 763.3 | 763.1 | 763.9 | 764.0 | 763.8 | 0.10 | -0.08 | 0.09 | -0.11 | 0.11 | -0.12 |
| 15550.0 | 758.2 | 758.3 | 758.1 | 759.2 | 759.3 | 759.1 | 759.8 | 759.8 | 759.7 | 0.10 | -0.11 | 0.08 | -0.09 | 0.07 | -0.08 |
| 15500.0 | 754.2 | 754.3 | 754.2 | 755.3 | 755.4 | 755.2 | 756.0 | 756.1 | 755.9 | 0.07 | -0.08 | 0.09 | -0.10 | 0.11 | -0.13 |
| 15450.0 | 750.6 | 750.7 | 750.4 | 751.6 | 751.7 | 751.5 | 752.4 | 752.5 | 752.3 | 0.10 | -0.11 | 0.10 | -0.11 | 0.11 | -0.13 |
| 15400.0 | 746.6 | 746.7 | 746.5 | 747.9 | 748.0 | 747.8 | 748.8 | 748.9 | 748.6 | 0.07 | -0.08 | 0.10 | -0.12 | 0.11 | -0.12 |
| 15350.0 | 742.6 | 742.7 | 742.5 | 743.7 | 743.8 | 743.6 | 744.5 | 744.6 | 744.4 | 0.11 | -0.12 | 0.09 | -0.11 | 0.10 | -0.10 |
| 15300.0 | 738.6 | 738.7 | 738.5 | 739.8 | 739.9 | 739.6 | 740.5 | 740.6 | 740.4 | 0.08 | -0.09 | 0.11 | -0.13 | 0.13 | -0.14 |
| 15250.0 | 734.6 | 734.7 | 734.5 | 735.7 | 735.8 | 735.6 | 736.6 | 736.7 | 736.4 | 0.10 | -0.11 | 0.10 | -0.11 | 0.12 | -0.14 |
| 15200.0 | 730.6 | 730.7 | 730.5 | 731.8 | 731.9 | 731.7 | 732.7 | 732.8 | 732.5 | 0.08 | -0.10 | 0.12 | -0.12 | 0.14 | -0.16 |
| 15150.0 | 726.6 | 726.7 | 726.5 | 727.8 | 727.9 | 727.7 | 728.6 | 728.7 | 728.5 | 0.10 | -0.10 | 0.11 | -0.12 | 0.13 | -0.14 |
| 15100.0 | 722.7 | 722.7 | 722.6 | 723.8 | 723.9 | 723.7 | 724.6 | 724.8 | 724.5 | 0.08 | -0.10 | 0.12 | -0.12 | 0.14 | -0.15 |
| 15050.0 | 718.7 | 718.8 | 718.6 | 719.8 | 719.9 | 719.7 | 720.6 | 720.7 | 720.5 | 0.10 | -0.10 | 0.11 | -0.12 | 0.12 | -0.15 |
| 15000.0 | 714.7 | 714.8 | 714.6 | 715.9 | 716.0 | 715.8 | 716.6 | 716.8 | 716.5 | 0.08 | -0.11 | 0.11 | -0.11 | 0.13 | -0.14 |
| 14950.0 | 710.7 | 710.8 | 710.6 | 711.8 | 711.9 | 711.7 | 712.6 | 712.8 | 712.5 | 0.10 | -0.10 | 0.11 | -0.12 | 0.13 | -0.14 |
| 14923.5 | 708.4 | 708.5 | 708.3 | 709.7 | 709.8 | 709.5 | 710.5 | 710.7 | 710.4 | 0.08 | -0.10 | 0.13 | -0.14 | 0.13 | -0.15 |
| 14900.0 | 706.4 | 706.5 | 706.4 | 707.4 | 707.5 | 707.3 | 708.3 | 708.4 | 708.1 | 0.07 | -0.08 | 0.10 | -0.11 | 0.12 | -0.14 |
| 14850.0 | 704.2 | 704.3 | 704.1 | 705.5 | 705.7 | 705.3 | 706.4 | 706.6 | 706.2 | 0.12 | -0.14 | 0.16 | -0.18 | 0.19 | -0.21 |
| 14802.6 | 703.3 | 703.3 | 703.4 | 704.2 | 704.2 | 704.1 | 704.9 | 704.9 | 704.8 | -0.01 | 0.02 | 0.01 | -0.05 | 0.00 | -0.05 |
| 14794.1 | 700.5 | 700.5 | 700.4 | 702.4 | 702.4 | 702.4 | 703.0 | 703.0 | 703.0 | 0.03 | -0.04 | 0.01 | -0.03 | -0.01 | -0.01 |
| 14750.0 | 699.6 | 699.7 | 699.4 | 700.4 | 700.6 | 700.3 | 701.2 | 701.3 | 701.0 | 0.13 | -0.16 | 0.11 | -0.10 | 0.14 | -0.12 |
| 14700.0 | 695.3 | 695.3 | 695.3 | 696.8 | 696.8 | 696.7 | 697.5 | 697.5 | 697.4 | 0.01 | -0.03 | 0.04 | -0.07 | 0.02 | -0.05 |
| 14667.2 | 690.0 | 690.1 | 689.9 | 691.5 | 691.7 | 691.4 | 693.1 | 693.2 | 692.9 | 0.11 | -0.09 | 0.15 | -0.15 | 0.14 | -0.17 |
| 14650.0 | 690.4 | 690.4 | 690.1 | 691.6 | 691.9 | 691.4 | 692.5 | 692.6 | 692.3 | 0.06 | -0.28 | 0.26 | -0.25 | 0.15 | -0.17 |
| 14600.0 | 688.7 | 688.8 | 688.3 | 689.4 | 689.4 | 689.3 | 690.0 | 691.2 | 689.9 | 0.13 | -0.37 | 0.02 | -0.05 | 1.25 | -0.10 |

**TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%**
**PERMANENTE CREEK RESTORATION PLAN**

| | Water Surface Elevations | | | Water Surface Elevations | | | Water Surface Elevations | | | Differences between Sensitivity Trial and Design * | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEC-RAS | 1.5-YR Proposed Conditions | | | 10-YR Proposed Conditions | | | 100-YR Proposed Conditions | | | 1.5-YR Water Surface | | 10-YR Water Surface | | 100-YR Water Surface | |
| STATION | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% |
| 14550.0 | 687.5 | 687.5 | 687.5 | 689.3 | 689.4 | 689.2 | 690.7 | 690.8 | 690.7 | 0.01 | -0.01 | 0.07 | -0.11 | 0.03 | -0.02 |
| 14500.0 | 686.2 | 686.3 | 685.8 | 687.8 | 687.8 | 687.8 | 689.1 | 689.0 | 689.1 | 0.12 | -0.34 | 0.03 | 0.03 | -0.06 | 0.05 |
| 14450.0 | 684.7 | 684.7 | 684.7 | 686.2 | 686.4 | 686.0 | 686.9 | 687.1 | 686.8 | -0.01 | 0.01 | 0.19 | -0.16 | 0.14 | -0.12 |
| 14412.8 | 682.2 | 682.2 | 682.1 | 683.8 | 683.8 | 683.9 | 685.3 | 685.3 | 685.3 | 0.05 | -0.05 | -0.06 | 0.01 | -0.02 | -0.04 |
| 14389.0 | 677.6 | 677.6 | 677.5 | 679.8 | 679.8 | 679.7 | 681.1 | 681.1 | 681.1 | 0.04 | -0.05 | 0.08 | -0.06 | 0.04 | -0.03 |
| 14350.0 | 675.2 | 675.3 | 675.0 | 676.7 | 676.9 | 676.6 | 677.9 | 678.0 | 677.7 | 0.17 | -0.15 | 0.11 | -0.12 | 0.12 | -0.12 |
| 14300.0 | 670.7 | 670.7 | 670.7 | 672.4 | 672.5 | 672.3 | 673.4 | 673.5 | 673.3 | -0.01 | -0.01 | 0.06 | -0.06 | 0.09 | -0.11 |
| 14250.0 | 667.2 | 667.3 | 667.2 | 667.8 | 667.9 | 667.8 | 668.6 | 668.6 | 668.5 | 0.07 | -0.07 | 0.05 | -0.04 | 0.04 | -0.03 |
| 14192.7 | 664.8 | 664.8 | 664.8 | 666.5 | 666.5 | 666.5 | 667.5 | 667.5 | 667.5 | 0.00 | -0.01 | 0.00 | 0.00 | -0.02 | 0.01 |
| 14150.0 | 662.7 | 662.8 | 662.6 | 663.9 | 663.9 | 663.8 | 664.8 | 664.8 | 664.7 | 0.15 | -0.10 | 0.09 | -0.09 | 0.08 | -0.07 |
| 14096.7 | 660.9 | 661.0 | 660.9 | 662.6 | 662.6 | 662.5 | 663.8 | 663.8 | 663.7 | 0.06 | -0.04 | 0.01 | -0.07 | 0.00 | -0.02 |
| 14082.0 | 660.3 | 660.4 | 660.3 | 661.7 | 661.8 | 661.7 | 662.7 | 662.8 | 662.8 | 0.07 | -0.08 | 0.10 | 0.02 | 0.04 | 0.02 |
| 14050.0 | 659.5 | 659.6 | 659.5 | 661.2 | 661.2 | 661.1 | 662.2 | 662.2 | 662.2 | 0.03 | -0.01 | 0.03 | -0.08 | -0.05 | -0.05 |
| 14000.0 | 658.1 | 658.2 | 658.0 | 659.5 | 659.6 | 659.5 | 660.5 | 660.7 | 660.5 | 0.12 | -0.14 | 0.06 | 0.00 | 0.20 | -0.01 |
| 13950.0 | 656.3 | 656.3 | 656.3 | 658.0 | 658.1 | 657.9 | 659.1 | 659.1 | 659.0 | 0.00 | 0.00 | 0.11 | -0.13 | -0.02 | -0.16 |
| 13900.0 | 653.7 | 653.8 | 652.6 | 654.8 | 654.8 | 654.7 | 656.0 | 656.1 | 655.9 | 0.14 | -1.04 | 0.07 | -0.07 | 0.11 | -0.03 |
| 13850.0 | 652.0 | 652.0 | 652.0 | 653.6 | 653.6 | 653.5 | 654.2 | 654.3 | 654.1 | 0.00 | 0.00 | 0.01 | -0.12 | 0.12 | -0.13 |
| 13800.0 | 650.5 | 650.5 | 650.4 | 651.8 | 651.9 | 651.3 | 652.8 | 652.9 | 652.7 | 0.04 | -0.06 | 0.11 | -0.54 | 0.13 | -0.12 |
| 13750.0 | 649.0 | 649.1 | 648.9 | 650.5 | 650.5 | 650.5 | 651.4 | 651.4 | 651.5 | 0.10 | -0.06 | -0.02 | 0.02 | -0.05 | 0.05 |
| 13700.0 | 647.7 | 647.7 | 647.7 | 649.4 | 649.4 | 649.3 | 650.4 | 650.5 | 650.3 | 0.04 | 0.01 | 0.02 | -0.10 | 0.06 | -0.09 |
| 13657.2 | 646.5 | 646.6 | 646.3 | 647.7 | 647.9 | 647.7 | 648.8 | 648.8 | 648.8 | 0.13 | -0.16 | 0.14 | -0.01 | 0.03 | 0.00 |
| 13594.6 | 644.6 | 644.6 | 644.6 | 645.6 | 645.7 | 645.5 | 646.5 | 646.6 | 646.3 | -0.01 | 0.00 | 0.05 | -0.15 | 0.16 | -0.16 |
| 13560.7 | 644.0 | 644.0 | 643.9 | 645.4 | 645.4 | 645.3 | 646.2 | 646.2 | 646.1 | 0.04 | -0.04 | 0.04 | -0.03 | 0.05 | -0.06 |
| 13500.0 | 643.1 | 643.2 | 643.0 | 644.3 | 644.4 | 644.2 | 645.2 | 645.3 | 645.1 | 0.08 | -0.11 | 0.06 | -0.09 | 0.05 | -0.07 |
| 13450.0 | 641.3 | 641.3 | 641.3 | 643.0 | 643.0 | 643.0 | 643.9 | 643.9 | 644.0 | 0.00 | 0.00 | 0.00 | 0.02 | -0.05 | 0.07 |
| 13426.5 | 640.0 | 640.1 | 639.9 | 641.1 | 641.2 | 641.1 | 641.9 | 642.0 | 641.9 | 0.12 | -0.11 | 0.05 | -0.05 | 0.05 | -0.04 |
| 13400.0 | 639.2 | 639.2 | 639.1 | 640.5 | 640.6 | 640.4 | 641.7 | 641.8 | 641.6 | 0.06 | -0.07 | 0.10 | -0.08 | 0.13 | -0.14 |
| 13350.0 | 638.3 | 638.4 | 638.2 | 639.7 | 639.9 | 639.6 | 641.1 | 641.3 | 640.9 | 0.08 | -0.08 | 0.15 | -0.18 | 0.15 | -0.19 |
| 13335.6 | 637.9 | 638.0 | 637.8 | 639.5 | 639.6 | 639.3 | 640.9 | 641.0 | 640.7 | 0.09 | -0.09 | 0.15 | -0.16 | 0.14 | -0.16 |
| 13300.0 | 637.1 | 637.2 | 637.0 | 638.8 | 639.0 | 638.6 | 640.3 | 640.4 | 640.1 | 0.12 | -0.14 | 0.16 | -0.20 | 0.14 | -0.17 |
| 13239.0 | 636.5 | 636.5 | 636.5 | 637.9 | 638.0 | 637.8 | 638.8 | 638.9 | 638.7 | 0.04 | -0.04 | 0.06 | -0.06 | 0.12 | -0.08 |
| 13208.1 | 635.7 | 635.7 | 635.7 | 636.9 | 636.8 | 636.9 | 637.8 | 637.7 | 637.9 | -0.01 | 0.02 | -0.04 | 0.07 | -0.07 | 0.04 |
| 13200.0 | 632.8 | 632.8 | 632.7 | 635.1 | 635.1 | 635.0 | 636.2 | 636.2 | 636.2 | 0.04 | -0.04 | 0.03 | -0.03 | -0.01 | 0.01 |
| 13171.2 | 630.8 | 630.9 | 630.6 | 634.0 | 634.0 | 634.0 | 635.6 | 635.5 | 635.6 | 0.15 | -0.18 | 0.03 | -0.03 | -0.06 | 0.06 |
| 13150.0 | 630.8 | 631.0 | 630.7 | 633.1 | 633.0 | 633.1 | 634.3 | 634.2 | 634.3 | 0.20 | -0.05 | -0.02 | 0.03 | -0.09 | 0.07 |
| 13113.0 | 629.8 | 629.8 | 629.6 | 631.3 | 631.4 | 631.2 | 632.5 | 632.6 | 632.5 | 0.00 | -0.17 | 0.08 | -0.07 | 0.08 | -0.04 |
| 13087.0 | 626.6 | 626.7 | 626.6 | 628.9 | 629.0 | 628.8 | 630.3 | 630.4 | 630.2 | 0.09 | -0.03 | 0.12 | -0.13 | 0.12 | -0.11 |
| 13050.0 | 625.8 | 625.8 | 625.6 | 627.0 | 627.2 | 626.9 | 628.4 | 628.6 | 628.2 | 0.02 | -0.24 | 0.19 | -0.17 | 0.22 | -0.20 |
| 13000.0 | 623.2 | 623.4 | 623.1 | 625.8 | 625.9 | 625.4 | 627.6 | 627.7 | 627.1 | 0.21 | -0.05 | 0.06 | -0.44 | 0.05 | -0.54 |
| 12950.0 | 620.0 | 620.1 | 619.8 | 621.8 | 621.9 | 621.7 | 623.0 | 623.0 | 622.9 | 0.09 | -0.19 | 0.12 | -0.07 | 0.07 | -0.05 |
| 12900.0 | 618.2 | 618.3 | 618.2 | 620.6 | 620.7 | 620.3 | 622.3 | 622.3 | 621.7 | 0.08 | 0.00 | 0.11 | -0.30 | -0.02 | -0.60 |
| 12850.0 | 617.2 | 617.3 | 617.0 | 619.0 | 619.3 | 618.2 | 620.0 | 620.3 | 619.8 | 0.15 | -0.16 | 0.26 | -0.78 | 0.22 | -0.24 |

**TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%**
**PERMANENTE CREEK RESTORATION PLAN**

| | Water Surface Elevations | | | Water Surface Elevations | | | Water Surface Elevations | | | Differences between Sensitivity Trial and Design * | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEC-RAS | 1.5-YR Proposed Conditions | | | 10-YR Proposed Conditions | | | 100-YR Proposed Conditions | | | 1.5-YR Water Surface | | 10-YR Water Surface | | 100-YR Water Surface | |
| STATION | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% |
| 12800.0 | 615.4 | 615.4 | 615.4 | 617.7 | 617.7 | 617.7 | 619.2 | 619.2 | 619.1 | 0.00 | 0.00 | 0.00 | 0.01 | 0.02 | -0.11 |
| 12750.0 | 613.8 | 614.0 | 613.7 | 614.7 | 615.0 | 614.5 | 616.0 | 616.1 | 615.9 | 0.15 | -0.17 | 0.22 | -0.21 | 0.13 | -0.12 |
| 12700.0 | 612.1 | 612.1 | 612.1 | 614.2 | 614.2 | 614.1 | 615.3 | 615.3 | 615.0 | 0.02 | 0.00 | -0.01 | -0.06 | 0.03 | -0.34 |
| 12650.0 | 610.5 | 610.6 | 610.3 | 611.4 | 611.6 | 611.3 | 612.6 | 612.8 | 612.5 | 0.11 | -0.16 | 0.17 | -0.13 | 0.15 | -0.10 |
| 12600.0 | 608.8 | 609.0 | 608.8 | 610.7 | 610.7 | 610.6 | 611.6 | 611.7 | 611.3 | 0.12 | -0.06 | -0.02 | -0.13 | 0.08 | -0.32 |
| 12590.0 | 608.4 | 608.5 | 608.3 | 610.0 | 610.1 | 610.0 | 611.1 | 611.1 | 610.9 | 0.06 | -0.16 | 0.04 | -0.04 | 0.04 | -0.19 |
| 12580.0 | 608.0 | 608.2 | 608.0 | 609.4 | 609.5 | 609.3 | 610.3 | 610.9 | 610.2 | 0.20 | 0.03 | 0.08 | -0.08 | 0.56 | -0.15 |
| 12570.0 | 607.6 | 607.7 | 607.6 | 609.3 | 609.4 | 609.4 | 610.5 | 610.5 | 610.4 | 0.11 | 0.03 | 0.10 | 0.04 | 0.00 | -0.07 |
| 12560.0 | 607.2 | 607.3 | 607.1 | 609.0 | 609.1 | 609.0 | 610.0 | 610.2 | 610.0 | 0.07 | -0.11 | 0.07 | -0.05 | 0.15 | -0.02 |
| 12550.0 | 606.9 | 606.9 | 606.8 | 607.7 | 607.7 | 607.7 | 609.8 | 609.9 | 609.7 | 0.05 | -0.05 | -0.01 | 0.01 | 0.06 | -0.08 |
| 12540.4 | 606.4 | 606.5 | 606.4 | 607.3 | 608.4 | 607.4 | 609.5 | 609.5 | 609.4 | 0.06 | -0.07 | 1.02 | 0.02 | 0.04 | -0.10 |
| 12530.9 | 606.0 | 606.1 | 606.0 | 607.9 | 608.0 | 607.0 | 609.0 | 609.0 | 609.0 | 0.06 | -0.07 | 0.04 | -0.96 | 0.04 | 0.03 |
| 12521.3 | 605.7 | 605.7 | 605.6 | 607.4 | 607.5 | 607.5 | 608.6 | 608.6 | 608.5 | 0.06 | -0.07 | 0.06 | 0.10 | 0.02 | -0.09 |
| 12511.7 | 605.3 | 605.3 | 605.2 | 607.0 | 607.0 | 606.9 | 608.2 | 608.2 | 608.2 | 0.07 | -0.07 | 0.01 | -0.14 | 0.05 | 0.09 |
| 12502.1 | 604.9 | 604.9 | 604.8 | 606.5 | 606.6 | 606.5 | 607.8 | 607.8 | 607.7 | 0.06 | -0.06 | 0.10 | 0.01 | -0.02 | -0.15 |
| 12492.5 | 604.5 | 604.5 | 604.5 | 606.2 | 606.3 | 606.1 | 607.3 | 607.3 | 607.2 | 0.03 | -0.03 | 0.12 | -0.09 | 0.09 | -0.06 |
| 12482.9 | 604.0 | 604.1 | 603.9 | 605.6 | 605.7 | 605.6 | 606.9 | 606.9 | 606.7 | 0.08 | -0.07 | 0.04 | -0.07 | -0.03 | -0.18 |
| 12473.3 | 603.7 | 603.8 | 603.6 | 605.4 | 605.4 | 604.9 | 606.6 | 606.7 | 605.9 | 0.05 | -0.07 | 0.09 | -0.45 | 0.12 | -0.69 |
| 12463.7 | 603.4 | 603.5 | 603.3 | 604.9 | 604.9 | 604.9 | 606.2 | 606.1 | 606.2 | 0.05 | -0.09 | 0.01 | 0.01 | -0.02 | 0.02 |
| 12411.9 | 601.4 | 601.5 | 601.3 | 603.2 | 603.3 | 603.1 | 603.9 | 604.3 | 603.7 | 0.10 | -0.07 | 0.10 | -0.11 | 0.48 | -0.12 |
| 12356.3 | 600.2 | 600.3 | 600.2 | 601.7 | 601.8 | 601.6 | 602.8 | 602.8 | 602.9 | 0.07 | -0.07 | 0.11 | -0.12 | -0.02 | 0.03 |
| 12301.3 | 598.0 | 598.0 | 598.0 | 599.7 | 599.7 | 599.7 | 600.7 | 600.8 | 600.6 | 0.00 | -0.01 | -0.02 | 0.01 | 0.11 | -0.10 |
| 12250.5 | 596.0 | 596.1 | 595.9 | 597.7 | 597.9 | 597.6 | 599.0 | 599.1 | 598.7 | 0.09 | -0.13 | 0.12 | -0.16 | 0.19 | -0.22 |
| 12225.1 | 594.8 | 594.9 | 594.8 | 596.8 | 596.8 | 596.8 | 598.3 | 598.2 | 598.4 | 0.04 | 0.00 | -0.01 | 0.00 | -0.06 | 0.08 |
| 12191.7 | 593.6 | 593.7 | 593.3 | 594.7 | 594.8 | 594.6 | 595.7 | 595.9 | 595.6 | 0.04 | -0.34 | 0.13 | -0.12 | 0.13 | -0.13 |
| 12142.0 | 592.0 | 592.1 | 592.0 | 593.5 | 593.5 | 593.6 | 594.6 | 594.6 | 594.5 | 0.14 | -0.03 | -0.07 | 0.03 | -0.05 | -0.18 |
| 12092.7 | 590.2 | 590.2 | 590.1 | 591.4 | 591.5 | 591.3 | 592.1 | 592.2 | 592.1 | -0.01 | -0.11 | 0.13 | -0.09 | 0.11 | -0.02 |
| 12033.9 | 587.2 | 587.3 | 587.1 | 589.3 | 589.5 | 588.4 | 589.7 | 589.9 | 589.4 | 0.15 | -0.07 | 0.14 | -0.92 | 0.12 | -0.32 |
| 11982.1 | 585.1 | 585.1 | 585.0 | 587.2 | 587.2 | 587.2 | 588.5 | 588.5 | 588.5 | 0.02 | -0.01 | 0.00 | 0.02 | 0.00 | 0.00 |
| 11932.5 | 582.4 | 582.6 | 582.2 | 583.7 | 583.8 | 583.6 | 584.6 | 584.5 | 584.7 | 0.19 | -0.19 | 0.09 | -0.09 | -0.10 | 0.12 |
| 11881.8 | 580.3 | 580.3 | 580.2 | 581.7 | 582.0 | 581.5 | 582.9 | 583.1 | 582.5 | 0.02 | -0.06 | 0.23 | -0.23 | 0.27 | -0.36 |
| 11827.8 | 576.2 | 576.3 | 576.1 | 577.8 | 579.0 | 577.7 | 578.8 | 580.2 | 578.8 | 0.14 | -0.10 | 1.16 | -0.08 | 1.42 | -0.06 |
| 11774.4 | 575.0 | 575.1 | 575.0 | 578.9 | 578.9 | 578.8 | 580.1 | 580.1 | 580.1 | 0.05 | -0.05 | 0.02 | -0.02 | 0.03 | -0.03 |
| 11724.3 | 574.8 | 574.8 | 574.8 | 578.8 | 578.8 | 578.8 | 580.1 | 580.1 | 580.0 | 0.02 | -0.02 | 0.01 | -0.01 | 0.00 | -0.02 |
| 11678.1 | 574.7 | 574.7 | 574.7 | 578.8 | 578.8 | 578.8 | 580.0 | 580.0 | 580.0 | 0.01 | -0.01 | 0.01 | -0.01 | 0.00 | -0.01 |
| 11668.6 | 574.7 | 574.7 | 574.7 | 578.8 | 578.8 | 578.8 | 580.0 | 580.0 | 580.0 | 0.01 | -0.01 | 0.01 | -0.01 | 0.00 | -0.01 |
| 11659.0 | 574.7 | 574.7 | 574.7 | 578.8 | 578.8 | 578.7 | 579.9 | 579.9 | 579.9 | 0.01 | -0.01 | 0.01 | -0.01 | 0.00 | -0.01 |
| 11649.4 | 574.6 | 574.7 | 574.6 | 578.7 | 578.7 | 578.7 | 579.9 | 579.9 | 579.9 | 0.01 | 0.00 | 0.00 | -0.01 | 0.00 | -0.01 |
| 11639.9 | 574.6 | 574.6 | 574.6 | 578.7 | 578.7 | 578.7 | 579.8 | 579.8 | 579.8 | 0.01 | 0.00 | 0.00 | -0.01 | 0.00 | -0.01 |
| 11630.3 | 574.6 | 574.6 | 574.6 | 578.7 | 578.7 | 578.7 | 579.8 | 579.8 | 579.8 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | -0.01 |
| 11620.76 ** | 574.6 | 574.6 | 574.6 | 578.6 | 578.6 | 578.6 | 579.7 | 579.7 | 579.7 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | -0.02 |
| 11527.0 | 569.7 | 569.7 | 569.7 | 574.1 | 574.1 | 574.1 | 575.4 | 575.4 | 575.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**TABLE T4. SENSITIVITY ANALYSIS: COMPARISONS OF WATER SURFACE ELEVATIONS FROM HEC-RAS BY RAISING AND LOWERING CHANNEL ROUGHNESS DESIGN VALUES BY 10%**
**PERMANENTE CREEK RESTORATION PLAN**

| | Water Surface Elevations | | | Water Surface Elevations | | | Water Surface Elevations | | | Differences between Sensitivity Trial and Design * | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HEC-RAS | 1.5-YR Proposed Conditions | | | 10-YR Proposed Conditions | | | 100-YR Proposed Conditions | | | 1.5-YR Water Surface | | 10-YR Water Surface | | 100-YR Water Surface | |
| STATION | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | DESIGN | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% | n + 10% | n - 10% |
| 11476.8 | 566.6 | 566.6 | 566.6 | 567.4 | 567.4 | 567.4 | 568.3 | 568.3 | 568.3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11412.9 | 566.3 | 566.3 | 566.3 | 568.3 | 568.3 | 568.3 | 569.3 | 569.3 | 569.3 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11362.7 | 566.3 | 566.3 | 566.3 | 568.3 | 568.3 | 568.3 | 569.5 | 569.5 | 569.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11318.1 | 566.3 | 566.3 | 566.3 | 568.3 | 568.3 | 568.3 | 569.5 | 569.5 | 569.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11287.2 | 565.8 | 565.8 | 565.8 | 568.0 | 568.0 | 568.0 | 569.0 | 569.0 | 569.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11211.2 | 561.0 | 561.0 | 561.0 | 565.8 | 565.8 | 565.8 | 566.5 | 566.5 | 566.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11200.0 | 557.7 | 557.7 | 557.7 | 559.0 | 559.0 | 559.0 | 560.2 | 560.2 | 560.2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11186.2 | 559.5 | 559.5 | 559.5 | 560.9 | 560.9 | 560.9 | 561.9 | 561.9 | 561.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11137.9 | 559.5 | 559.5 | 559.5 | 560.9 | 560.9 | 560.9 | 561.8 | 561.8 | 561.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11102.5 | 559.5 | 559.5 | 559.5 | 560.8 | 560.8 | 560.8 | 561.8 | 561.8 | 561.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 11070.7 | 559.5 | 559.5 | 559.5 | 560.7 | 560.7 | 560.7 | 561.7 | 561.7 | 561.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10790.0 | 546.7 | 546.7 | 546.7 | 549.3 | 549.3 | 549.3 | 551.8 | 551.8 | 551.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10739.3 | 545.1 | 545.1 | 545.1 | 548.3 | 548.3 | 548.3 | 550.6 | 550.6 | 550.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10690.7 | 544.6 | 544.6 | 544.6 | 548.1 | 548.1 | 548.1 | 550.6 | 550.6 | 550.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10644.3 | 544.3 | 544.3 | 544.3 | 548.0 | 548.0 | 548.0 | 550.6 | 550.6 | 550.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10601.6 | 543.4 | 543.4 | 543.4 | 546.7 | 546.7 | 546.7 | 548.2 | 548.2 | 548.2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10485.2 | 542.8 | 542.8 | 542.8 | 545.9 | 545.9 | 545.9 | 546.9 | 546.9 | 546.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10432.9 | 541.7 | 541.7 | 541.7 | 543.4 | 543.4 | 543.4 | 544.1 | 544.1 | 544.1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10382.9 | 541.3 | 541.3 | 541.3 | 542.7 | 542.7 | 542.7 | 543.7 | 543.7 | 543.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10332.7 | 541.2 | 541.2 | 541.2 | 542.6 | 542.6 | 542.6 | 543.7 | 543.7 | 543.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10295.4 | 541.1 | 541.1 | 541.1 | 542.5 | 542.5 | 542.5 | 543.6 | 543.6 | 543.6 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10166.1 | 536.7 | 536.7 | 536.7 | 538.0 | 538.0 | 538.0 | 538.5 | 538.5 | 538.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10115.9 | 532.9 | 532.9 | 532.9 | 535.1 | 535.1 | 535.1 | 536.4 | 536.4 | 536.4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10065.8 | 532.1 | 532.1 | 532.1 | 534.0 | 534.0 | 534.0 | 534.7 | 534.7 | 534.7 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 10016.3 | 530.5 | 530.5 | 530.5 | 532.5 | 532.5 | 532.5 | 533.2 | 533.2 | 533.2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9966.5 | 528.5 | 528.5 | 528.5 | 531.1 | 531.1 | 531.1 | 531.9 | 531.9 | 531.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9920.0 | 527.1 | 527.1 | 527.1 | 529.6 | 529.6 | 529.6 | 530.8 | 530.8 | 530.8 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9869.7 | 525.4 | 525.4 | 525.4 | 528.1 | 528.1 | 528.1 | 529.5 | 529.5 | 529.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9819.5 | 524.3 | 524.3 | 524.3 | 527.0 | 527.0 | 527.0 | 528.0 | 528.0 | 528.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9769.3 | 523.0 | 523.0 | 523.0 | 525.7 | 525.7 | 525.7 | 527.5 | 527.5 | 527.5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9739.1 | 522.3 | 522.3 | 522.3 | 525.1 | 525.1 | 525.1 | 526.9 | 526.9 | 526.9 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

**NOTES:**

* Some differences between the water surface elevations for the design model and the sensitivity models exceeded a magnitude (absolute value) of 0.3 feet at discreet locations, as shown in green. These fluctations in water surface elevations occur at single cross sections and are bracketed by fluctations that are typically well below 0.3 feet. The sensitivity models were not iterated and stabilized to remove these fluctuations, as the goal of the sensitiy analysis was to assess general and potential changes in water surface elevations from specific changes in channel roughness values. The spot variations are attributed to anamolies in model stability that would typically be resolved for design purposes.

** Mannings n was not revised downstream of Culvert #6 at station 11620.76, as proposed conditions in the channel do not extend beyond that point.

# APPENDIX F

## Engineered Streambed Material, Floodplain Armor and Vegetated Rock Slope Protection Sizing Calculations

# Engineered Streambed Material (ESM) Calculations

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

**Calculations to determine the gradation and thickness of ESM for constructed floodplains throughout project area.**

## 1. Inputs

| Proposed Conditions Site Data (Culvert #7) | | |
|---|---|---|
| Design Flow* | 1087 | cfs |
| Channel Width = | 20 | ft |
| q = | 54.4 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.039 | ft/ft |

| Proposed Conditions Site Data (Culvert #8) | | |
|---|---|---|
| Design Flow* | 1009 | cfs |
| Channel Width = | 26 | ft |
| q = | 38.8 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.027 | ft/ft |

| Sediment Fan Tributary | | |
|---|---|---|
| Design Flow* | 12.1 | cfs |
| Channel Width = | 6 | ft |
| q = | 2.0 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.249 | ft/ft |

| Material Removal Area Tributary | | |
|---|---|---|
| Design Flow* | 16.2 | cfs |
| Channel Width = | 7 | ft |
| q = | 2.3 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.141 | ft/ft |

| Rock Pile 7.7% | | |
|---|---|---|
| Design Flow* | 949 | cfs |
| Channel Width = | 18.5 | ft |
| q = | 51.3 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.077 | ft/ft |

| Material Removal Area 12% | | |
|---|---|---|
| Design Flow* | 683 | cfs |
| Channel Width = | 16.3 | ft |
| q = | 41.9 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.120 | ft/ft |

***Portion of 100-year design flow that is being conveyed over the ESM.**

***Portion of 100-year design flow that is being conveyed**

## 2. Equations to Calculate D50 particle size

**Bathhurst (1987)**

developed for: slope (0.23 to 9%), particle dia. (0.35 to 11 inches)

$D_{50} = 3.56\ q^{2/3}\ S^{.75} / g^{1/3}$

| | | |
|---|---|---|
| $D_{50}$ = | 1.4 | ft |
| $D_{50}$ = | 0.9 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{50}$ = | 0.5 | ft |
| $D_{50}$ = | 2.3 | ft |
| $D_{50}$ = | 2.8 | ft |

**Robinson et al. (1998)**

developed for: slope (2% to 40%), particle dia. (0.6 to 11 inches)

$D_{50} = [q_{design} / (8.07 \times 10^{-6}\ S^{-0.58})]^{0.529}$

| | | |
|---|---|---|
| $q_{design}$ ($m^3$/s/m) = | 5.05 | |
| $D_{50}$ (mm) = | 431 | |
| $D_{50}$ = | 1.4 | ft |
| $q_{design}$ ($m^3$/s/m) = | 3.61 | |
| $D_{50}$ (mm) = | 322 | |
| $D_{50}$ = | 1.1 | ft |
| $q_{design}$ ($m^3$/s/m) = | 0.19 | |
| $D_{50}$ (mm) = | 133 | |
| $D_{50}$ = | 0.4 | ft |
| $q_{design}$ ($m^3$/s/m) = | 0.21 | |
| $D_{50}$ (mm) = | 120 | |
| $D_{50}$ = | 0.4 | ft |
| $q_{design}$ ($m^3$/s/m) = | 4.77 | |
| $D_{50}$ (mm) = | 514 | |
| $D_{50}$ = | 1.7 | ft |
| $q_{design}$ ($m^3$/s/m) = | 3.89 | |
| $D_{50}$ (mm) = | 354 | |
| $D_{50}$ = | 1.2 | ft |

**Abt and Johnson (1991)**

developed for: slope (1% to 20%), particle dia. (1 to 6 inches)

$D_{50} = 0.436\ q_{sizing}{}^{0.56}\ S^{0.43}$

$q_{sizing} = q$ * sizing factor

sizing factor = 1.35

| | | |
|---|---|---|
| $D_{50}$ = | 1.2 | ft |
| $D_{50}$ = | 0.8 | ft |
| $D_{50}$ = | 0.4 | ft |
| $D_{50}$ = | 0.4 | ft |
| $D_{50}$ = | 1.6 | ft |
| $D_{50}$ = | 1.7 | ft |
| **Choose $D_{50}$ =** | 1.4 | ft |
| **Choose $D_{50}$ =** | 1.1 | ft |
| **Choose $D_{50}$ =** | 0.6 | ft |
| **Choose $D_{50}$ =** | 0.5 | ft |
| **Choose $D_{50}$ =** | 2.0 | ft |
| **Choose $D_{50}$ =** | 2.0 | ft |

## 3. Develop Grain Size Distribution Utilizing the Calculated $D_{50}$

**Washinton Department of Fish and Wildlife Grain Size Distribution** (WDFW, 2003)

| | | |
|---|---|---|
| $D_{84}/D_{100}$ = | 0.4 | |
| $D_{84}/D_{50}$ = | 2.5 | |
| $D_{84}/D_{16}$ = | 8 | |
| **WDFW Substrate Gradation** | | |
| $D_{100}$ = | 8.8 | ft |
| $D_{84}$ = | 3.5 | ft |
| $D_{50}$ = | 1.4 | ft |
| $D_{16}$ = | 5.25 | in |
| $D_{100}$ = | 6.9 | ft |
| $D_{84}$ = | 2.8 | ft |
| $D_{50}$ = | 1.1 | ft |
| $D_{16}$ = | 4.13 | in |
| $D_{100}$ = | 3.8 | ft |
| $D_{84}$ = | 1.5 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.25 | in |
| $D_{100}$ = | 3.1 | ft |
| $D_{84}$ = | 1.3 | ft |
| $D_{50}$ = | 0.5 | ft |
| $D_{16}$ = | 1.88 | in |
| $D_{100}$ = | 12.5 | ft |
| $D_{84}$ = | 5.0 | ft |
| $D_{50}$ = | 2.0 | ft |
| $D_{16}$ = | 7.50 | in |
| $D_{100}$ = | 12.5 | ft |
| $D_{84}$ = | 5.0 | ft |
| $D_{50}$ = | 2.0 | ft |
| $D_{16}$ = | 7.50 | in |

**Note**: WDFW gradation above is based on wide variety of stream beds in different environments. The $D_{84}/D_{100}$ ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using $D_{100}=2xD_{50}$. If using ACOE steep slope methods to size substrate, then $D_{84} = 1.5D_{30}$ (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the $D_{84}$ calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

**Resulting Floodplain Armor Gradation for Various Work Areas**

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 3.5 | ft |
| $D_{84}$ = | 2.5 | ft |
| $D_{50}$ = | 1.4 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |
| $D_{100}$ = | 2.8 | ft |
| $D_{84}$ = | 2.0 | ft |
| $D_{50}$ = | 1.1 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |
| $D_{100}$ = | 1.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |
| $D_{100}$ = | 1.3 | ft |
| $D_{84}$ = | 0.9 | ft |
| $D_{50}$ = | 0.5 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |
| $D_{100}$ = | 5.0 | ft |
| $D_{84}$ = | 4.0 | ft |
| $D_{50}$ = | 2.0 | ft |
| $D_{16}$ = | 6.0 | in |
| $D_8$ = | 0.08 | in |
| $D_{100}$ = | 5.0 | ft |
| $D_{84}$ = | 4.0 | ft |
| $D_{50}$ = | 2.2 | ft |
| $D_{16}$ = | 4.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

Note: Refer to Specifications for final size gradation

Note: Refer to Specifications for final size gradation

Note: Refer to Specifications for final size gradation

Note: Refer to Specifications for final size gradation

Note: Refer to Specifications for final size gradation

**Justification**

Choose largest size of Floodplain Armor to be equal to the $D_{84}$ calculated using the WDFW gradation.

## 4. ESM Thickness

Thickness greater or equal to max($1.5XD_{50}$ or $D_{100}$) (ACOE EM 1110-2-1601)

## 5. References


1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

# Floodplain Armor Calculations (Page 1 of 2)

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

**Calculations to determine the gradation and thickness of Floodplain Armor for constructed floodplains throughout project area.**

## 1. Inputs

| Channel Widening (Sta. 16+70 to 21+25) | | |
|---|---|---|
| Design Flow* | 577 | cfs |
| Channel Width = | 50 | ft |
| q = | 11.5 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.049 | ft/ft |

| Channel Widening (Sta. 21+25 to 23+00) | | |
|---|---|---|
| Design Flow* | 174 | cfs |
| Channel Width = | 14 | ft |
| q = | 12.4 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.035 | ft/ft |

| Channel Widening (Sta. 23+00 to 28+00) | | |
|---|---|---|
| Design Flow* | 326.9 | cfs |
| Channel Width = | 31.3 | ft |
| q = | 10.4 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.040 | ft/ft |

| Channel Widening (Sta. 30+75 to 31+75) | | |
|---|---|---|
| Design Flow* | 381.3 | cfs |
| Channel Width = | 35 | ft |
| q = | 10.9 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.081 | ft/ft |

| Channel Widening (Sta.31+75 to 40+50) | | |
|---|---|---|
| Design Flow* | 115.9 | cfs |
| Channel Width = | 18.5 | ft |
| q = | 6.3 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.032 | ft/ft |

***Portion of 100-year design flow that is being conveyed over the floodplain armor.**

**2. Equations to Calculate D50 particle size**

| Bathhurst (1987) | |
|---|---|
| developed for: | slope (0.23 to 9%) |
| | particle dia. (0.35 to 11 inches) |
| $D_{50}$ = | 3.56 q^2/3 S^.75 / g^1/3 |
| $D_{50}$ = | 0.6 ft |

| Bathhurst (1987) | |
|---|---|
| developed for: | slope (0.23 to 9%) |
| | particle dia. (0.35 to 11 inches) |
| $D_{50}$ = | 3.56 q^2/3 S^.75 / g^1/3 |
| $D_{50}$ = | 0.5 ft |

| Bathhurst (1987) | |
|---|---|
| developed for: | slope (0.23 to 9%) |
| | particle dia. (0.35 to 11 inches) |
| $D_{50}$ = | 3.56 q^2/3 S^.75 / g^1/3 |
| $D_{50}$ = | 0.5 ft |

| Bathhurst (1987) | |
|---|---|
| developed for: | slope (0.23 to 9%) |
| | particle dia. (0.35 to 11 inches) |
| $D_{50}$ = | 3.56 q^2/3 S^.75 / g^1/3 |
| $D_{50}$ = | 0.8 ft |

| Bathhurst (1987) | |
|---|---|
| developed for: | slope (0.23 to 9%) |
| | particle dia. (0.35 to 11 inches) |
| $D_{50}$ = | 3.56 q^2/3 S^.75 / g^1/3 |
| $D_{50}$ = | 0.3 ft |

| Robinson et al. (1998) | |
|---|---|
| developed for: | slope (2% to 40%) |
| | particle dia. (0.6 to 11 inches) |
| $D_{50}$ = | $[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$ |
| $q_{design}$ ($m^3$/s/m) = | 1.07 |
| $D_{50}$ (mm) = | 204 |
| $D_{50}$ = | 0.7 ft |

| Robinson et al. (1998) | |
|---|---|
| developed for: | slope (2% to 40%) |
| | particle dia. (0.6 to 11 inches) |
| $D_{50}$ = | $[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$ |
| $q_{design}$ ($m^3$/s/m) = | 1.15 |
| $D_{50}$ (mm) = | 191 |
| $D_{50}$ = | 0.6 ft |

| Robinson et al. (1998) | |
|---|---|
| developed for: | slope (2% to 40%) |
| | particle dia. (0.6 to 11 inches) |
| $D_{50}$ = | $[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$ |
| $q_{design}$ ($m^3$/s/m) = | 0.97 |
| $D_{50}$ (mm) = | 182 |
| $D_{50}$ = | 0.6 ft |

| Robinson et al. (1998) | |
|---|---|
| developed for: | slope (2% to 40%) |
| | particle dia. (0.6 to 11 inches) |
| $D_{50}$ = | $[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$ |
| $q_{design}$ ($m^3$/s/m) = | 1.01 |
| $D_{50}$ (mm) = | 230 |
| $D_{50}$ = | 0.8 ft |

| Robinson et al. (1998) | |
|---|---|
| developed for: | slope (2% to 40%) |
| | particle dia. (0.6 to 11 inches) |
| $D_{50}$ = | $[q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$ |
| $q_{design}$ ($m^3$/s/m) = | 0.58 |
| $D_{50}$ (mm) = | 129 |
| $D_{50}$ = | 0.4 ft |

| Abt and Johnson (1991) | |
|---|---|
| developed for: | slope (1% to 20%) |
| | particle dia. (1 to 6 inches) |
| $D_{50}$ = | 0.436 $q_{sizing}$^0.56 S^0.43 |
| | $q_{sizing}$ = q * sizing factor |
| | sizing factor = 1.35 |
| $D_{50}$ = | 0.6 ft |
| **Choose $D_{50}$ =** | 0.6 ft |

| Abt and Johnson (1991) | |
|---|---|
| developed for: | slope (1% to 20%) |
| | particle dia. (1 to 6 inches) |
| $D_{50}$ = | 0.436 $q_{sizing}$^0.56 S^0.43 |
| | $q_{sizing}$ = q * sizing factor |
| | sizing factor = 1.35 |
| $D_{50}$ = | 0.5 ft |
| **Choose $D_{50}$ =** | 0.6 ft |

| Abt and Johnson (1991) | |
|---|---|
| developed for: | slope (1% to 20%) |
| | particle dia. (1 to 6 inches) |
| $D_{50}$ = | 0.436 $q_{sizing}$^0.56 S^0.43 |
| | $q_{sizing}$ = q * sizing factor |
| | sizing factor = 1.35 |
| $D_{50}$ = | 0.5 ft |
| **Choose $D_{50}$ =** | 0.6 ft |

| Abt and Johnson (1991) | |
|---|---|
| developed for: | slope (1% to 20%) |
| | particle dia. (1 to 6 inches) |
| $D_{50}$ = | 0.436 $q_{sizing}$^0.56 S^0.43 |
| | $q_{sizing}$ = q * sizing factor |
| | sizing factor = 1.35 |
| $D_{50}$ = | 0.7 ft |
| **Choose $D_{50}$ =** | 0.8 ft |

| Abt and Johnson (1991) | |
|---|---|
| developed for: | slope (1% to 20%) |
| | particle dia. (1 to 6 inches) |
| $D_{50}$ = | 0.436 $q_{sizing}$^0.56 S^0.43 |
| | $q_{sizing}$ = q * sizing factor |
| | sizing factor = 1.35 |
| $D_{50}$ = | 0.3 ft |
| **Choose $D_{50}$ =** | 0.4 ft |

**3. Develop Grain Size Distribution Utilizing the Calculated $D_{50}$**

**Washinton Department of Fish and Wildlife Grain Size Distribution** (WDFW, 2003)

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

| WDFW Substrate Gradation | | |
|---|---|---|
| $D_{100}$ = | 3.8 | ft |
| $D_{84}$ = | 1.5 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.25 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

| WDFW Substrate Gradation | | |
|---|---|---|
| $D_{100}$ = | 3.8 | ft |
| $D_{84}$ = | 1.5 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.25 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

| WDFW Substrate Gradation | | |
|---|---|---|
| $D_{100}$ = | 3.8 | ft |
| $D_{84}$ = | 1.5 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.25 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

| WDFW Substrate Gradation | | |
|---|---|---|
| $D_{100}$ = | 5.0 | ft |
| $D_{84}$ = | 2.0 | ft |
| $D_{50}$ = | 0.8 | ft |
| $D_{16}$ = | 3.00 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

| WDFW Substrate Gradation | | |
|---|---|---|
| $D_{100}$ = | 2.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.4 | ft |
| $D_{16}$ = | 1.50 | in |

**Note**: WDFW gradation above is based on wide variety of stream beds in different environments. The $D_{84}/D_{100}$ ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using $D_{100}=2xD_{50}$. If using ACOE steep slope methods to size substrate, then $D_{84}=1.5D_{30}$ (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the $D_{84}$ calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

**Resulting Floodplain Armor Gradation for Various Work Areas**

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 1.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 1.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 1.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 2.0 | ft |
| $D_{84}$ = | 1.3 | ft |
| $D_{50}$ = | 0.8 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 1.0 | ft |
| $D_{84}$ = | 0.8 | ft |
| $D_{50}$ = | 0.4 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

**Justification**

Choose largest size of Floodplain Armor to be equal to the $D_{84}$ calculated using the WDFW gradation.

## 4. Floodplain Armor Thickness

Thickness greater or equal to max($1.5XD_{50}$ or $D_{100}$) (ACOE EM 1110-2-1601)

## 5. References


1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

# Floodplain Armor Calculations (Page 2 of 2)

Project: Permanente Quarry
Project #: 13-016
Date: 9/28/2018
Calculated by: BMZ
Checked by: B.M.S.

**Calculations to determine the gradation and thickness of Floodplain Armor for constructed floodplains throughout project area.**

## 1. Inputs

| Channel Widening (Sta. 40+50 to 45+00) | | |
|---|---|---|
| Design Flow* | 159 | cfs |
| Channel Width = | 8 | ft |
| q = | 19.9 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.057 | ft/ft |

| Channel Widening (Sta. 40+50 to 45+00) | | |
|---|---|---|
| Design Flow* | 433 | cfs |
| Channel Width = | 14 | ft |
| q = | 30.9 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.057 | ft/ft |

| Channel Widening (Sta. 45+00 to 48+75) | | |
|---|---|---|
| Design Flow* | 449 | cfs |
| Channel Width = | 60 | ft |
| q = | 7.5 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.054 | ft/ft |

| Rock Pile | | |
|---|---|---|
| Design Flow* | 1145 | cfs |
| Channel Width = | 22 | ft |
| q = | 52.0 | cu.ft./sec ft |
| gravity, g | 32.2 | ft/sec^2 |
| Slope, S | 0.12 | ft/ft |

***Portion of 100-year design flow that is being conveyed over the floodplain armor.**

**2. Equations to Calculate D50 particle size**

**Bathhurst (1987)**

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
$D_{50}$ = 3.56 q^2/3 S^.75 / g^1/3

| | | |
|---|---|---|
| $D_{50}$ = | 1.0 | ft |

**Bathhurst (1987)**

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
$D_{50}$ = 3.56 q^2/3 S^.75 / g^1/3

| | | |
|---|---|---|
| $D_{50}$ = | 1.3 | ft |

**Bathhurst (1987)**

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
$D_{50}$ = 3.56 q^2/3 S^.75 / g^1/3

| | | |
|---|---|---|
| $D_{50}$ = | 0.5 | ft |

**Bathhurst (1987)**

developed for: slope (0.23 to 9%)
particle dia. (0.35 to 11 inches)
$D_{50}$ = 3.56 q^2/3 S^.75 / g^1/3

| | | |
|---|---|---|
| $D_{50}$ = | 3.2 | ft |

**Robinson et al. (1998)**

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

| | | |
|---|---|---|
| $q_{design}$ ($m^3$/s/m) = | 1.85 | |
| $D_{50}$ (mm) = | 238 | |
| $D_{50}$ = | 0.8 | ft |

**Robinson et al. (1998)**

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

| | | |
|---|---|---|
| $q_{design}$ ($m^3$/s/m) = | 2.87 | |
| $D_{50}$ (mm) = | 359 | |
| $D_{50}$ = | 1.2 | ft |

**Robinson et al. (1998)**

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

| | | |
|---|---|---|
| $q_{design}$ ($m^3$/s/m) = | 0.70 | |
| $D_{50}$ (mm) = | 170 | |
| $D_{50}$ = | 0.6 | ft |

**Robinson et al. (1998)**

developed for: slope (2% to 40%)
particle dia. (0.6 to 11 inches)
$D_{50} = [q_{design} / (8.07 \times 10^{-6} S^{-0.58})]^{0.529}$

| | | |
|---|---|---|
| $q_{design}$ ($m^3$/s/m) = | 4.84 | |
| $D_{50}$ (mm) = | 473 | |
| $D_{50}$ = | 1.6 | ft |

**Abt and Johnson (1991)**

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
$D_{50}$ = 0.436 $q_{sizing}$^0.56 S^0.43
$q_{sizing}$ = q * sizing factor
sizing factor = 1.35

| | | |
|---|---|---|
| $D_{50}$ = | 0.8 | ft |
| **Choose $D_{50}$ =** | 1.0 | ft |

**Abt and Johnson (1991)**

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
$D_{50}$ = 0.436 $q_{sizing}$^0.56 S^0.43
$q_{sizing}$ = q * sizing factor
sizing factor = 1.35

| | | |
|---|---|---|
| $D_{50}$ = | 1.0 | ft |
| **Choose $D_{50}$ =** | 1.3 | ft |

**Abt and Johnson (1991)**

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
$D_{50}$ = 0.436 $q_{sizing}$^0.56 S^0.43
$q_{sizing}$ = q * sizing factor
sizing factor = 1.35

| | | |
|---|---|---|
| $D_{50}$ = | 0.5 | ft |
| **Choose $D_{50}$ =** | 0.6 | ft |

**Abt and Johnson (1991)**

developed for: slope (1% to 20%)
particle dia. (1 to 6 inches)
$D_{50}$ = 0.436 $q_{sizing}$^0.56 S^0.43
$q_{sizing}$ = q * sizing factor
sizing factor = 1.35

| | | |
|---|---|---|
| $D_{50}$ = | 1.9 | ft |
| **Choose $D_{50}$ =** | 1.9 | ft |

**3. Develop Grain Size Distribution Utilizing the Calculated $D_{50}$**

**Washinton Department of Fish and Wildlife Grain Size Distribution** (WDFW, 2003)

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

**WDFW Substrate Gradation**

| | | |
|---|---|---|
| $D_{100}$ = | 6.3 | ft |
| $D_{84}$ = | 2.5 | ft |
| $D_{50}$ = | 1.0 | ft |
| $D_{16}$ = | 3.75 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

**WDFW Substrate Gradation**

| | | |
|---|---|---|
| $D_{100}$ = | 8.1 | ft |
| $D_{84}$ = | 3.3 | ft |
| $D_{50}$ = | 1.3 | ft |
| $D_{16}$ = | 4.88 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

**WDFW Substrate Gradation**

| | | |
|---|---|---|
| $D_{100}$ = | 3.8 | ft |
| $D_{84}$ = | 1.5 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.25 | in |

| | |
|---|---|
| $D_{84}/D_{100}$ = | 0.4 |
| $D_{84}/D_{50}$ = | 2.5 |
| $D_{84}/D_{16}$ = | 8 |

**WDFW Substrate Gradation**

| | | |
|---|---|---|
| $D_{100}$ = | 11.9 | ft |
| $D_{84}$ = | 4.8 | ft |
| $D_{50}$ = | 1.9 | ft |
| $D_{16}$ = | 7.13 | in |

**Note**: WDFW gradation above is based on wide variety of stream beds in different environments. The $D_{84}/D_{100}$ ratio of 0.4 may give too large of boulder size in some cases. Experience and engineering judgment should be used to adjust distribution to the site. ACOE EM 1110-2-1601 suggests using $D_{100}=2xD_{50}$. If using ACOE steep slope methods to size substrate, then $D_{84}=1.5D_{30}$ (WDFW, 2003). Choose the largest size of Stream Simulation Material to be equal to the $D_{84}$ calculated using the WDFW gradation. Note: the largest rock should not be greater in individual size than 1/4 of the active channel width.

**Resulting Floodplain Armor Gradation for Various Work Areas**

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 2.5 | ft |
| $D_{84}$ = | 2.0 | ft |
| $D_{50}$ = | 1.0 | ft |
| $D_{16}$ = | 4.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 3.3 | ft |
| $D_{84}$ = | 2.5 | ft |
| $D_{50}$ = | 1.3 | ft |
| $D_{16}$ = | 4.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 1.5 | ft |
| $D_{84}$ = | 1.0 | ft |
| $D_{50}$ = | 0.6 | ft |
| $D_{16}$ = | 2.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

| Size Class | Particle Diamter | |
|---|---|---|
| $D_{100}$ = | 5.0 | ft |
| $D_{84}$ = | 4.0 | ft |
| $D_{50}$ = | 2.0 | ft |
| $D_{16}$ = | 6.0 | in |
| $D_8$ = | 0.08 | in |

Note: Refer to Specifications for final size gradation

**Justification**

Choose largest size of Floodplain Armor to be equal to the $D_{84}$ calculated using the WDFW gradation.

**4. Floodplain Armor Thickness**

Thickness greater or equal to max(1.5X$D_{50}$ or $D_{100}$) (ACOE EM 1110-2-1601)

**5. References**


1.) U.S. Department of the Interior Bureau of Reclamation. 2007. Rock Ramp Design Guidelines.
2.) Washington Department of Fish and Wildlife. 2003 Design of Road Culverts for Fish Passage
3.) U.S. Army Corps of Engineers. 1994. Hydraulic Design of Flood Control Channels, EM-1110-2-1601
4.) California Department of Fish and Game (CDFG). 2009. Fish Passage Design and Implementation: Part XII of the California Salmonid Stream Habitat Restoration Manual. Sacramento, CA, CA Department of Fish and Game.

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/15/2019
Calculated by: DR
Checked by: BMZ

## Caltrans RSP Design at Culvert #6

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 116+20.76 | ft | (enter) | River Station |
| **$V_{av}$** | **4.53** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **$V_f$** | 1.33 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 6.02 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **9** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 0.50 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 1000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 0.48 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 2.26 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 3.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 4.24 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 116+20.76
Design velocity is low, resulting in small rock size.

Use 1/2 ton RSP for construction efficiency (1/2 ton RSP is specified for the Culvert #7 removal area). The 1/2 ton RSP will also allow for stacking of rock to conform the proposed floodplain bench to the existing oversteepened bank at the Culvert #6 inlet. The larger rock size will also help ensure stability if debris collects near the culvert inlet and creates complex hydraulic conditions that result in eddy formation or other hydraulic forces that are not easy to predict and have the potential to be erosive.

Use Method A - individually place rocks.

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/15/2019
Calculated by: DR
Checked by: BMZ

## Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 121+91 | ft | (enter) | River Station |
| **$V_{av}$** | **14.61** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **Vf** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 1.20 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **949** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 0.50 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 1000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 2.22 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 2.26 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 3.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 4.24 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

## Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 143+50 | ft | (enter) | River Station |
| **$V_{av}$** | **18.24** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **Vf** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 16.42 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **3841** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 2.00 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 4000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 3.54 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 3.59 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 5.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 6.73 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

WATERWAYS CONSULTING, INC.

# RSP Sizing Sensitivity Analysis

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

## Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was increased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 121+91 | ft | (enter) | River Station |
| **$V_{av}$** | **13.90** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **$V_f$** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 1.20 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **704** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 0.50 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 1000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 2.01 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 2.26 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 3.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 4.24 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

## Caltrans RSP Design at Culvert #7

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was decreased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 121+91 | ft | (enter) | River Station |
| **$V_{av}$** | **15.34** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **$V_f$** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 1.20 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **1188** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 0.50 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 1000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 2.40 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 2.26 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 3.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 4.24 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 1/2 Ton RSP

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

## Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was increased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 143+50 | ft | (enter) | River Station |
| **$V_{av}$** | **17.88** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **$V_f$** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 16.09 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **3408** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 2.00 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 4000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 3.40 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 3.59 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 5.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 6.73 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

# Rock Slope Protection Calculations

Project: Permanente Creek
Project #: 13-016
Date: 10/25/2019
Calculated by: BMZ
Checked by: BMS

## Caltrans RSP Design at Culvert #9

FHWC-CA-TL-95-10

(The velocity is from the hydraulic modeling sensitivity analysis where Manning's n was decreased by 10%)

$$W_{min} = \frac{0.00002\ (V_{av}.V_f)^6\ SG}{(SG-1)^3\ SIN^3(r-a)}$$ (Eq. 1, 5-1-C)

| Parameter | Value | Units | Data type | Description |
|---|---|---|---|---|
| **Flow** | 1276 | cfs | | 100-year Design Flow |
| **RS u/s** | 143+50 | ft | (enter) | River Station |
| **$V_{av}$** | **18.57** | fps | (enter) | Average channel velocity at Section A |
| **SG** | 2.5 | - | (constant) | Min. Specific Gravity (Caltrans 72-2.02) |
| **r** | 70 | - | (constant) | Constant for randomly placed rubble. |
| **a** | 45.00 | degrees | (enter) | Outside slope face angle (26.6 for 2H:1V) |
| **sin(r-a)** | 0.42 | - | (result) | |
| **$V_f$** | 0.9 | - | (enter) | Velocity Factor (.67 for parallel and 1.33 for impinging) |
| **$V_{ss}$** | 16.53 | fps | (result) | Factored velocity ($V_{av}$ x $V_f$) |
| **$W_{min}$** | **4000** | lbs | (result) | Theoretical Min. Rock Mass that remains stable |
| **RSP-Class** | 2.00 | ton | (enter) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **RSP-Class** | 4000 | lbs | (result) | STANDARD Rock Size greater than $W_{min}$ (T 5-1) |
| **$D_{min}$** | 3.59 | ft | (result) | Min. Rock Dia. based on a sphere, 165 pcf. |
| **$D_{50}$** | 3.59 | ft | (result) | Diameter of STANDARD (50-100%) rock size, 165 pcf. |
| **$t_A$** | 5.39 | ft | (result) | Thickness for Type A placement, t = 1.5 $D_{50}$ |
| **$t_B$** | 6.73 | ft | (result) | Thickness for Type B placement, t = 1.875 $D_{50}$ |

**Notes:**
Results are for HEC Sta. 122+25
Use Method A - individually place rocks
Use 2 Ton RSP

# APPENDIX G

## Floodplain Log Ballast Calculations

**Wood and Ballast Calculations for Floodplain logs at Permanente Creek**

**Project:** Permanente Creek Restoration Project
**Project #:** 13-016
**Date:** 10/25/18
**Calculated by:** B.M.S.
**Checked by:** B.M.Z.

**Note: adjust values in red cells.**

Alder/willow average dry density = 28 lbs/cuft

**Ballast Estimate**

Density of water = 62.4 lbs/cuft

**Ballast in one cubic foot Small Cobble:**

Average Dry Unit Weigh Cobble = 142.6 lbs/cuft
Ballast provided by one cubic foot of Cobble = 80.20 lbs/cuft

**Log Dimensions**

Diameter 1.5 ft average diameter along length of log

Bouyant Force on Log = 60.8 lbs/ft

**Ballast of Cobble Over Log per Linear Foot**

Width of trench = 1.5 Width of trench equal to diameter of log
Burial Depth (i.e. trench depth) = 1.5 Adjust burial depth as needed to calculate acceptible factor of safety

Ballast of rock in trench = 180.45 lbs/ft ballast force per linear foot of trench

**Assume:**

50% of log is burried by rock ballast to a minimum depth of 1.5 ft

Then

Weight of rock ballast per linear foot of trench = 180.45 lbs/ft

Unit weight of ballast per linear foot over entire log assuming 50% of log buried below ballast = 90.225 lbs/ft ballast force per foot of burried log

Factor of Safety = 1.5 for a 1.5 ft. diameter log

Note: Smaller diameter logs would have a greater factor of safety, larger diameter logs would have a smaller Fs for the specified burial depth.
Adjust calculations as required during construction to conform to available log sizes and species.

**Calculations are conservative because they do not account for:**

Friction forces of soil/ballast material on log that result pullout
Additional ballast weight from cone of influence of material outside of trench width

**Log Structure Ballast Calculations**
**Project: Permanente Creek Restoration Project**
**Project #: 13-016**
**Date: 10/15/19**
**Calculated by: BMZ**

## Anchor Mass Solver: Log Revetment Structure

**Reference: D'Aoust and Millar, 2000. Stability of ballasted woody debris habitat structures.**

**Input Variables**

| | | | |
|---|---|---|---|
| Design Velocity (V) | **4.5** | m/s | |
| Target $FS_B$ | **1.50** | | **Solution** |
| Number of anchor boulders | **4** | X | **1.22** m boulder(s) |
| | | | for a total mass of |
| | | | **9,980** kg |

| **Summary of LWD & $F_{BL}$** | LWD | | | Ballast Factor | Buoyancy Force ($F_{BL}$) Equation (3-1) |
|---|---|---|---|---|---|
| | Length (m) | Diam.(m) | Number | | (N) |
| LWD No. 1 (25 foot cross logs) | **7.6** | **0.6** | **2** | **2** | 27,511 |
| LWD No. 2 (25 foot cross logs) | | | | | 0 |
| LWD No. 3 (20 foot cell logs) | | | | | 0 |
| LWD No. 4 (10 foot back piles) | | | | | 0 |
| LWD No. 5 (15 foot back piles) | | | | | 0 |
| LWD No. 6 | | | | | |
| | Length | RW Diam. | Butt Diam. | Number | |
| Root Wad No.1 | **1.2** | **1.8** | **0.9** | **1** | 5,282 |
| Root Wad No.2 | | | | | |
| **Total Buoyant Force** | | | | | **32,793** |

| | | | |
|---|---|---|---|
| Vertical Lift Force on Boulders ($F_{LB}$) | 7,832 | N | Equation (3-4) |
| Immersed Weight of Boulders (W') | 60,955 | N | Equation (3-5) |
| **Computed Mass of Boulders** | **9,979** | kg | |
| **Computed Factors of Safety (FS)** | **1.50** | | Equation (3-9) |

**Summary (English untis)**

| | | |
|---|---|---|
| Total Buoyant Force | 7,378 | lbf |
| Vertical Lift Force on Boulders ($F_{LB}$) | 1,762 | lbf |
| Immersed Weight of Boulders (W') | 13,715 | lbf |
| **Computed Mass of Boulders** | **21,954** | lbs |
| **Number of 4' dia. Boulders** | **4.0** | |

**Adjusted for Backfill Ballast**

| | | |
|---|---|---|
| Volume of Backfill Ballast* | 45 | cu.ft. |
| Immersed Weight of 1 cu. Ft. gravel | 61.56 | lbs |
| Immersed Weight of Backfill Ballast | 2,770 | lbs |
| Actual Weight of Ballast | 4,454 | lbs |
| | | |
| **Adjusted Mass of Boulders Required*** | **17,501** | lbs |
| **Number of 4' dia. Boulders** | **3.2** | |

**Design Assumptions:**

Log structures to be installed at the Culvert #7 and #8 removal areas.

The design velocity is the maximum Q100 velocity from the proposed conditions HEC-RAS model occuring at the Culvert #7 removal area.

Log structures to be ballasted with four 2.5 ton (5,000 lb) boulders and backfill to resist buoyont forces.

# APPENDIX H

**Golder Associates 2019**

**Geologic and Geomorphic Assessment of Permanente Creek**

# TECHNICAL MEMORANDUM

**DATE** October 31, 2019 **Project No.** 179018601

**TO** Erika Guerra, Talia Flagan
Lehigh Permanente

**CC** Brent Zacharia, Waterways Consulting, Inc.

**FROM** Robert Humphries; William Fowler, PG 4401, CEG 1401 **EMAIL bfowler@golder.com**

**GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK, LEHIGH HANSON PERMANENTE QUARRY, SANTA CLARA COUNTY, CA**

## 1.0 INTRODUCTION

This technical memorandum provides the results of our geologic and geomorphic assessment of the Permanente Creek Restoration Plan – 90% Level Submittal, Waterways Consulting, Inc., dated 11/15/18 and updated 10/31/19 (the Project). The focus of the study was to determine if there were any specific areas of the proposed project which require further subsurface geotechnical exploration and testing to refine the project restoration design, so as to respond to comments dated February 14, 2019 from the County of Santa Clara Planning Office ("County"). Specifically, this work focused on a field assessment of the proposed alignment and longitudinal gradient of the proposed stream channel and how it compares to existing conditions. Particular attention was placed on the Rock Pile and Material Removal Area and the proposed depth of excavations required and stability of the adjacent creek sideslopes.

The scope of work for our study included a desktop data review, and site reconnaissance and mapping of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design. The work product from our investigation includes a geologic map and cross sections of the project area, along with this technical memorandum. This memorandum includes:

- A brief presentation of the methods applied in this assessment
- A summary of pertinent supporting data from our previous investigations throughout the facility
- A geologic map and a description of the earth materials encountered along Permanente Creek
- A geologic and geomorphic assessment of the Permanente Creek channel profile
- A discussion of these results and their significance to the proposed Permanente Creek Restoration Plan
- Golder Associates Inc.'s (Golder) conclusions and recommendations regarding this assessment



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# 2.0 METHODS

## 2.1 Data Compilation and Review

Golder reviewed available existing data pertaining to the project including aerial photographs, historical USGS topographic and geologic maps, site boring logs, seismic data from previously completed work within the project area, the Waterways 90% plan set, and pertinent site and regional geologic data.

## 2.2 Site Reconnaissance

Golder conducted a site visit over three days from July 25 to 27, 2019. The field team consisted of three primary members, including a fluvial geomorphologist, a geohazards geologist, and a staff geologist. The field team was given a site orientation and tailgate safety briefing by a locally based senior technician with long term familiarity with the site and specific knowledge of creek access points and safety. Creek access is difficult, and locally hazardous, because of very steep terrain, heavy vegetation, and other obstacles such as loose rock, fallen trees, etc. This rugged terrain also severely limits access for drill rigs to many of the reaches of the creek.

Golder communicated with Waterways to discuss our initial opinions and received feedback as to what specific reaches or features needed further study, or have the most uncertainty, with respect to the 90% design effort to focus our field mapping efforts. The field mapping efforts focused on the reaches that include the following two areas: 1) Rockpile and 2) Material Removal Area. Note, however, that the entire project area was traversed on foot by the field reconnaissance team.

## 2.3 Field Mapping

The mapping focused on defining areas of mining disturbance, (e.g., overburden, roads, structures, etc.) versus native slopes and development of geologic cross sections in key locations (e.g., Rockpile and Materials Removal Area). The mapping also identified other pertinent geomorphic features such as native slope angles, natural shallow slides, areas of erosion, sediment accumulation, bedrock exposures, etc.

# 3.0 REGIONAL GEOLOGIC AND GEOMORPHIC SETTING

## 3.1 Bedrock Geologic Units

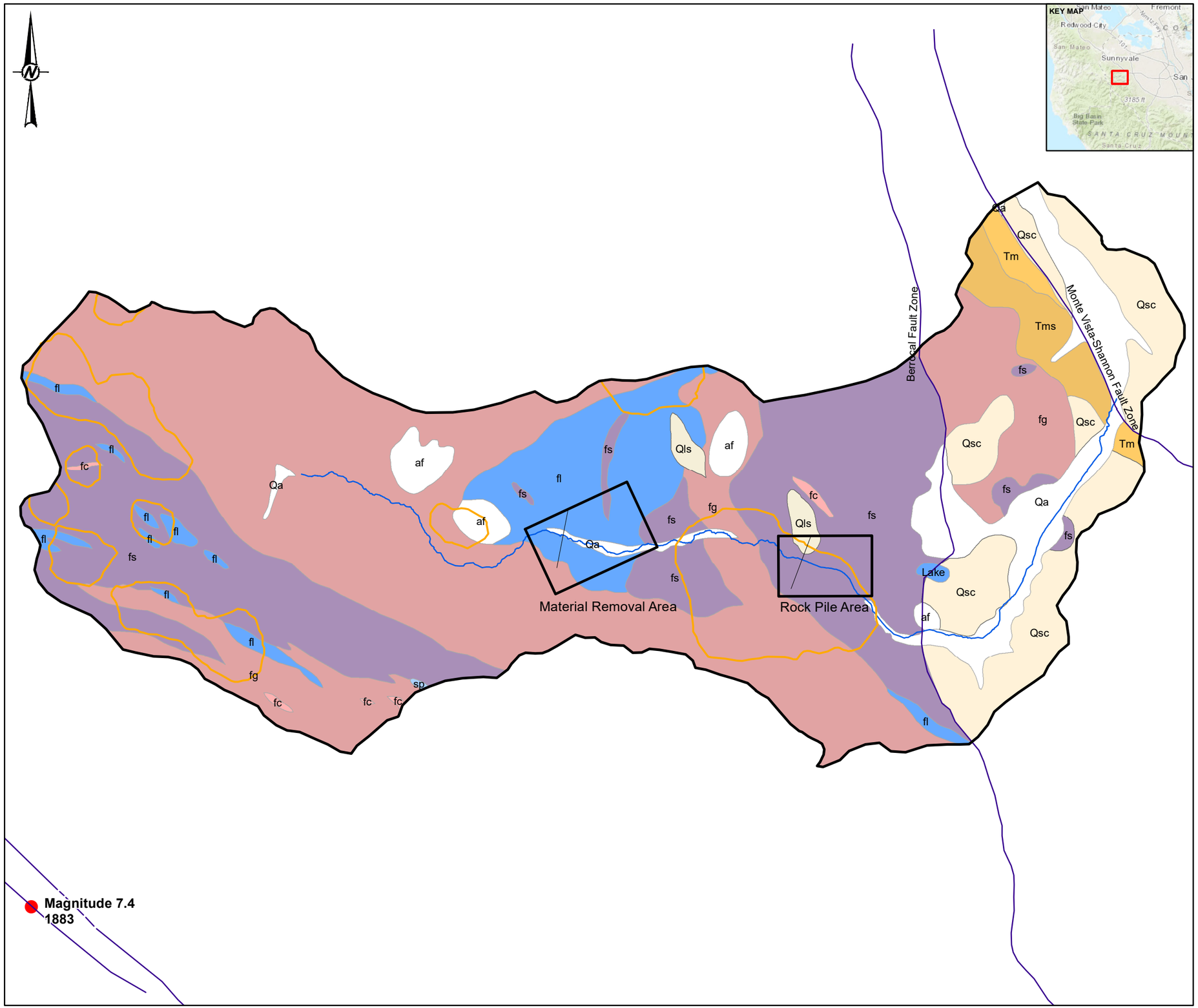
The bedrock materials exposed in the Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone), chert, and limestone. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the Quarry.

Golder has referenced two geologic map sources in our presentation of the geology of the Permanente Creek Basin (Figure 1). One set of maps comes from the Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b), and the other comes from the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have mapped the basin (Brabb 1970, Pulver 1979a and b).

## 3.2 Surficial Geologic Units

### 3.2.1 Overburden and Fill

Many of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden. These are generally described as side-cast fills that mantle existing canyon slopes and fill small




LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Mostly Landslides
- Faults
- Earthquake Epicenter Location

**Geologic Units**

**UnitNam**

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

**NOTE(S)**
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

**REFERENCE(S)**

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY


CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK

TITLE
**GEOLOGIC MAP OF PERMANENTE CREEK BASIN**

CONSULTANT
GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

| PROJECT NO. | PHASE | REV. | FIGURE |
|---|---|---|---|
| 179018601 | 100 | 0 | 1 |

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drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness, starting at the Rock Pile Area and continuing up through the Material Removal Area. A large percentage of this material within the Project area will be removed as part of the restoration effort.

The Rock Pile area is comprised of stockpiled material for production. The character of the overburden is variable but generally consists of fine to coarse gravel to angular cobble sized rock fragments. Elsewhere, overburden is a heterogeneous mixture of fines, sand, gravel and cobble sized fragments (i.e., greenstone, graywacke, cherts, and soil materials) but with small percentages of limestone.

### 3.2.2 Alluvium

This includes modern unconsolidated alluvial deposits along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

### 3.2.3 Colluvium

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay.

### 3.2.4 Ancient Natural Landslide Deposits

Several large, ancient landslides have been mapped by various investigators in various areas of the 3,510-acre Lehigh property, and throughout the broader foothill's region (Figure 1). These landslides are generally described as possible old landslides and considered to be early Holocene or possibly late- Pleistocene features. These are naturally occurring landslides that are not related to any modern day mining activities. Along the south flank of Permanente Creek, two large landslides are identified by Sorg and McLaughlin (1975) while Rogers and Armstrong (1973) map only one of the landslide features.

The presence of these ancient landslides, as well as much smaller surficial slides that occur along the canyon walls, and in steep zero-order drainages that report to Permanent Creek, reflects the young, steep geologic terrain that comprises the Santa Cruz Mountains. The relatively thin surficial failures that are common in this terrain are to be expected going forward with this Project both from natural sources—like the zero-order drainages along the south canyon wall—and potentially from restored natural grades once overburden is removed as part of the Project. Note that one of the primary goals of the creek restoration program is to remove specified overburden and fill materials and restore, to the extent practicable, natural slope angles both along the longitudinal profile of the creek and transverse to the creek (i.e., the creek banks).

## 3.3 Faulting and Seismicity

The San Andreas Fault zone is located approximately two miles southwest of the Quarry (Figure 1). The Sargent-Berrocal Fault Zone (SBFZ), part of the Santa Cruz Mountains front-range thrust fault system, parallels the San Andreas to the east and forms the eastern-most structural boundary to the Permanente Terrain.

Near the Quarry, the SBFZ consists of two northwest-trending, sub-parallel faults, namely the northeastern-most Monta Vista Fault Zone and the southwestern-most Berrocal Fault Zone (Sorg and McLaughlin, 1975) (Figure 1).

The Monta Vista Fault Zone is located approximately 1 mile to the northeast of the Quarry. A strand of the Berrocal Fault Zone lies beneath the Permanente Cement Plant area to the south of the EMSA, and extends west to other portions of the Quarry (Mathieson, 1982; Sorg and McLaughlin, 1975).

Using the 2008 Update of the United States National Seismic Hazard Maps (Peterson, et.al., 2008), which incorporates the findings of the Next Generation Attenuation Relation Project, Golder estimates that design peak ground accelerations should be approximately 0.57g for the site.

## 4.0 BASIN GEOMORPHOLOGY

The geomorphology of the Permanente Creek basin is influenced by multiple active geologic processes. The highly active tectonics of the San Andreas Fault and other nearby faults and fault zones result in a high rate of uplift and relatively frequent, high magnitude earthquakes. The tectonic activity has modified both the headwater basins and offsets lower elevations of landscape in juxtaposition to each other. The relatively frequent occurrence of high magnitude earthquakes is likely to have increased magnitude and occurrence of ancient, naturally-occurring landslides within the basin. Additionally, the highly variable rock types, tectonic histories, and geomechanical properties of the accretionary island arc geology of the Franciscan mélange have resulted in highly differential rates of erosion. These differential erosion rates are expressed in the varying morphologic characteristics of the basin.

As an added complexity, the carbonate units of the Franciscan complex have resulted in carbonate-rich water precipitating travertine deposits on the bed and banks of Permanente Creek. These travertine deposits interact with the self-forming step-pools of the steeper portions of the channel and contribute to a repeating cycle of travertine dam formation and breaching (Fuller et al. 2010). Additionally, the subsurface precipitation of travertine in the interstitial voids between sediment grains in sediment deposits increases the intergranular bond strength, making the sediment more resistant to erosion and potentially decreasing the rippability of the material.

In addition to the natural processes interacting with the basin morphology, the long history of mining in the basin has also substantially interacted with the surface processes defining the basin morphology. The very high rate of sediment supplied to the channel, in the form of overburden and fill placed along the margin of the stream channel during the early history of mining (1940s and 1950s), has resulted in aggradation of the channel in lower gradient portions of the channel.

### 4.1 Fault Influence

The drainage basins of the northeast side of the Santa Cruz mountains are characterized by geomorphic features that are controlled by faulting. The features include right-lateral deflected and offset drainages, drainages that follow lineaments, sidehill benches, closed depressions, aligned benches, linear scarps, linear troughs, saddles, and linear vegetation contrasts (Smith 1981).

In the downstream portion of the basin, the Monte Vista-Shannon fault zone defines geomorphic features. These features are believed to have been formed during the Pleistocene and possible Holocene. They include the reverse displacement of lower elevation sediment to higher elevations than those of their original deposition, forming benches, saddles, linear valleys, faceted spurs, scarps, linear range fronts, linear depressions, and associated vegetation contrasts (Bedrossian 1980, Hitchcock et al. 1994).

Similarly, the Jurassic and Cretaceous aged rocks of the Franciscan Complex are thrust over Pliocene and Pleistocene alluvial sediment of the Santa Clara Formation and younger Quaternary deposits (Sorg and

McLaughlin 1975, Wesling and Helley 1989, McLaughlin et al. 1991, Hitchcock et al. 1994). On the site, colluvial deposits are thrust over fluvial gravel of Permanente Creek, indicating late Pleistocene and possible Holocene displacement (Hitchcock et al. 1994).

Hitchcock and Kelson (1999) noted that coseismic deformation associated with the 1989 Loma Prieta earthquake, was coincident with geomorphic features suggestive of faulting along the Monte Vista-Shannon fault zone (Haugerud and Ellen 1990, Hitchcock et al. 1994, Langenheim et al. 1997). This could indicate that repeated localized contraction is in part coincident with the occurrence of Loma Prieta-type earthquakes. This would suggest a recurrence interval of about 400 years (Working Group on California Earthquake Probabilities 1996). Hitchcock et al. (1994) reported a late Pleistocene displacement rate across the Monte Vista fault zone of 0.3 ±0.2 mm/yr.

## 4.2 Hillslopes and Landslide Processes

The Santa Cruz Mountains are a steep and rugged terrain with a long history of landslide activity. The geomorphology of the Permanente Creek basin exhibits a high rate of dynamic change. This high rate of change, termed morphodynamics, is driven by the complex interaction between the dual processes of rapid uplift associated with the compressional tectonics along the San Andreas Fault system (as discussed above) and the relatively weak, easily erodible, and highly variable rocks of the Franciscan Complex.

The resulting topography forms narrow, steep sided, and actively eroding canyons. The Santa Cruz Mountains, and Permanente Creek canyon, are subject to both shallow (e.g., debris flows or “mudslides”) and deep landslides (e.g., large rotational slumps or translational block glides). Average slope angles in the canyon are approximately 25 degrees (or 2H:1V) which is reflective of the natural stability of the highly broken and sheared greenstone and mélange terrane. Steeper slopes, greater than 35 to 40 degrees, are locally observed in areas underlain by more competent limestone and graywacke bedrock but these are the exception.

## 4.3 Geotechnical Background and Considerations

Golder has a long history of geologic and geotechnical investigations at the Permanente Site starting in 2006 and continuing to present. The investigations include (but are not limited to) sector specific investigations of the quarry pitshell including existing landslides, both the EMSA and WMSA overburden stockpiles and foundation conditions, several investigations for updated storm water basins, a new crusher location and foundation, and a proposed water treatment plant location. In summary, we have an extensive library of material properties and corresponding stability analyses and therefore a good understanding of slope behavior for different types of materials and slope angles. Our geotechnical recommendations for slope design, discussed below, are based on this extensive background. A summary of material types and properties based on a number of our previous investigations is included in Appendix A.

From a geotechnical perspective, the proposed project primarily involves excavation and removal of man-made surficial deposits (i.e., overburden and artificial fills) to restore the creek channel and creek banks back to a more natural state. The intent is to remove the man-made surficial materials down to bedrock (or native soils) while minimizing excavations/cuts into bedrock or soil slopes. In general, excavations onto canyon slopes will only be done where the surfaces have been altered or affected by mining activities. Existing natural slopes will not be modified or excavated.

Our geotechnical recommendations for the Project include:

- Rock Slopes: Slopes greater than 20 feet in height in greenstone materials should not exceed slope angles of 2H:1V if possible. Slopes less than 20 feet should perform adequately at 1.5H:1V; however, localized areas of instability may be encountered. Cutslopes in limestone and graywacke greater than 20 feet in height should not exceed 1H:1V and slopes less than 20 feet should be limited to no steeper than 3/4H:1V.
- Fill or Soil Slopes: For planning purposes, permanent slopes comprised of overburden, alluvium, colluvium or other site-derived fill should not exceed 2H:1V.

Earlier versions of the Project included construction of retaining structures, or engineered structural elements, that warranted more detailed geotechnical investigations for design purposes. Retaining structures have been eliminated from the Project (with the exception of the Material Removal Area), and with other modifications, the main geotechnical considerations are limited to recommended slope angles for final slopes of previously filled or otherwise disturbed surfaces.

The Material Removal Area, and the Rock Pile Area, present the largest challenges due to depths of the cuts that are required, and the steep natural terrain underlying and comprising the hillslopes that are overlain by overburden. In some locations along creek banks, it is anticipated that cuts will expose natural surficial materials (i.e., colluvium and slope wash) as opposed to bedrock and may require localized cuts steeper than 2H:1V in order to daylight the cuts into natural slopes.

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). This is discussed in further detail in Section 6.2.

# 5.0 SITE RECONNAISSANCE AND GEOMORPHIC CHARACTERIZATION

The following section provides a summary of our geomorphic observations of the Project. All station references in this report are coincident with that used by Waterways on Sheets C2-C4 in their 90% restoration plan report (2019).

## 5.1 Overview of Permanente Creek Profile

The profile of Permanente Creek can broadly be classified into depositional reaches and bedrock reaches (delineated on Figure 2 as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach. The channel hydraulics are directly coupled to the rate at which water is delivered to the channel.

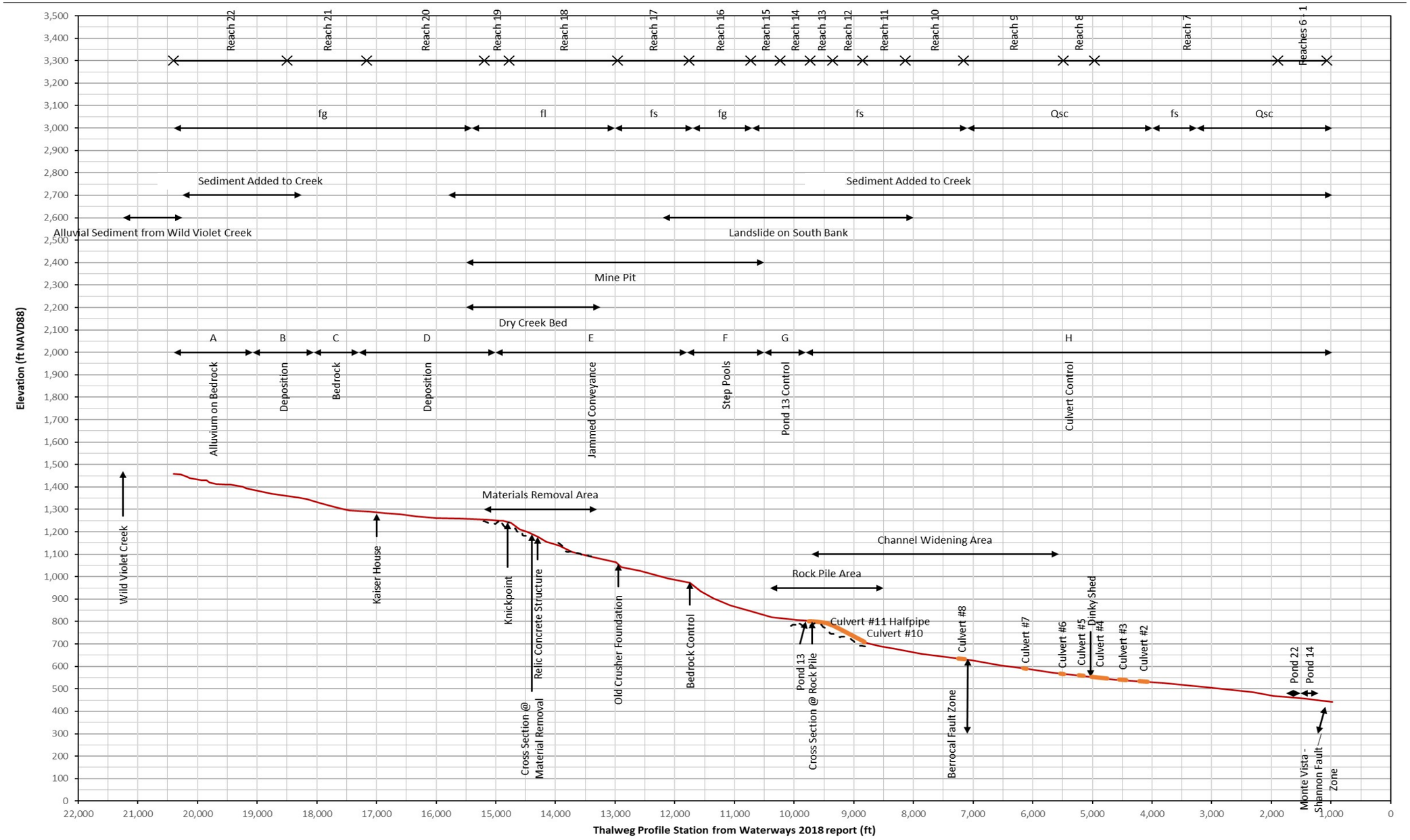


**Figure 2: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).**

### 5.1.1 Reach A: Alluvium on Bedrock

The upstream most portion of the survey channel is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel. The sediment supplied here is likely to come from natural processes and is likely partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch 2007a and b) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the river and may be coupled to the debris flows originating from Wild Violet Creek.

### 5.1.2 Reach B: Deposition

This depositional reach is characterized by a relatively wide, low gradient, flat valley floor that extends for approximately 1,000 feet along the valley axis. In combination with downstream gradient controlled from the Bedrock reach, the sediment load is too great and too coarse for the local hydraulics to transport, resulting in deposition on the valley floor.

### 5.1.3 Reach C: Bedrock Control

The Bedrock controlled reach is relatively short (750 feet) and has a relatively low gradient (<2%), but the narrow bedrock channel maintains hydraulic and sediment continuity through this reach, resulting in a thin alluvial cover on a bedrock channel bed. It appears that this reach only receives sediment from the channel upstream and conveys almost all of this load through to the downstream reach.

### 5.1.4 Reach D: Deposition

This Deposition reach is characterized by the aggradation of sediment on the valley floor and relatively wide flat valley bottom that receives sediment from the upstream reach and the tributaries that confluence with Permanente Creek from the south. The downstream end of this reach is marked by the occurrence of a sharp change in channel gradient associated with a bedrock knickpoint. This portion of the landscape is within the Materials Removal Area. Further discussion of the implications of these features to the restoration plan are discussed in Section 6.

### 5.1.5 Reach E: Jammed Conveyance

The Jammed Conveyance is very steep (>9%), but due to the large quantity of material it receives, and the armoring effect of both the coarse sediment and the relict mining infrastructure within the channel, a large portion of this material remains within the reach. The geomorphic term ‘jammed’ describes steep channels that are clogged with debris (Zimmerman et al. 2010). Natural channels of this gradient are typically not depositional but rather erosional. The debris residing on the bed in this reach is immobile, and the modern channel alignment is constricted between the debris from the north and the south valley wall for much of this reach. The Material Removal Area is contained within the upstream portion of this reach.

### 5.1.6 Reach F: Step Pools

Downstream of the Jammed Conveyance, a large, mapped natural landslide borders the south bank of the river for the entirety of this reach. The large boulders from both mining and natural sources, as well as woody debris, form large, steep step-pools within this reach. Some of these step-pools appear to have been reinforced with travertine deposits, as evidenced by the relict abutment deposits on the channel margins.

### 5.1.7 Reach G: Pond 13 Control

The reach downstream of the Step Pools reach, appears to act as a gradient control. Although this gradient control may be driven by the back-water effect of the small reservoir at Pond 13, data from the Seismic survey indicates that this feature may be reinforced by naturally occurring bedrock ridges within the channel. A local bedrock ridge is present just downstream of Pond 13 (Figure 2).

### 5.1.8 Reach H: Culvert Control

Downstream from Pond 13 the channel is confined within culverts and canals that do not exhibit a morphologic connection to the adjacent landscape.

## 5.2 Geomorphic Observations

### 5.2.1 Knickpoints

In response to the dynamic changes driven by tectonic base level change, upstream propagating waves of erosion have migrated up Permanente Creek. The upstream most location of a given wave is marked by a distinct change in channel gradient, termed a knickpoint. Knickpoints characteristically migrate more rapidly through more easily erodible material, and more slowly through more erosion-resistant material (Whipple 2004).

**Figure 3 - Travertine Deposits**

The upstream most knickpoint with the assessed channel is located at Station 148+00 within the Material Removal Area (Figure 2). This reach is characterized by a relatively low gradient reach upstream of this point and a steep reach downstream. The steep reach downstream is simultaneously receiving and conveying a large quantity of material, typically composed of the finer fraction of the total sediment load, and aggrading the coarser fraction, composed of large boulders.

### 5.2.2 Travertine

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally forming step-pools were reinforced by travertine deposition to form travertine dams (Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

### 5.2.3 Basin Capture

A process termed basin capture can occur whereby drainage networks and flow paths are rearranged through landscape modifying influences of tectonics and surface processes. This process can result in characteristic landscape features like wind gaps, where valley geometry and upstream drainage are mismatched, and fishhooks, where headwater streams exhibit a significant curved alignment where the drainage meets the basin edge. The fishhook morphology is observable in the Permanente Creek basin, and adjacent basins (Figure 4). Evidence of basin capture is significant to the current investigation as the changes in basin area related to basin capture can be associated with a dis-equilibrium between the channel morphology and the sediment regime of the river. More straightforwardly, this implies that the basin used to be bigger, and the current hydrologic regime may not be sufficient to transport the former natural sediment load.

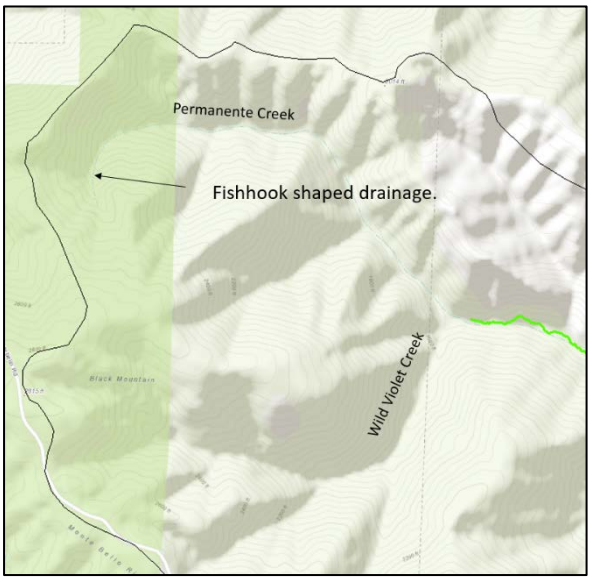


**Figure 4 – Fishhook shaped headwaters**

## 6.0 REVIEW OF RESTORATION DESIGN

This section provides an overview of the Waterways 90% design report (2019) with respect to the design basis and an evaluation of potential geotechnical issues for the Rock Pile and Material Removal Areas.

## 6.1 Geomorphic Design Basis

Waterways has based their geomorphic design on maintaining sediment transport continuity through the constructed reaches and proportionately distributing shear stresses across the channel bed and floodplain areas during floods to maintain a dynamic morphology without destabilizing the landscape. They optimized the design geometry by matching the hydraulics during flooding to the sediment size and transport rate of the channel. Additionally, design geometry incorporated the bankfull width and depth, and pool dimension and spacing relationships, of nearby reference watersheds and analog reaches (URS 2009). Waterways (2019) conducted hydrologic and hydraulic simulations of the restoration design and compared those results to fish passage capability, channel stability, flood conveyance, and sediment transport.

Waterways (2019) design specifications include the following primary elements:

- Engineered Streambed Material (ESM)
- Floodplain Armoring
- Vegetated Rock Slope Protection
- Vegetation Design
- Best Management Practices
- Engineered Woody Debris

- Slope Angle Guidance (Golder 2014)

## 6.2 Material Removal Area Design

**Location:** From Station 150+25 to 130+25

**General Description (Waterways):**

"This area has been modified by the placement of material within and adjacent to the channel… A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement.

Proposed cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best fit bedrock exposures encountered during excavation."

**Design Elements and Objectives:**

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward 25 feet along the majority of the project area, except near Pond 4A where it will move northward 16 feet;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity; and
- Installation of native vegetation.

### 6.2.1 Evaluation and Discussion of Materials Removal Area

A geologic and a geomorphic map of the Material Removal Area is presented in Figure 5. Longitudinal and thalweg profiles of this area are presented in Figures 6, 7 and 8. In general, both the cross section and long profile indicate that bedrock is close to the surface throughout the Material Removal Area with the exception of a few local areas where depths may be in the range of 15 to 20 ft bgs. The design approach used by Waterways notes that the estimated bedrock contacts as shown are approximate, and that the design will allow for the work to conform to and follow the bedrock surface as it uncovered during excavation.[1] Golder concurs with this general approach and doesn't believe any additional exploration would provide value to the design above and beyond the data provided by the seismic refraction surveys.

[1] It should be noted that where shown on included figures that the bedrock surface as interpreted from seismic refraction data is approximately located and will be field verified during construction.

LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Material Removal Area
- BedrockPoints

## Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400
FEET
1 IN = 206 FT

**NOTE(S)**
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

**REFERENCE(S)**
1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: MATERIAL REMOVAL AREA

TITLE
**GEOMORPHIC MAP OF THE MATERIAL REMOVAL AREA**

CONSULTANT
GOLDER

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| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

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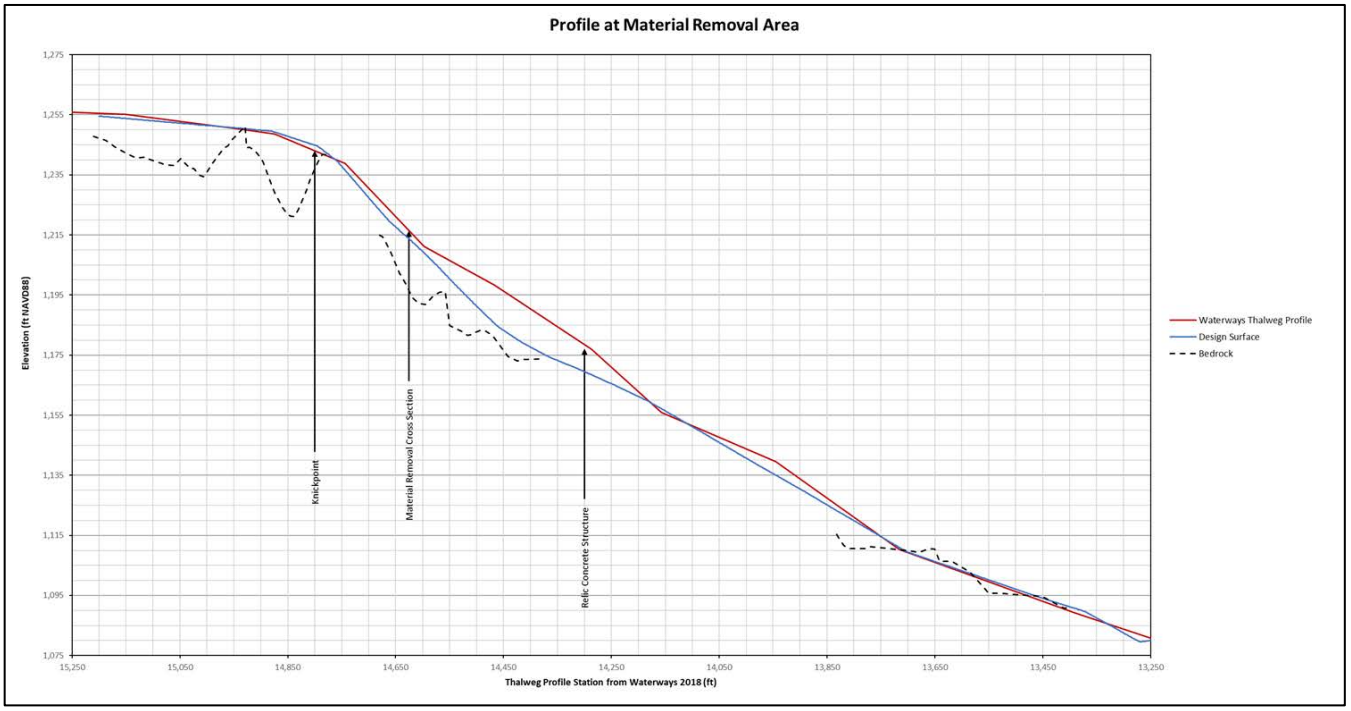



**Figure 6: Profile of Material Removal Area from Station 152+50 to 132+50.**

The following bullet points provide Golder's observations of the design as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- At Station 148+00, bedrock close to the surface is likely the controlling feature of an upstream migrating knickpoint. The design shows the channel invert conforming to knickpoint and then potentially being established on exposed bedrock downstream of the knickpoint. We concur with this design approach. Additional design elements proposed including ESM and other profile control elements such as boulder weirs and sills should help to ensure stability of the knickpoint.
- Between Stations 146+50 and 142+50, the restoration design identifies a large quantity of material for removal from the channel. The relic mining infrastructure may play a role in defining the channel alignment and facilitating an armored surface on some of the debris. The result of the restoration efforts will increase the local gradient within this reach and extend the length of the high-gradient portion of the channel. Sheet C34 of the 2019 plan set provides additional details for Step-pool and cascade channel design segments in this reach to mitigate the local gradient. We concur with this approach and note that field engineering design modifications and follow on monitoring may be necessary to ensure that the post material removal channel geometry is stable.
- Between Stations 138+50 and 134+50, the seismic profiles indicate that bedrock may be encountered below design grade, but as the seismic profile lines were collected adjacent to the channel and not in the thalweg, Golder believes that bedrock may be exposed at relatively shallow depths along the thalweg. We understand that the intent of the design is to construct the channel on exposed bedrock

occurring within the proposed grading envelope and based on our reconnaissance we think this is generally achievable.

- There is a large relic concrete structure located in the left bank of the stream channel five to ten feet above the channel invert (143+00). There is a smaller relic concrete structure located in the channel further downstream. Golder understands that the removal of old mining infrastructure from the channel will increase the connectivity of the channel to the adjacent landscape and also that the relict structures may currently be contributing to the stability of this reach. We understand that weirs and steps will be constructed using material with a minimum size meeting the D50 of the specified material and a boulder sill w/ a minimum size meeting the D84. This design approach is intended to replace any potential stability relic structures are providing.
- The most challenging geologic and geotechnical issue in the Material Removal Area is the presence of the Upper Water Treatment System infrastructure, including the 1250 Pond and associated facilities located along the top of the creek bank and the access road to Permanente Creek. The lifetime of these facilities is uncertain at this time as they are required for on-going operations of the Facility. However, once reclamation is completed, they may no longer be necessary. If the facilities need to be protected during the creek restoration project, a retaining structure (e.g., Mechanically Stabilized Earth wall) will be necessary to maintain the road and the 1250 pond (as shown in Figure 4.0 of Waterways Updated Response Letter to the County dated 3-5-18 shown below). The retaining structure would be required as the design calls for pushing the north bank of the creek approximately 25 further north than current conditions.

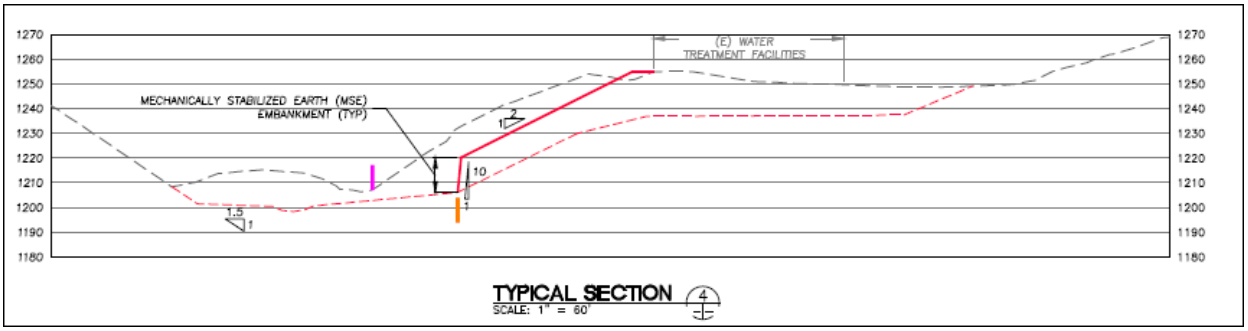



**Figure 7: Typical Section of Potential MSE Wall to protect Water Treatment Facilities**

- If a retaining structure is required, Golder recommends that a geotechnical investigation be performed along the alignment of the wall to verify depth to bedrock and to obtain appropriate design parameters for the design of the wall. However, depending on the timing of the restoration project, a retaining structure may not be necessary and therefore we recommend delaying any further investigation until such time it is needed. Figure 8 illustrates the design surface and bedrock conditions if the slope can be graded back at 2H:1V. This slope configuration meets Golder's general recommendations for cutslopes developed in surficial materials and is considered acceptable.

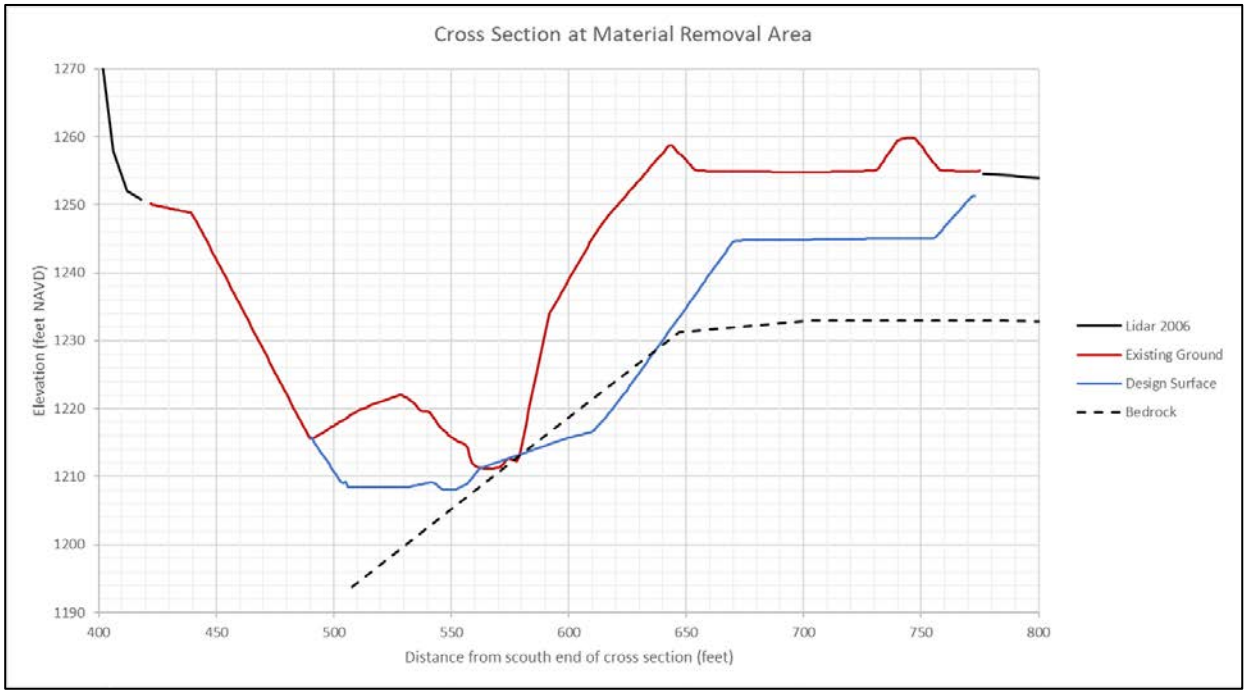



**Figure 8: Cross section at Material Removal Area. Located at Thalweg Profile Station 146+00. Note depth to bedrock is approximate and estimated based on seismic refraction data.**

## 6.3 Rock Pile Area Design

**Location:** From Station 104+50 to 85+50 within the Channel Widening Reach.

**General Description (Waterways 2019):**

"Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11 and the dam at Pond 13…. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. Final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel…The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Engineering Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road."

**Design Elements and Objectives:**

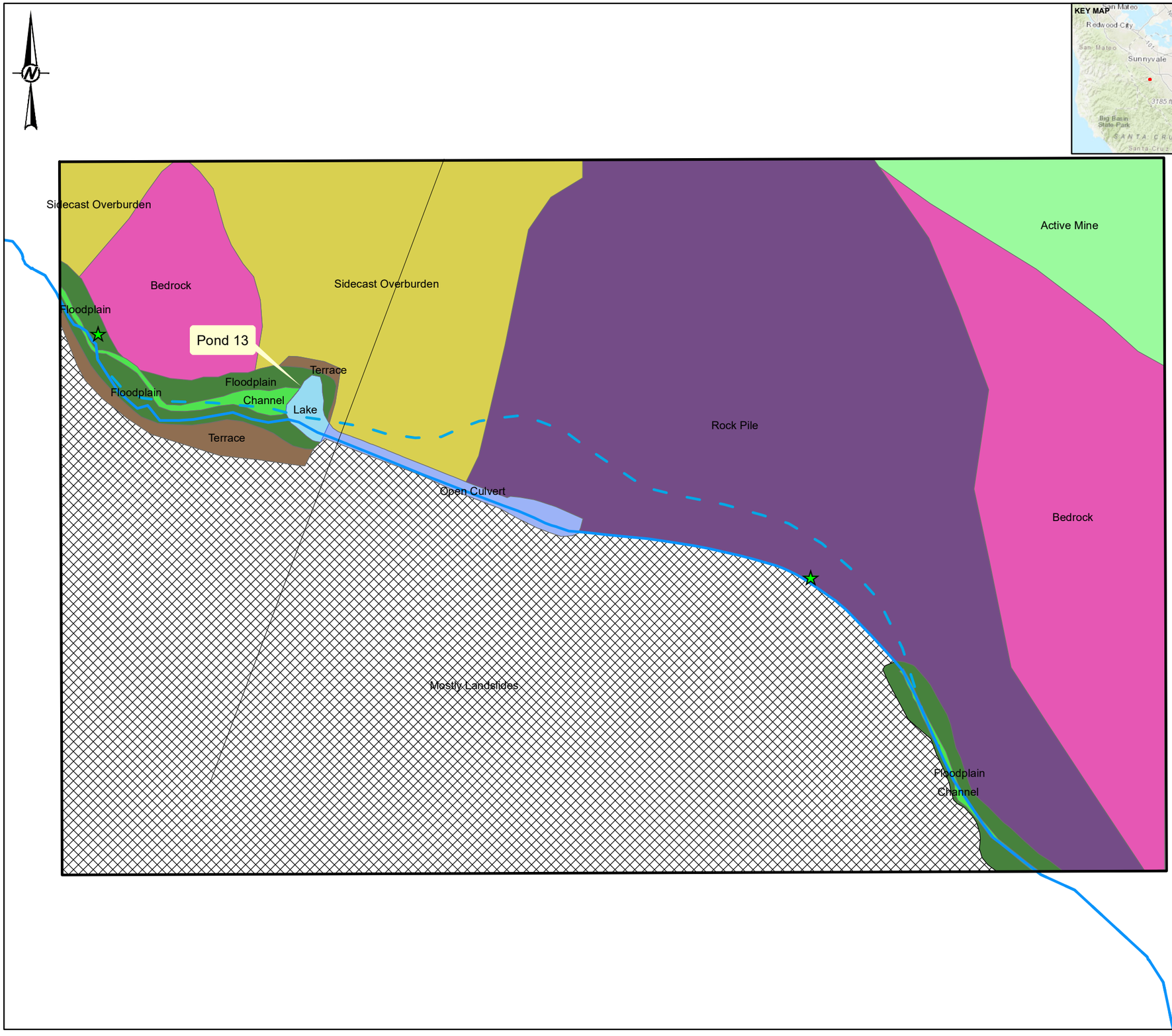
- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity;

- Removal of Rock Pile, retired Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam/metal infrastructure; and
- Installation of native vegetation.

### 6.3.1 Evaluation and Discussion of Rock Pile Area

A geologic and a geomorphic map of the Rock Pile Area is presented in Figure 9. Cross sections and thalweg profiles of this area are presented in Figures 10 and 11. Appendix B includes Figure 1 from Waterways Updated Response Letter to the County dated March 5, 2018 showing the locations of exploratory borings drilled previously by Golder in the area of the Rockpile restoration work and boring logs. The following discussion provides additional observations of specific design elements as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- In the Rock Pile Area, Golder's comparison of the restoration design with seismic survey results indicates that bedrock ranges from about 5 feet to approximately 25 feet below ground surface with significant relief along the longitudinal profile (Figure 10). As with the Material Removal Area, the design intent will allow for the work to conform to and follow the bedrock surface as it is uncovered during excavation.
- The interpreted depth to top of native alluvium or bedrock for borings along the proposed thalweg (Borings 1101 and 1103) is approximately 25 feet although native surficial materials were likely encountered approximately 5 to 10 feet shallower. Boring 1107, also along the thalweg but near the downstream limit of the area, encountered a concrete structure at approximately 7 feet bgs interpreted as being near original ground surface along the channel thalweg. The remaining borings were drilled upslope of the thalweg to evaluate depths of fill along the toe of the proposed slope. In general, these borings indicate depths of overburden along the toe of the slope in the range of 60 to 70 ft bgs.
- The bedrock surface depicted on Figure 10 is close to the "Upper Limit of Potential Design Channel Invert" as defined by Waterways (based on seismic lines and verification borings), whereas the grading plan included on the design drawings represents the "Lower Limit of Potential Design Channel Invert" to show the maximum extent of potential grading. It is our opinion based on the review of available data that the constructed profile will be close to the "Upper Limit" upstream of Rock Pile Design. In summary, it is our opinion that the design is reasonable, and additional exploration will not provide value to the design above and beyond the data provided by the seismic refraction surveys and previous completed borings.
- The seismic data also identifies a potential former bedrock channel, which extends through the Rock Pile Area that in some locations is north of the proposed thalweg (Figure 11). Golder understands that Waterways has, to the extent possible, re-occupied the historic thalweg; however, extensive grading would be required in some areas to realign the channel and move it further to the north to occupy the historic channel thalweg. We understand that pushing the toe of the slope further north is not considered feasible given that this would require significant flattening of the slope which would impact the extensive infrastructure located at the top of slope including the main access road and the crusher facility. Golder recommends that field engineering design modifications be applied to utilize existing



**LEGEND**

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Rock Pile Area
- BedrockPoints

## Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400 FEET

1 IN = 145 FT

**NOTE(S)**

1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

**REFERENCE(S)**

1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: ROCK PILE AREA

TITLE
**GEOMORPHIC MAP OF THE ROCK PILE AREA**

CONSULTANT
GOLDER

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| APPROVED | BF |

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bedrock topography and historic thalweg to the extent possible to meet the desired restoration outcomes.

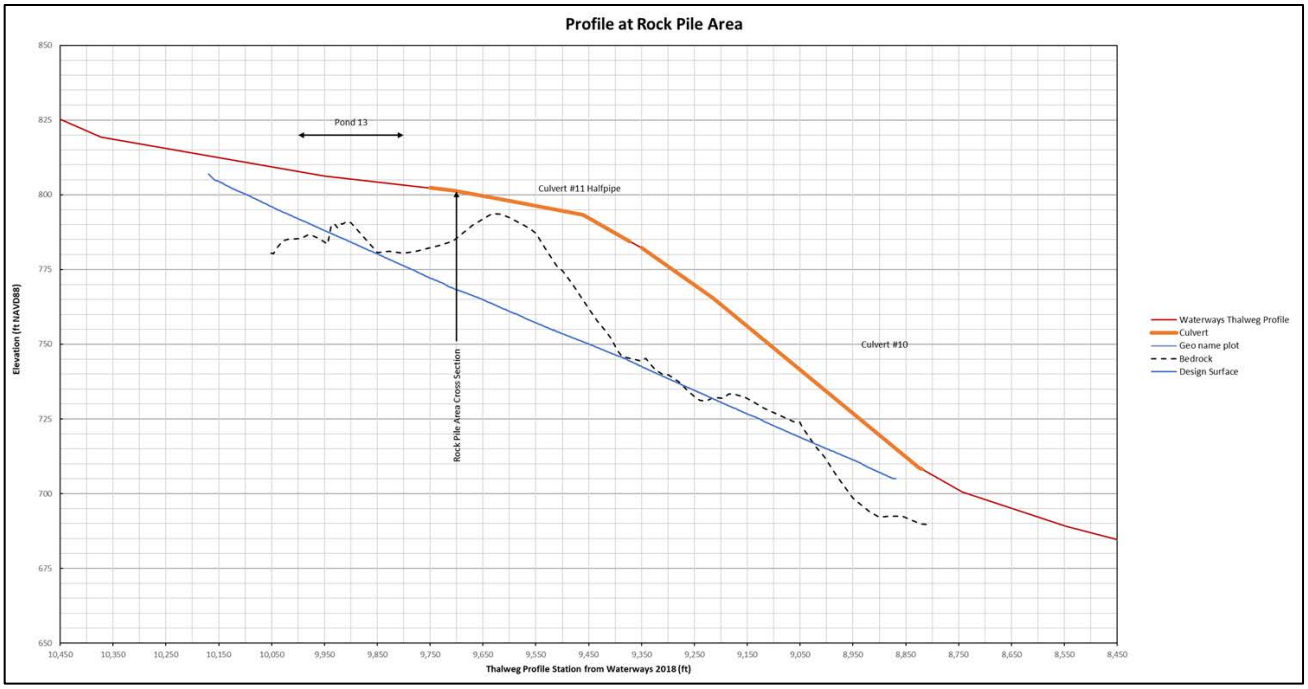



**Figure 10: Profile of Rock Pile Area from Station 104+50 to 84+50.**

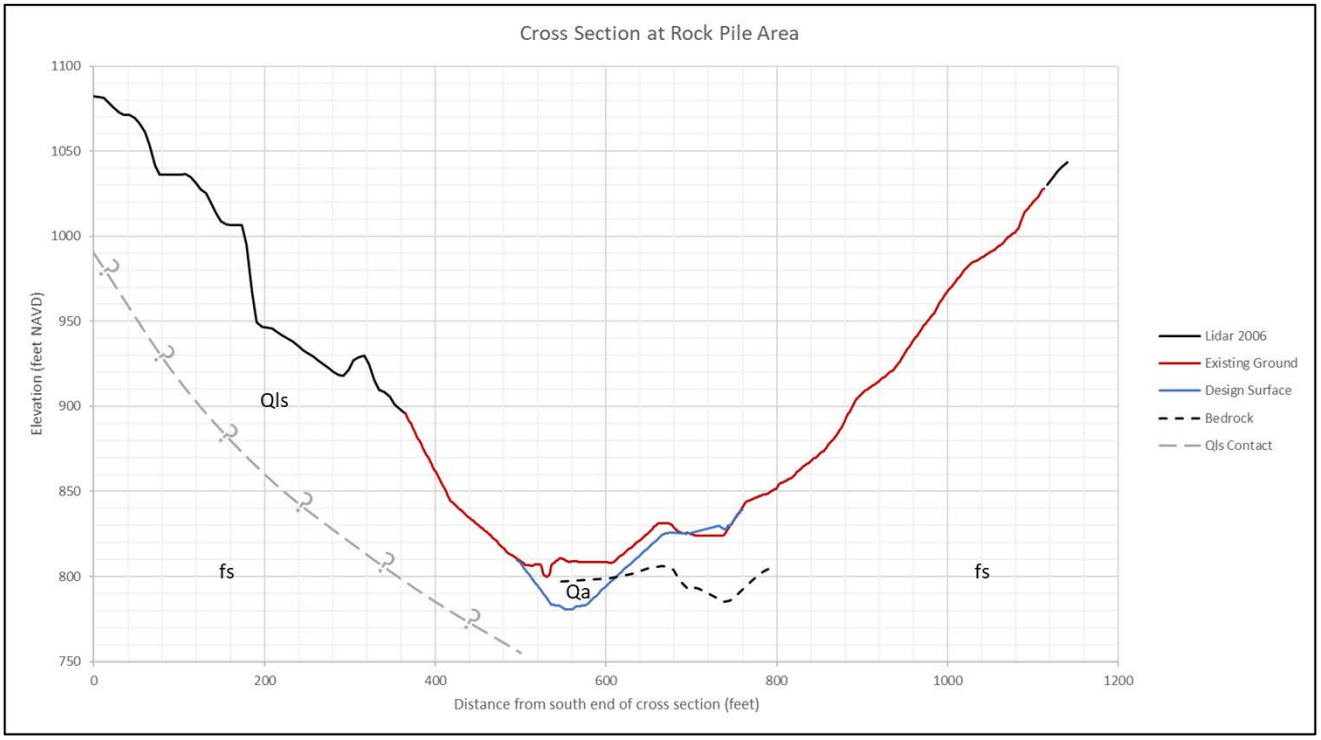



**Figure 11: Cross section at the Rock Pile Area. Located at Thalweg Profile Station 97+00.**

- The removal of the two culverts and creation of a floodplain with an inset channel in this reach will re-establish the lateral connectivity of the channel to the adjacent hillslopes. Reconnecting the channel to the adjacent landscape will have positive benefits as designed by Waterways, but it will also increase the potential for a laterally migrating channel to affect adjacent hillslopes. The north valley wall will consist of the excavated Rock Pile and the south valley wall is defined as a large, ancient landslide based on regional geologic mapping.
- The seismic data indicate that there is a bedrock ridge, oriented perpendicular to the valley axis, located just downstream of Pond 13. It appears that Pond 13, and/or the underlying more resistant bedrock, may be acting as a grade control structure on the reach upstream of Pond 13 (Figure 10).The channel morphology upstream of Pond 13 appears to have adjusted to this local gradient control and has resulted in the aggradation of sediment upstream of Pond 13. We understand that, the channel upstream of Pond 13 will be excavated into the stored sediment and depending on the depth to bedrock, a large proportion of these sediments will be removed as part of the restoration effort. In addition, we understand that grade control will be installed at the upstream limits of work under either Profile scenario.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

In this section, Golder summarizes the finding of our investigations and provides recommendations to facilitate the implementation of the Restoration Plan (Waterways 2018).

## 7.1 Adaptive Management and Monitoring

In our opinion, the most effective way to ensure a successful project is thorough engineering observation and field fitting of final profiles during excavation activities. This is the best way to achieve the goal of restoring natural profiles while minimizing excavation of native soils or bedrock materials. Note that this is a well-established concept first described and promoted by Karl Terzaghi as the “Observational Method” and was later described in detail by Ralph Peck (1969). The intent of the method is to balance the cost of investigation and design while still achieving a successful project through adaptive management in the field. The method entails designing to the most probable conditions rather than the most unfavorable conditions. Data gaps are filled by detailed observations during construction and designs are modified as needed.

It is important that stakeholders recognize that this is a restoration project, not an engineered stream channel, and this will by necessity entail restoration of new slopes to match previously existing slopes. This will require slope angles which, in some cases, may evidence stability just like the existing natural slopes. In our opinion, additional subsurface exploration will not alter this fundamental concept or improve the project outcome. Rather, it is understood by the Project team that shallow slides and/or erosion may occur on restored natural slopes.

## 7.2 Evolution of Design

The plan set is in general conformance with the applicable geotechnical recommendations as outlined in our “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans” dated April 28, 2014 (Golder 2014). We note that several structural construction elements that were part of the original project design in 2014 have been eliminated from the 2019 plan set. With the exception of a possible MSE wall in the Material Removal Area, structural elements such as gabions or retaining walls, which would warrant more detailed subsurface investigation and testing, are no longer part of the project.

## 7.3 Field Observations and Adaptive Management

As stated in the Field Engineering Notes section of the project plan notes (Sheet C28) stability of hillsides may necessitate:

- Field engineering and a field directed construction approach, i.e., field observations and adaptive design as discussed above
- Final geometries to be directed in the field by the Project Engineer to account for unanticipated subsurface conditions
- Flexibility with respect to final gradients and defined “grading envelopes” for channel gradients
- A narrowing of floodplain widths in areas where the final design profile approaches the lower limit of the grading envelope
- Slope benching to reduce slope angles and lengths in areas of disturbed terrain, and to control surface runoff and erosion while vegetation is established

We concur with the above recommendations, and the Field Engineering Notes in general, with respect to addressing and minimizing potential slope instabilities. We further recommend that the Project Geotechnical Engineer or Project Engineering Geologist inspect all interim and final cutslopes as the project progresses such that any potential areas of concern can be identified early in the process and remedial measures developed, if required.

## 7.4 Material Removal Area

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). Our understanding is that Waterways is recommending that work at the Material Removal Area is sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in place at the start of project implementation. Work would start with the Channel Widening Area and generally proceed upstream. The second phase of work would include the Rock Pile Area. The final stage of work would include the Material Removal Area.

If the MSE wall is required, then Golder recommends a geotechnical investigation be completed to prepare final design and construction plans. Based on the above construction sequence, there will adequate time to plan, permit and implement this investigation even after the project has started.

## 7.5 Rock Pile Area

The main geotechnical challenge for the proposed project is likely related to the Rock Pile Area which entails a reach of the creek where culverts will be removed, and a large stockpile of aggregate materials placed along the margin of the creek and up onto the hillside to a height in excess of 200 vertical feet. The estimated thickness of the rock pile ranges up to 100 feet. Estimated natural slopes angles underneath and above the rock pile are shown as steep as 1H:1V. We recommend inspection of these slopes by the Project Engineering Geologist or Geotechnical Engineer following the removals to evaluate the geologic conditions and stability of the exposed materials. If the removals expose bedrock, stability of the slopes should be adequate. However, if the cut leaves significant thicknesses of overburden in place, potential localized slope instability may be encountered. Golder

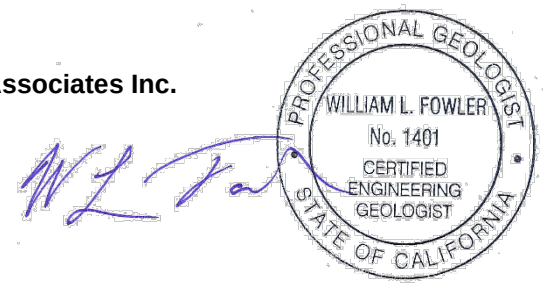
recommends that Lehigh and Waterways have contingency plans in place to design and implement remedial measures such as:

- Additional localized removals of loose or unstable materials
- Slope laybacks and benching
- Engineered drainage controls
- Buttresses or slope sections comprised of compacted rockfill

## 7.6 Travertine Deposits

The deposition of travertine between clasts in step-pools and dam-like structures, as well as deposited sediment that is accessed by the channel flow is likely to have increased the apparent strength of localized areas of alluvial materials along the channel. This cementation may make the removal of this material more difficult than anticipated and may play a role in long term channel stability. Golder recommends that this cemented material be left in place wherever possible to augment the restoration design.

**Golder Associates Inc.**




William L. Fowler, PG, CEG *Dated: 10/31/19*
*Senior Program Leader/Principal*

https://golderassociates-my.sharepoint.com/personal/bfowler_golder_com/documents/permanente/creek restoration/perm creek recon_final_wlf_10-31-19 r4.docx

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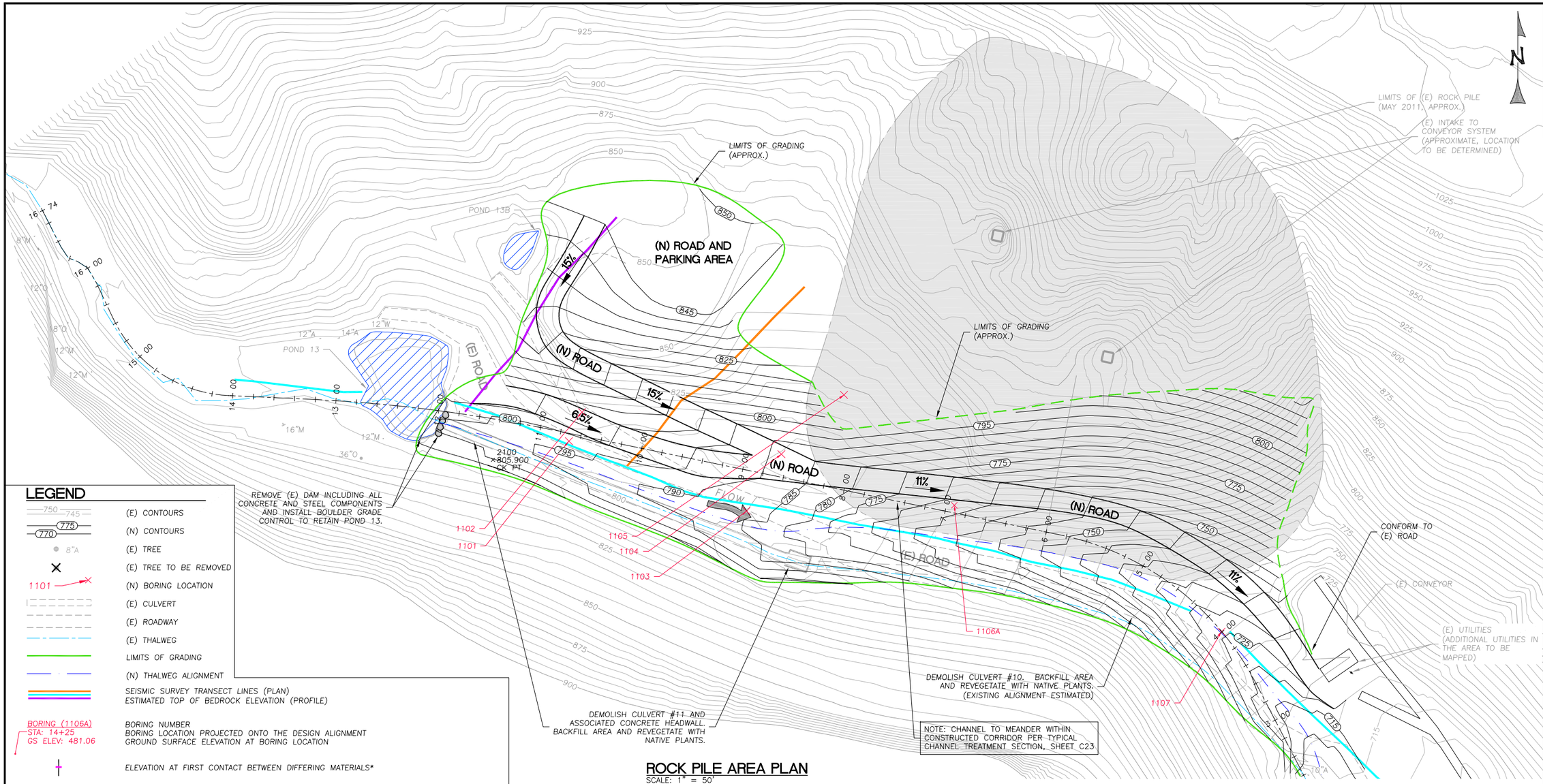
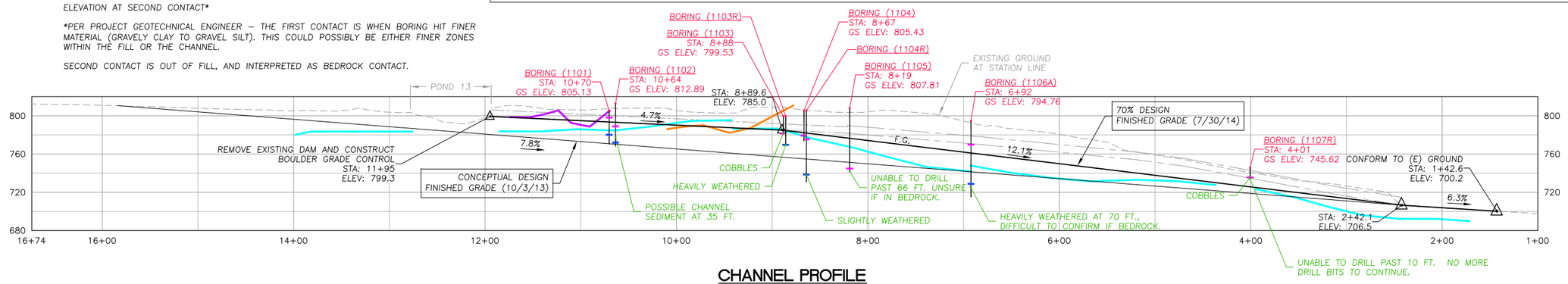
# Appendix A

# Appendix B




## ROCK PILE AREA PLAN
SCALE: 1" = 50'




## CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# ROCK PILE AREA SEISMIC STUDY AND BORING RESULTS

# PERMANENTE CREEK RESTORATION PLAN

## SUBSURFACE BORING LOCATIONS

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S |
| CHECKED BY: | M.W.W. |
| DATE: | 03/10/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIG. 1

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Telephone:

# BORING NUMBER 1101



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1101 is located on road (furthest east location). Estimated depth of bedrock with seismic line is about 25 feet.

**REMARKS CONTINUED** Possible pond sediment at ~7 feet and weathered bedrock at ~25 feet.

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SANDY SILT, subangular to subrounded sand and gravel, low plastic fines; brown; moist. |
| | | | 5 | | |
| | | CH | 10 | | (NATIVE possible pond sediment; CH) gravelly CLAY, medium to high plastic fines, fine subangular gravel, some coarse sand; dark brownish-gray; mosit. |
| | | | 15 | | gravel decreases with depth |
| | | | 20 | | |
| | | | 25 | | at 25 feet: driller notice material is a little harder |
| SS | 18/18 | CL | 30 | | (NATIVE; CL) gravelly CLAY, angular to subangular gravel, some FeOx staining, weathered Franciscan clasts; dark gray; moist. |
| | | GM | | | (NATIVE; GM) SILTY GRAVEL, angular to subangular, low to medium plastic fines, weathered Franciscan bedrock; dark gray; moist to wet. |
| | 12/18 | | 35 | | Bottom of borehole at 35.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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# BORING NUMBER 1102



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1102 is located on road above 1101. Drilled through fill and hit clay at ~19 feet and possibly weathered Franciscan at ~41 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; SM) gravelly SILTY SAND, fine sand, subangular to subrounded gravel; brown; dry to moist. |
| | | | 5 | | |
| | | | 10 | | at 10-15 feet: increase in gravel, fine to coarse angular to subangular gravel; whitish-brown. |
| | | SM | 15 | | |
| | 0/18 | | 20 | | at 19 feet: driller noticed softer material; attempted a drive sample (no recovery) |
| | | CL | 25 | | (FILL; CL) gravelly SILTY CLAY, fine subangular to subrounded gravel, some coarse sand; grayish-brown; moist. |
| | | GM | 30 | | (FILL; GM) SILTY GRAVEL, angular to subangular gravel, some sand; wet. |
| | | CH | 35 | | (NATIVE; CH) CLAY, possible channel sediment, medium to high plastic fines. |
| | 18/18 | GM | 40 | | (NATIVE; GM) sandy SILTY GRAVEL, possible channel sediment. |
| | | ML | | | (NATIVE; ML) sandy gravelly SILT, low to medium plastic fines, weathered Franciscan bedrock; brownish-gray. |

Bottom of borehole at 45.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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Telephone:

# BORING NUMBER 1103



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1103 is located on road. Hit cobbles at 18 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; dark grayish-brown; moist. |
| | | SM | 5 | | (FILL; SM) gravelly SILTY SAND, fine sand, low plastic fines, subangular to subrounded gravel; brown; moist. |
| | | ML | 10 | | (FILL; ML) gravelly sandy SILT, low to medium plastic fines; dark brown; moist. |
| | | GM | 15 | | (FILL; GM) SILTY GRAVEL and COBBLES, angular to subangular; whitish-brown.<br>unable to drill past 18 feet; possibly stuck on a boulder |
| | | | | | Bottom of borehole at 18.0 feet. |

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Telephone:

# BORING NUMBER 1103R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1103R is 3 feet east of 1103. Hit weathered Franciscan bedrock at ~25-30 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; light brown to brown; moist. |
| | | SM | 5 | | (FILL; SM) gravelly SILTY SAND, fine sand, low to medium plastic fines, subangular to subrounded gravel; brown to dark brown; moist. |
| | | ML | 10 | | (FILL, ML) gravelly sandy SILT, angular to subangular gravel, weathered Franciscan clasts; brown. |
| | | CL-ML | 15 | | (NATIVE; CL-ML) gravelly SILT to gravelly CLAY, angular to subangular gravel, weathered Franciscan bedrock; reddish-orangish-brownish-gray; moist to wet. |
| | | | 20 | | |
| | | | 25 | | |
| | | | 30 | | Bottom of borehole at 30.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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# BORING NUMBER 1104



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1104 is located on rockpile. Hit cobbles at 32 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; ML) gravelly sandy SILT, low to medium plastic fines, subangular to subrounded gravel; gray; moist. |
| | | ML | 5 | | color change to light grayish-brown |
| | | | 10 | | color change to light brown |
| | | CL-ML | 15 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, medium plastic fines, subangular to subrounded gravel, trace coarse sand; brown; moist. |
| | | GM | 20 | | (FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel, some coarse angular sand; tannish-whitish-brown; moist. |
| | | | 25 | | at 26 feet: driller noticed material became more stiff |
| | 18/18 | CL-ML | 30 | | (FILL; ML-CL) gravelly CLAY to gravelly SILT, medium plastic fines, fine subangular to subrounded gravel, some fine sand, weathered; dark brownish-gray; moist. |
| | 3/12 | | | | at 32 feet: hard material; unable to drill any further. |
| | | | | | Bottom of borehole at 33.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1104R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1104R is 3 feet east of 1104. Possibly hit weathered Franciscan bedrock at about 67 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; ML) gravelly sandy SILT, low plastic fines, angular to subangular gravel; grayish-brown; moist. |
| | | ML | 5 | | |
| | | | 10 | | at 9 ' color changes to light brown |
| | | | 15 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines; brown; moist. |
| | | CL-ML | 20 | | |
| | | | 25 | | (FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel; tanish-brown; moist. |
| | | GM | 30 | | |
| | | | 35 | | (FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. |
| | | CL-ML | | | at 35' color changes to reddish-brown |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | CL-ML | 45 | | (FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. *(continued)* |
| | | ML | 50 | | (FILL; ML) gravelly SILT, low plastic fines, coarse subangular to angular gravel; brown; moist. |
| | | CL-ML | 55 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, angular to subangular gravel; brown; moist. |
| | | GM | 60 | | (FILL; GM) SILTY GRAVEL, low plastic fines, fine subangular gravel; light tanish-brown; moist. |
| | | | 65 | | at 67 feet: driller notices a change in drilling |
| | | GM | 70 | | (NATIVE; GM-SM) sandy GRAVEL to gravely SAND, low plastic fines, weathered Franciscan clasts; brownish-gray to greenish-gray; moist to wet. |
| | | CL | 75 | | (NATIVE; CL) CLAY, slightly weathered Franciscan; dark gray; moist to wet. |
| | | | | | Bottom of borehole at 75.0 feet. |

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# BORING NUMBER 1105



**PROJECT NUMBER** 1302968-01
**PROJECT NAME** Lehigh Rockpile Drill
**LOCATION** Cupertino, CA
**DRILLING METHOD** HSA
**GROUND ELEVATION**
**TOP OF CASING** ----
**LOGGED BY** LF

**DATE STARTED** 2/13/15
**DATE COMPLETED** 2/13/15
**CASING TYPE/DIAMETER** ----
**SCREEN TYPE/SLOT** ----
**GRAVEL PACK TYPE** ----
**GROUT TYPE/QUANTITY** ----
**DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1105 is located on rockpile (most North on Figure). Hit clay at ~63 feet, unable to drill past 66 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 0 | | (FILL, GM) SILTY GRAVEL, angular to subangular; light to dark gray. |
| | | CL-ML | 5 | | (FILL; CL-ML) gravelly sandy CLAY to sandy SILT, medium plastic fines, medium to coarse sand, subangular gravel; dark gray; moist. |
| | | ML | 10 | | (FILL; ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse sand; brown; moist. |
| | | GM | 20 | | (FILL, GM) SILTY GRAVEL, fine to coarse angular to subangular gravel, low plastic fines; whitish-brown; moist. |
| | | ML | 30 | | (FILL; ML) gravelly SILT, low to medium plastic fines, subangular gravel; brown; moist. |
| | | ML | 35 | | (FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist.<br><br>at 35 feet: driller noticed material became more stiff; drill bit became hot and started smoking. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | | | (FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. *(continued)* |
| | | | 45 | | (FILL; ML) gravelly SILT, low plastic fines, anuglar to subangular gravel; brown; moist. |
| | | ML | 50 | | |
| | | | 55 | | |
| | | | 60 | | (FILL; ML-SM) gravelly sandy SILT, low plastic fines, fine to coarse sand, subangular to subrounded gravel; brown; moist. |
| | | SM-ML | | | |
| | | CH | | | (NATIVE; CH) gravelly CLAY, possible pond sediment, medium to high plastic fines, subangular to subrounded gravel, some coarse subangular sand; brown to dark brownish-gray to black; moist. |
| SS | 3/6 5/6 | | 65 | | |
| | | CL-ML | | | (NATIVE; ML-CL) CLAYEY SILT to SILTY CLAY, possible pond sediment, low plastic fines, some fine sand, trace coarse subangular sand; light brownish-gray mottled dark gray. |
| | | | | | Bottom of borehole at 66.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1106A



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1106A location is downslope on rockpile (east of previous boreholes). Driller notes gravel at ~18 feet.

**REMARKS CONTINUED** Possible pond sediment at ~25 feet. Possibly hit weathered Franciscan bedrock at ~66 feet.

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 0–10 | | (FILL; GM) sandy SILTY GRAVEL, angular to subangular gravel, low plastic fines, fine to coarse sand; brown; moist. |
| | | GP | 10–15 | | (FILL; GP) poorly graded GRAVEL, coarse subangular gravel, some silt; brown; moist. |
| | | GM | 15–20 | | (FILL; GM-GC) SILTY GRAVEL to CLAYEY GRAVEL, low plastic fines, subangular gravel; brown; moist. |
| | | SM | 20–25 | | (FILL; SM) SILTY SAND, fine sand, low plastic fines, some medium to coarse subangular sand, some fine to coarse subangular gravel; brown; moist. |
| | | CL-ML | 25–35 | | (FILL/COLLUVIUM (?); ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, fine to coarse subangular gravel; brown; moist. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

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# BORING NUMBER 1106A



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine subangular gravel; brown; moist. |
| | | ML | 45 | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low palstic fines, fine subangular gravel, some fine to coarse subangular sand; brown; moist. |
| | | GM | 50 | | (FILL/COLLUVIUM (?); GM) SILTY GRAVEL, fine angular to subangular gravel, low plastic fines, some coarse subangular gravel; brown; moist. |
| | | ML | 55 | | |
| | | | 60 | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse subangular sand; brown; moist |
| SS | 12/18 | | 65 | | |
| | | SM | | | (NATIVE; SM/GP) SILTY SAND and GRAVEL, heavily weathered; wet. |
| | | CL-ML | | | (NATIVE; ML-CL) gravelly SILT to gravelly CLAY, heavily weathered, possibly Franciscan bedrock; wet. |
| SS | 6/18 | | 70 | | (NATIVE; GM) sandy SILTY GRAVEL, fine to coarse angular to subangular gravel, possibly Franciscan bedrock; brown and dark green; wet. |
| | | GM | | | |
| SS | 12/18 | | 75 | | (NATIVE; SM) gravelly SILTY SAND, fine to coarse sand, low plastic fines, angular to subangular gravel, weathered, possibly Franciscan bedrock; reddish-brown mottled brown; wet. |
| | | SM | | | |
| SS | 3/80 | | 80 | | Bottom of borehole at 80.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1107



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1107 is located on rockpile (most East on Figure). Hit a burried retaining wall at 7 feet and can't drill further.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 5 | | (FILL; ML-GM) gravelly SILT to SILTY GRAVEL, low plastic fines, fine to coarse angular to subangular gravel, some coarse angular to subangular sand; dark gray; moist. |
| | | | | | at 7 feet: hit retaining well; can't drill futher. |
| | | | | | Bottom of borehole at 7.0 feet. |

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1107R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1107R is 3 feet east of 1107. Hit cobbles 10 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 5 | | (FILL; GM) SILTY GRAVEL, coarse subangular gravel; dark gray; moist. |
| | | | 10 | | at 10 feet: stuck on cobble; can't drill further. |
| | | | | | Bottom of borehole at 10.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

# APPENDIX I

**Golder Associates 2021**

**Slope Stability Analyses, Permanente Creek Restoration Plan**

GOLDER
MEMBER OF WSP

# TECHNICAL MEMORANDUM

**DATE** July 22, 2021 **Project No.** 179018610

**TO** Erika Guerra
Lehigh Hanson

**FROM** Robert Paul C. Erickson, PE; William L. Fowler, PG, CEG **EMAIL robertpaul_erickson@golder.com, bill_fowler@golder.com**

**RE: SLOPE STABILITY ANALYSES, PERMANENTE CREEK RESTORATION PLAN, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. PERMANENTE QUARRY, CUPERTINO, CALIFORNIA**

Ms. Guerra,

Golder Associates Inc. (Golder) is submitting this technical memorandum to Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our slope stability analyses of the proposed Rock Pile and mining overburden removal to the design finished grade related to Permanente Creek Restoration Plan, herein referred to as the Restoration Plan (Waterways, 2018)[1], at the Permanente Quarry in Cupertino, California. This work was performed in support of our response to comments dated June 25, 2021 compiled by ESA and submitted to the County of Santa Clara regarding the Permanente Creek Restoration Plan (PCRP).

The following sections provide a brief description of the analyses that were performed, the results and conclusions, and relevant slope stability analyses model outputs are provided as Attachment 1.

## 1.0 MODEL DEVELOPMENT

Golder analyzed cross-section C-C', shown on Sheets 19 and 21 of the Restoration Plan, 90% design submittal (Waterways, 2019). This cross-section location is considered critical for slope stability because it consists of, nominally, the greatest height of the rockpile overburden material (250 feet measured from toe to crest) and captures the steepest inclinations of both the existing rockpile (approximately 1.1H to 1.2H:1V) and underlying native metabasalt (aka greenstone) (approximately 1H: 1V). The geometry of the existing site conditions is based on topographic data per a survey collected by Lehigh in May 2011. The Restoration Plan provides additional information regarding the interpretation of the depth to the underlying native bedrock. The topographic data provided to Golder was truncated at the existing haul road on the north side of the creek at approximately elevation 1070 feet (El. 1070), therefore, model geometry north of the haul road was estimated based on measurements from Google Earth.

In lieu of piezometer data along cross-section C-C', Golder assumed a phreatic surface based on our understanding of the general subsurface water conditions along the south rim of the quarry as informed by long

[1] Waterways Consulting, Inc. 2019. Permanente Creek Restoration Plan Grading Plan 90% Design. Santa Clara County Grading Permit Submittal, October 31, 2019.

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term installation and data collection from vibrating wire piezometers installed between the quarry and Permanente Creek. The analyses performed here assumed the depth to water is approximately 75 feet below the existing haul road and declines through the native bedrock to a depth of approximately 20 feet below the existing culvert in the creek (near original creek thalweg elevation).

## 2.0 ANALYSES

Golder performed 2-dimensional, limit equilibrium slope stability analysis along cross-section C-C' using Slide2 Modeler, Version 9.012[2]. The analyses presented here used Spencer's method of analysis because it satisfies static horizontal and vertical equilibrium as well as moment equilibrium. These analyses evaluated circular failures only because the interpretation of the subsurface conditions indicate a block type failure is unlikely (i.e., no weak horizontal stratum). Critical slip surfaces and corresponding FOS were evaluated for local failures through upper and lower portions of the respective slopes as well as global failures that span from the ultimate crest to ultimate toe of the final slope configuration.

Golder analyzed the following four cases for slope stability:

1. The existing rockpile overburden given existing conditions.
2. The interpreted native bedrock following excavation and removal of the rockpile overburden and underlying thin surficial deposits.
3. The interpreted native bedrock surface in the creek bottom following excavation to the expected upper limit of the design finished subgrade of the creek per the Restoration Plan.
4. The interpreted native bedrock surface in the creek bottom following excavation to the expected lower limit of the design finished subgrade of the creek per the Restoration Plan.

As a limited sensitivity analysis, Golder evaluated each of the above four cases considering the assume phreatic surface described in Section 1 as well as under dry conditions to bracket the range of factors of safety (FOS).

## 3.0 GEOTECHNICAL PARAMETERS

The geotechnical parameters used in slope stability analyses are summarized in Table 1 and described below.

**Table 1: Summary of Geotechnical Parameters**

| Material | Unit Weight (pcf) | Cohesion (psf) | Effective Friction Angle (degrees) |
|---|---|---|---|
| Rockpile Overburden | 125 | 0 | 40 |
| Metabasalt/Greenstone | 165 | 6,480 | 30 |

Notes: pcf = pounds per cubic foot
psf = pounds per square foot

[2] Rocscience Inc. 2020. Slide 2 Modeler, 2D Limit Equilibrium Analysis for Slopes. Build Version 9.012. Build date December 11, 2020.

Golder assumed the rockpile overburden has a unit weight of 125 pounds per cubic foot (pcf) with 0 cohesion and an effective friction angle ($\Phi$') of 40 degrees. Its assumed friction angle corresponds to the rockpile's angle of repose and these assumed shear strength parameters yield a minimum static FOS of 1.0 which is reasonable considering the rockpile has performed well and appears stable since its placement.

Numerous previous analyses were performed by Golder[3] to back calculate, test, and develop shear strength parameters for the native greenstone at the site. These investigations and analyses determined the characteristics of the greenstone vary across the site with poorer quality greenstone generally observed in the northern portion of the quarry and better-quality rock located along the southern and southeastern portions of the site. The best geologic analog for the Rock Pile area is the nearby southern quarry rim which is located about 1500 feet west-northwest of the Rock Pile. The two areas are on trend with respect to the structural fabric of the quarry, and it is our opinion that they likely are underlain by the same general package of Franciscan bedrock comprised of a mixture of metabasalt and graywacke with associated interlayered limestone blocks.

Golder performed a detailed investigation and analyses of the south quarry area for the purpose of final pitslope design in 2008. The results of this work are included as Chapter 9 of our geotechnical report published in support of the updated 2011 Reclamation Plan. Four coreholes were installed in the south quarry rim and approximately 1500 feet of core were recovered and analyzed. Rock mass properties used for the pitslope design were developed from geotechnical core logging, point load testing, and laboratory testing of the core. Mohr-Coulomb strengths for the rock units were estimated from Hoek-Brown strengths using the computer program RocData, by Rocscience. Based on this previous work, Golder assumed the metabasalt/greenstone unit has a unit weight of 165 pounds per cubic foot (pcf) with 45 psi cohesion and an effective friction angle ($\Phi$') of 30 degrees.

## 4.0 RESULTS

The results of slope stability analyses are summarized in Table 2 and relevant model outputs are provided as Attachment 1.

[3] Golder Associates Inc. 2011. Geotechnical Evaluations and Design Recommendations (Revised), Permanente Quarry Reclamation Plan Update, Santa Clara County, California. December 2011.

**Table 2: Summary of Slope Stability Analyses**

| Case | Failure Mode | FOS | |
|---|---|---|---|
| | | Hypothetical Dry Conditions | Assumed Phreatic Surface |
| 1 – Existing Conditions | Upper Slope | 1.13 | 1.13 |
| | Lower Slope | 1.15 | 1.15 |
| | Global | 1.37 | 1.37 |
| 2 – Excavate Rockpile | Local (Upper Slope) | 2.09 | 1.98 |
| | Global | 2.32 | 2.05 |
| 3 – Excavate to Upper Limit of Finished Grade | Local (Upper Slope) | 2.09 | 1.97 |
| | Lower Slope | 5.58 | 5.13 |
| | Global | 2.14 | 1.87 |
| 4 – Excavation to Lower Limit of Finished Grade | Local (Upper Slope) | 2.09 | 1.98 |
| | Lower Slope | 4.92 | 4.37 |
| | Global | 2.13 | 1.83 |

## 5.0 CONCLUSIONS AND CONSIDERATIONS

The results of the analyses presented here indicate the proposed excavation of the existing rockpile as well as excavation to both the upper and lower limits of the finished subgrade of the creek per the Restoration Plan will exceed a static FOS of 1.8. These conclusions are based on the interpreted extent of the native metabasalt/greenstone beneath the rockpile as described in the Restoration Plan, the condition (and corresponding geotechnical parameters) of the native metabasalt/greenstone Golder assumed for the analyses, and the phreatic surface Golder assumed for the analyses.

As outlined in our response to comments, and our previous documents published in support of the Permanente Creek Restoration Plan, a qualified professional engineer or geologist is required to inspect and map the native bedrock that is exposed beneath the rockpile overburden to confirm, or modify, the assumptions made to perform these analyses. If the observed conditions are different than those assumed here, additional analyses may be required.

## 6.0 CLOSING

Please contact the undersigned if you have questions or require clarifications regarding the information provided in this memorandum.

**Golder Associates Inc.**

Robert Paul C. Erickson, PE
*Senior Consultant*
RPCE/WLF/rpce

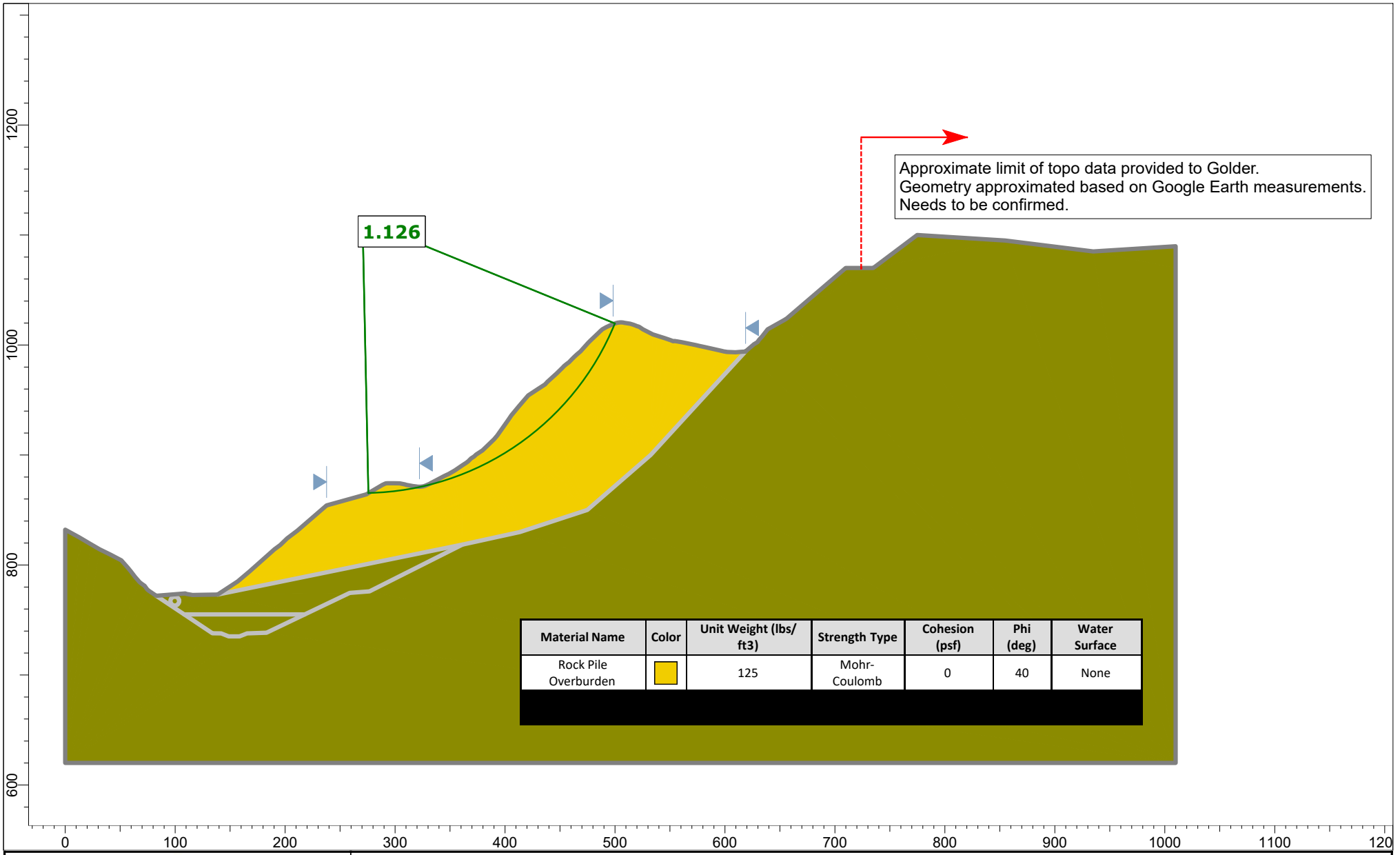
William L. Fowler, PG, CEG
*Principal Engineering Geologist*

Attachments: Attachment 1 – Slope Stability Analyses Model Outputs

https://golderassociates.sharepoint.com/sites/0637109940-lehighpermgwmonitoring-ca/shared documents/creek restoration/lehigh permanente creek restoration slope stability memo - 20210722.docx

**ATTACHMENT 1**

# Slope Stability Analyses Model Outputs




| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

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SLIDEINTERPRET 9.012

| | | | |
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1444 | *Company* |
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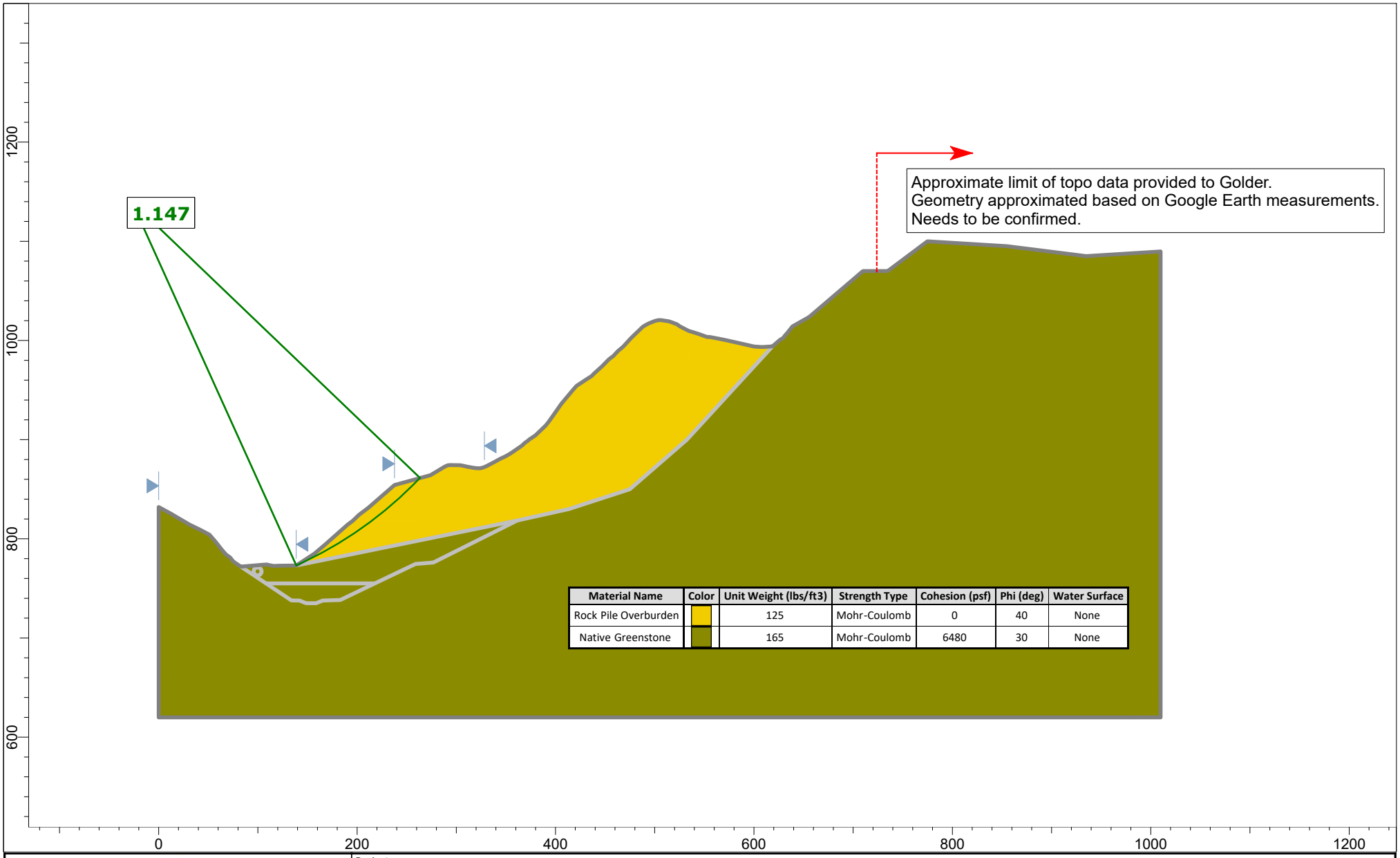


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
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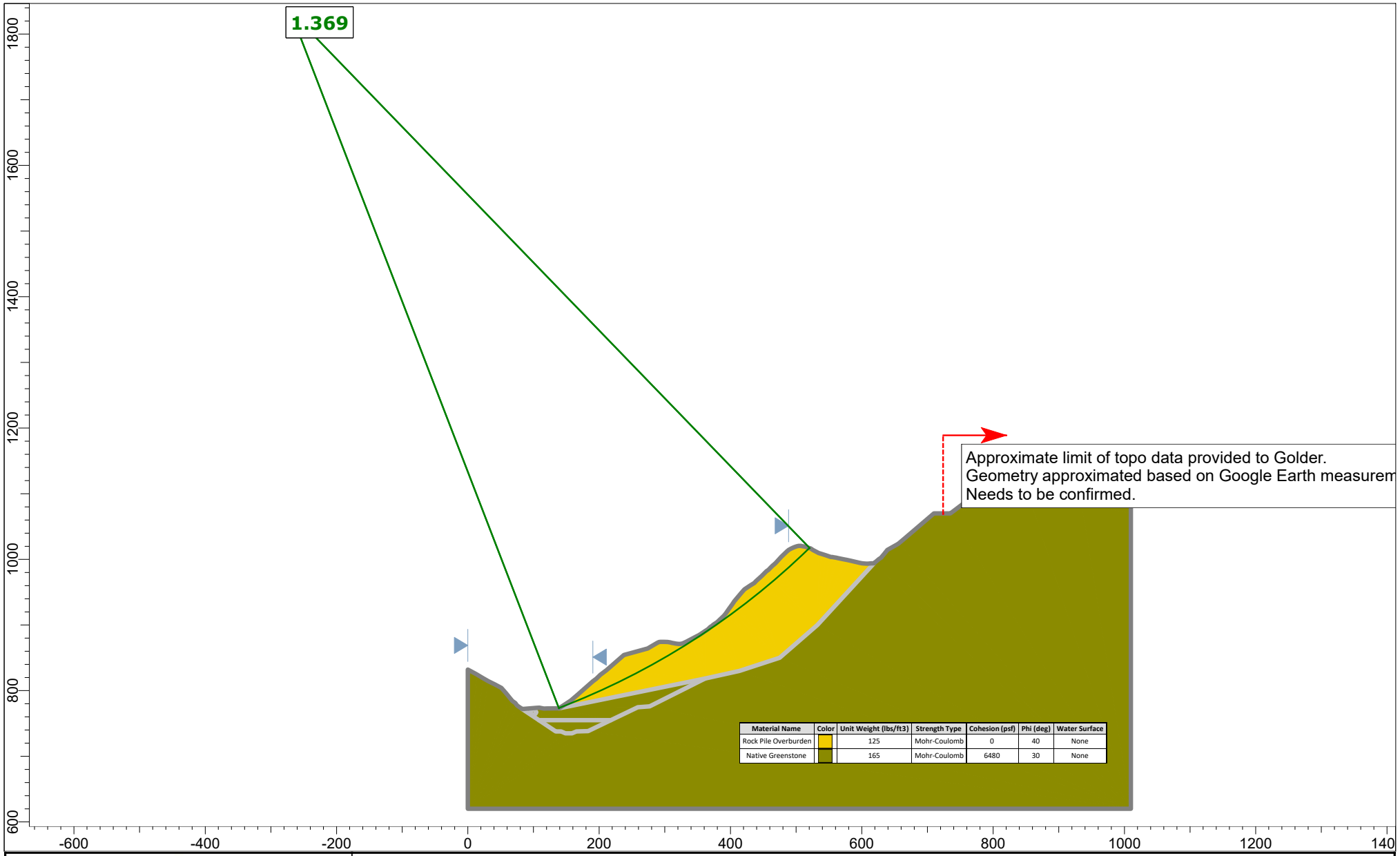


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SLIDEINTERPRET 9.012

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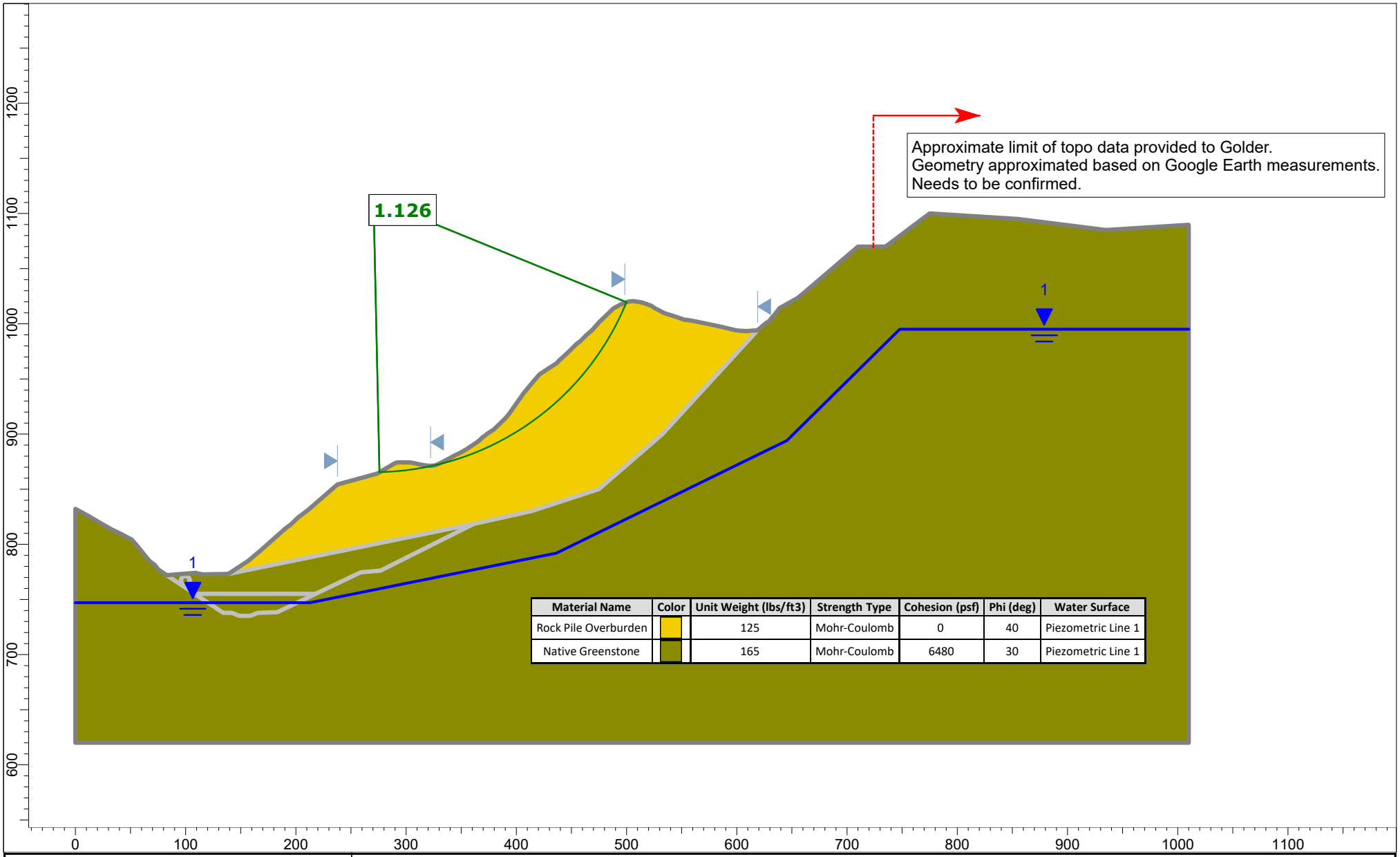


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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| | | |
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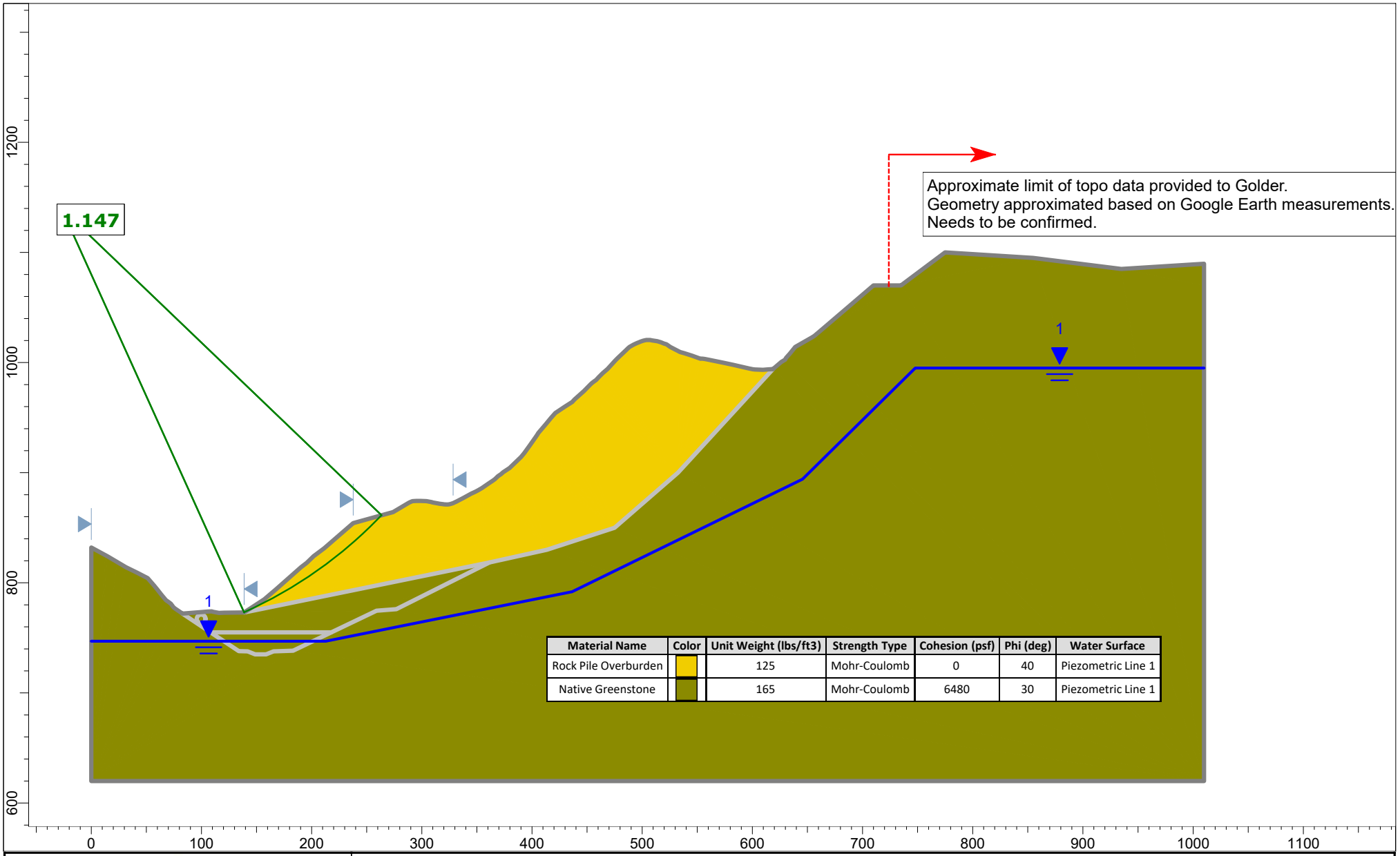


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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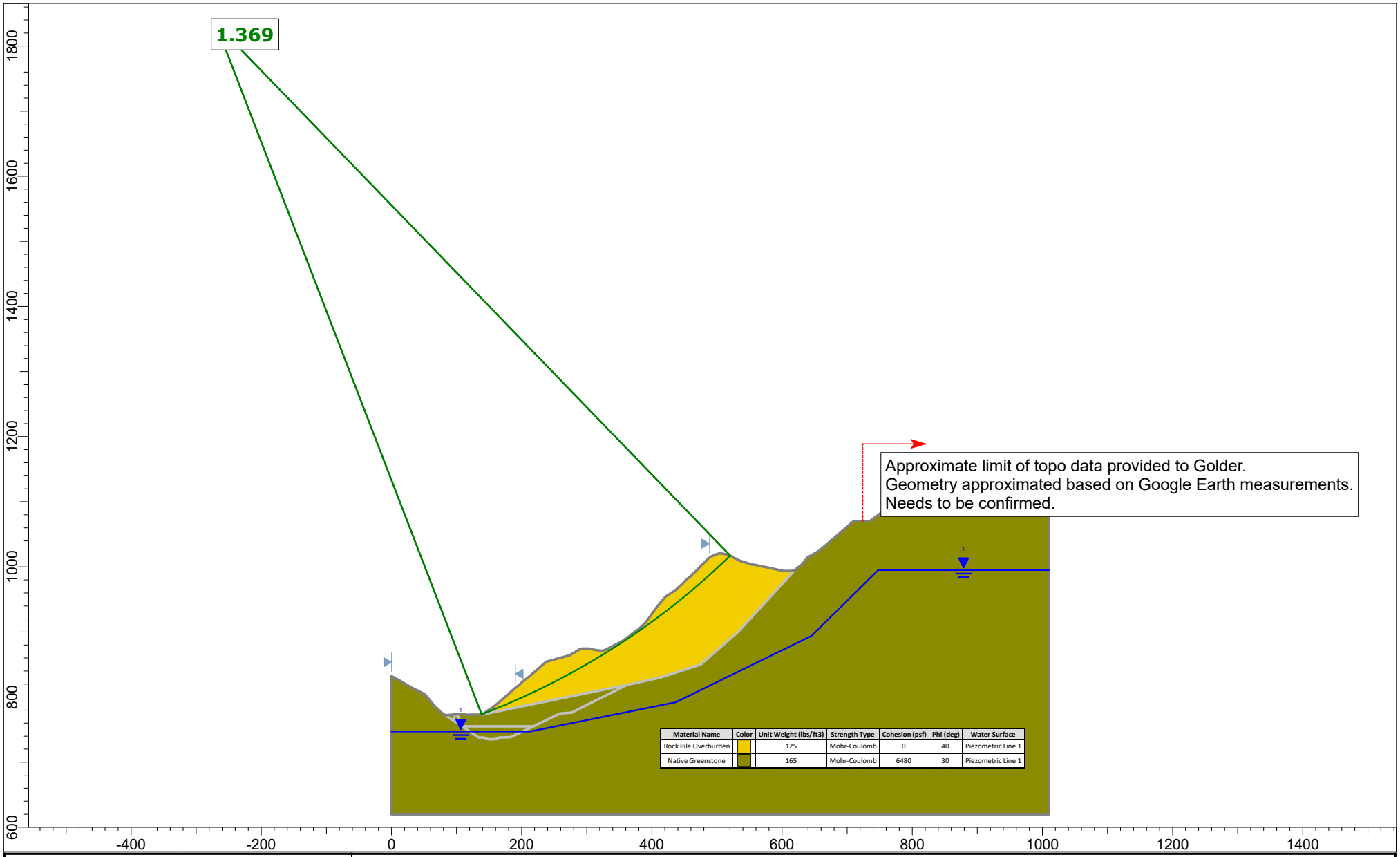


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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SLIDEINTERPRET 9.012

| | | |
|---|---|---|
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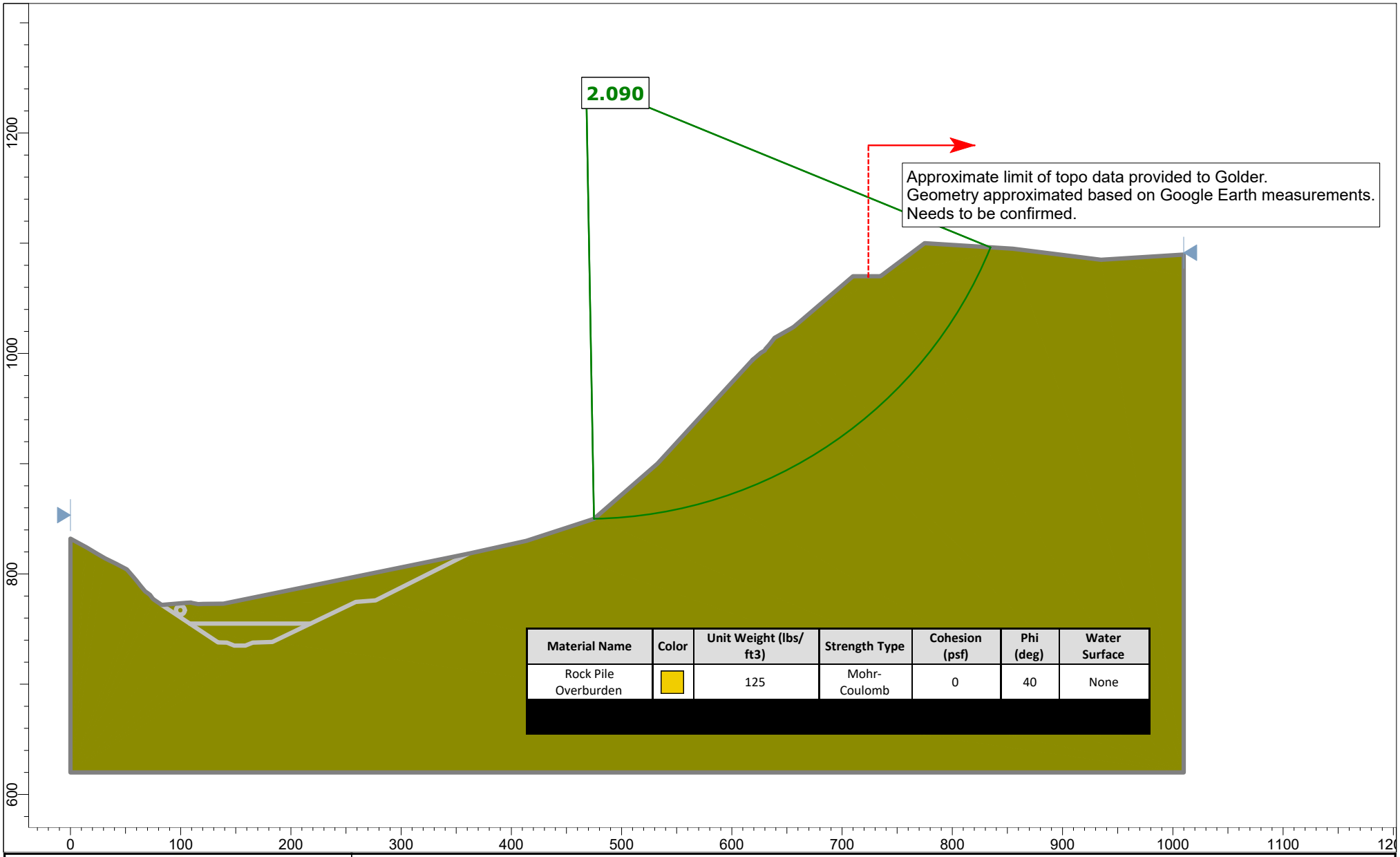


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

| | | | |
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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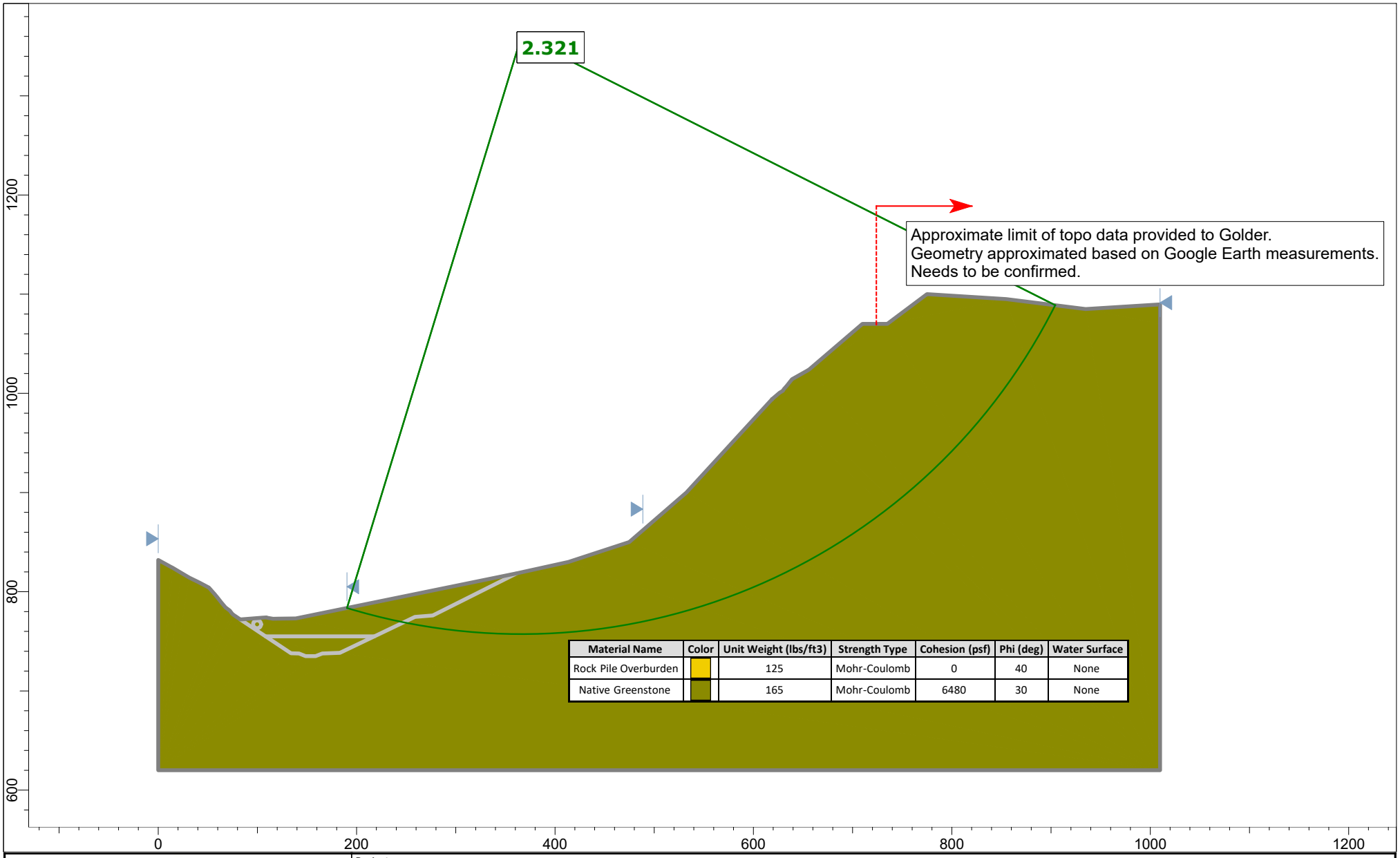


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

GOLDER

SLIDEINTERPRET 9.012

| | | | |
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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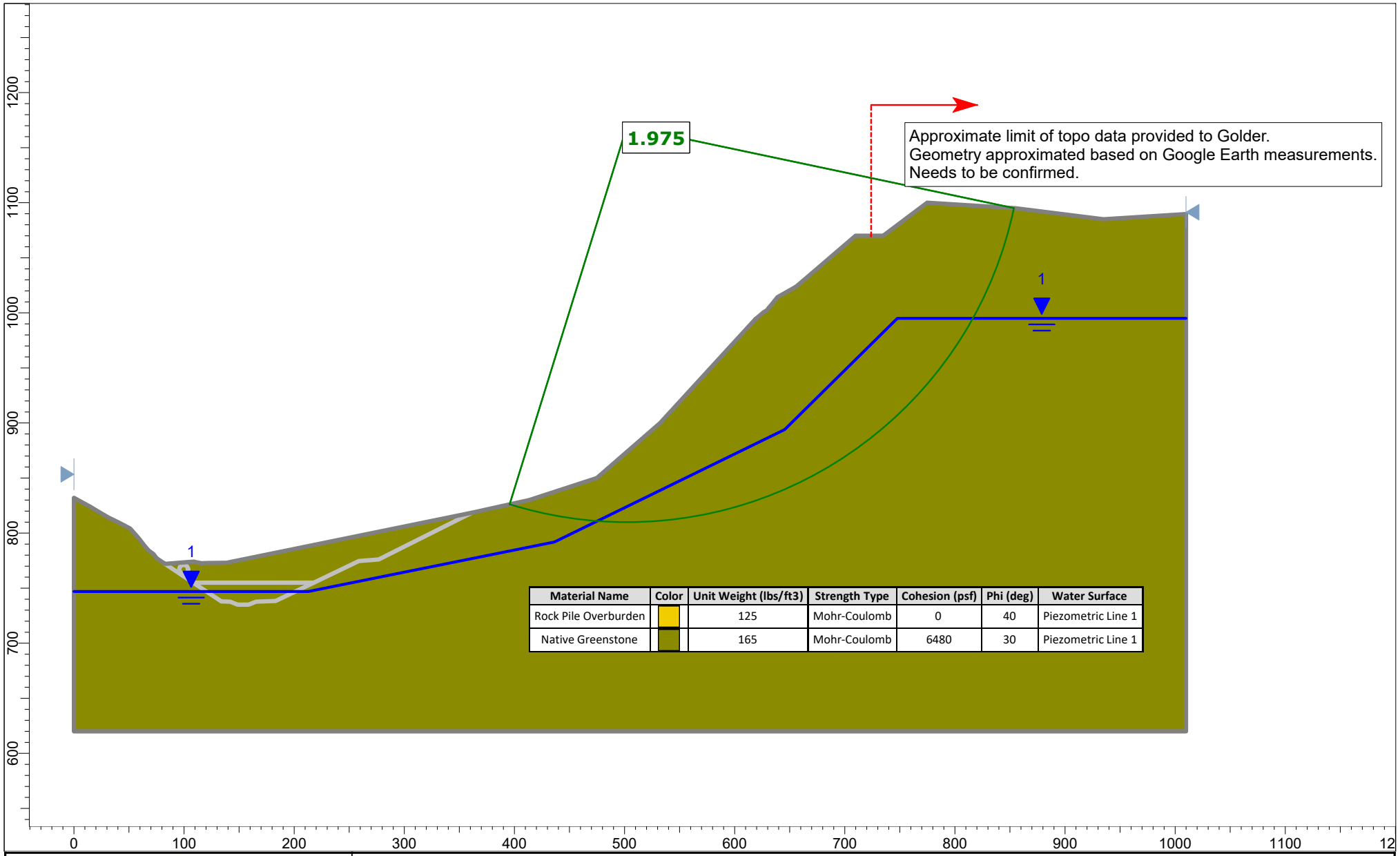


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|
| *Project* SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | |
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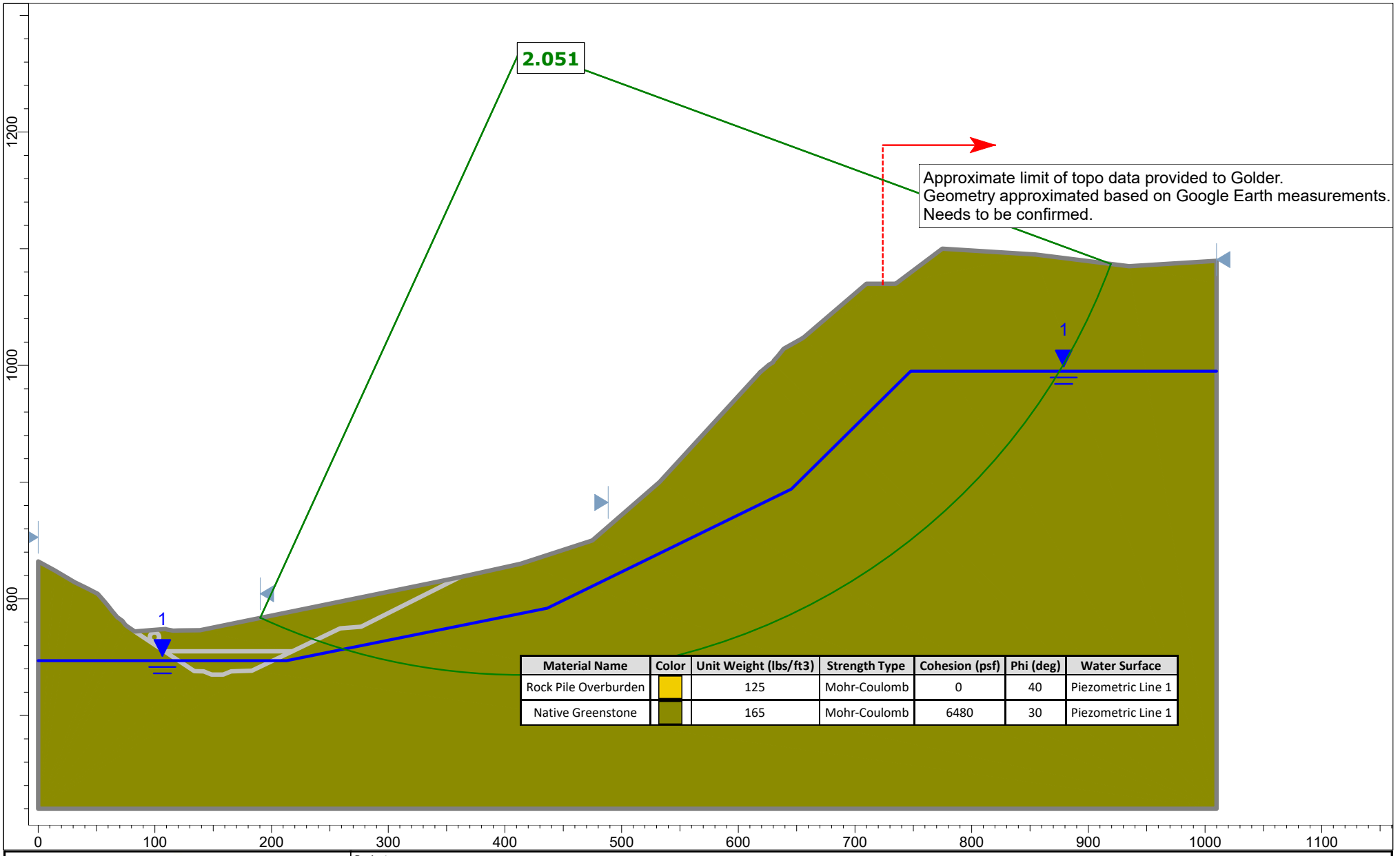
| *Date* 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
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SLIDEINTERPRET 9.012

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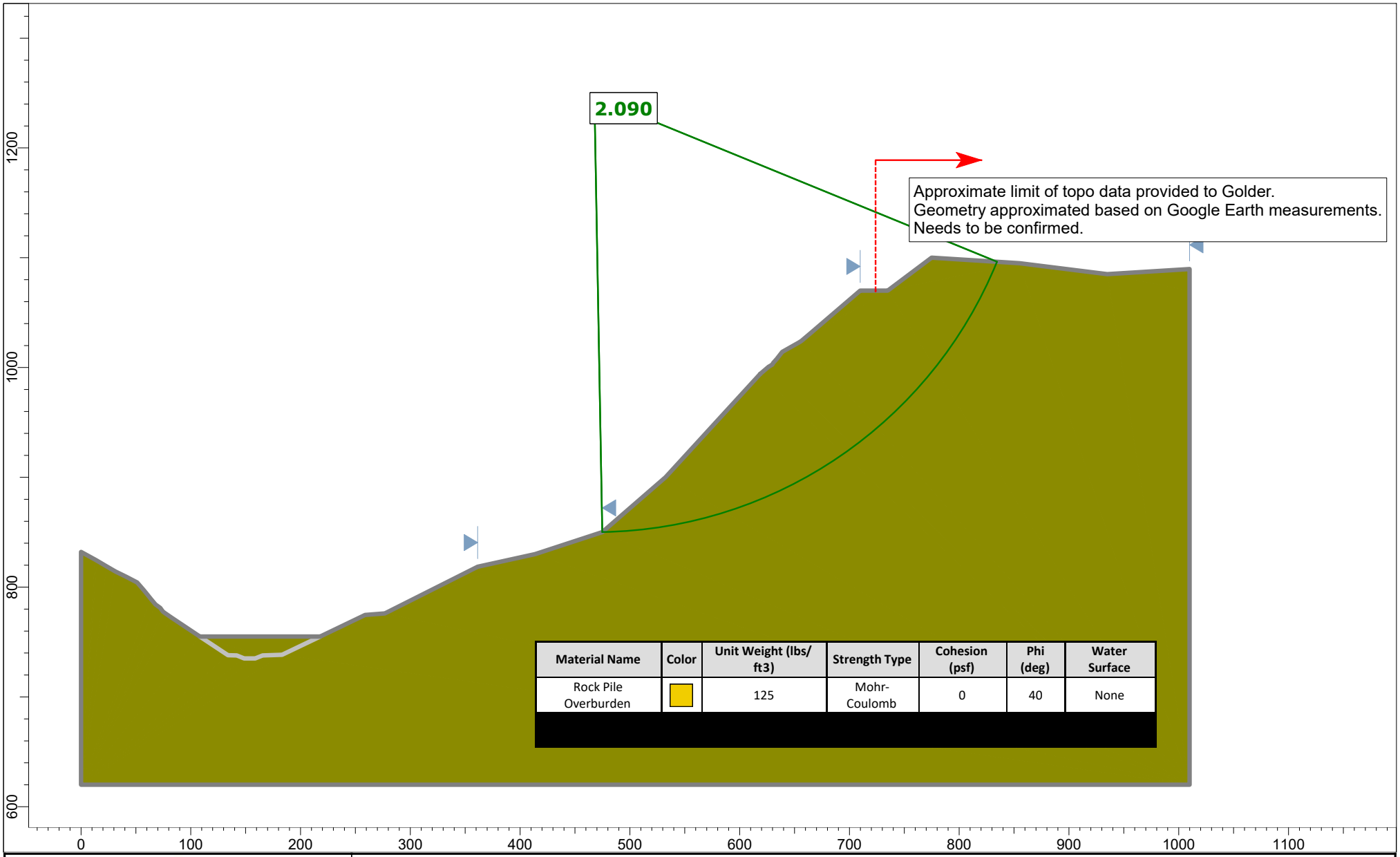


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

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SLIDEINTERPRET 9.012

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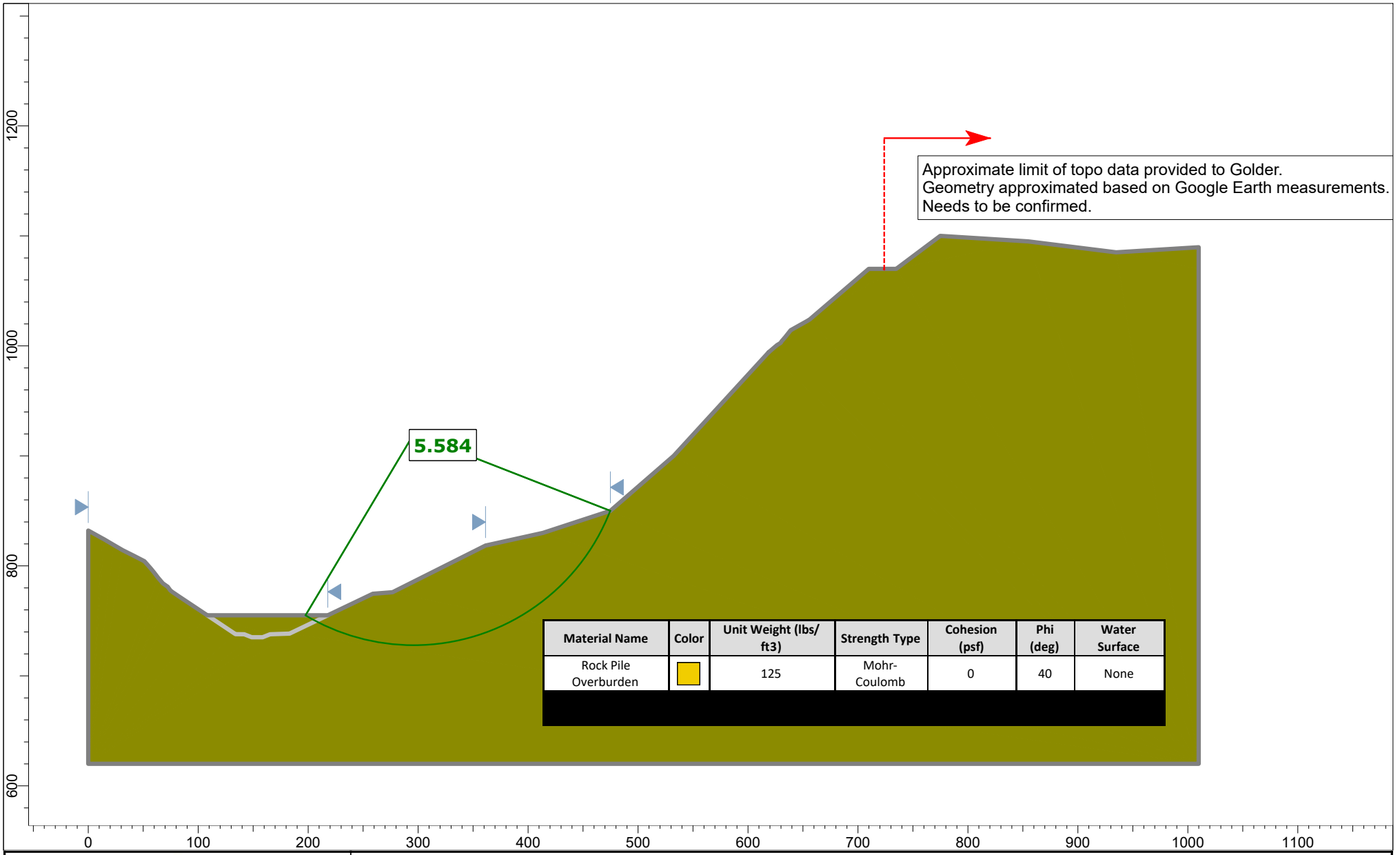


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

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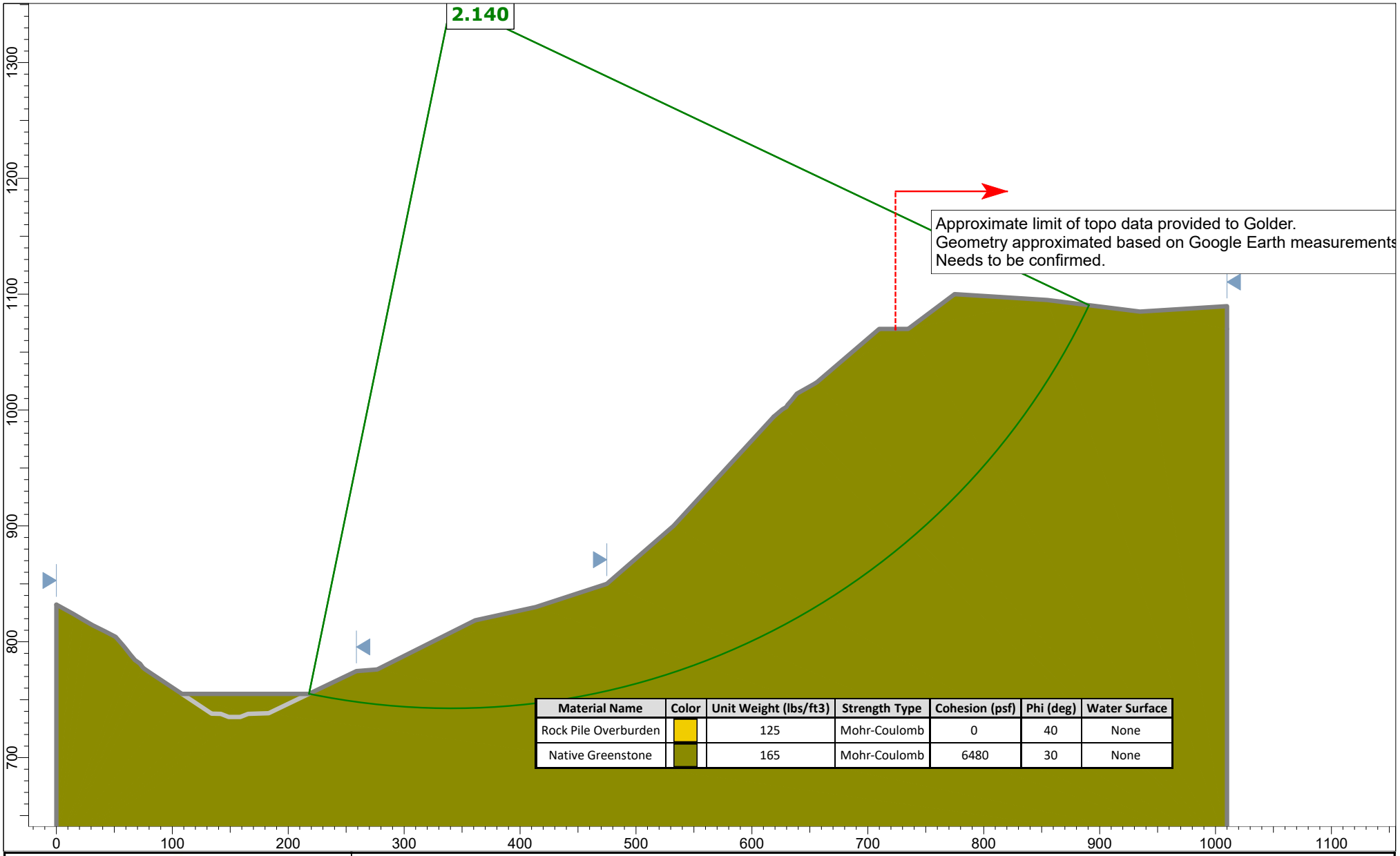


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|
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| *Analysis Description* | | |
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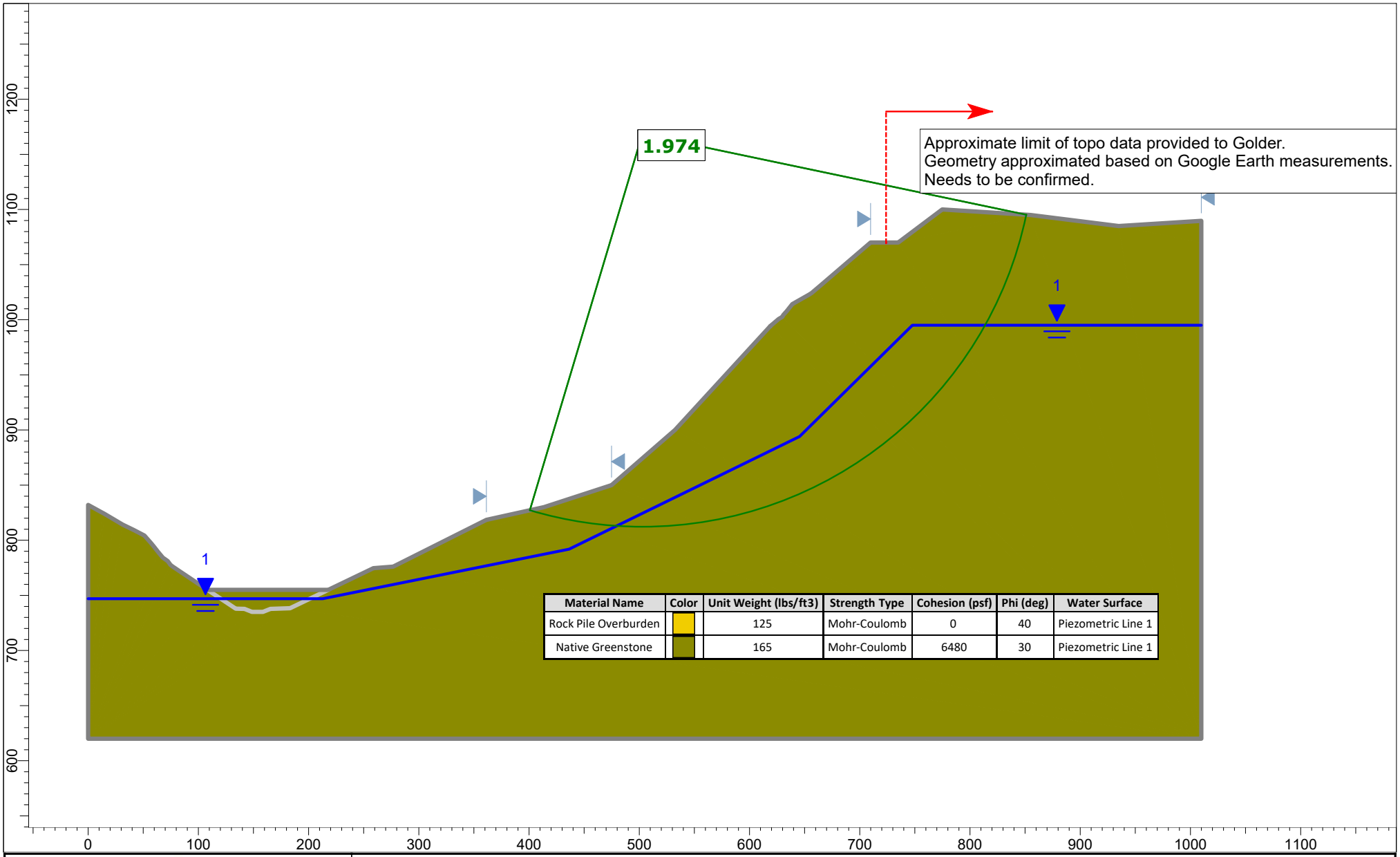


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
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| *Project* | SLIDE - An Interactive Slope Stability Program | | |
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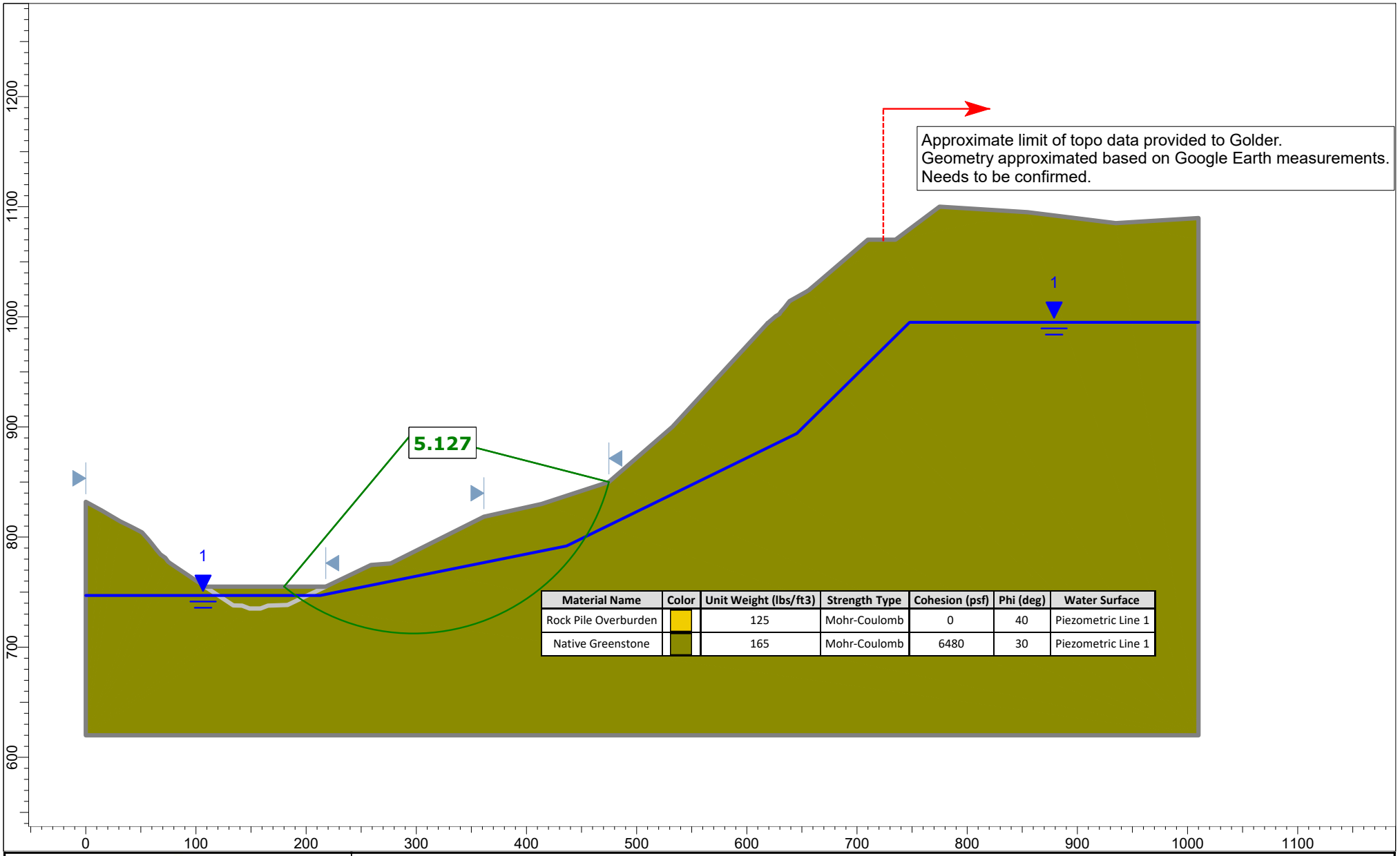


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
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SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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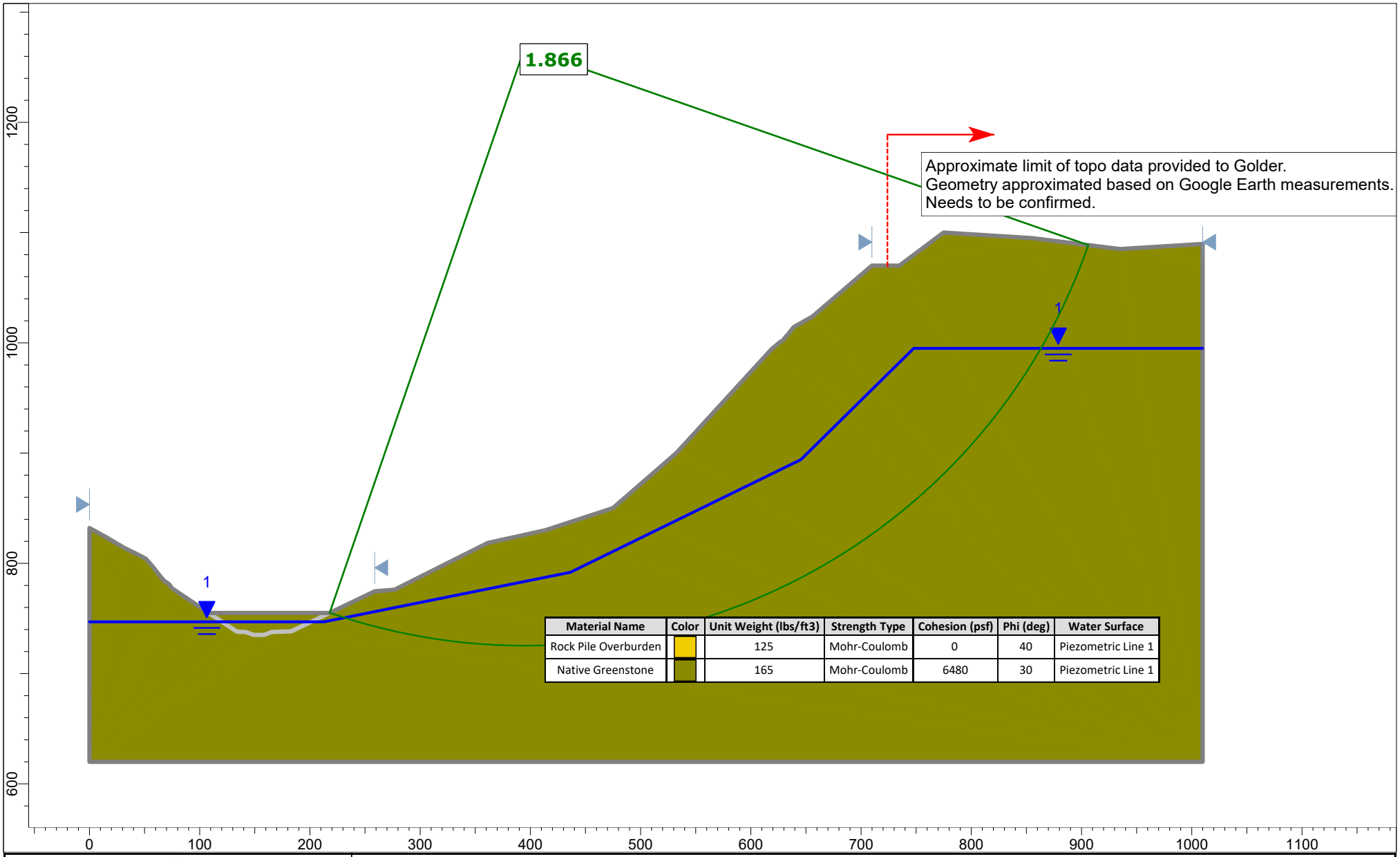


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
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SLIDEINTERPRET 9.012

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|---|---|---|
| *Project* SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | |
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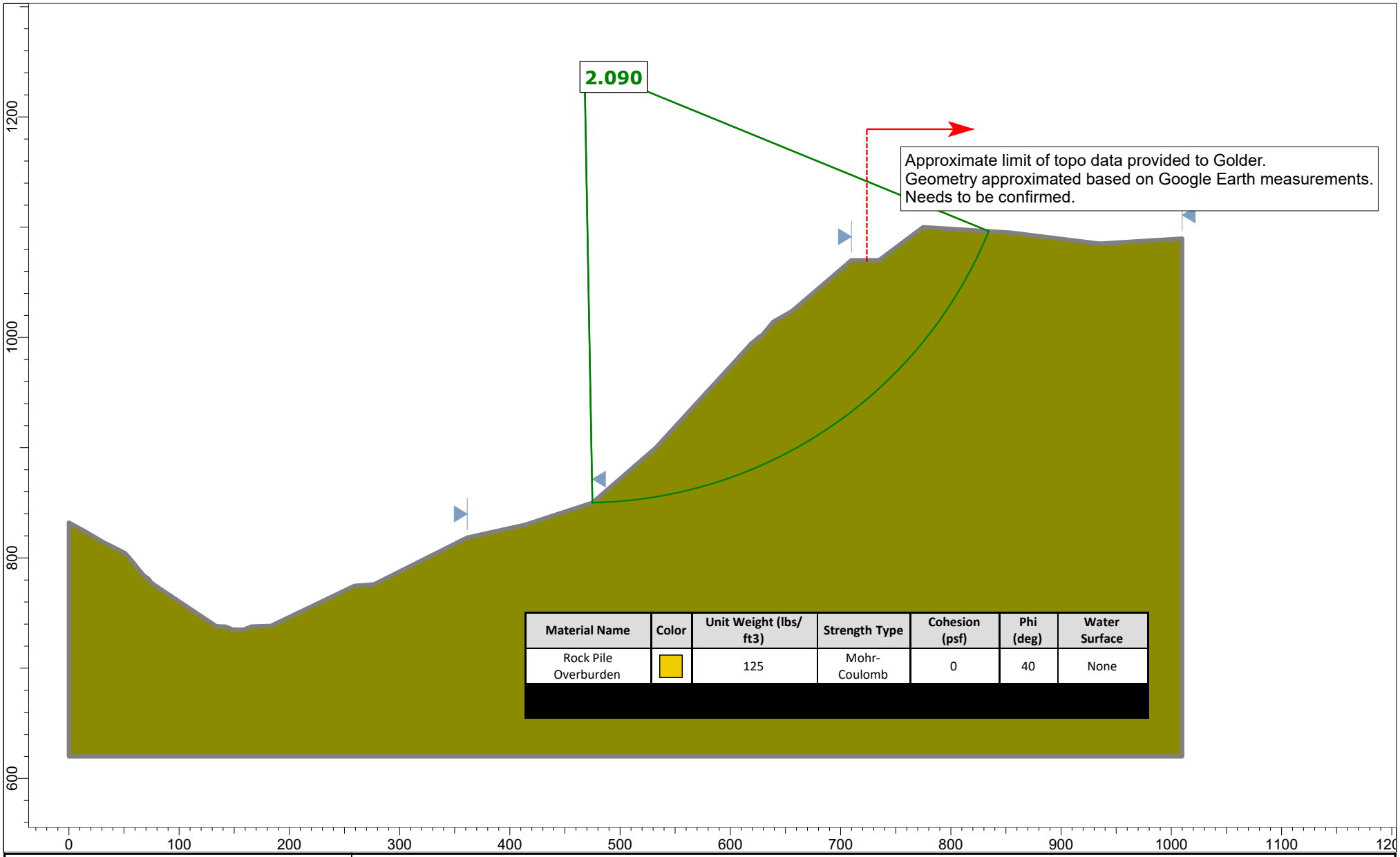


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
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GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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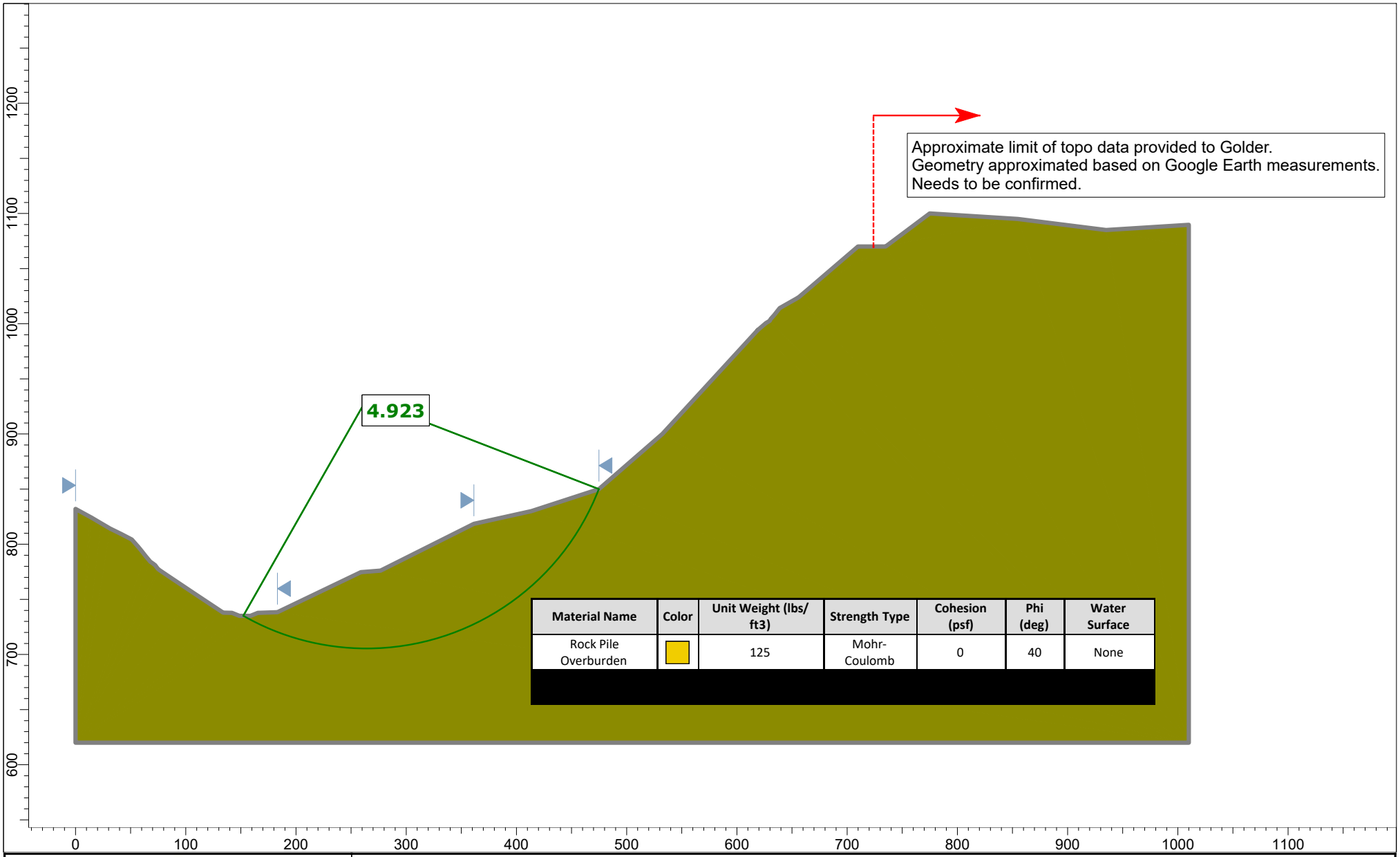


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

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|---|---|---|
| Project: SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description: | | |
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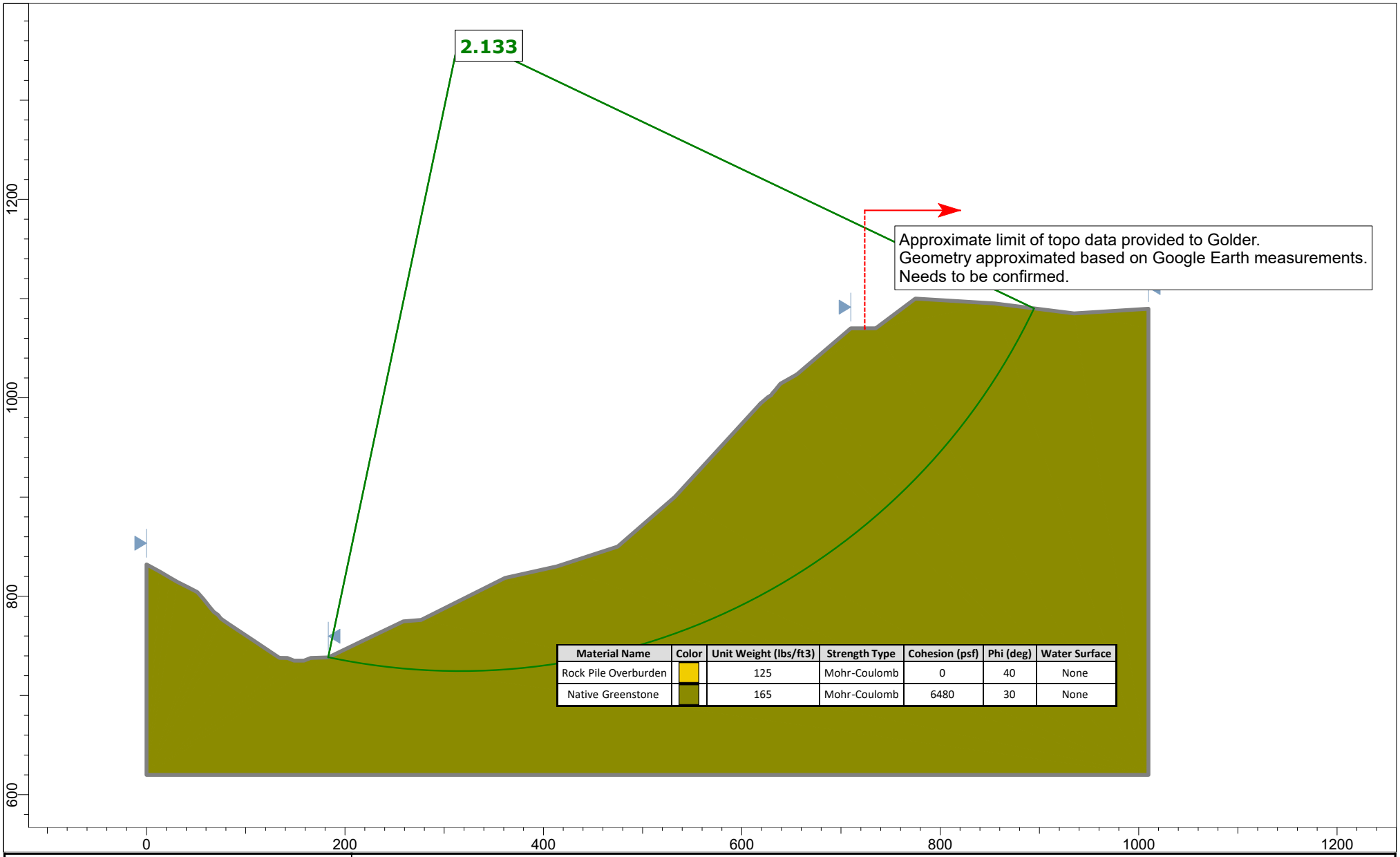
| Date: 7/9/2021, 4:25:49 PM | | File Name: Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
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GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| Project | SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | | |
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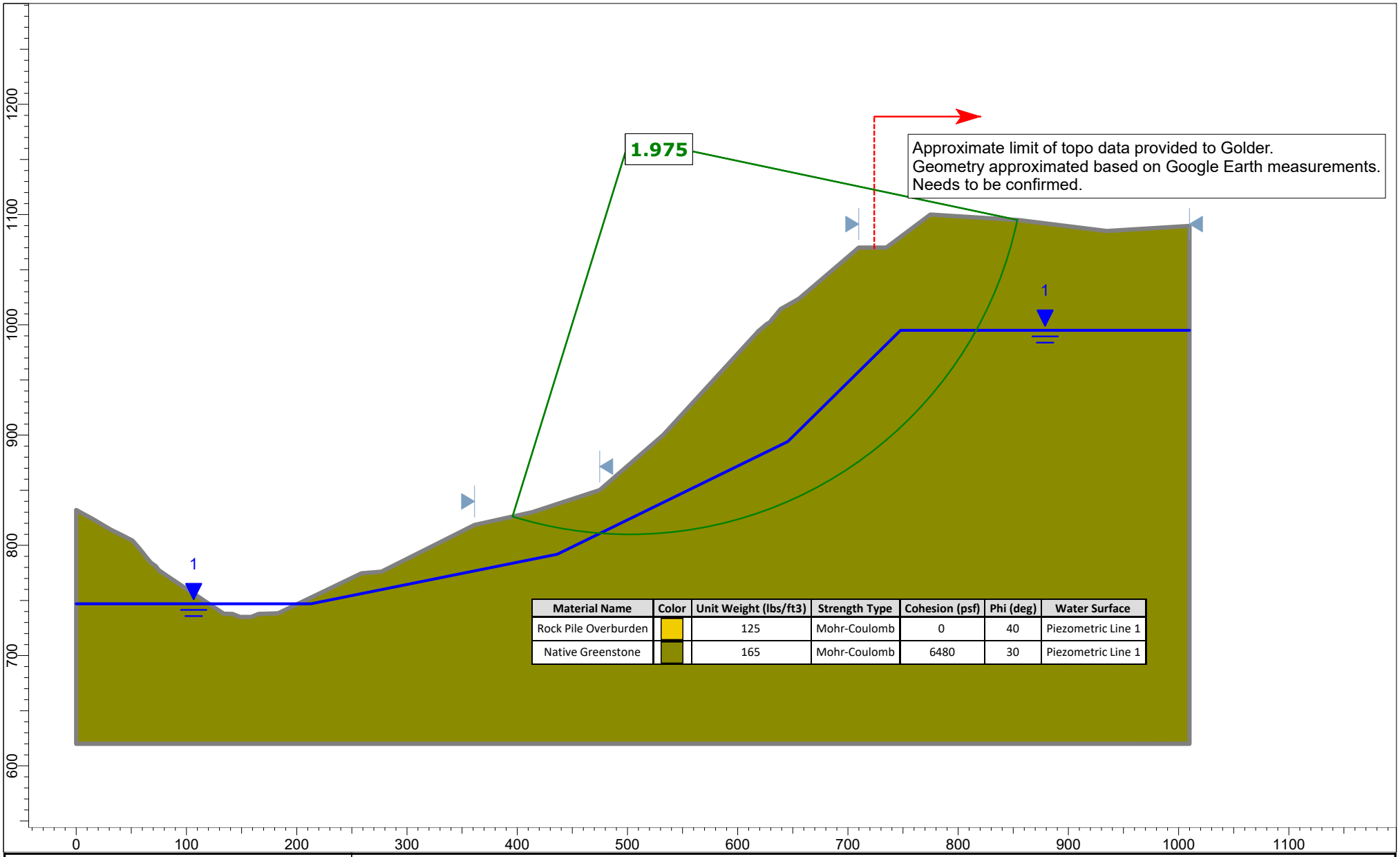


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
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|---|---|---|
| *Project* SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | |
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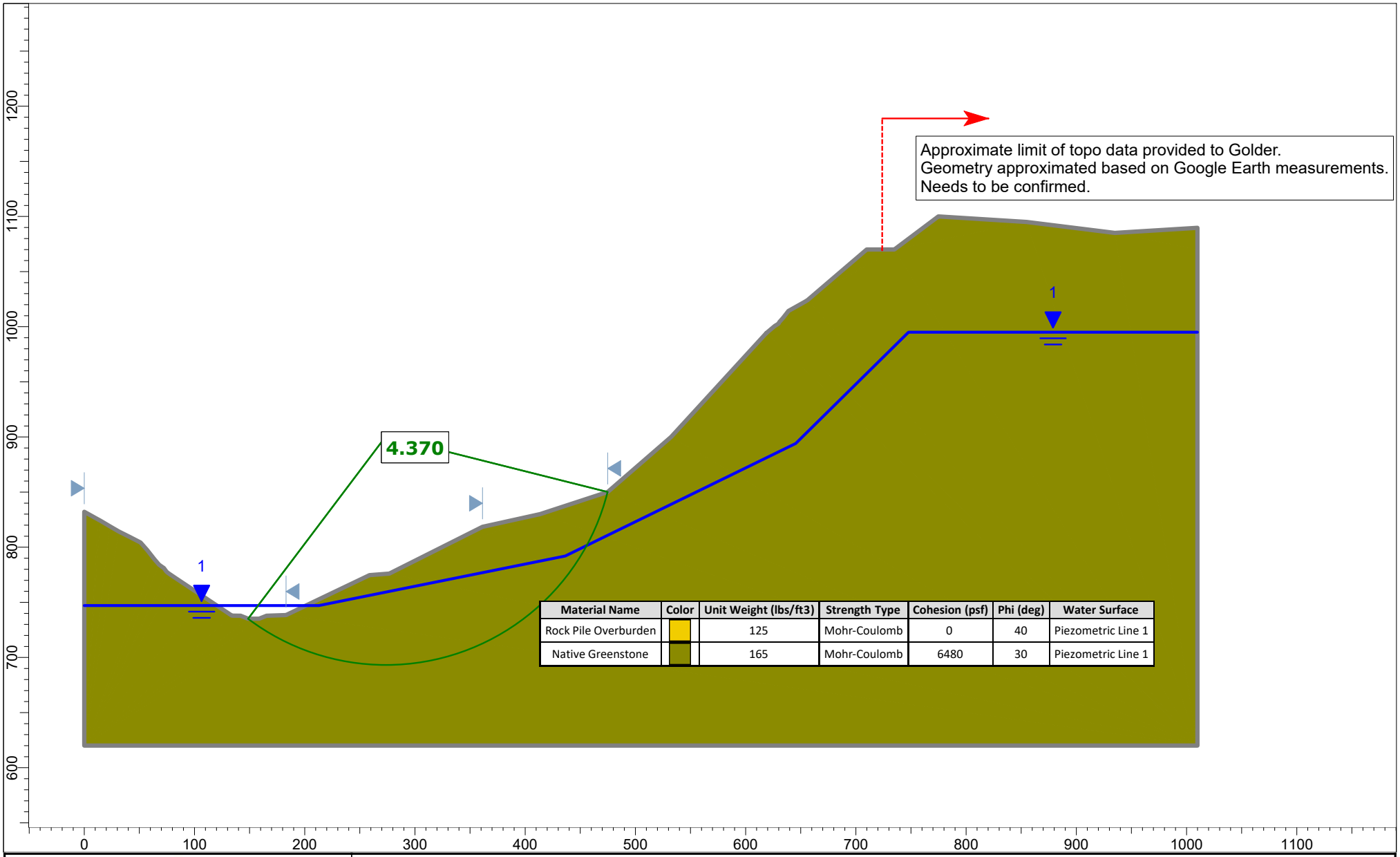
| *Date* 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
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|---|---|---|---|
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| *Analysis Description* | | | |
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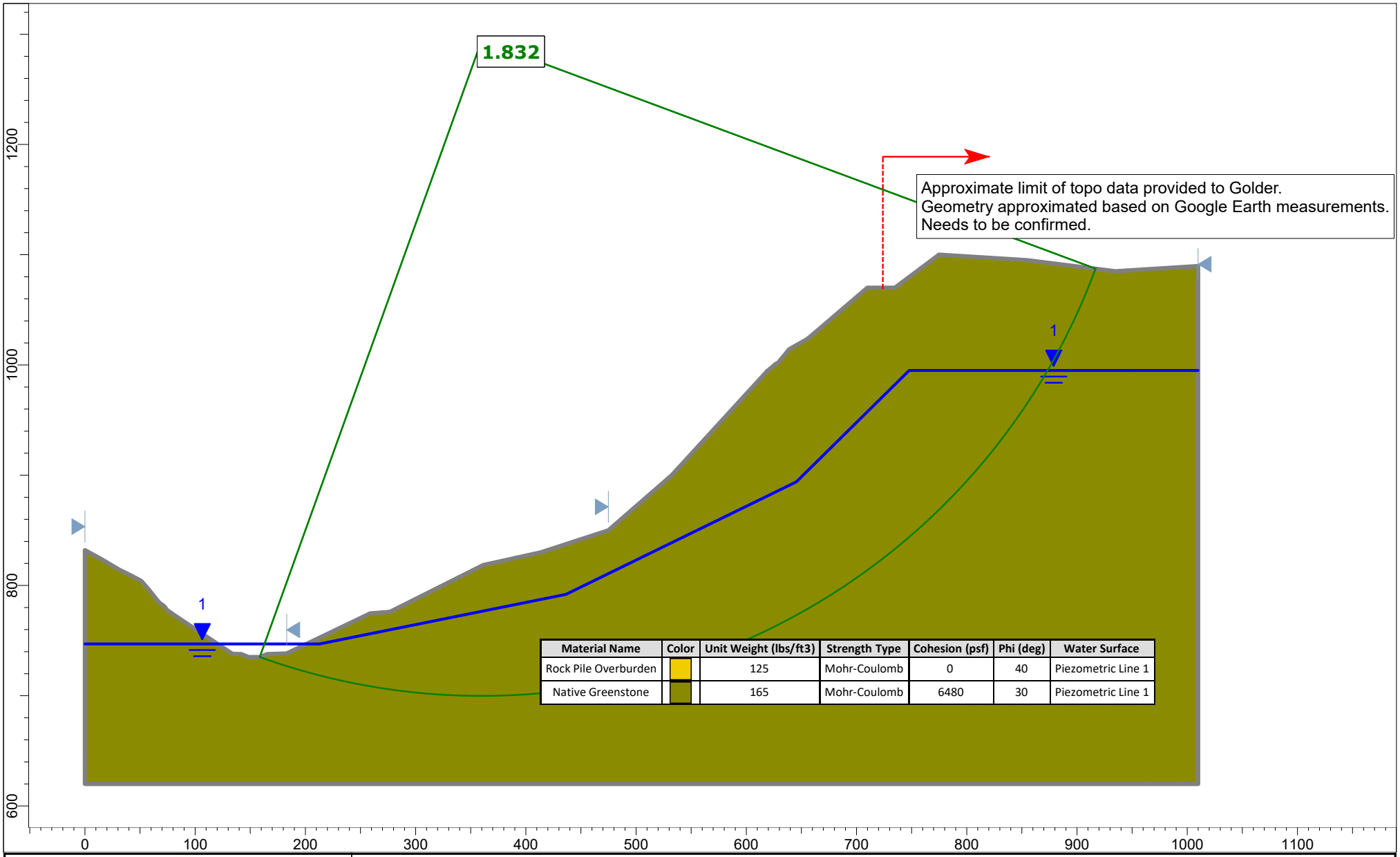


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
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SLIDEINTERPRET 9.012

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|---|---|---|---|
| Project | SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | | |
| Drawn By | | Scale 1:1444 | Company |
| Date | 7/9/2021, 4:25:49 PM | | File Name Section C-C'_20210715.slmd |

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

**Description:**
Soil and sediment material that is generated from maintenance projects conducted at the Lehigh Permanente Facility (Site) will be sampled, analyzed, and managed according to this standard operating procedure (SOP). This document is intended to provide instructions to adequately manage soil and sediment from maintenance operations by specifying screening guidelines, testing requirements, and placement to conform to applicable Federal, State and Local regulations.

**Regulatory Framework:**
The San Francisco Bay Regional Water Quality Control Board (Water Board) issued Waste Discharge Requirements, Order No. R2-2018-0028, (WDRs) to Lehigh for the Permanente Facility. The WDR regulates discharges to land and governs wastes and activities that generate waste at the site that have the potential to impact groundwater and hydrogeologically connected surface waters. Operations and maintenance of Waste Management Units (WMUs) at the Facility, including the Eastern Material Storage Area (EMSA) and Western Material Storage Area (WMSA), must be conducted in accordance to California Code of Regulations (CCR) 27 (Title 27), section 13263 of the California Water Code (CWC) and the approved plans required by Waste Discharge Requirement Order No. R2-2018-0028. The purpose of the procedures set forth herein is to ensure that material placement resulting from soil and sediment removal from maintenance operations is consistent with the requirements established by the WDRs.

- **Responsibility**— Environmental Department
- **Applicability**— Sampling and sediment of creek sediment originated from culvert cleanout activities
- **Affected Area**— Culverts in Permanente Creek
- **Frequency**— As needed
- **Attachments**— Attachment A – Environmental Screening Levels
- **Safety**—Basic Plant mandated PPE is required

**Procedure:**
Soil or sediment samples will be collected by Lehigh personnel and sent to laboratory for analysis. Samples will be analyzed for parameters listed on Table 1 and results compared against the most recent, applicable Water Board's Tier 1 Environmental Screening Levels (ESLs) for soils and groundwater as modified (Attachment A contains the 2019 ESLs for metals, the primary constituents of concern), as described below.

The documentation required includes:

1. Reports of removed material volume, date of removal, and location
2. Field data sheets and testing results
3. Temporary storage location, including survey coordinates, if needed
4. Final placement location, including survey coordinates

5. Report with December Self-Monitoring Report.

**Sampling Guidelines:**

Samples will be collected and analyzed in a manner sufficient to characterize the material. Sampling and laboratory analysis will be conducted in compliance with the following requirements:

1. All analysis will be performed in accordance with EPA and California approved methods
2. Analysis of samples will be completed and reported by an analytical laboratory accredited by the California State Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Program;
3. The laboratory detection limits for Modified Waste Extraction Test (WET) results must be below the applicable Tier 1 ESLs for groundwater;
4. The laboratory reporting limits will be reported on a dry-weight basis; and
5. The results of the laboratory analysis will be reported in a standard laboratory data package, including a summary of the quality control and quality assurance sample results and chain of custody documentation.

Discrete soil samples will be collected unless regulatory approval is obtained for collection of composite samples for a specific project or if the project is greater than acres (Table 2). Samples will be collected with dedicated sampling equipment (e.g., plastic scoops) when possible. Any non-dedicated sampling equipment will be decontaminated between sampling locations. Field data sheets documenting sampling collection date, time, location, personnel, weather conditions, and sample identification will be completed. Each sample will be logged on a chain-of-custody record, which will accompany the samples through collection and delivery to the analytical laboratory. Table 1 includes the analytical parameters and sampling schedule.

**Table 1: Laboratory Analytical Parameters**

| Analysis | EPA Analytical Method | Frequency |
|---|---|---|
| California Title 22 Metals (TTLC) | USEPA 6010B, 6020B, and/or 7471A | All |
| Modified WET California Title 22 Metals with DI Water | USEPA 6010B, 6020B, 1631E and/or 7471A | As necessary per TTLC results; minimum 1 out of 4 samples |
| VOCs | USEPA 82600/624 | 1 of 10 samples; minimum 1 sample per project |

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

| Analysis | EPA Analytical Method | Frequency |
|---|---|---|
| SVOCs | USEPA 8270/625/SIM | 1 of 10 samples; minimum 1 sample per project |
| PCBs and Pesticides (surface water only) | USEPA 8080/8081/608 | 1 of 10 samples; minimum 1 sample per project |
| TPH as diesel, motor oil, and gasoline | EPA 8015 | 1 of 10 samples; minimum 1 sample per project |
| Cyanide | EPA 335.4/10-204-00 | 1 of 10 samples; minimum 1 sample per project |

All samples will be analyzed for total metals via TTLC and a subset for leachability per the modified WET procedure. The WET results will be used to determine if metal concentrations in the soil or sediment have the potential to leach to groundwater. The WET results will be compared to the modified Tier 1 ESLs for groundwater. An additional subset of samples will be analyzed for other potential constituents of concern. These parameters, as well as the TTLC metal results, will be compared to the Tier 1 ESLs for soil.

The sampling schedule varies depending on the volume of soil or sediment to be displaced as part of the maintenance project. The frequency is listed on Table 2 and is based on the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Information Advisory Clean Imported Fill Material Fact Sheet (https://dtsc.ca.gov/information-advisory-clean-imported-fill-material-fact-sheet).

**Table 2: Sampling Frequency for Evaluation of Material**

| **Area of Individual Area** | **Sampling Requirements per Area** |
|---|---|
| 2 acres or less | Minimum of 4 samples |
| 2 to 4 acres | Minimum of 1 sample every ½ acre |
| Greater than 10 acres | Minimum of 8 samples with 4 subsamples per location |
| **Volume of Stockpiled Material** | **Samples per Volume** |
| Up to 1,000 cubic yards | 1 sample per 250 cubic yards |
| 1,000 to 5,000 cubic yards | 4 samples for first 1000 cubic yards +1 sample per each additional 500 cubic yards |

| | |
|---|---|
| Greater than 5,000 cubic yards | 12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards |

**Results Evaluation and Material Placement:**

The sampling results will be tabulated and reviewed. Based on the findings, the following scenarios will be followed.

1. If the results are below applicable Tier 1 ESLs, the removed soil and sediment material may be considered for backfill or cover material on site with regulatory notification and approval.
2. If the metal concentrations do not meet the applicable Tier 1 ESLs, but are below TTLC and/or STLC thresholds, additional characterization may be completed to determine the appropriate placement based on the following:
    a. If the material is determined to be a Group B mining waste similar to the material already present in the WMUs, the material will be placed and managed within a WMU (e.g., WMSA) in accordance with the Operations, Maintenance, and Contingency (OM&C) Plan.
    b. If the material is characteristically distinct from the Group B waste present in the WMUs, contains concentrations above applicable Tier 1 ESLs, and concentrations below TTLC and/or STLC thresholds, Lehigh will consult with the Water Board regarding the management and potential on and offsite disposal of these materials.
3. While not anticipated, if the results are above TTLC and/or STLC thresholds, the WATER BOARD will be notified and additional characterization will be completed to confirm the results and aid in determining appropriate management and disposal options. Upon completion of the additional characterization, Lehigh will seek the Water Board's concurrence on the management and disposal of these materials.

***Dewatering Analysis and Placement Requirements:***

1. Dewatering – If dewatering is conducted, additional characterization of the material may be conducted after dewatering has been implemented and soil is no longer saturated.
2. The water from the dewatering operations will be collected and sent to the on-site water treatment system(s) via the reclaim water system.
3. The soil or sediment will be moved to a selected dewatering location if necessary. Once the material is dewatered and characterized, the material will be managed and disposed of as appropriate based on this SOP.

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Attachment A: Screening Values

| Metal | CAS No. | Tier 1 ESL Soil (mg/kg) | TTLC (mg/kg) | Tier 1 ESL Groundwater (µg/L)* | STLC (µg/L) |
|---|---|---|---|---|---|
| | | Total Metal | | WET Results | |
| Antimony | 7440-36-0 | 11 | 500 | 6.0 | 1500 |
| Arsenic | 7440-38-2 | 0.067**** | 50 | 10**** | 500 |
| Barium | 7440-39-3 | 390 | 10000 | 1000 | 100000 |
| Beryllium | 7440-41-7 | 5.0 | 75 | 2.7 | 75 |
| Cadmium | 7440-43-9 | 1.9 | 100 | 0.25 | 1000 |
| Chromium | 7440-47-3 | 160 | 2500 | 50.0 | 5000*** |
| Cobalt | 7440-48-4 | 23 | 8000 | 3.0 | 80000 |
| Copper | 7440-50-8 | 180 | 2500 | 3.1 | 25000 |
| Lead | 7439-92-1 | 32 | 1000 | 2.5 | 5000 |
| Mercury | 7439-97-6 | 13 | 20 | 0.025 | 200 |
| Molybdenum | 7439-98-7 | 6.9 | 3500 | 100 | 350000 |
| Nickel | 7440-02-0 | 86 | 2000 | 8.2 | 20000 |
| Selenium | 7782-49-2 | 2.4 | 100 | 5.0** | 1000 |
| Silver | 7440-22-4 | 25 | 500 | 0.19 | 5000 |
| Thallium | 7440-28-0 | 0.78 | 700 | 2.0 | 7000 |
| Vanadium | 7440-62-2 | 18 | 2400 | 19 | 24000 |
| Zinc | 7440-66-6 | 340 | 5000 | 81 | 250000 |

Notes:

ESLs based on January 2019 (Rev. 1) Water Board ESL Workbook Tier 1 values for soil and groundwater unless otherwise noted.

* DI WET results to be compared to Tier 1 GW ESL.

** Freshwater Ecotox used instead of Saltwater Ecotox for the Aquatic Habitat Goal that comprises the GW Tier 1 ESL for selenium.

*** If the soluble chromium as determined by the TCLP is less than 5mg/L, and the soluble chromium as determined by the STLC test equals or exceeds 560mg/L, and the waste is not otherwise identified as a RCRA hazardous waste, then the waste is a non-RCRA hazardous waste.

**** Arsenic background levels are known to be above these screening levels.

# APPENDIX J

**Golder Associates 2022**

**Water Quality Evaluation, Permanente Creek Restoration Project**

# TECHNICAL MEMORANDUM

**DATE** August 26, 2022 **Project No.** 31405507

**TO** Carolina Addison
Lehigh Hanson, Inc.

**FROM** George Wegmann, PG, CHg;
Bill Fowler, PG, CEG **EMAIL** **gwegmann@wsp.com**

**WATER QUALITY EVALUATION, PERMANENTE CREEK RESTORATION PROJECT, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC., PERMANENTE QUARRY, CUPERTINO, CALIFORNIA**

## 1.0 INTRODUCTION

Golder Associates USA Inc. (Golder), a member of WSP, prepared this memorandum for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our assessment regarding the significance of potential water related impacts associated with specific elements of the proposed Permanente Creek Restoration Project (PCRP) adjacent to the Permanente Cement Plant and North Quarry (Permanente Site). The specific elements include:

- The type of onsite material(s) used for backfill or other restoration-related activities where those materials that may come in contact with the Permanente Creek watercourse, and recommendations related thereto;
- Expected geology of the restored creek channel that will come in contact with the Permanente Creek watercourse.

This evaluation is based on available geochemical characterization data and the conceptual site geochemical model prepared in accordance with applicable permits for the Permanente Site (*e.g.,* San Francisco Regional Water Quality Control Board (Water Board) Order No. R2-2018-002 (WDRs), and additional information or studies prepared in response to Water Code section 13267 Orders or as part of, site operations and reclamation-related activities. The scope of work for this evaluation included (1) a desktop data review of previous studies, (2) summarizing more recent rock unit characterization and creek sediment sampling, and (3) completing a site reconnaissance of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design.

## 1.1 Background

The Permanente Site is located in Santa Clara County, California, west of the City of Cupertino. In response to a Cleanup and Abatement Order issued by the Water Board (Order No. 99-018) and as a result of a 2016 Amended Consent Decree entered into by Lehigh and the Sierra Club, Lehigh has committed to undertake the PCRP. Details regarding the scope of the PCRP are set forth in 2016 Amended Consent Decree and the 90% design documents prepared by Lehigh's consultant, Waterways, which were recently updated to incorporate regulatory agency and Santa Clara County comments to date, and submitted to the County on August 26, 2022 (90% Design drawings). The portion of Permanente Creek involved in the PCRP is located south/southeast of the Permanente Site, and the project involves, among other activities, removing material/sediment from Permanente Creek, laying back slopes, widening reaches, and ensuring stream bank stability and ecological/geomorphic function.

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The headwaters of Permanente Creek are located approximately 2 miles west/southwest of the Permanente Site. Approximately 4.2 miles of Permanente Creek are adjacent or traverse through Lehigh's Permanente Site in a south/south-eastern/eastern "L" shaped direction, portions of which are included in the PCRP, including stretches of the Creek upstream of the Cement Plant that have been re-aligned into an open culverted channel or placed in underground culverts, or are subject to dam infrastructure (Pond 13). Flow in Permanente Creek continues in an eastern direction as it leaves the Permanente Site, flowing through the highly urbanized area Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay. The downstream hydrology of the Permanente Creek watershed has been substantially altered for flood protection purposes.

The Cement Plant and North Quarry at the Permanente Site have been operational since 1939 and has been a major source of cement for Santa Clara County. The facility contains two mining waste rock (also called "overburden") storage areas, the East Material Storage Area (EMSA) and West Material Storage Area (WMSA), largely comprised of soil and rocks excavated from the North Quarry, some of which may be accessed for onsite use as part of the PCRP as backfill. The North Quarry sits between the two storage areas, while the Cement Plant is located southwest of the EMSA (Attachment A, Figure 1).

## 1.2 Regional Geologic Setting

Most of the Site is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage. The eastern portion of the Site, including portions of the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation, which in turn overlie the Franciscan bedrock. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek, and relatively shallow surficial deposits comprised of soil and colluvium. The Miocene-age Monterey Formation lies just east of the Site in fault contact with the Franciscan basement rocks along the Monte Vista Fault System.

### 1.2.1 Bedrock Geologic Units

The bedrock materials exposed in the North Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone) and limestone and, to a lesser extent, graywacke. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the North Quarry. The Franciscan Complex contains complexly deformed marine sedimentary rocks and basalt, which were metamorphosed and altered during subduction and subsequent thrust faulting. The Santa Clara Formation, a late Tertiary-Pleistocene assemblage of conglomerate, sandstone, siltstone, and claystone sits unconformably on the Franciscan Complex in the eastern portion of the site. Surficial deposits of unconsolidated alluvial deposits, fill material, colluvium, landslide deposits, and surface soils overlie the bedrock units.

The geology of the Permanente Creek Basin is shown on Figure 2 (Attachment A) based on our site reconnaissance and two main geologic map sources: Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b); and the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have also mapped the basin (Brabb 1970, Pulver 1979a and b).

### 1.2.2 Surficial Geologic Units

Some of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden, which is a heterogeneous mixture of fines, sand, gravel and cobble-sized fragments (*i.e.,* greenstone, graywacke, and soil materials) but with small percentages of limestone. This same overburden

comprises most of the WMSA and EMSA. Regarding the south-facing slopes, they are generally described as side-cast fills that mantle existing canyon slopes and fill small drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness and exist adjacent to the Rock Pile Area[1] (see 90% Design drawings at Sheet C19) and Material Removal Area (see 90% Design drawings at Sheets C23 & C24); this material will be removed and relocated as part of the PCRP.

Modern unconsolidated alluvial deposits are present along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock over thousands of years, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay. The alluvial and colluvial deposits contain a mixture of fines, sand, gravel and cobble-sized fragments (*i.e.*, greenstone, graywacke, and soil materials) but with small percentages of limestone.

### 1.2.3 Creek Bed Geology Summary

Most of the PCRP area is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage as depicted on Figure 2 (Attachment A). The eastern portion of the project area, including portions by the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek (restricted to the eastern portion of the property), and relatively shallow surficial deposits comprised of soil and colluvium.

Figure 3 (Attachment A) depicts the profile of Permanente Creek, which can broadly be classified into depositional reaches and bedrock reaches (delineated as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach.

The furthest upstream portion of Permanente Creek, upstream of the PCRP area, is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel that is comprised of greenstone and limestone. The sediment supplied here is likely to come from natural processes and is partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the Creek and may be coupled to the debris flows originating from Wild Violet Creek.

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical

[1] The Rock Pile area is comprised of stockpiled material for aggregate production, which is ongoing. The character of the Rock Pile is variable but generally consists of fine to coarse-grained gravel to angular cobble-sized rock fragments of limestone.

processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller, et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally formed step-pools were reinforced by travertine deposition to form travertine dams (Attachment A, Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

The primary geologic units within the PCRP area are mainly greenstone (including shear zones) and the Santa Clara Formation. Greenstone bedrock is present at Reaches 10-17 and 20-22 and Santa Clara Formation bedrock along reaches 1-9 (Attachment A, Figure 3). Limestone bedrock is present along Reaches 18 and 19, including south of the creek, and comprises less than 15% of the bedrock present along the PCRP area. Importantly, with regard to the material removal activities planned to occur in Reach 18, the bedrock surface within the creek channel has been unaltered by historical site activities (*i.e.,* no mining activities have occurred in the creek), and the PCRP activities will follow the contours of natural bedrock, and will not alter or change the bedrock surface or its profile as part of restoration construction activities (see 90% Design drawings at Sheet C23). The focus of the Project along the limestone bedrock reaches will be to remove loose material mantled on top of the bedrock.

# 2.0 DATA SUMMARY

## 2.1 Material Characterization

Historical mining activities have contributed surficial materials to Permanente Creek in addition to deposition from naturally occurring geologic and geomorphic processes. As part of site operations, regulatory efforts, and reclamation-related activities, a geochemical dataset has been compiled since 2008 to characterize the predominate Permanente Quarry rock types. The data includes work completed as part of the development of National Pollutant Discharge Elimination System (NPDES) permitting[2] and WDRs[3,4] as follows: (1) analysis on acid rock drainage (ARD) potential by acid base accounting (ABA) testing methods, (2) chemical and mineralogical composition by quantitative X-Ray Diffraction (XRD) and, (3) Total Threshold Limit Concentration (TTLC) and leaching potential via the California modified waste extraction test (WET) with deionized water and wall washing samples. The results have been previously summarized in several reports, including the Permanente Site's Conceptual Site Model (CSM) Update prepared in accordance with the WDRs,[5] and are discussed below along with supplemental information.

Golder previously completed sampling and testing of the following major units: limestone, greenstone, graywacke, Santa Clara Formation, and undisturbed soil/colluvium as summarized in the CSM Update.[6] In summary:

[2] NPDES No. CA0030210, Regional Water Board Order No. R2-2019-0024, previously Order No. R2-2014-0010, as amended by Order No. R2-2017-0030.

3 SLR, 2014, EMSA and WMSA Material Characterization, Permanente Quarry, Santa Clara, California.

4 Golder Associates, August 2014, WMSA and EMSA Runoff and Seep Investigation Report, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA

5 Golder Associates, 2020, CSM Update and Proposed SMP, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA. June 2020.

[6] Golder Associates, 2020 CSM Update and SMP, Lehigh Permanente. December 2020.

- No acid rock drainage potential was identified in the tested samples as would be expected based on the carbonate nature of the rock.
- The leachate testing indicates that greenstone and graywacke are not a significant source of metals.
- Greenstone samples reported higher leachate nickel concentrations as compared to limestone; however, the concentrations are below the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs) based on the California primary maximum contaminant for Freshwater Aquatic levels.
- Molybdenum and selenium leachate concentrations were generally greater in limestone samples compared to the other samples from greenstone and graywacke. Selenium leachate from the limestone has been detected above the Freshwater Aquatic ESL of 5 µg/L consistent with limestone wall washing results.[7]
- The selenium data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium.[8,9]

### 2.1.1 Sequential Leach Testing via Modified WET Method

In 2020, rock samples were analyzed using the modified WET method and were then subjected to four additional cycles of sequential leaching repeating the same method for a total of five leaching cycles to aid in evaluating long-term leachability. Limestone and greenstone, the predominate rock units, were selected for this analysis. The test results were compared to STLC thresholds and ESLs. Full tabulated leaching results are included as Table 1, Attachment B and time-series plots of the sequential leachate concentrations of the different materials is included as Attachment C. The results of the sequential leach testing are summarized as follows:

#### Limestone Samples

- STLC limits were not exceeded for any of the samples.
- Limestone leachate concentrations decreased over the leaching sequence for the following constituents: sulfate, chloride, total alkalinity, bicarbonate, antimony, calcium, magnesium, molybdenum, selenium, and vanadium.
- Limestone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: carbonate, hydroxide, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, potassium, silver, sodium, thallium, and zinc.
- Sulfate, calcium, and magnesium concentrations were elevated in leachates from the medium-grade non-weathered limestone sample during leaches 1-3 compared to the other limestone samples.
- Barium leachate concentrations gradually increased for all limestone samples over the leaching period.

#### Greenstone Samples

- STLC limits were not exceeded for any of the samples.
- Greenstone leachate concentrations decreased over the leaching sequence for the following constituents: total alkalinity, bicarbonate, antimony, magnesium, potassium, selenium, and sodium.

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[7] Golder Associates, 2011 Hydrogeologic Investigation, Lehigh Permanente. 2011.

8 Diener, A., Neuman, T., Kramar, U., Schild, D. 2012. Structure of Selenium Incorporated in Pyrite and Machinawite as Determined by XAFS Analysis. Journal of Contaminant Hydrology: 133 (30-39).

9 Presser, T. S. 1994. Geologic Origin and Pathways of Selenium from the California Coast Ranges to the West-Central San Joaquin Valley. Selenium in the Environment.

- Greenstone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: chloride, sulfate, carbonate, hydroxide, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, thallium, vanadium, and zinc.
- Total alkalinity, bicarbonate, arsenic, barium, magnesium, potassium, and sodium concentrations were higher in the non-weathered greenstone sample leachate compared to the weathered greenstone sample.
- The vanadium concentration was higher in the weathered greenstone leachate compared to the non-weathered greenstone sample across all leaching cycles.
- Aluminum concentrations in the weathered greenstone sample leachate increased between leaches 1-4 and plateaued after leach 4.

Overall, concentrations generally decrease with each leaching cycle, indicating that readily leachable parameters are depleted within a few flushing cycles and that the short-term metal leaching potential for the materials is low, and below regulatory thresholds. Furthermore, the greenstone samples exhibited less leachable concentrations than the limestone samples.

### 2.1.2 Material Characterization Summary

The leachate results indicate that greenstone and graywacke are not a significant source of metals to water. Limestone material is a potential source of selenium, though the potential is lesser in combined quantities and in a dynamic environment of a moving stream/creek. Specific observations include:

- Greenstone samples reported higher leachate nickel concentrations compared to limestone; however, the concentrations are below ESLs.
- Molybdenum and selenium leachate concentrations were predominantly greater in limestone samples as compared to the samples from greenstone and graywacke.
- Selenium leachate from the limestone was detected several times slightly above the Freshwater Aquatic ESL of 5 µg/L. The generation of leachable selenium decreases with subsequent leach tests.

The data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium—the primary constituent of concern. Following sulfide oxidation, water flow and/or infiltration is the primary transport mechanism for selenium transport. Greenstone and graywacke do not generate leachable materials at levels that would negatively affect groundwater or surface waters. Sampling and geochemical analysis of the greenstone and graywacke indicates a low potential to leach selenium and other metals at levels above surface or ground water quality standards, and that it is suitable to be used as fill material consistent with Water Board/WDR standards.

## 2.2 Background Water Samples and Bedrock Influence on Creek Water Quality

Water quality from the upstream headwaters has been monitored as part of the National Pollutant Discharge Elimination System (NPDES) permit sampling program. The upstream surface water results for selenium are consistently less than 1 ug/L. As noted in Section 1.2, bedrock limestone and associated travertine deposits are present in these areas. The results further support the premise that selenium production from oxidized limestone already present in the creek channel is finite. For this reason, we expect that the PCRP as designed, which proposes to remove material and follow the existing bedrock contours for the restored creek channel grade and elevation, will not contribute to increased in-stream concentrations of constituents of concern.

# 3.0 DISCUSSION AND RECOMMENDATIONS

For areas of the project where fill material is needed, it is recommended that onsite material comprised predominantly of greenstone or graywacke be used where needed for backfill, as both exhibit a low metals leaching potential under natural site conditions. Furthermore, greenstone is the prevalent native material at the Site and already encompasses the majority of the Permanente Creek basin. Based on the available data, we do not expect detrimental water quality impacts from the creek restoration activities (causing exceedance of applicable water quality standards) provided on-site materials adhere to the recommendations herein.

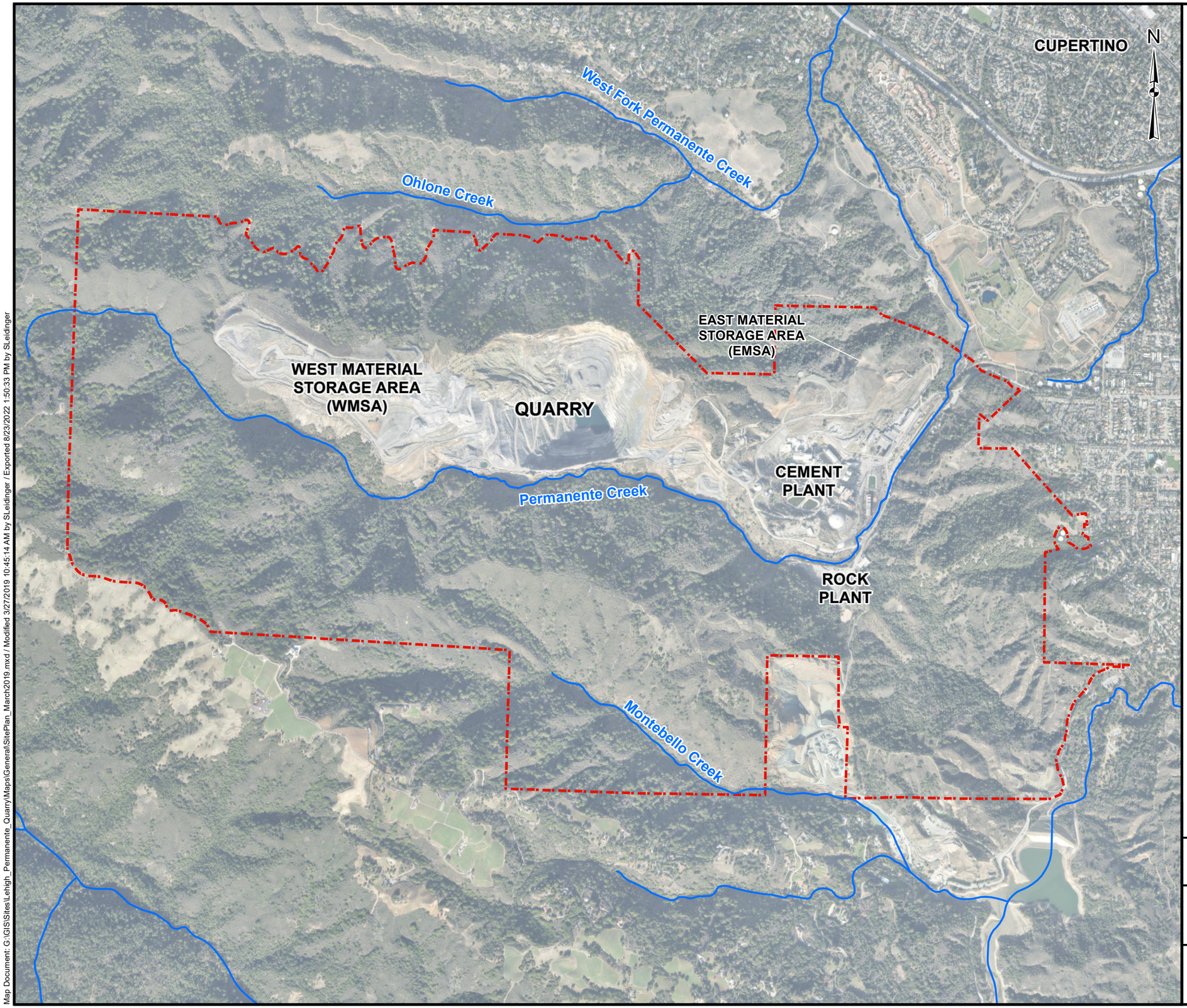
Further, the predominant areas where limestone is to naturally remain, e.g., Reach 18, will consist of non-disturbed bedrock, which, as demonstrated by upstream conditions, is not expected to contribute metals to the water column. Therefore, significant changes in the natural system will not occur and new source material will not be exposed to potentially undergo oxidation and mobilization of selenium based on the limestone bedrock present. As noted in Section 2.3, the water quality upstream of the PCRP is not impaired even though limestone bedrock and travertine deposits are present. As the bedrock surface in Reach 18 is inferred to have been exposed and undisturbed for a similar timeframe as the reaches upstream of the PCRP, impairment to water quality is not expected from the limestone bedrock section. Furthermore, as noted above, the production rate of leachable selenium from limestone decreases as the mobile fraction of selenium is depleted from the system. This process will be further expedited by removing potential sources (e.g., limestone material) via the PCRP, and the PCRP is not expected to interfere with those gains.

Attachments A: Figures 1-3
B: Data Summary Table 1
C: Time-Series Graphs

PCRP_Golder_creek_memo_fnl

**ATTACHMENT A**

# Figures 1-3




## LEGEND

- Stream
- Property Boundary

## NOTES

1) Locations based on conversion from local coordinates or Google Earth placement.

## REFERENCES

1)Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
2)Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
3)

1,200 0 1,200
Feet

PROJECT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

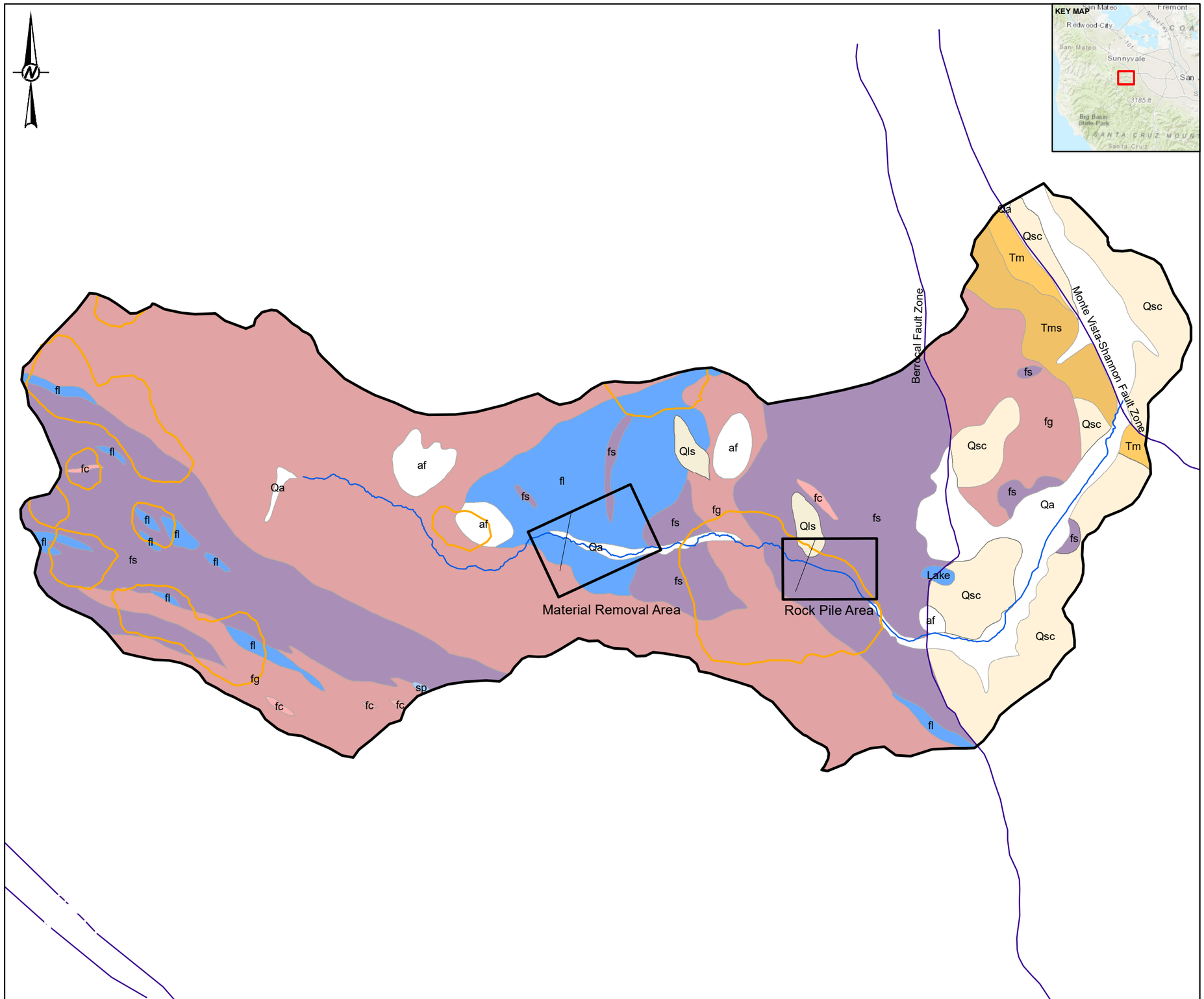
TITLE

**SITE OVERVIEW**

wsp GOLDER

| | | | | | |
|---|---|---|---|---|---|
| PROJECT No. | | 063-7109 | FILE No. | SitePlan_March2019.mxd | |
| DESIGN | SHL | 10/31/2013 | SCALE: AS SHOWN | REV. 0 | |
| GIS | SHL | 3/27/2019 | | | |
| CHECK | GW | 3/27/2019 | **FIGURE 1** | | |
| REVIEW | GW | 3/27/2019 | | | |

Map Document: G:\GIS\Sites\Lehigh_Permanente_Quarry\Maps\General\SitePlan_March2019.mxd / Modified 3/27/2019 10:45:14 AM by SLeidinger / Exported 8/29/2022 1:50:33 PM by SLeidinger




**LEGEND**

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Faults

**Geologic Units**

**UnitNam**

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

**NOTE(S)**

**REFERENCE(S)**

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

PROJECT

TITLE

**GEOLOGIC MAP OF PERMANENTE CREEK BASIN**

CONSULTANT

WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

| PROJECT NO. | PHASE | REV. | FIGURE |
|---|---|---|---|
| | | 0 | 2 |

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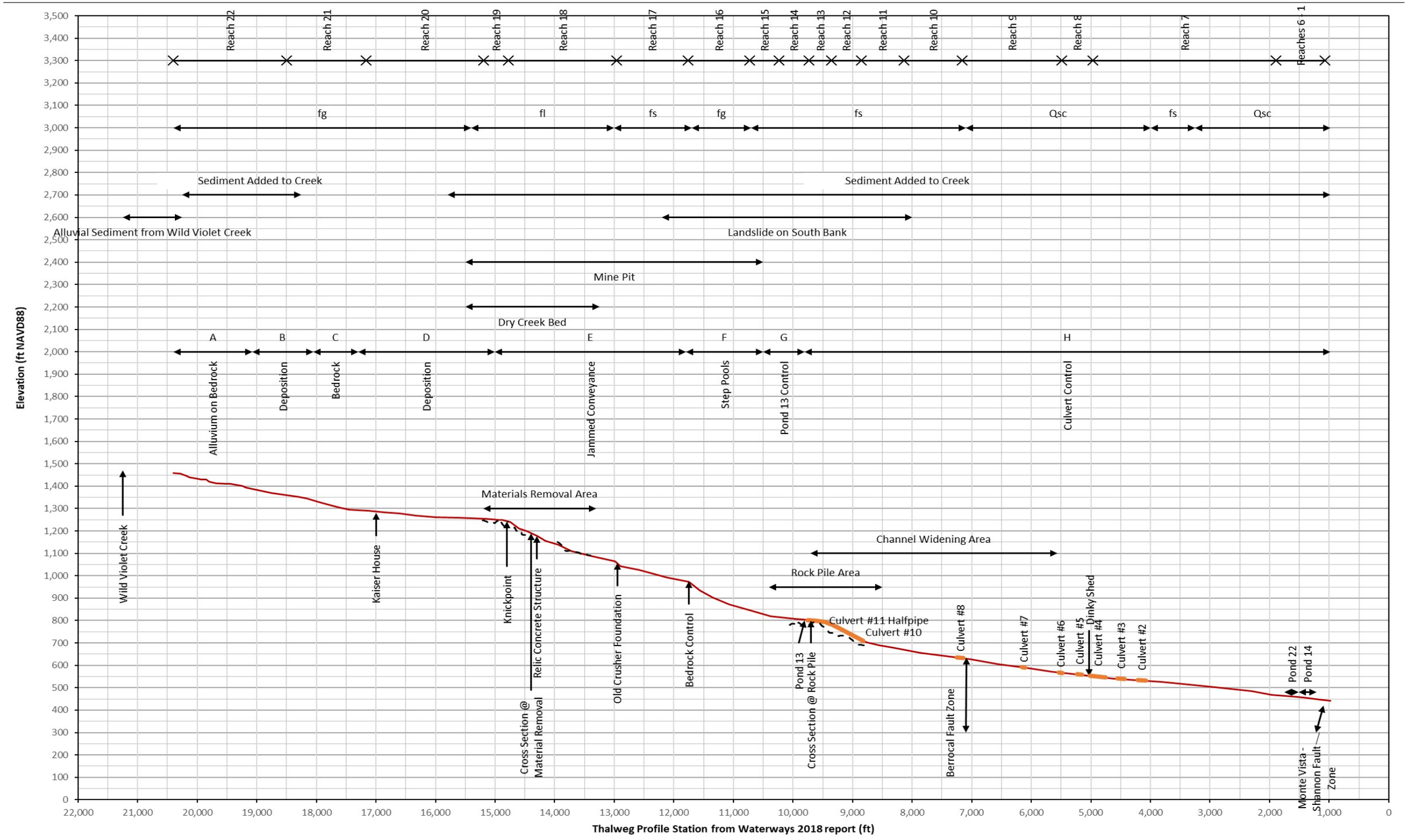



**Figure 3: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).**

**ATTACHMENT B**

# Data Summary Table 1

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-1: High-Grade Limestone, Non-Weathered | | | | | B-2: Medium-Grade Limestone, Non-Weathered | | | | | B-3: Low-Grade, Limestone Non-Weathered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | | | | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.0042 | 0.0025 | 0.0018 B | 0.00123 B | 0.0012 B | 0.0057 | 0.0040 | 0.0032 | 0.0026 | 0.0027 | 0.013 | 0.0078 | 0.0052 | 0.0052 | 0.0040 |
| Arsenic | mg/l | 5 | 0.01 | 0.00022 B | 0.00047 B | 0.0003 B | 0.00029 B | <0.001 | 0.00066 B | 0.00088 B | 0.00073 B | 0.00091 B | 0.00080 B | 0.0013 | 0.0011 | 0.00065 B | 0.00073 B | 0.00062 B |
| Barium | mg/l | 100 | 1 | 0.41 | 0.70 | 0.42 | 0.70 | 0.96 | 0.0288 B | 0.11 | 0.13 | 0.27 | 0.45 | 0.15 | 0.29 | 0.17 | 0.32 | 0.45 |
| Beryllium | mg/l | 0.75 | 0.0027 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | 0.00011 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | 0.00157 B | 0.0007 B | 0.00079 B | 0.00079 B | <0.002 | 0.0031 | 0.00062 B | 0.00077 B | 0.0017 B | <0.002 | 0.0028 | 0.00059 B | 0.00138 B | 0.00121 B |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | 0.000209 B | 0.000062 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Copper | mg/l | 25 | 0.009 | 0.0012 B | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0011 B | <0.002 | <0.002 | <0.002 | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00028 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.0001 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | 0.14 | 0.024 B | 0.020 B | <0.1 | <0.1 | 0.27 | 0.070 B | 0.048 B | 0.026 B | 0.021 B | 1.1 | 0.21 | 0.10 | 0.038 B | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0017 | 0.00042 B | <0.001 | <0.001 | <0.001 | 0.00099 B | 0.00069 B | <0.001 | <0.001 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.0017 | 0.0019 | 0.0011 | 0.00086 | 0.00080 | 0.0062 | 0.0051 | 0.0044 | 0.0049 | 0.0044 | 0.0085 | 0.0051 | 0.0043 | 0.0039 | 0.0033 |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00011 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.041 | 0.016 | 0.0098 | 0.0097 | 0.0098 | 0.0092 | 0.012 | 0.014 | 0.019 | 0.019 | 0.37 | 0.13 | 0.083 | 0.083 | 0.076 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | | | | | | | | | | | |
| Chloride | mg/l | | | 1.4 B | 2.5 | 0.77 B | 0.58 B | 0.85 B | <2 | 0.53 | 0.56 B | <2 | <2 | 2.3 | 3.6 | <2 | <2 | 0.78 B |
| Sulfate | mg/l | | | 9.0 | 5.9 | 7.9 | 4.4 B | 3.3 B | 212 | 31 | 26 | 9.2 | 7.9 | 22 | 12 | 16 | 9.1 | 4.8 B |
| Total Alkalinity | mg/l | | | 14 B | 17 B | 15 B | 14 B | 14 B | 16 B | 24 | 20 | 16 B | 17 B | 18 B | 23 | 18 B | 18 B | 17 B |
| Bicarbonate ($CaCO_3$) | mg/l | | | 14 B | 17 B | 15 B | 14 B | 14 B | 16 B | 24 | 20 | 16 B | 17 B | 18 B | 23 | 18 B | 18 B | 17 B |
| Carbonate as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL;

As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-4: Non-Cement Grade Limestone, Non-Weathered | | | | | B-5-9: High-Grade Limestone, Weathered | | | | | B-6: Greenstone, Non-Weathered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | | | | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.0030 | 0.0018 B | 0.0014 B | 0.0012 B | 0.0011 B | 0.0065 | 0.0038 | 0.0025 | 0.0026 | 0.0021 | 0.0030 | 0.00128 B | 0.00085 B | 0.00054 B | 0.00043 B |
| Arsenic | mg/l | 5 | 0.01 | 0.0002 B | 0.00031 B | <0.001 | 0.00023 B | <0.001 | 0.00047 B | 0.00069 B | 0.00039 B | 0.00054 B | 0.00046 B | 0.0026 | 0.0029 | 0.0021 | 0.0021 | 0.0017 |
| Barium | mg/l | 100 | 1 | 0.13 | 0.40 | 0.26 | 0.44 | 0.60 | 0.20 | 0.38 | 0.21 | 0.39 | 0.63 | 0.11 | 0.11 | 0.099 | 0.11 | 0.10 |
| Beryllium | mg/l | 0.75 | 0.0027 | 0.000082 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | 0.0007 B | <0.002 | <0.002 | <0.002 | <0.002 | 0.0026 | <0.002 | 0.00111 B | 0.00108 B | <0.002 | <0.002 | <0.002 | 0.00114 B | <0.002 |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | 0.00005 B | 0.000092 B | <0.00025 | <0.00025 | 0.000057 B | <0.00025 | <0.00025 | <0.00025 | 0.000059 B | <0.00025 | 0.000051 B | 0.000063 B | 0.00027 | 0.000066 B |
| Copper | mg/l | 25 | 0.009 | <0.002 | 0.0017 B | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | 0.00086 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00015 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.23 | 0.067 B | 0.044 B | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.00071 B | <0.001 | <0.001 | 0.0012 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.0013 | 0.0011 | 0.00092 | 0.00082 | 0.00077 | 0.0040 | 0.0035 | 0.0029 | 0.0028 | 0.0027 | 0.00054 | 0.00017 B | 0.00018 B | <0.00025 | <0.00025 |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | 0.00011 B | <0.0005 | 0.0005 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.0046 | 0.00161 B | 0.0022 | 0.0022 | 0.0023 | 0.036 | 0.016 | 0.012 | 0.014 | 0.015 | 0.013 | 0.012 | 0.0095 | 0.0095 | 0.0090 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | | | | | | | | | | | |
| Chloride | mg/l | | | 2.1 | 3.5 | 0.88 B | 1.1 B | 1.1 B | 1.35 B | 2.8 | <2 | <2 | 0.84 B | <2 | <2 | <2 | <2 | <2 |
| Sulfate | mg/l | | | 25 | 9.3 | 12 | 7.4 | 5.2 | 16 | 9.0 | 13 | 7.8 | 4.4 B | 12 | 6.6 | 4.9 B | 2.7 B | 1.7 B |
| Total Alkalinity | mg/l | | | 15 B | 22 | 16 B | 16 B | 16 B | 17 B | 22 | 17 B | 16 B | 17 B | 27 | 22 | 21 | 18 B | 17 B |
| Bicarbonate ($CaCO_3$) | mg/l | | | 15 B | 22 | 16 B | 16 B | 16 B | 17 B | 22 | 17 B | 16 B | 17 B | 27 | 22 | 21 | 18 B | 17 B |
| Carbonate as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-7-10: Greenstone, Weathered | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.00065 B | <0.002 | <0.002 | <0.002 | <0.002 |
| Arsenic | mg/l | 5 | 0.01 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Barium | mg/l | 100 | 1 | 0.029 B | 0.0247 B | 0.028 B | 0.026 B | 0.0226 B |
| Beryllium | mg/l | 0.75 | 0.0027 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | <0.002 | <0.002 | 0.00058 B | <0.002 |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | 0.000067 B | 0.000051 B | 0.00011 B | 0.000087 B |
| Copper | mg/l | 25 | 0.009 | 0.00133 B | <0.002 | <0.002 | 0.0013 B | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00018 B |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.00021 B | 0.00013 B | <0.00025 | <0.00025 | 0.00014 B |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.016 | 0.019 | 0.013 | 0.014 | 0.013 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | |
| Chloride | mg/l | | | <2 | <2 | <2 | <2 | <2 |
| Sulfate | mg/l | | | 4.8 B | 1.4 B | 1.3 B | <5 | <5 |
| Total Alkalinity | mg/l | | | 24 | 22 | 22 | 21 | 20 |
| Bicarbonate ($CaCO_3$) | mg/l | | | 22 | 20 B | 21 | 18 B | 18 B |
| Carbonate as $CaCO_3$ | mg/l | | | 2.3 B | 2.5 B | <20 | 2.4 B | 2.2 B |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 |

Notes:

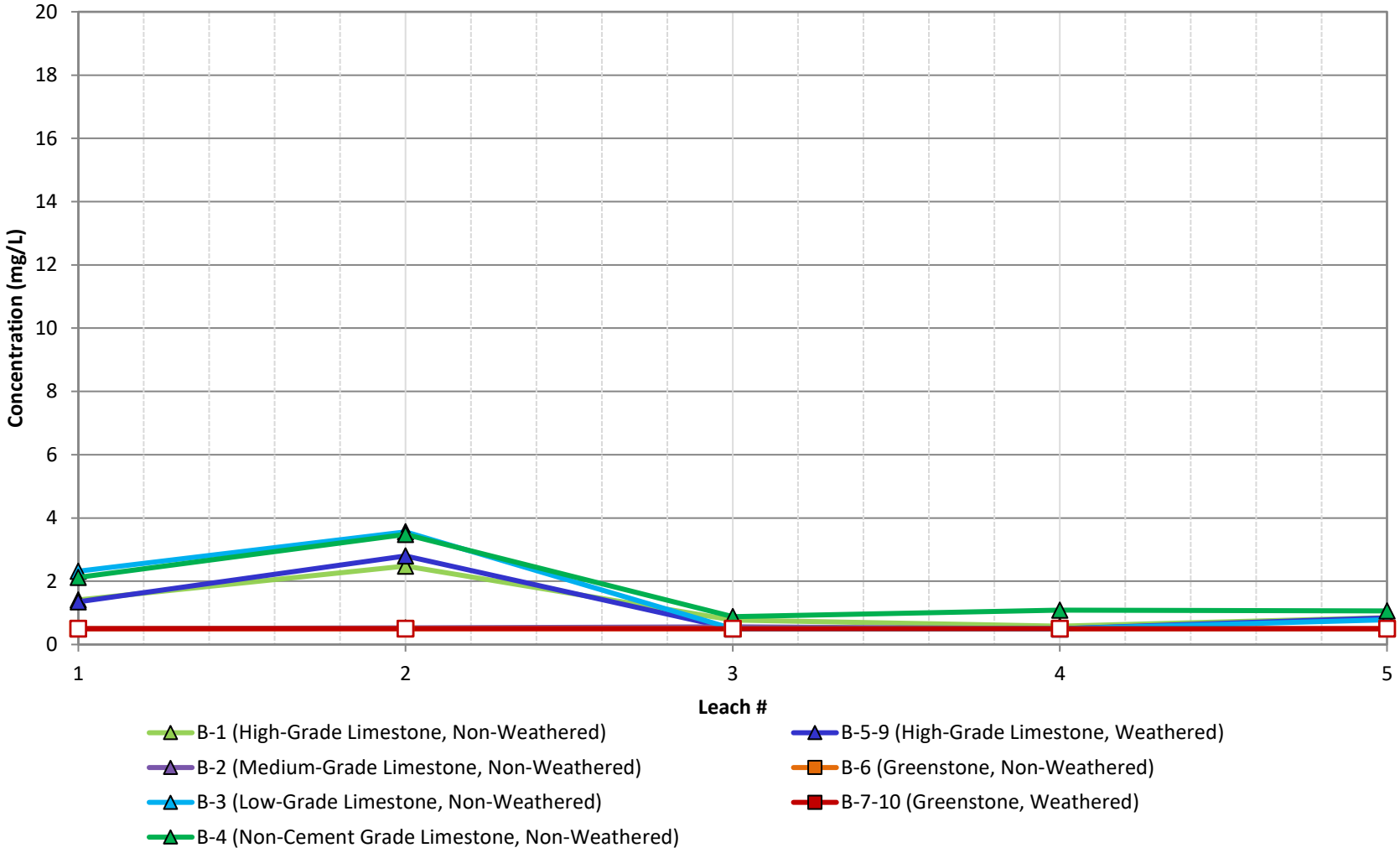
Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

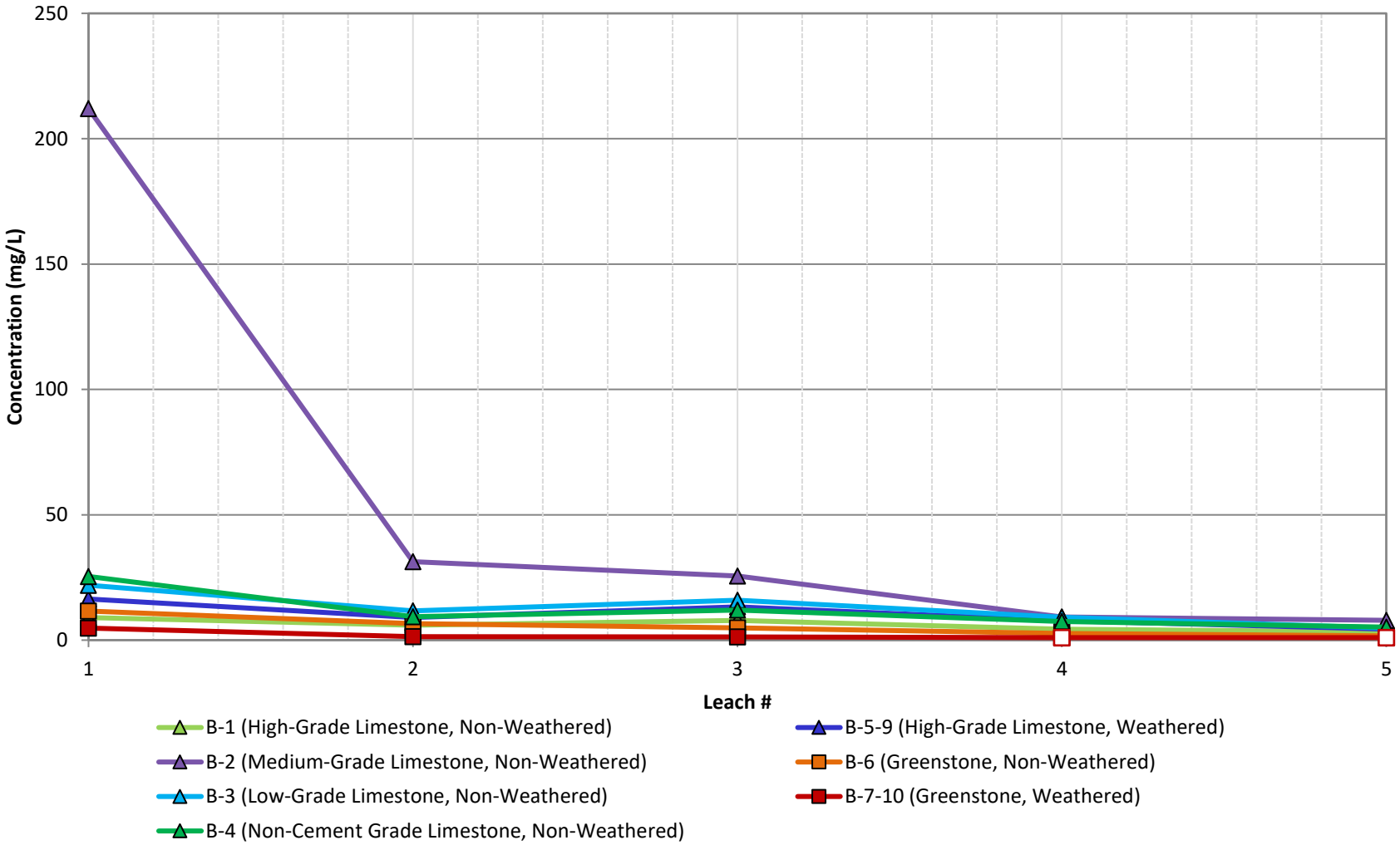
**ATTACHMENT C**

# Time-Series Graphs



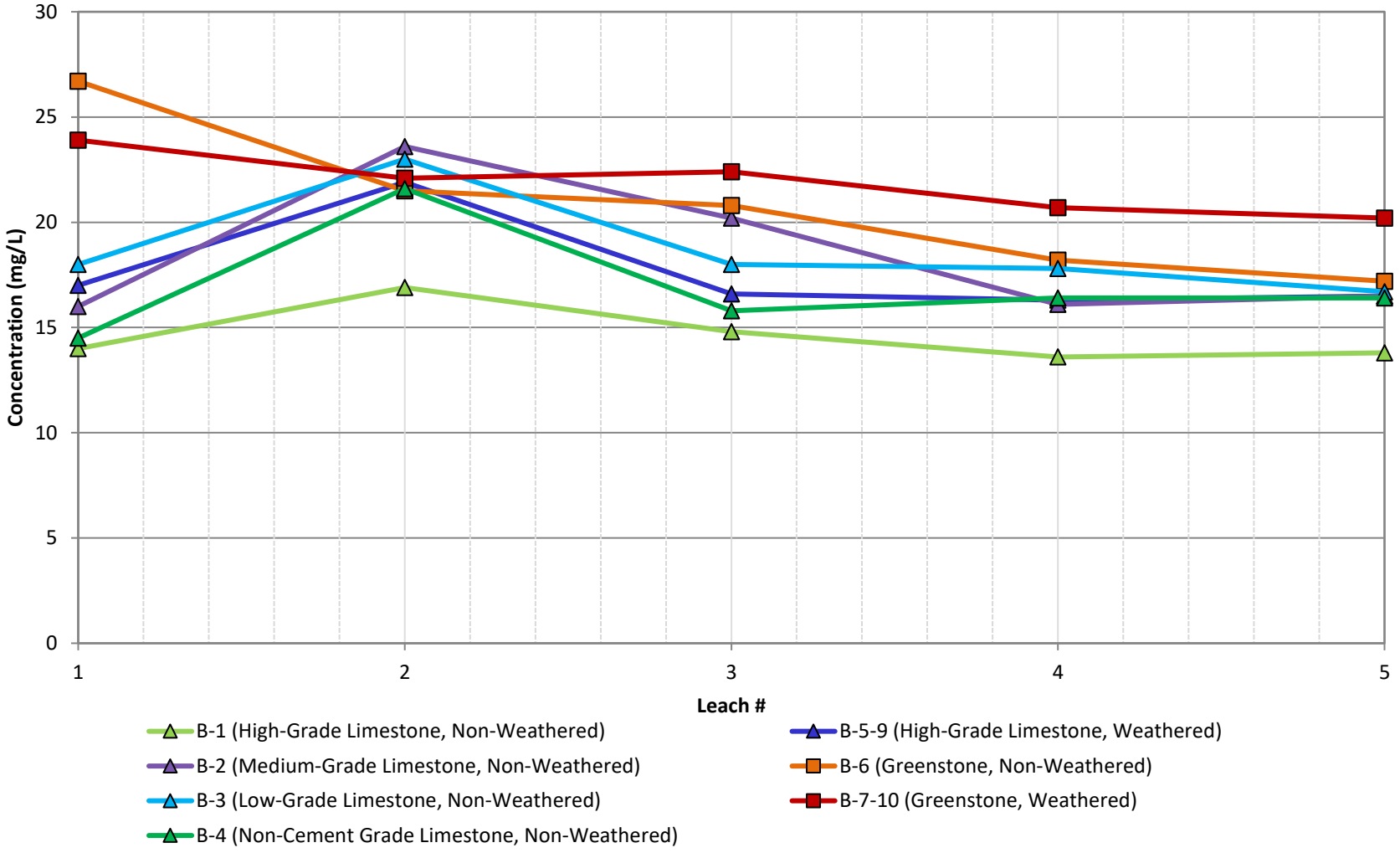

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Chloride** | | |
| | Project Name | Project No. 31405507 | FIGURE C-1 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



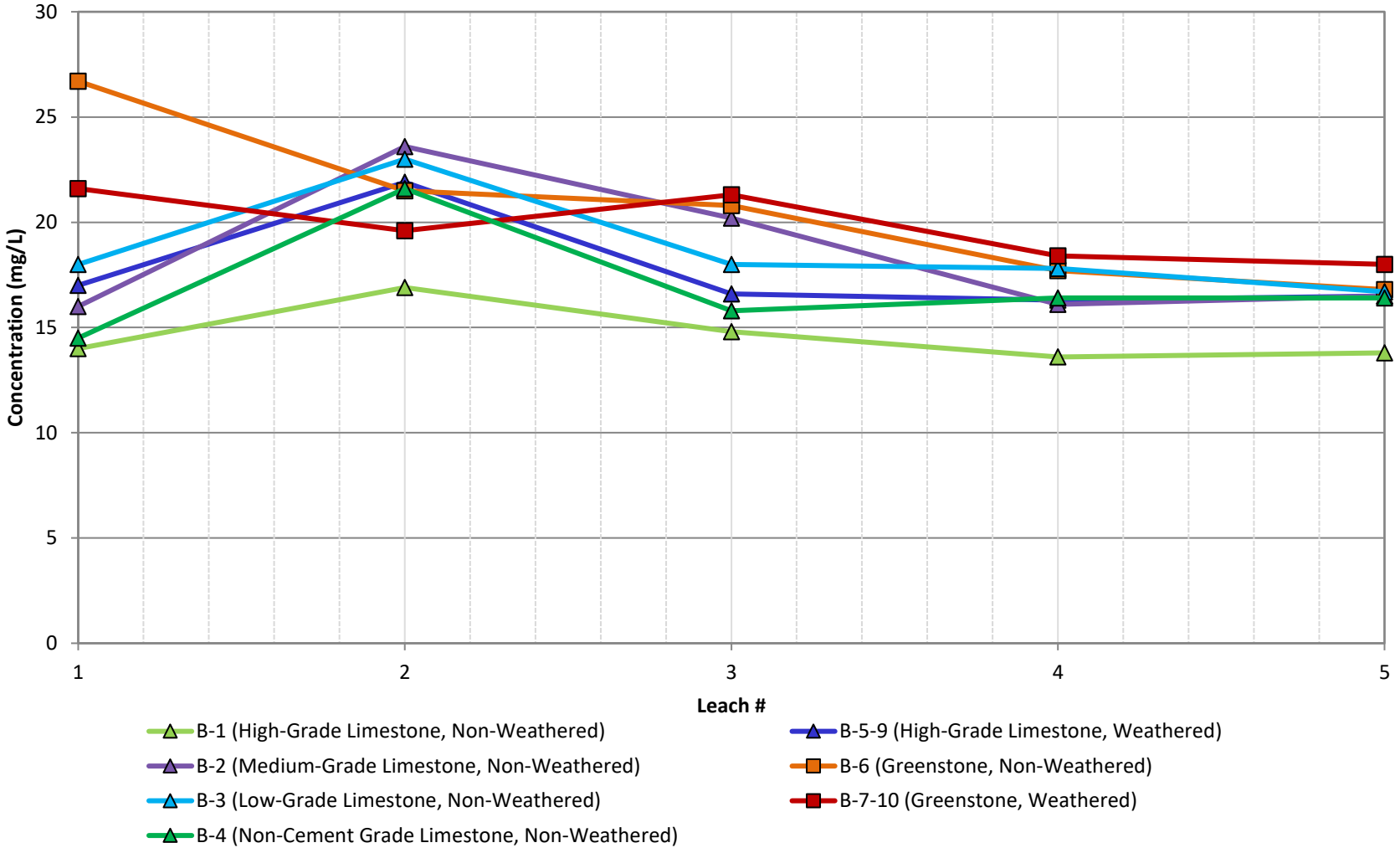

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| GOLDER | Title: **Sequential Modified WET- Sulfate** | | |
| | Project Name | Project No. 31405507 | FIGURE C-2 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



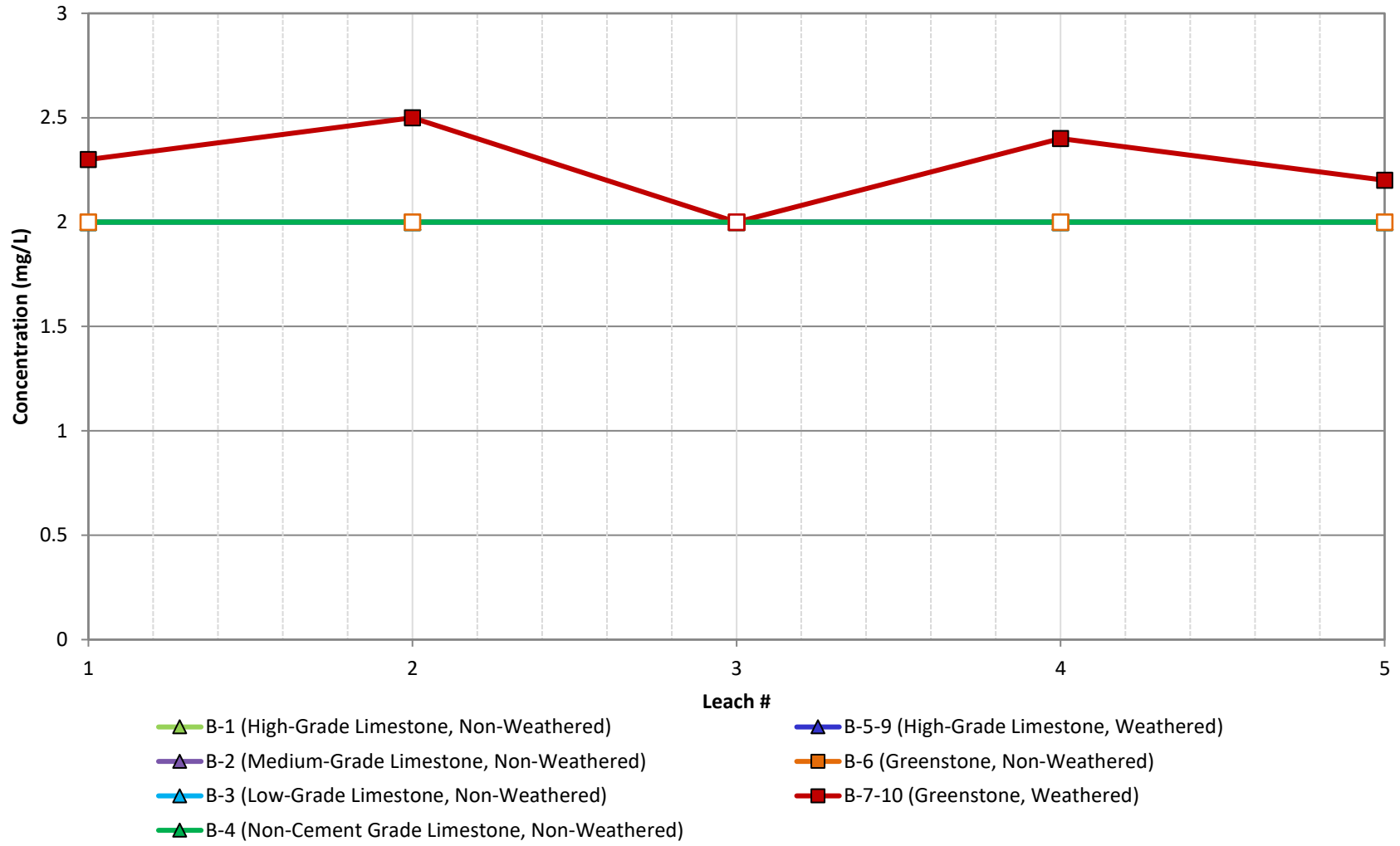

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Total Alkalinity** | | |
| | Project Name | Project No. 31405507 | FIGURE C-3 |
| | Client Name: Lehigh Permanente | Date: 3/4/2022 | |



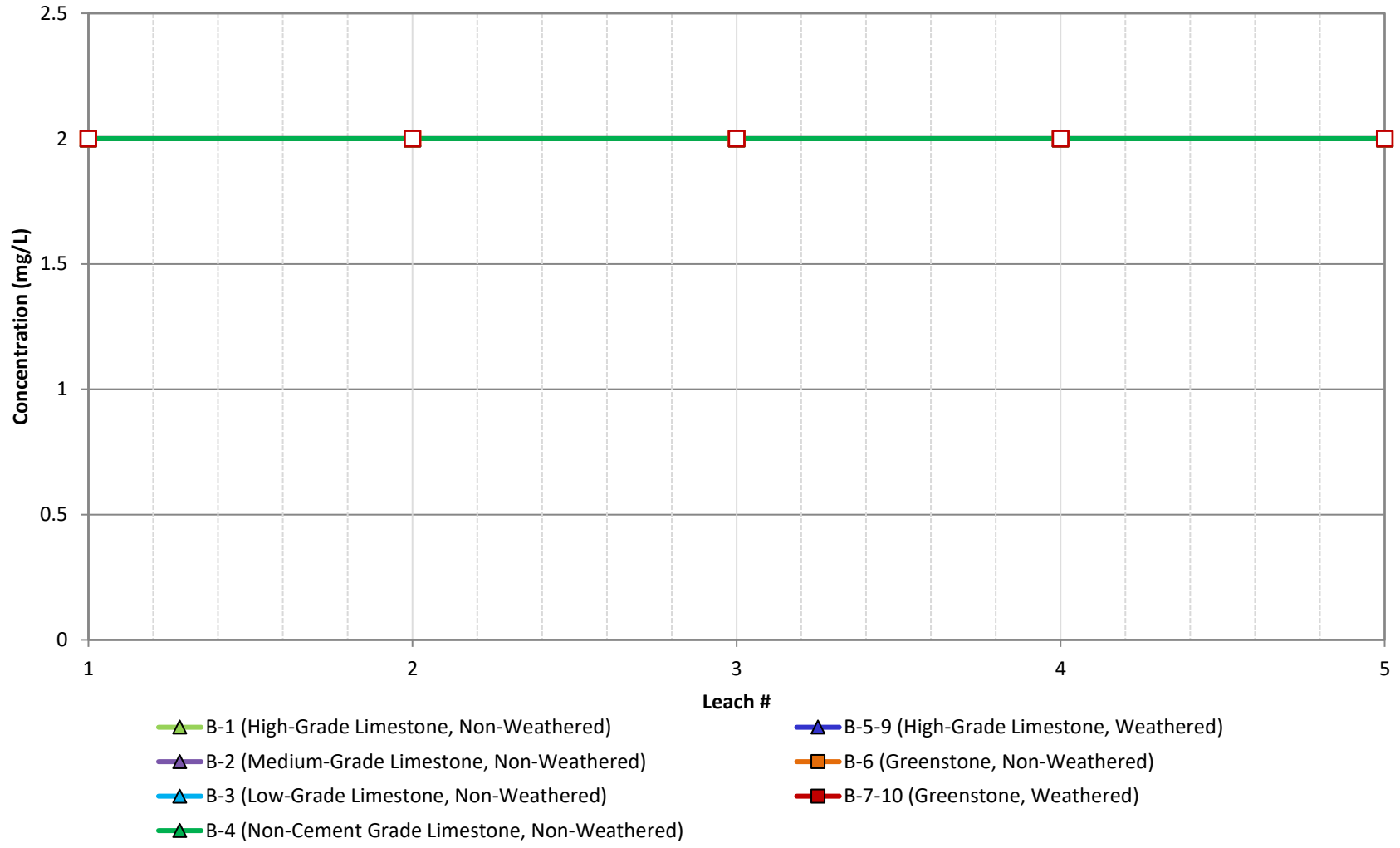

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Bicarbonate as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-4 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



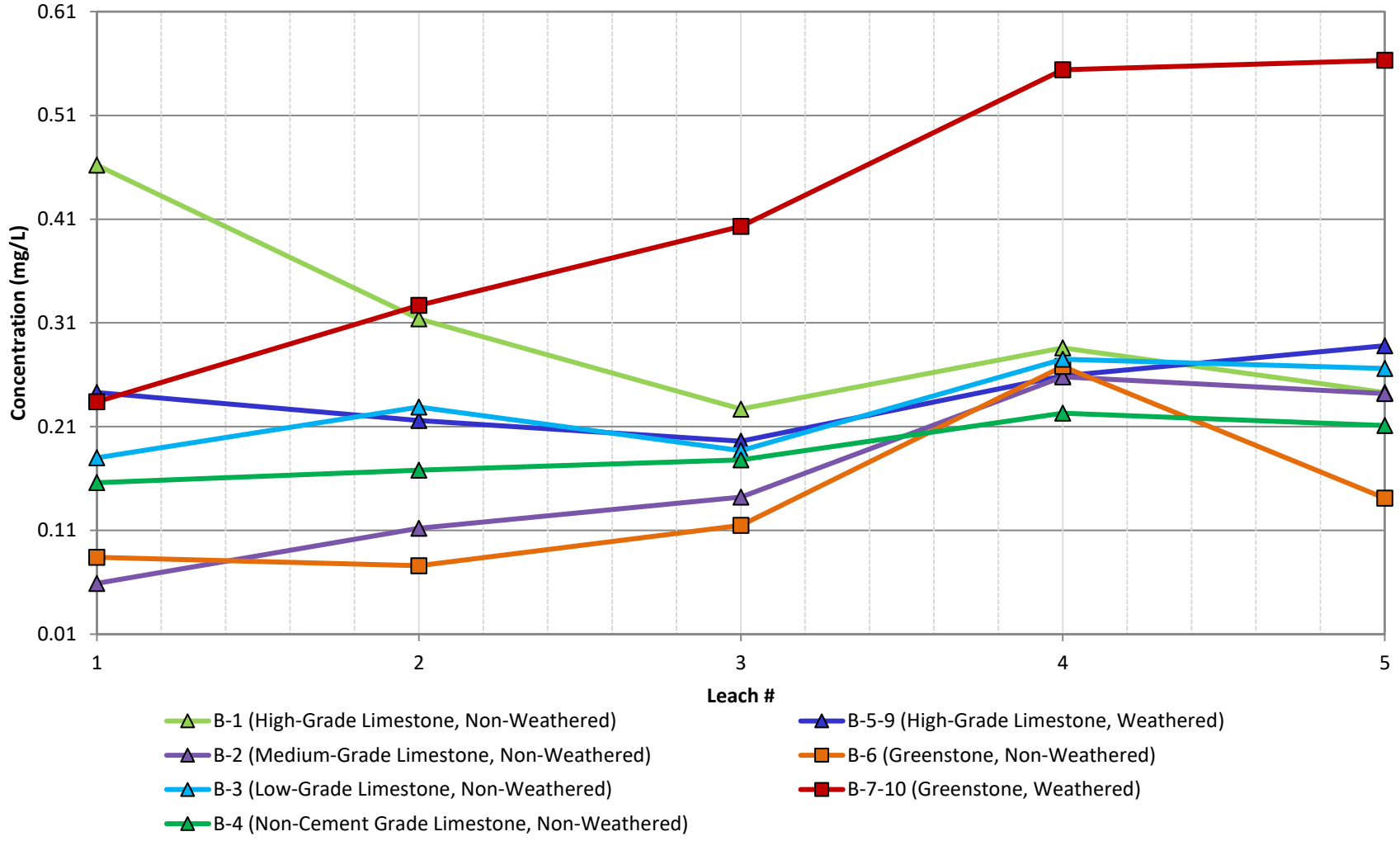

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Carbonate as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-5 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



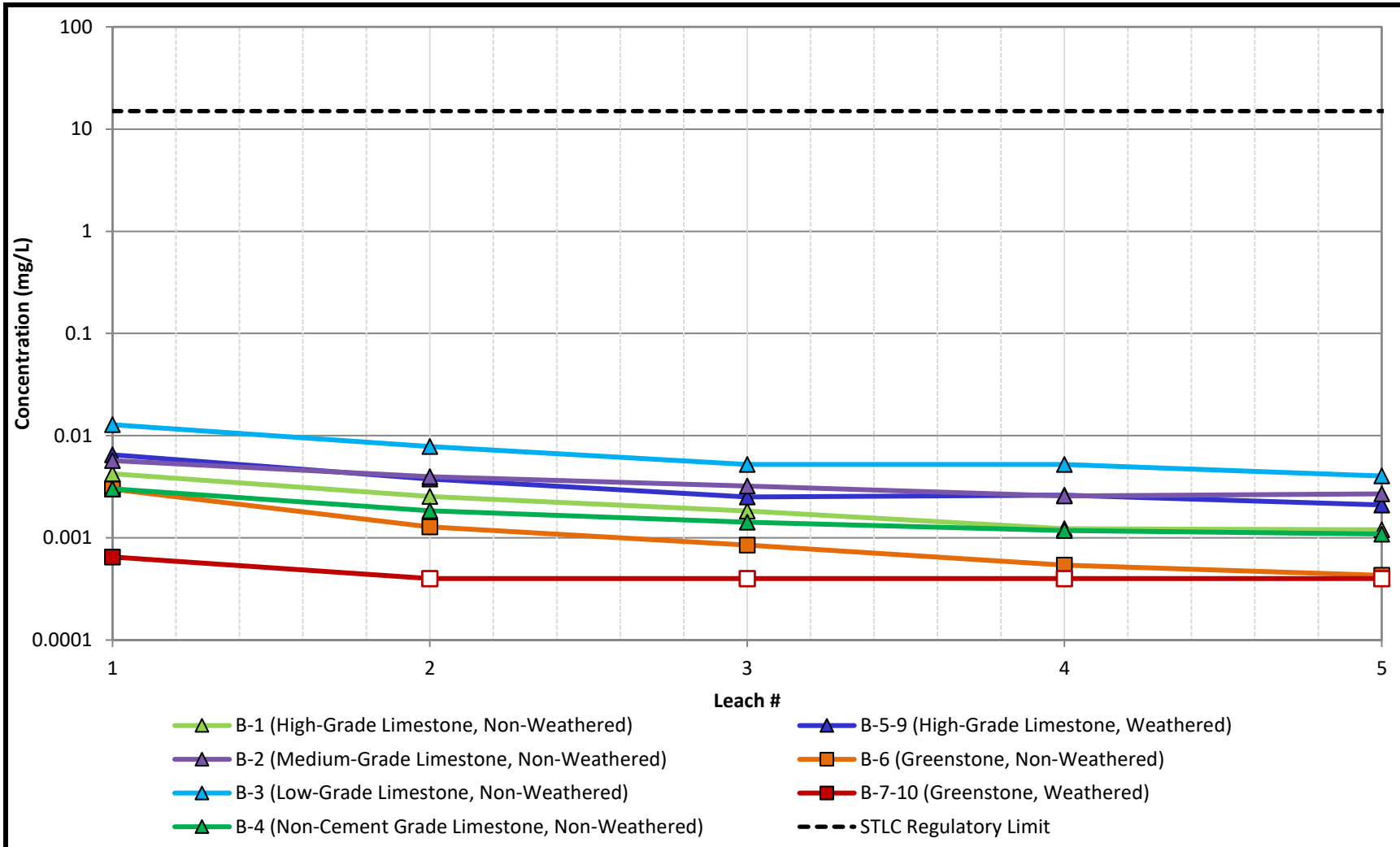

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Hydroxide as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-6 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



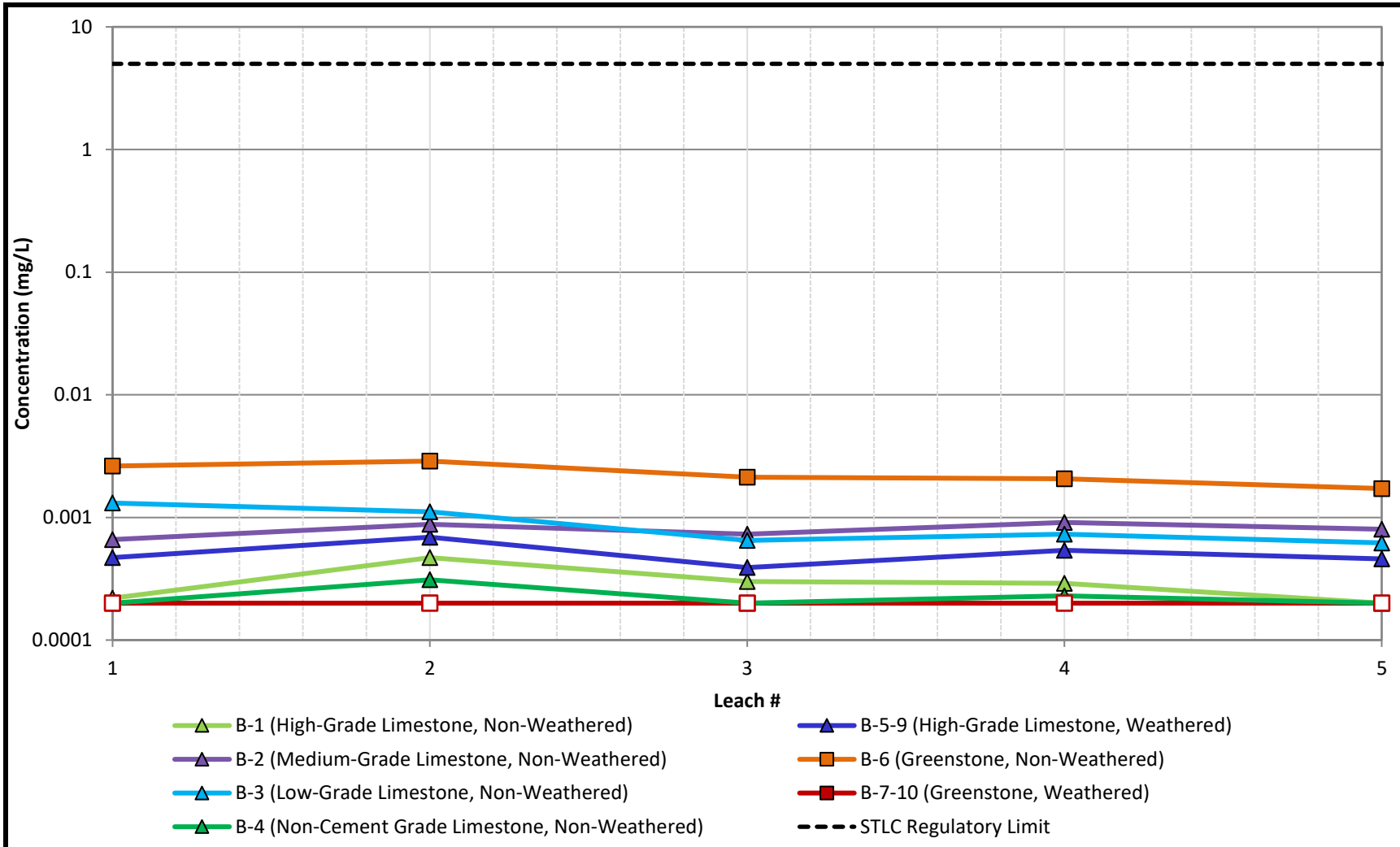

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Aluminum** | | |
| | Project Name | Project No. 31405507 | FIGURE C-7 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



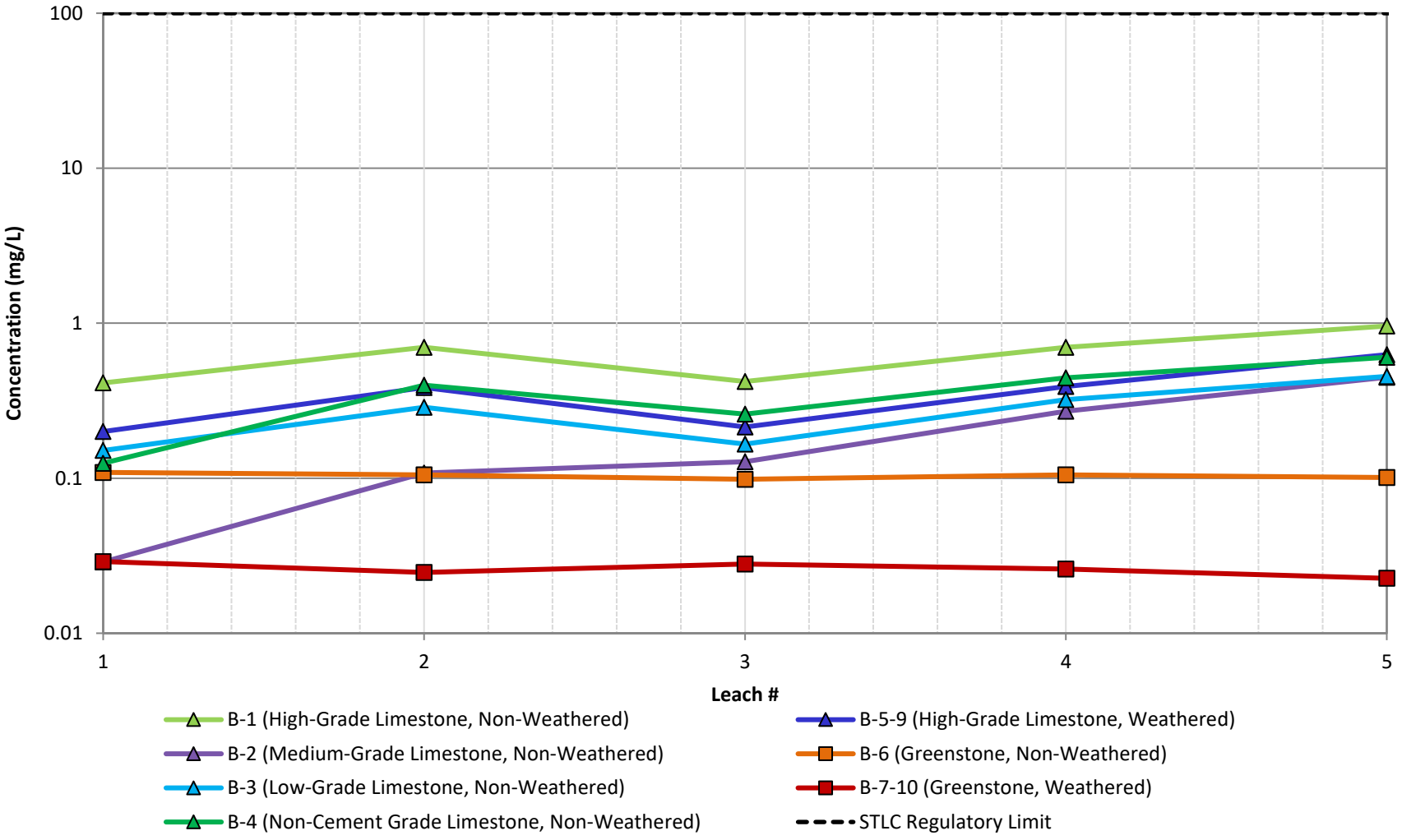

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Antimony** | | |
| | Project Name | Project No. 31405507 | FIGURE C-8 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



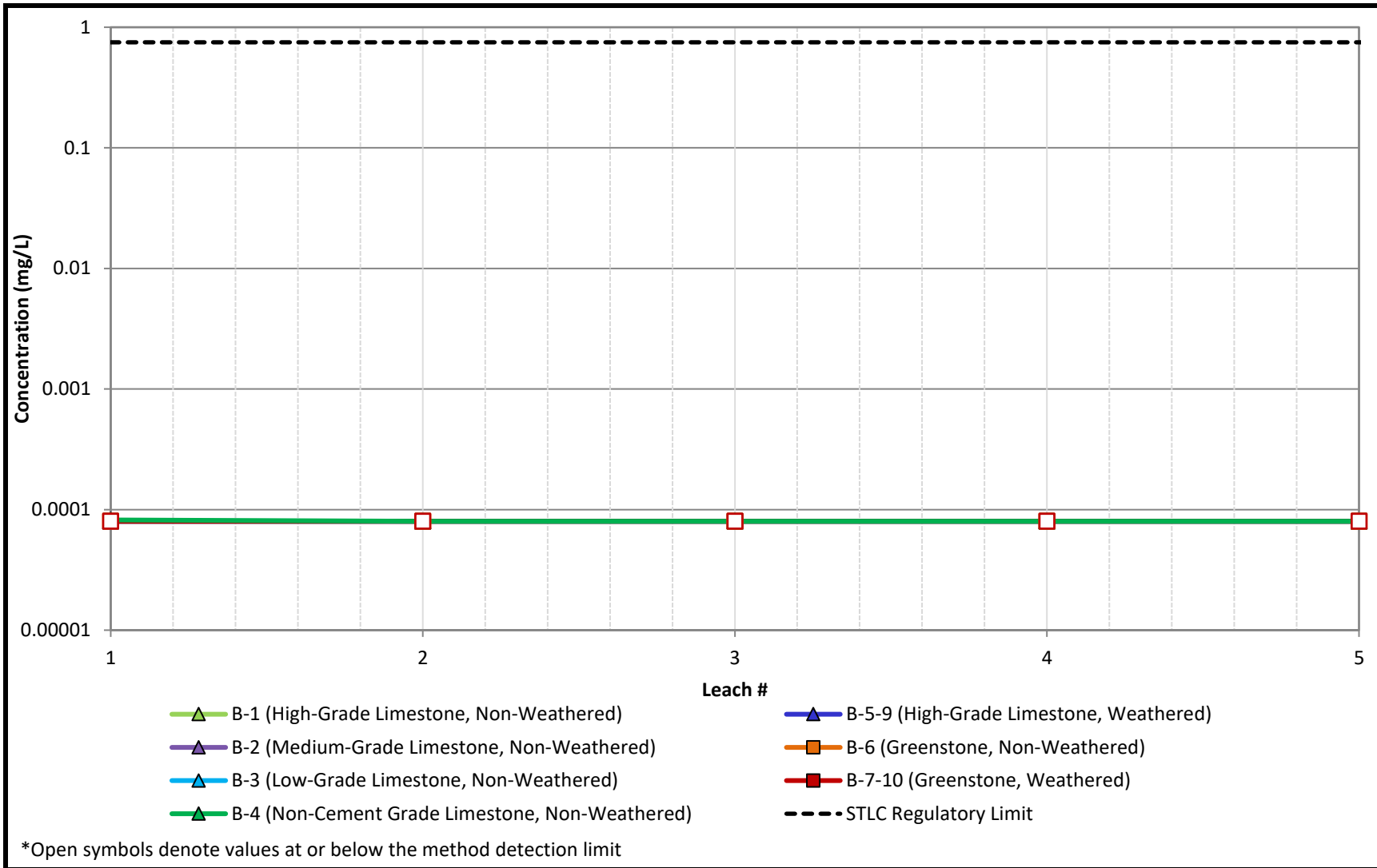

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Arsenic** | | |
| | Project Name | Project No. 31405507 | FIGURE C-9 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



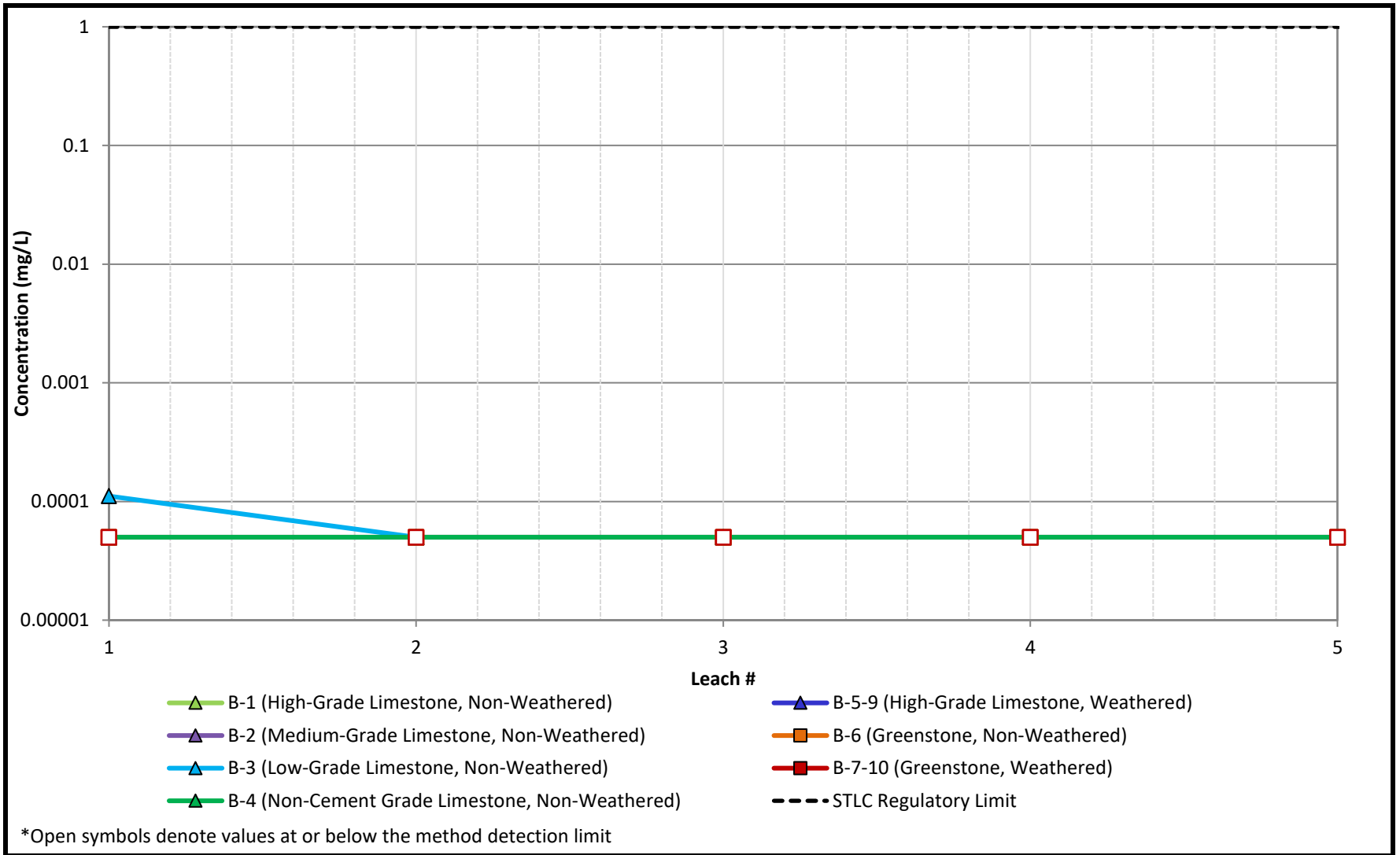

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Barium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-10 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



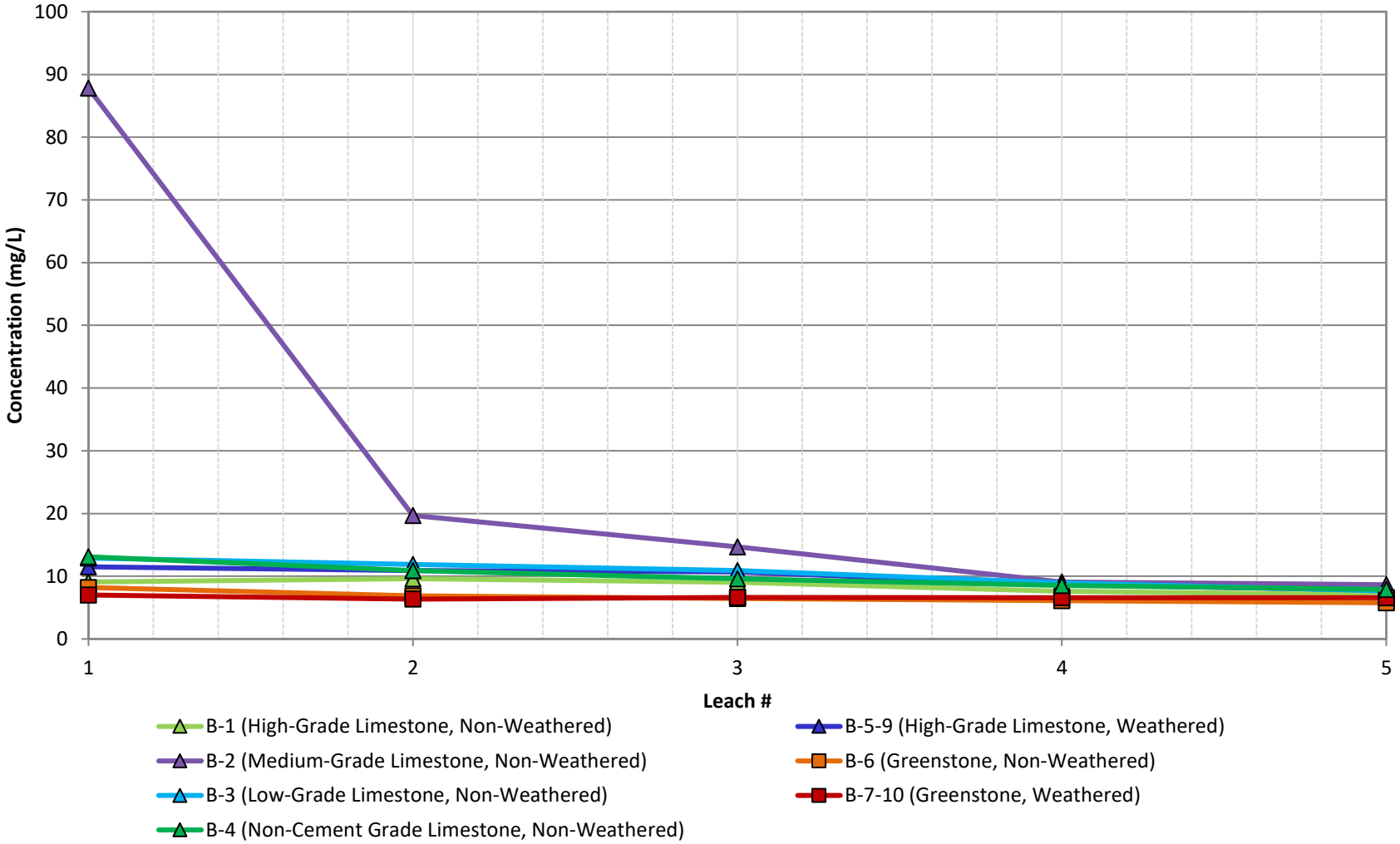

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Beryllium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-11 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



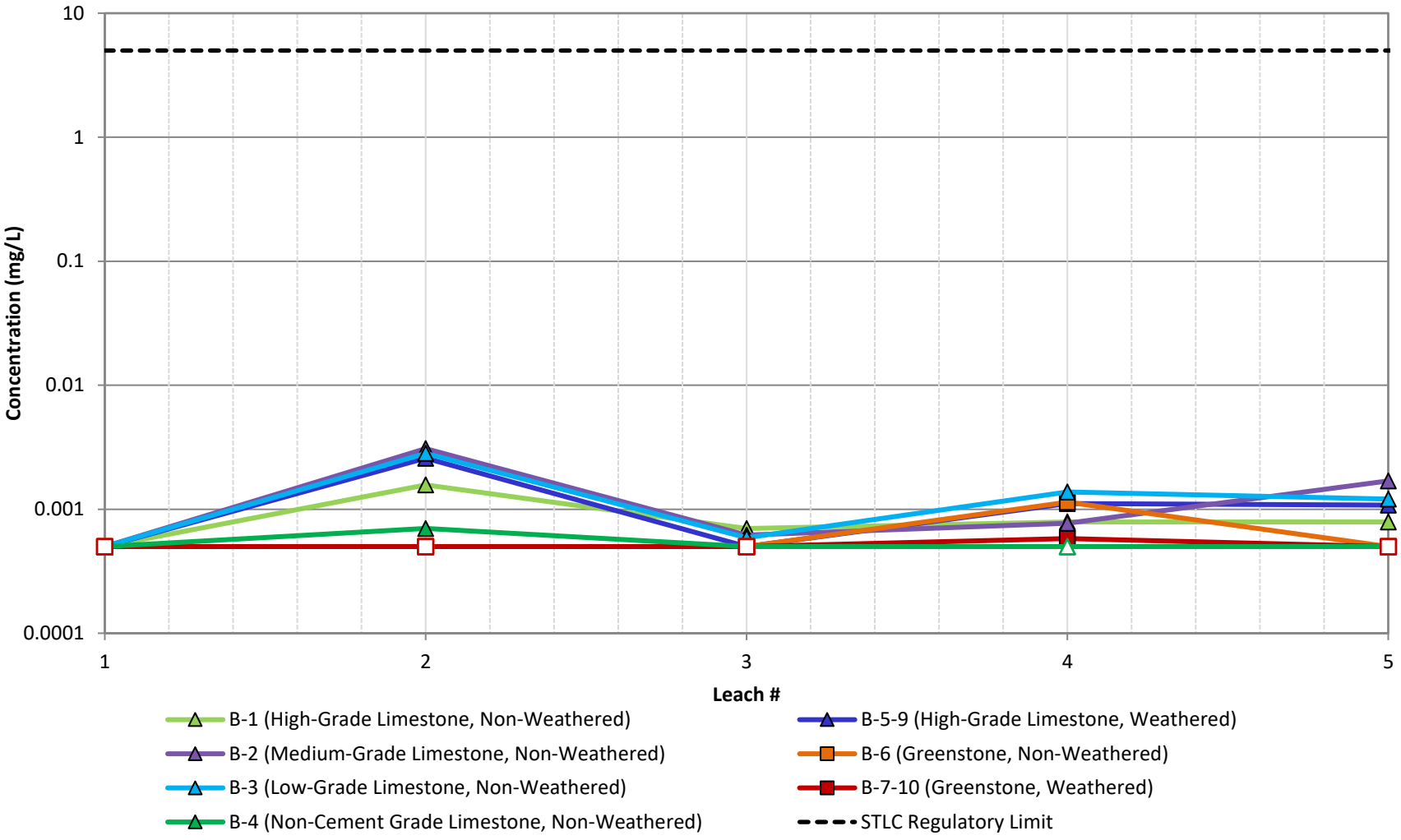

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Cadmium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-12 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



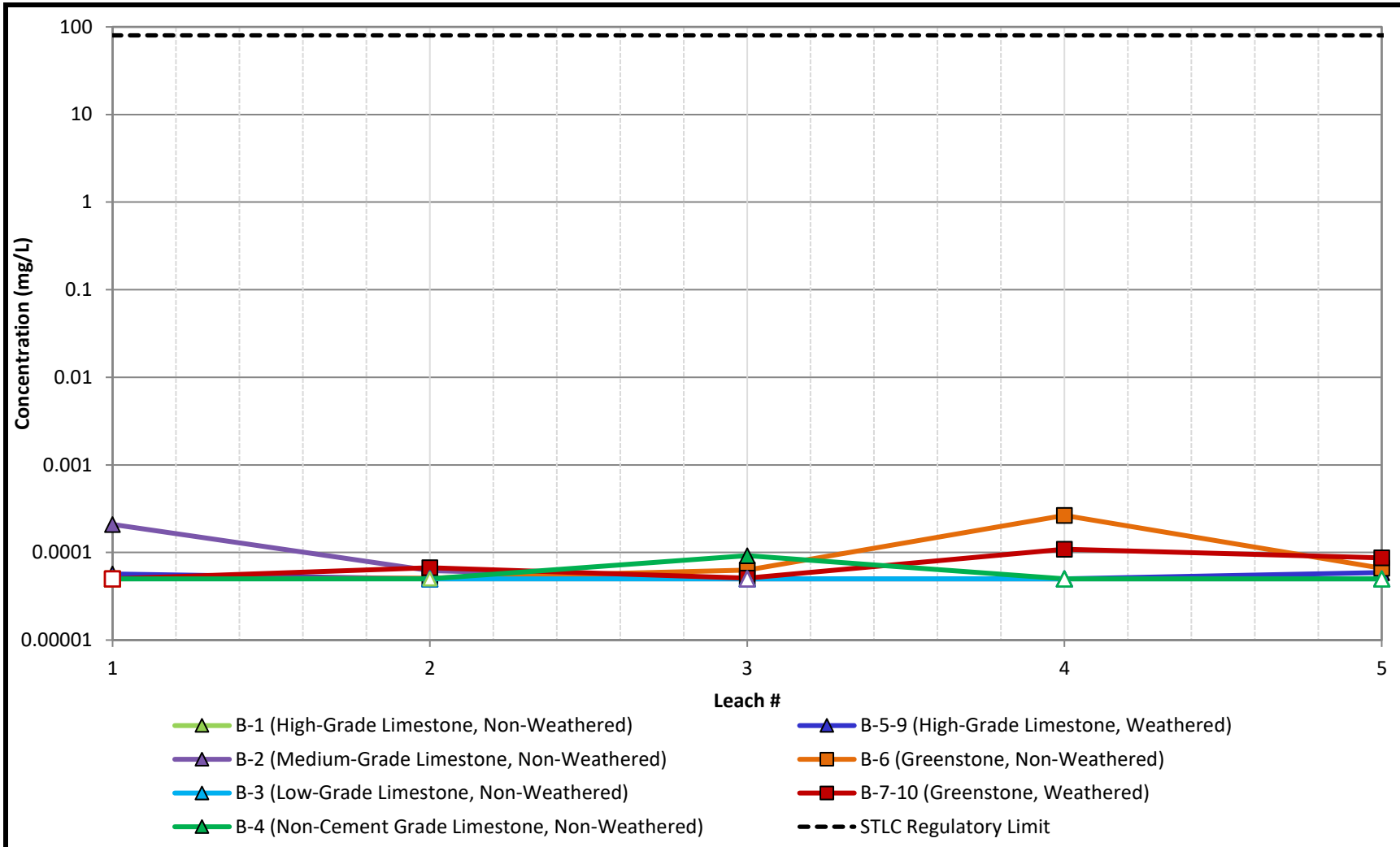

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Calcium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-13 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



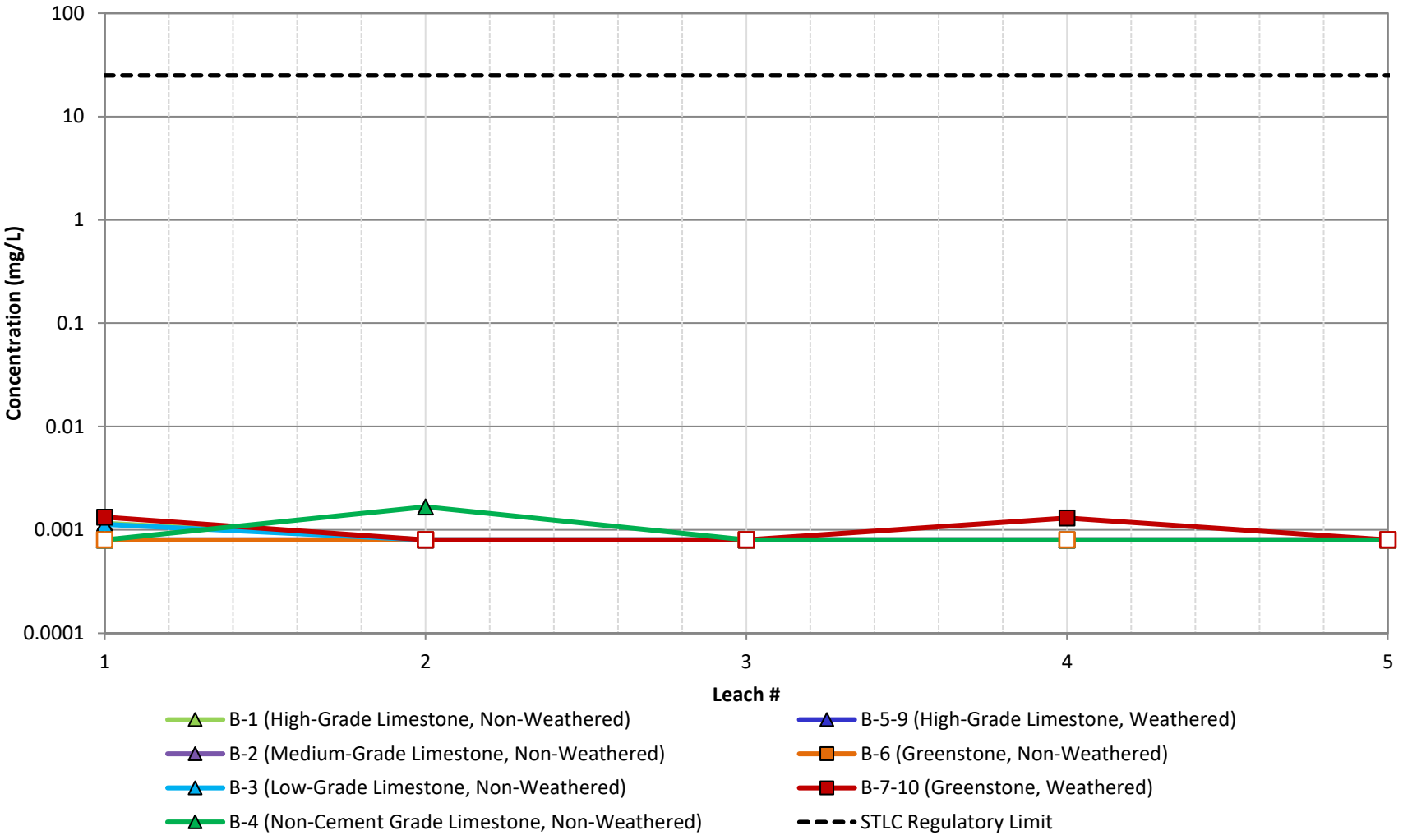

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Chromium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-14 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



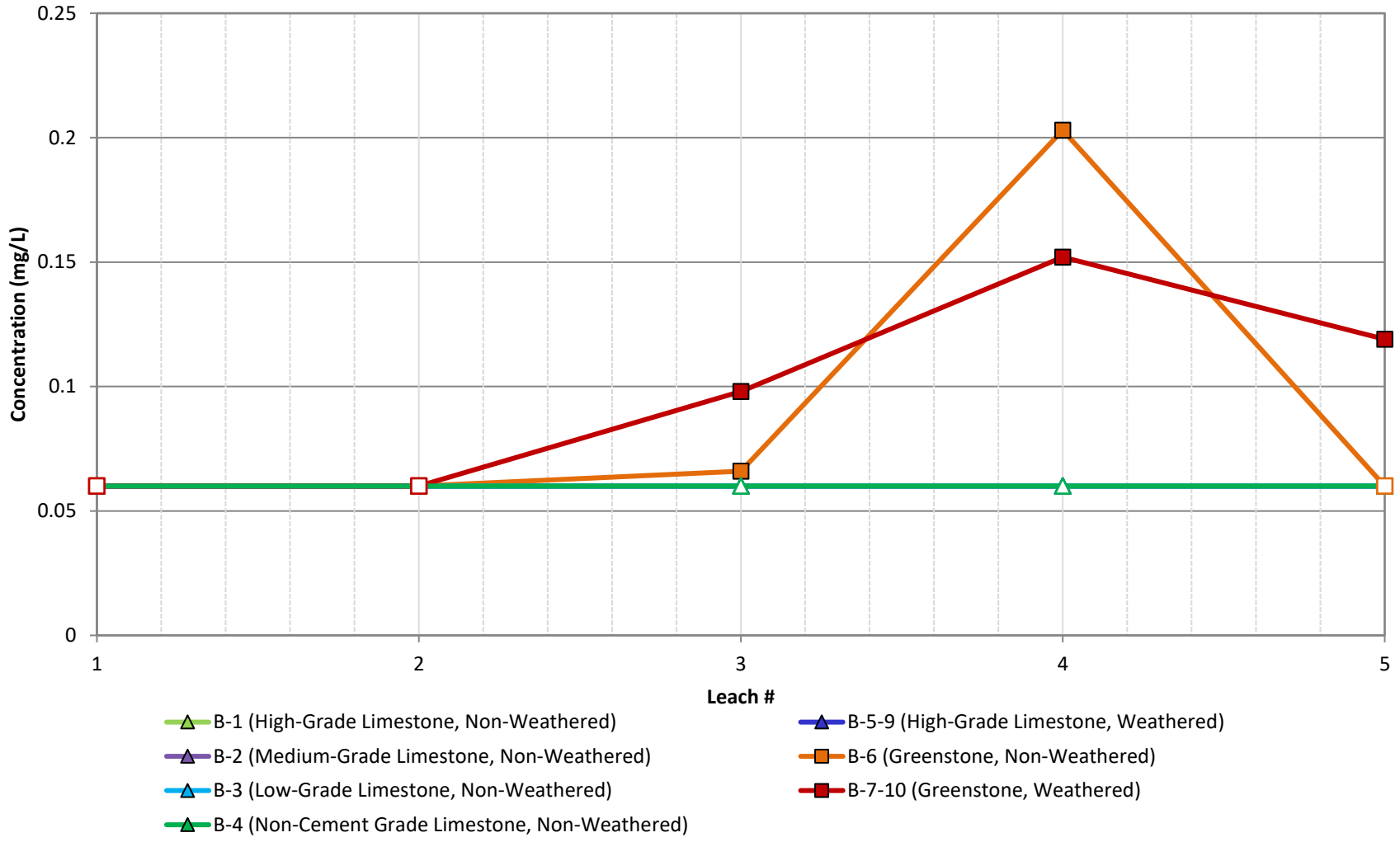

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Cobalt** | | |
| | Project Name | Project No. 31405507 | FIGURE C-15 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



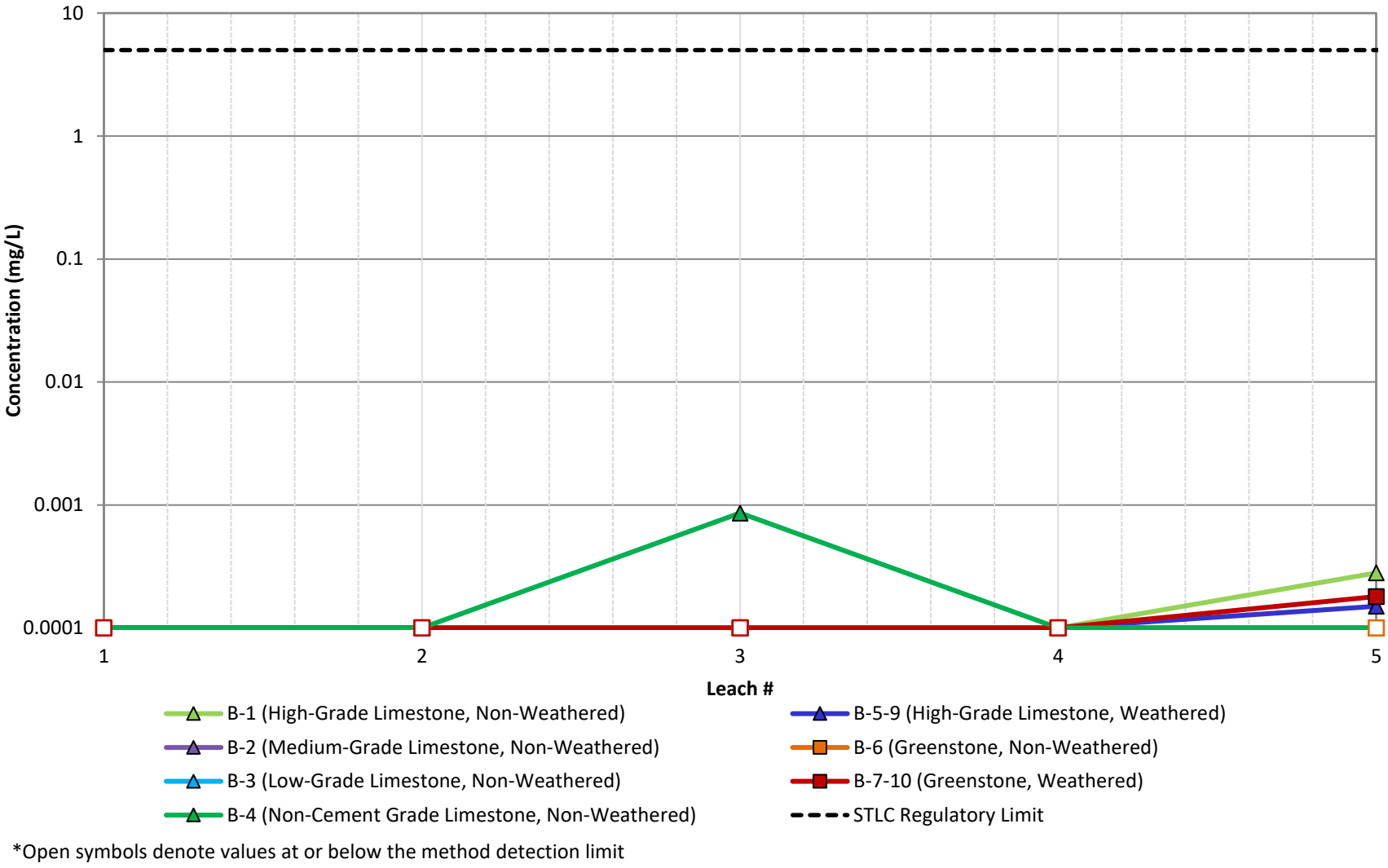

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Copper** | | |
| | Project Name | Project No. 31405507 | FIGURE C-16 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



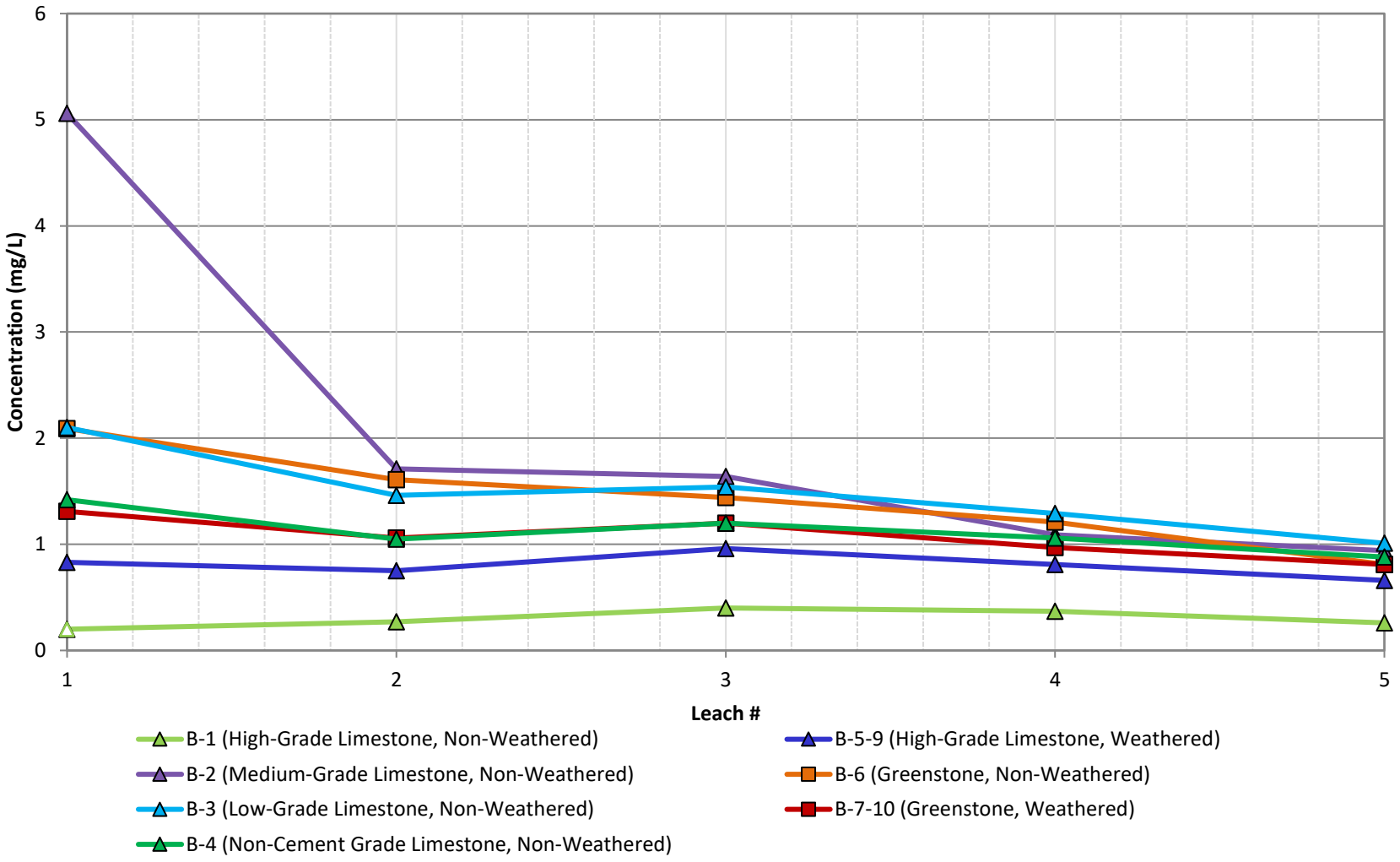

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Iron** | | |
| | Project Name | Project No. 31405507 | FIGURE C-17 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



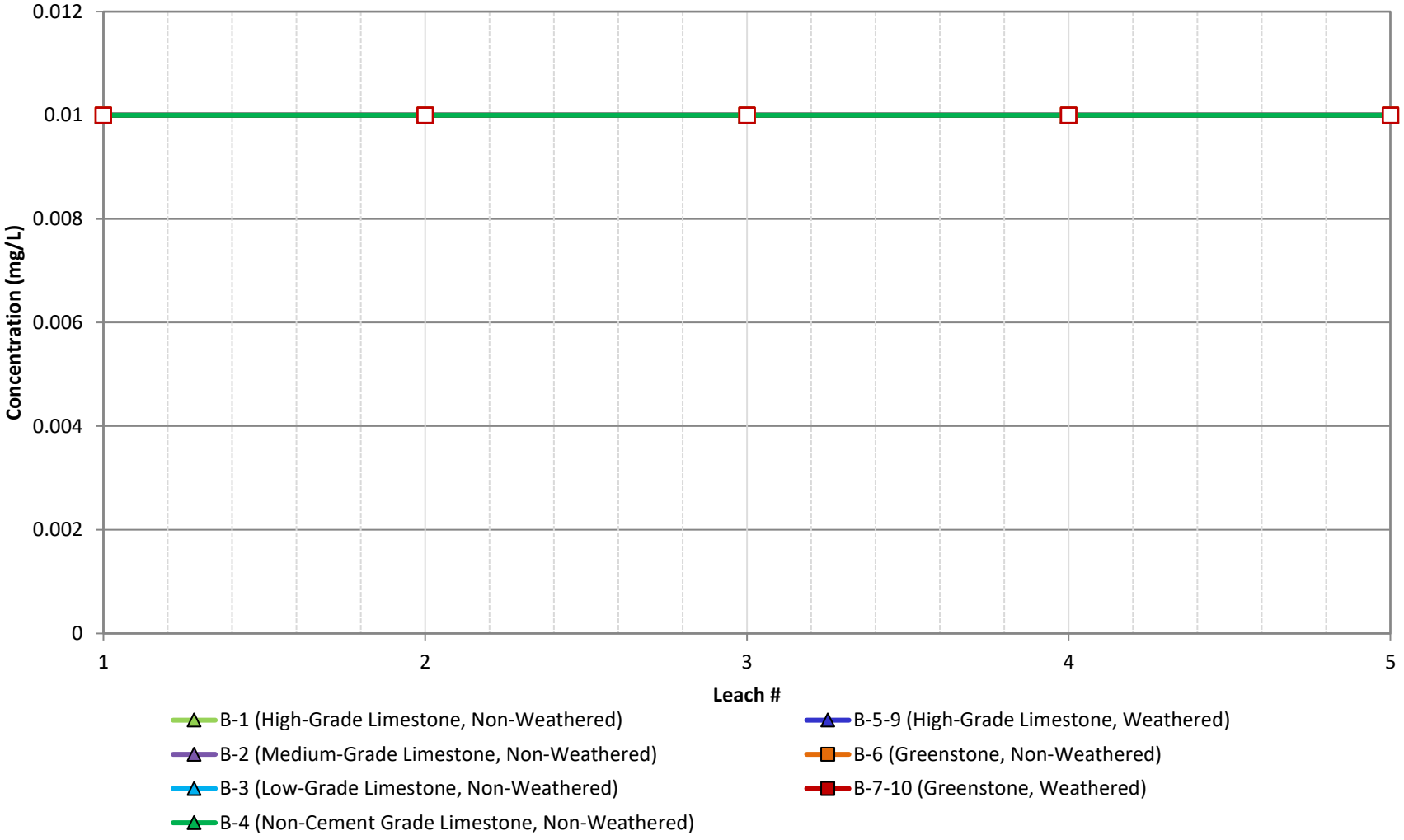

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Lead** | | |
| | Project Name | Project No. 31405507 | FIGURE C-18 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



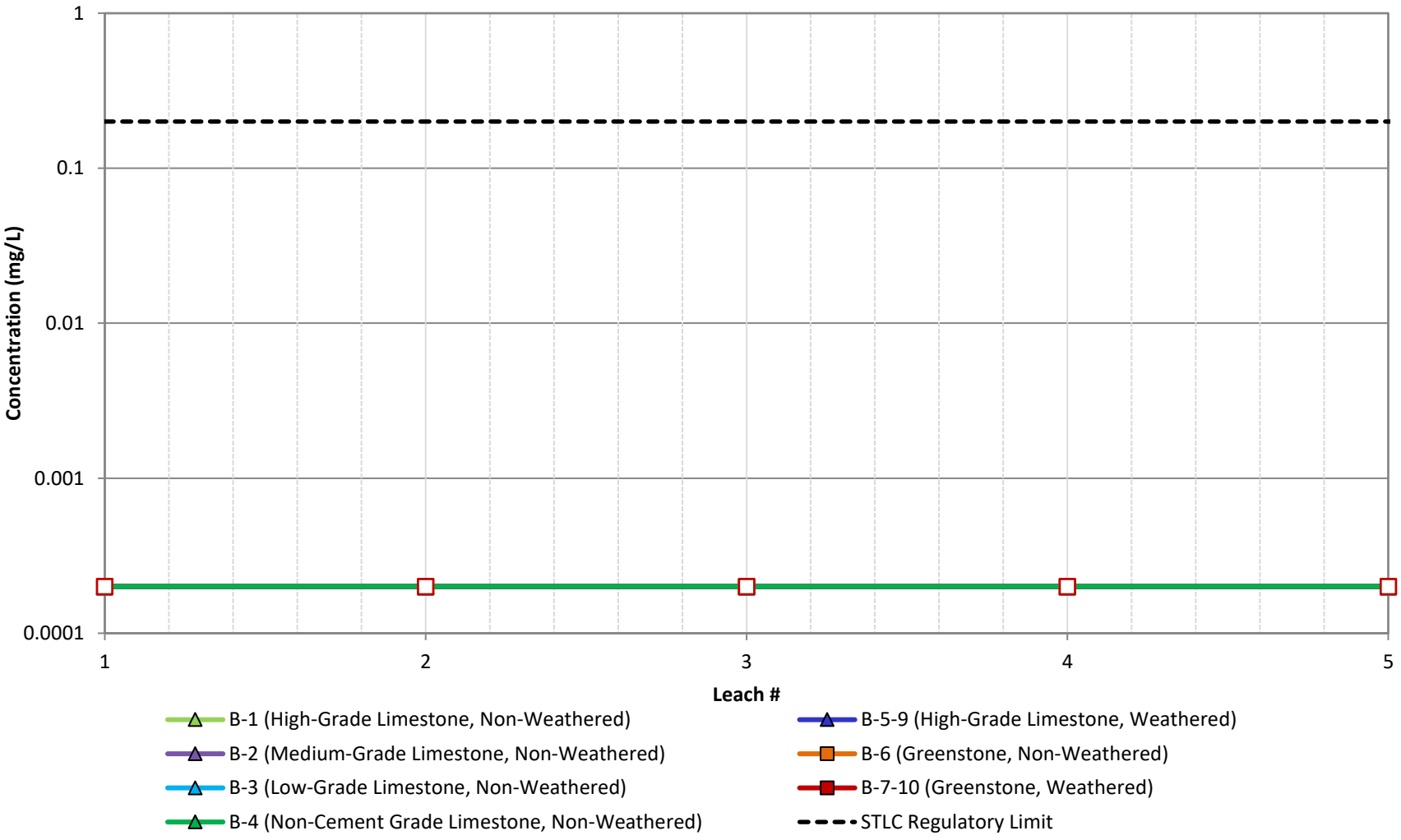

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Magnesium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-19 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



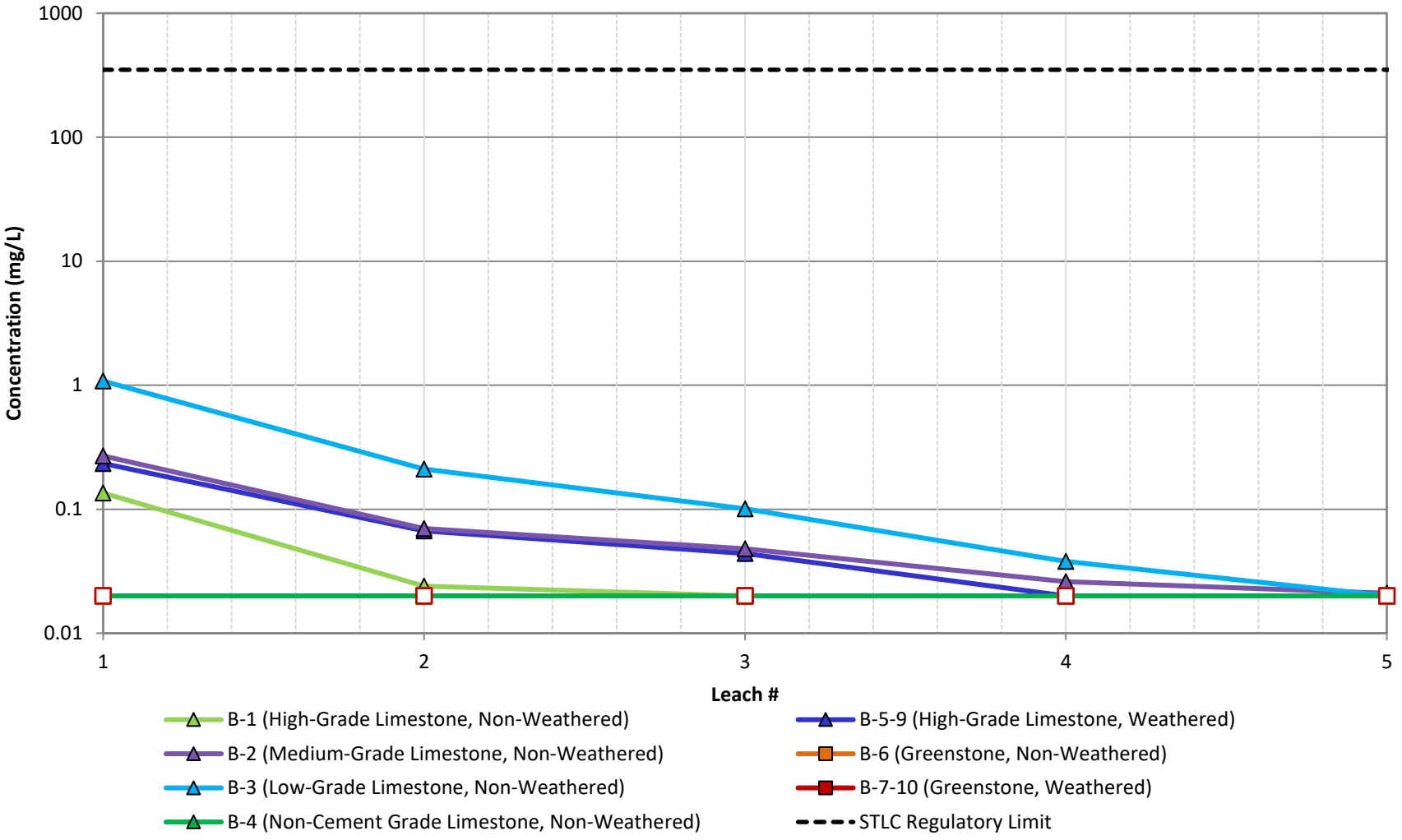

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Manganese** | | |
| | Project Name | Project No. 31405507 | FIGURE C-20 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



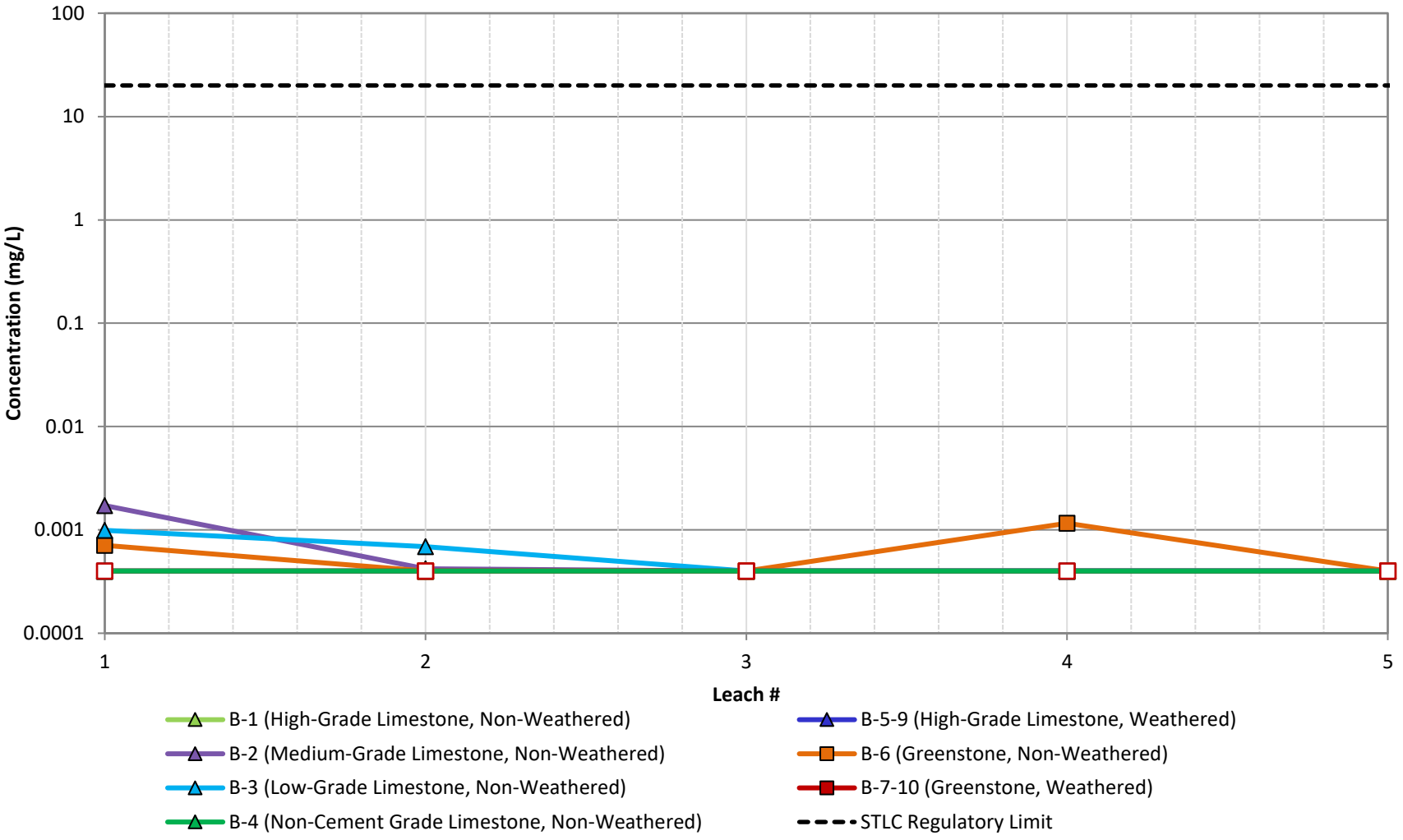

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Mercury** | | |
| | Project Name | Project No. 31405507 | FIGURE C-21 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



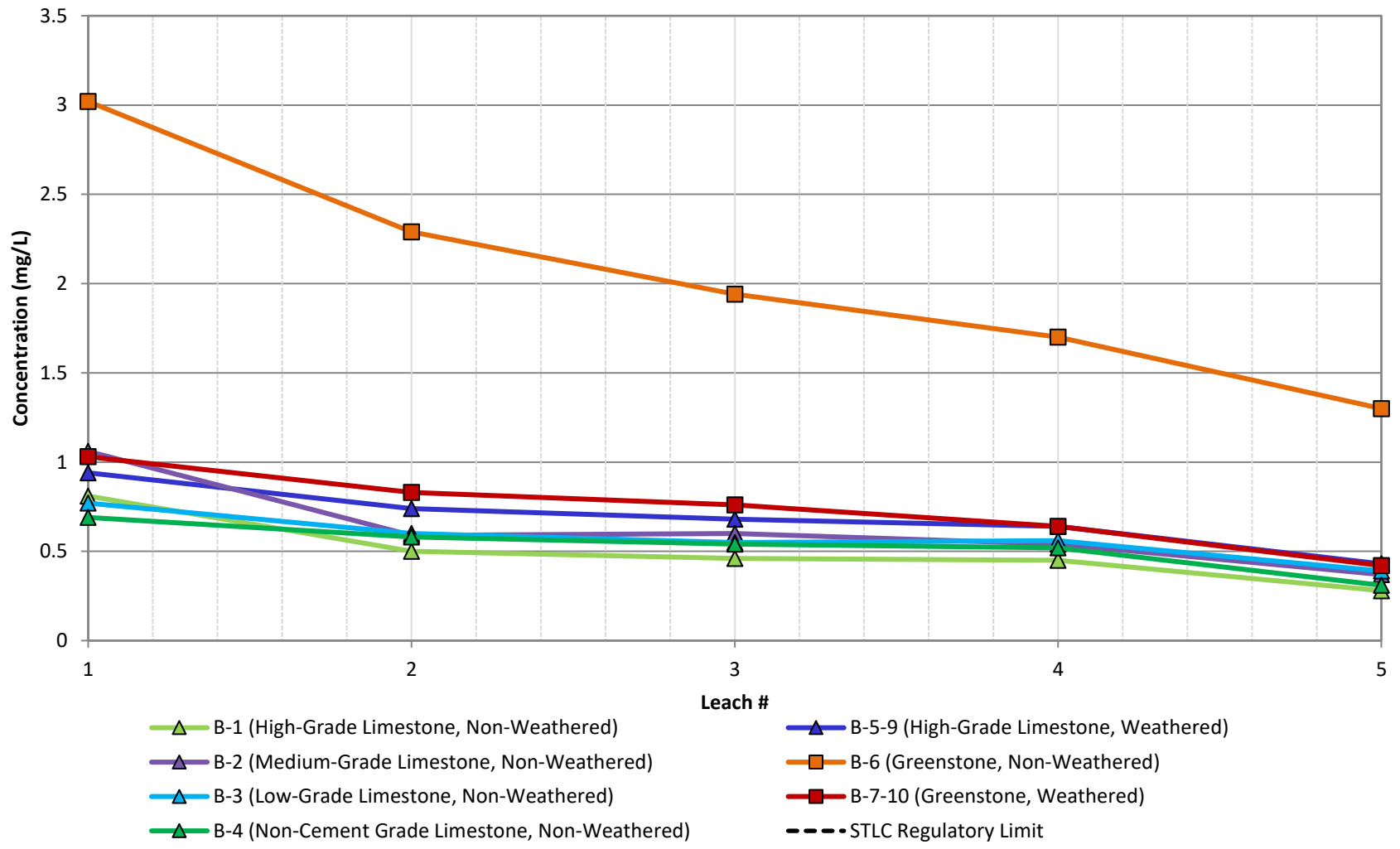

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Molybdenum** | | |
| | Project Name | Project No. 31405507 | FIGURE C-22 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



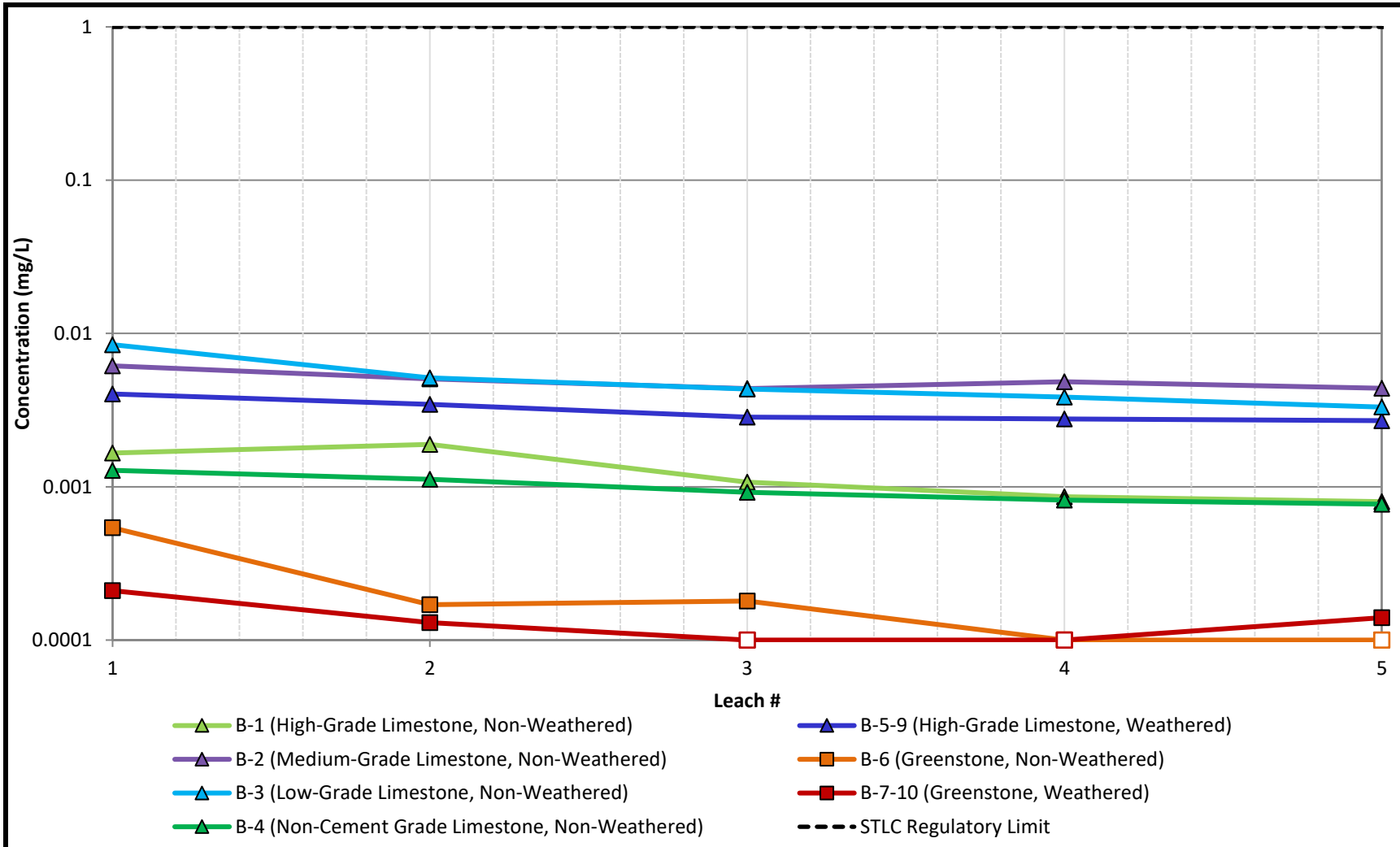

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Nickel** | | |
| | Project Name | Project No. 31405507 | FIGURE C-23 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



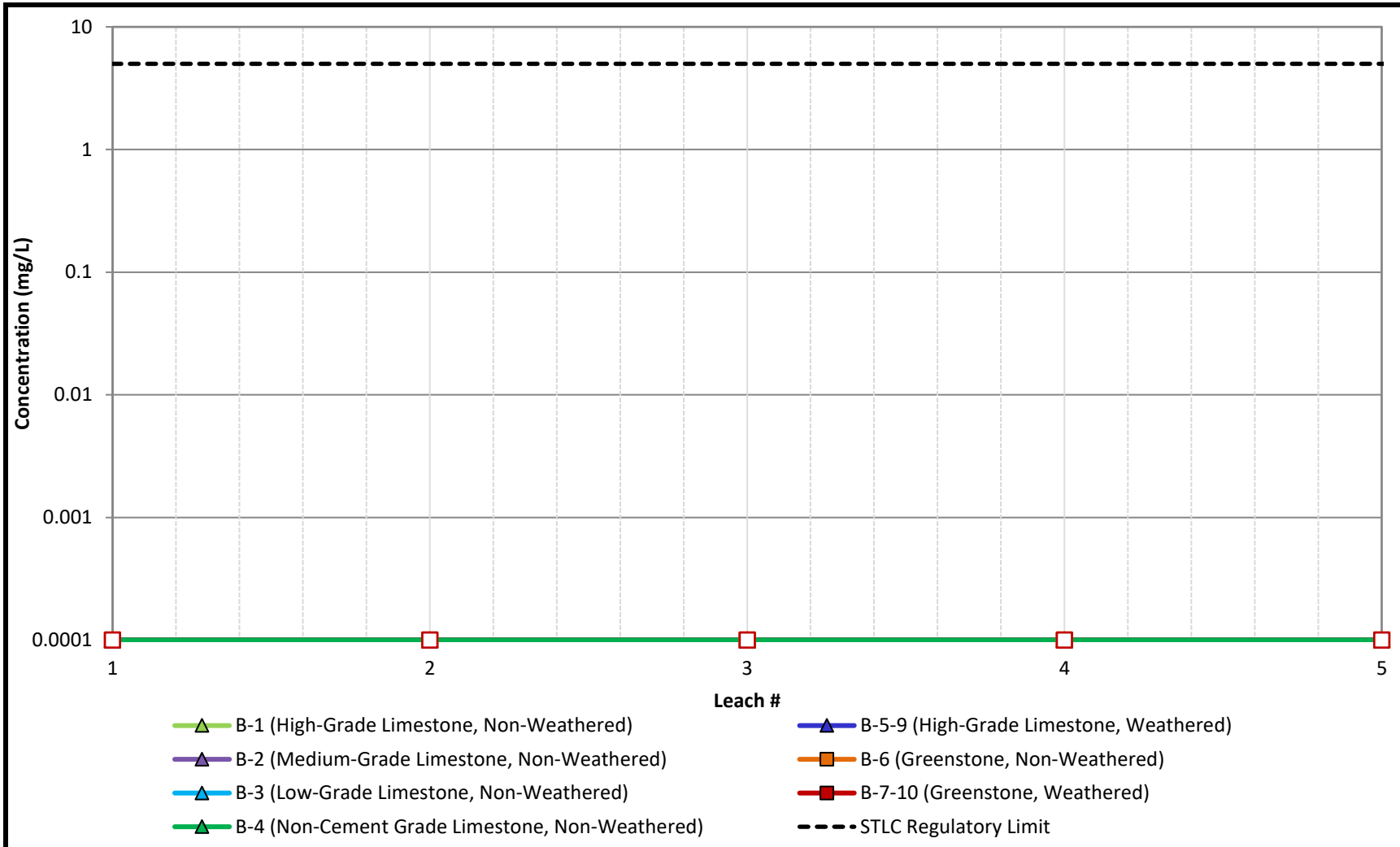

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Potassium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-24 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



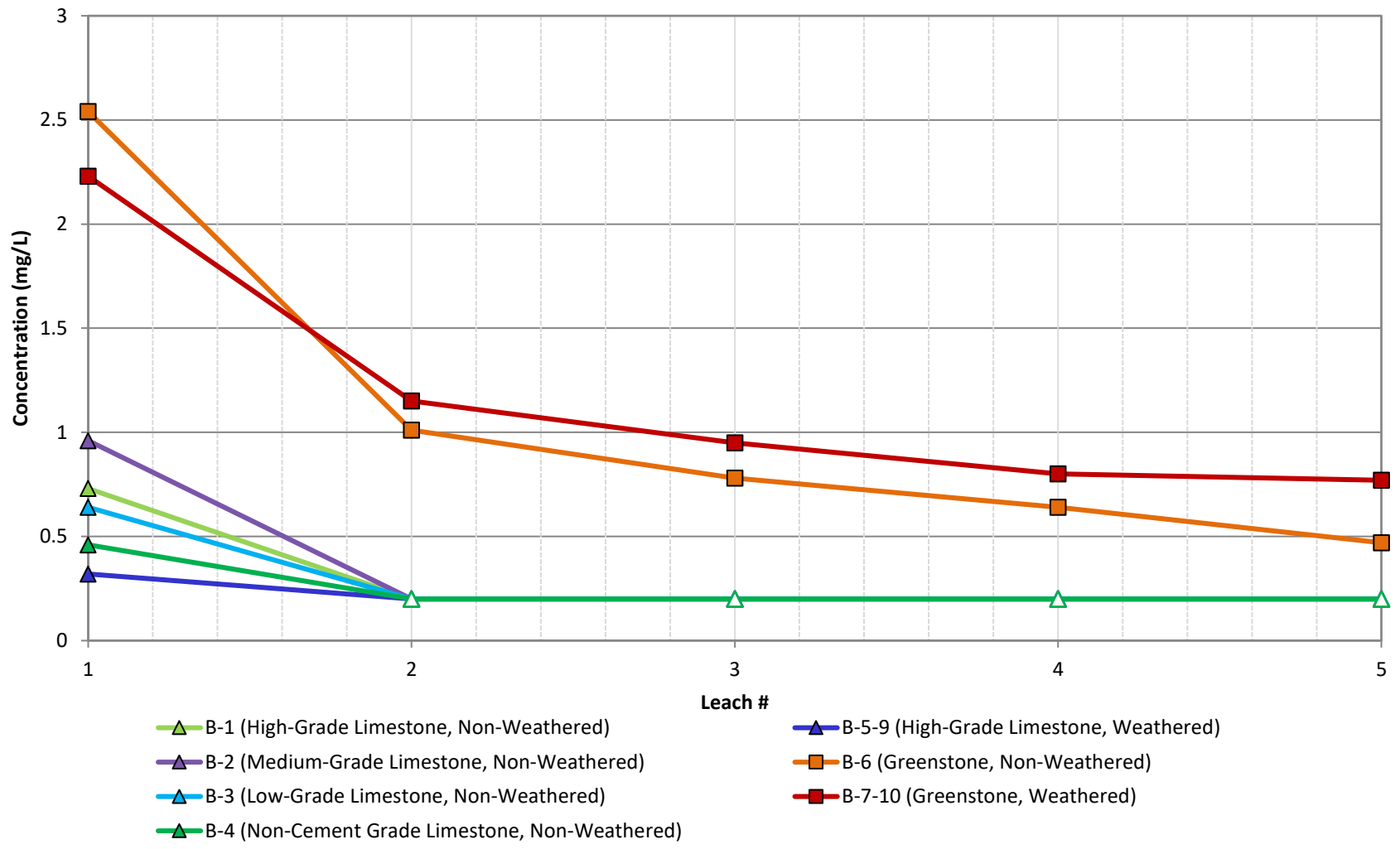

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Selenium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-25 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



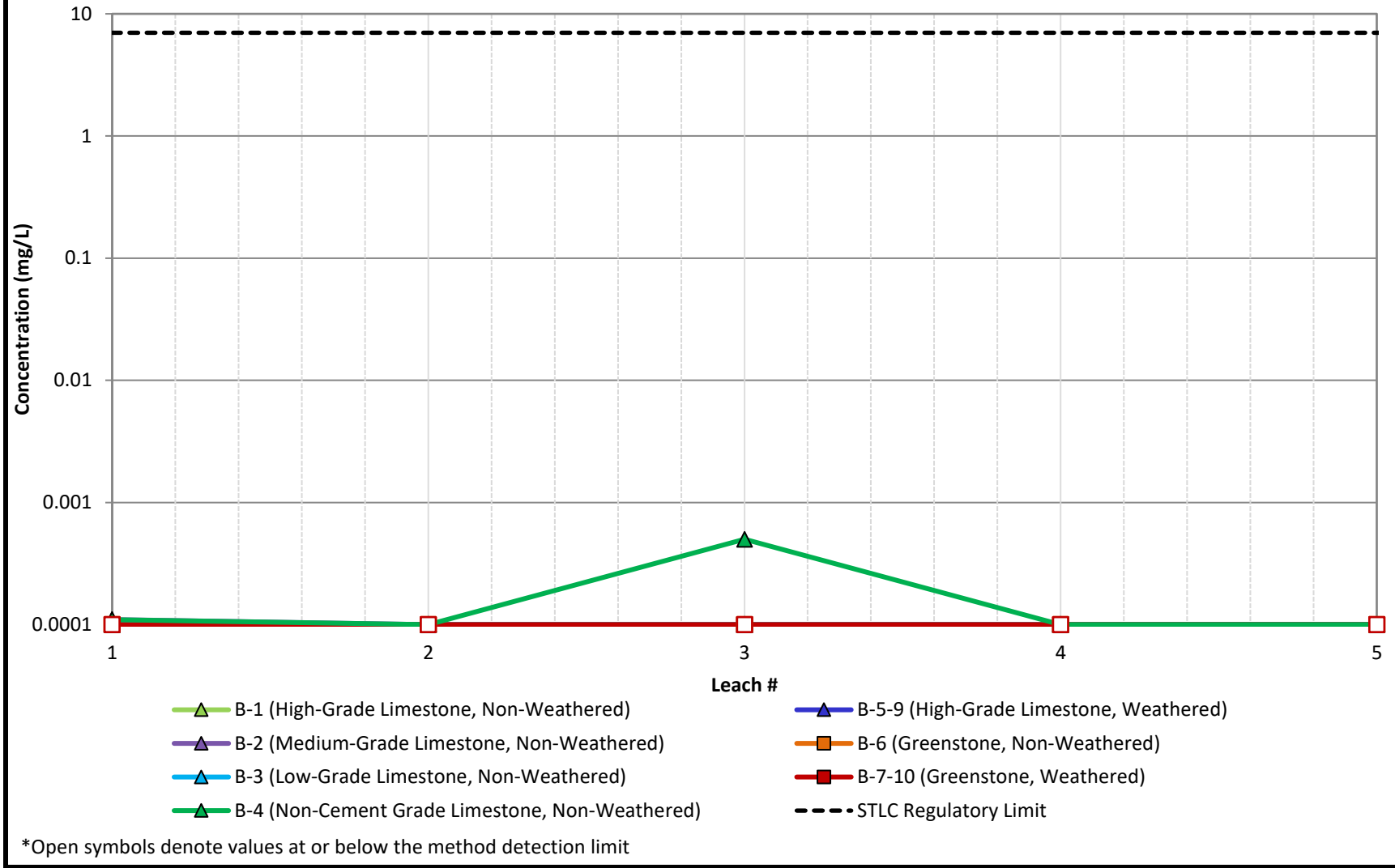

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Silver** | | |
| | Project Name | Project No. 31405507 | FIGURE C-26 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



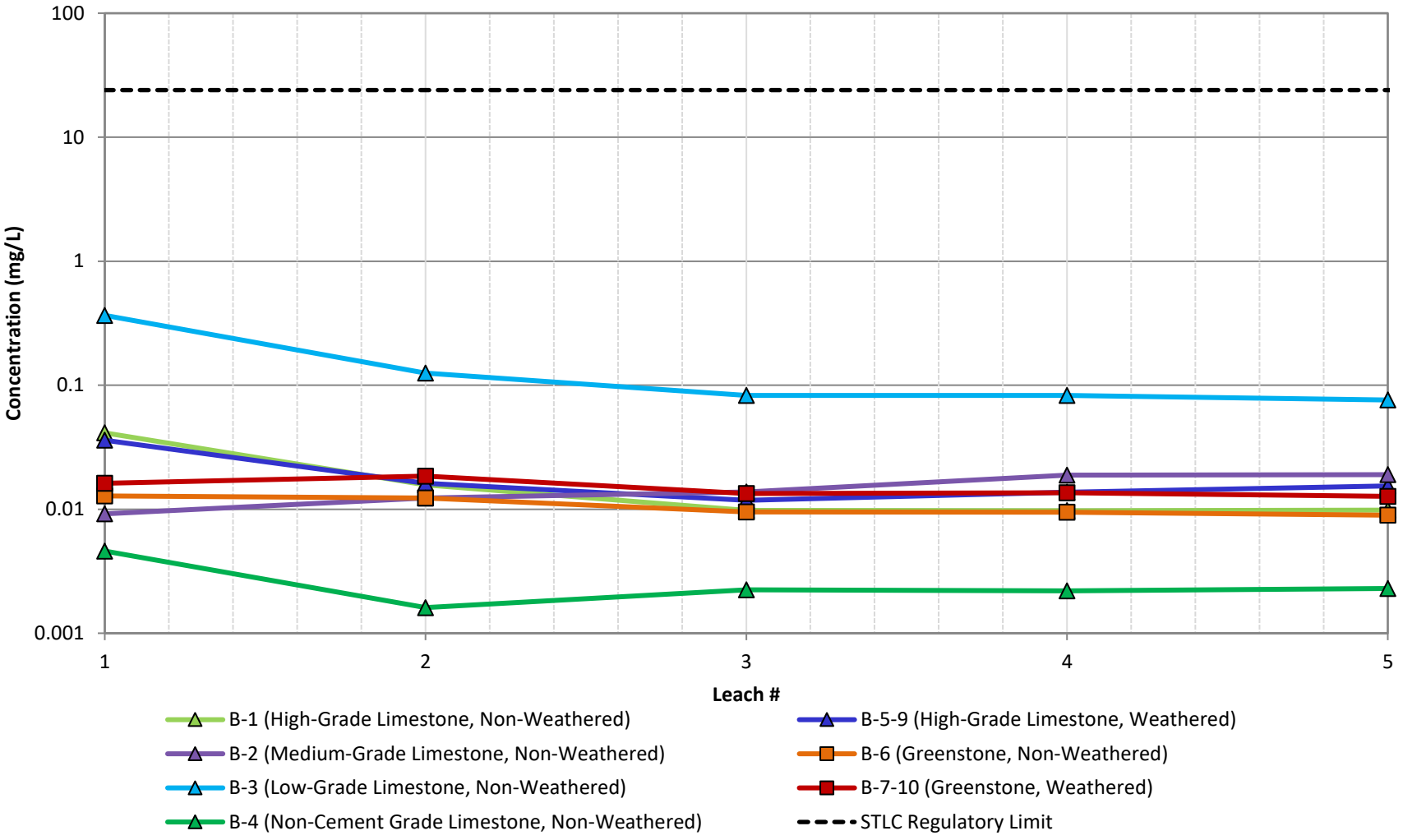

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Sodium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-27 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |




*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Thallium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-28 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |




*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Vanadium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-29 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |

# APPENDIX K

**Stantec 2022**

**Permanente Creek Restoration Plan Stability Analysis**

Stantec

# Memo

| | | | |
|---|---|---|---|
| To: | Carolina Addison<br>Lehigh Permanente | From: | Paul Kos<br>Denver |
| Project/File: | 233001622 | Date: | August 26, 2022 |

**Reference: PCRP Stability Analysis- DRAFT**

## INTRODUCTION

Lehigh Southwest Cement Company (Lehigh), a subsidiary of Lehigh Hanson, Inc., engaged Stantec Consulting Services Inc. (Stantec) to provide professional engineering services for geotechnical analysis related to proposed grading associated with the Permanente Creek Restoration Project (PCRP) at the Permanente Facility in Cupertino, California. An element of the PCRP involves removing material from the creek corridor and adjacent slopes. The PCRP design and grading plans are presented in the associated report prepared by Waterways (90% Designs, dated August 26, 2022). The grading plans were provided to Stantec by Waterways, and Stantec performed geotechnical analyses of the proposed slopes in support of the environmental review and subsequent permit applications.

This PCRP Stability Analysis has been prepared to assist Lehigh with upcoming environmental review and subsequent permit applications to relevant regulatory agencies. This report documents the results of static and pseudo-static slope stability analyses of the reclamation surface. The report does not contain the creek restoration design details and shall be reviewed in conjunction with Waterways' 90% Designs.

## BACKGROUND

The Permanente Facility is a limestone and aggregate mining operation, active since the late 1930's, in the unincorporated foothills of western Santa Clara County, approximately two miles west of the City of Cupertino, California. The Quarry occupies a portion of a 3,510-acre property (Permanente Property) owned by Hanson Permanente Cement, Inc. and operated by Lehigh.

The Permanente Property is situated in the rugged foothills along the eastern side of the Santa Cruz Mountains segment of the California Coast Ranges. This area of the Coast Ranges is characterized by moderately to steeply sloping hillsides ranging from approximately 500 to 2,000 feet (ft) above mean sea level (AMSL). The eastern side of the range is incised with eastern flowing drainages, including the Permanente Creek Drainage Basin, which flows through the central part of the Permanente Property, and flows through the Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay.

## GEOLOGIC SETTING

The geology in the project area is complex due to the faulting and deformation associated with the Franciscan Complex. This geologic unit consists of faulted limestone and metabasalts (greenstone) and also contains basalt, diorite, shale, sandstone, chert, greywacke, and schist. Structure in the area includes numerous low- and high-angle faults. Low-angle faults separate limestone units from greenstone units and

tend to follow the limestone bedding planes and typically dip to the southeast at 10° to 40°. High-angle faults, including the regional Berrocal Fault, are typically oriented in the northwest-southeast direction and dip at greater than 60°. The geology has been mapped several times by different geologists, and numerous drilling programs have been conducted. The results of these previous studies on the geologic units, structure, and interpretation were included in previous submittals (Golder 2011 and Foruria 2004).

## PREVIOUS GEOTECHNICAL EVALUATIONS

The geologic and geotechnical properties of the rocks present at the Permanente Quarry have been evaluated several times by several companies. Each investigation included drilling, laboratory testing, assessment of strength parameters for the various rock types encountered, and slope stability calculations. The rock strength parameters were based on laboratory data, rock mass rating (RMR) calculations, and back-analysis of landslide areas. The strength parameters for soil, greenstone overburden, and limestone have been consistent through multiple geotechnical analyses performed by multiple consultants, and these values are listed in Table 1. The strength parameters for greenstone vary significantly depending on the condition of the bedrock and particularly, the amount of weathering and shearing, and lower-bound values have historically been used for design purposes to be conservative. These lower-bound values are based on back-analysis of the Main Slide in the North Quarry. Laboratory data suggest the in-place greenstone may have significantly higher strength, particularly at depths greater than approximately 50 feet, where the bedrock has not been weathered. Site observations also suggest that greenstone strengths are often under-reported as several areas of the highwall are constructed in weathered greenstone, and these areas have maintained their integrity with 50-foot high benches with face angles of 60° to 70° (Golder 2011).

**Table 1: Historic Rock Strength Summary**

| Material | Unit Weight (pcf) | Cohesion (psf) | Φ' (°) |
|---|---|---|---|
| Limestone | 165 | 12,500 | 30 |
| Greenstone | 155-165 | 1,400-1,880 | 19-23 |
| Fault | 155 | 0 | 20 |
| Slide Debris | 135 | 0-700 | 20-23 |
| Greenstone Overburden | 125 | 0 | 35 |
| Soil | 120 | 200 | 30 |

## GEOTECHNICAL STABILITY EVALUATION

The slope stability analyses were modeled using the software Slide2 Modeler version 9 by rocscience, released in 2020. The software used limit equilibrium on slices of potential failure surface to calculate factor of safety (FoS). The models were evaluated under static and pseudo-static conditions, with horizontal ground acceleration, for the designed ramp configuration provided by the site using the Spencer method. The minimum FoS for each model evaluation is included in this report. The two types of analysis have been summarized in Table 2. The minimum acceptable factors of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions based on mining industry standards. For the pseudo-static model conditions, a horizontal seismic coefficient of 0.15 times the force of gravity (g) was applied to the

static condition models to be consistent with previous studies and to follow recommendations for earthquakes with magnitudes up to 8.25 (Golder 2011). To evaluate the slope stabilities, cross-sections were analyzed for the reclamation surface.

**Table 2: Stability Analyses**

| Analysis Type | Description | Minimum Acceptable Factor of Safety |
|---|---|---|
| Static Analysis | A limit equilibrium method of analysis which satisfies moment and force equilibrium to solve a slope stability problem. The output is a single FoS for the potential failure surface with the lowest FoS. | 1.3 |
| Pseudo-static Analysis | A limit equilibrium method of analysis which represents the effects of earthquake shaking by accelerations that create inertial forces. This is the simplest way to analyze the dynamic effects of earthquake loading of a soil or slope. The output is a single FoS for the potential failure surface with the lowest FoS. | 1.0 |

Site specific geotechnical information is available for each rock type on the property, and strength parameters for the material have been established in previous geotechnical analyses (Golder 2011). These strength parameters are based on laboratory testing, back-calculation, and published values for soil properties. These strength parameters are listed in Table 3.

**Table 3: Geotechnical Strength Parameters**

| Material | Unit Weight (pcf) | Cohesion (psf) | Phi' (Degrees) |
|---|---|---|---|
| Greenstone (Weathered) | 165 | 1,800 | 27 |
| Greenstone (Unweathered) | 165 | 12,500 | 30 |
| Limestone | 165 | 12,500 | 30 |

As previously discussed, the greenstone strengths can vary significantly depending on the degree of weathering, and Stantec focused on evaluating the greenstone strengths as part of this geotechnical investigation. The greenstone strengths were re-evaluated based on RMR classifications. The historic greenstone strength ($\phi$'=27° and cohesion=1,800 pounds per square foot [psf]) is suitable for areas that have been weathered and are near the surface. A stronger strength for greenstone is expected for bedrock at depths greater than 50 feet from the surface, which is "beyond" the surficial weathered zone. While this transition to competent bedrock has been demonstrated by drilling, Stantec has used the weathered greenstone strength values for all depths to be conservative. Similarly, there are likely areas with limestone

that would exhibit greater strengths, and these have also not been included in the geotechnical analyses to be conservative.

Stability analyses are focused on areas with greater excavation volumes, particularly the rock pile removal area (Section A) and the 1250 Pond area (Sections C and E); the cross-sections modeled align with Waterway's sections and Waterway's naming conventions have been retained for clarity between the reports. Stantec modelled multiple cross-sections in the Pond 1250 area to evaluate the stability under different slope configurations and excavation depths. The cross-sections extend to the top of the surrounding slopes to evaluate any impacts that the grading may have on the global stability. Stantec adjusted the limits of the analyses to evaluate both the global slope stability and the stability in the area immediately adjacent to the PCRP grading.

The configurations modeled as part of this analysis exceed the minimum acceptable factor of safety, as defined in Table 3. Generally, the elevated geotechnical stability results are from the shallow cut slopes associated with the PCRP grading plan. Results from the stability analyses are shown in Table 4. Printouts of the slope stability sections are attached.

**Table 4: Geotechnical Stability Analyses Results**

| Analysis Area | Analysis method | Section A | Section C | Section E |
|---|---|---|---|---|
| Cut Slope | Static | 1.8 | 3.0 | 2.3 |
| | Pseudo-Static | 1.7 | 2.8 | 2.2 |
| Global Slope | Static | 1.5 | 2.8 | 1.5 |
| | Pseudo-Static | 1.5 | 2.7 | 1.4 |

## CLOSURE

This report provides the analysis and supporting information needed to demonstrate that Lehigh Southwest Cement Company's plan for the PCRP meets design and performance requirements under static and seismic conditions. The PCRP will be excavated so that stable slopes remain. As mutual protection to Lehigh, the public, and Stantec, this report was submitted for exclusive use by Lehigh Southwest Cement Company. Our report and recommendations should not be reproduced in whole or in part without the supporting Waterways 90% Design report and our express written permission, other than as required in relation to agency review and submittals. A draft of this report was reviewed by personnel from Lehigh Southwest Cement Company.

Regards,

**STANTEC CONSULTING SERVICES INC.**

**Reference: PCRP Stability Analysis**

**Paul Kos** P.E.
Senior Geological Engineer
Mobile: 303-570-9163
paul.kos@stantec.com

Attachment: Stability Model Reports

Stantec

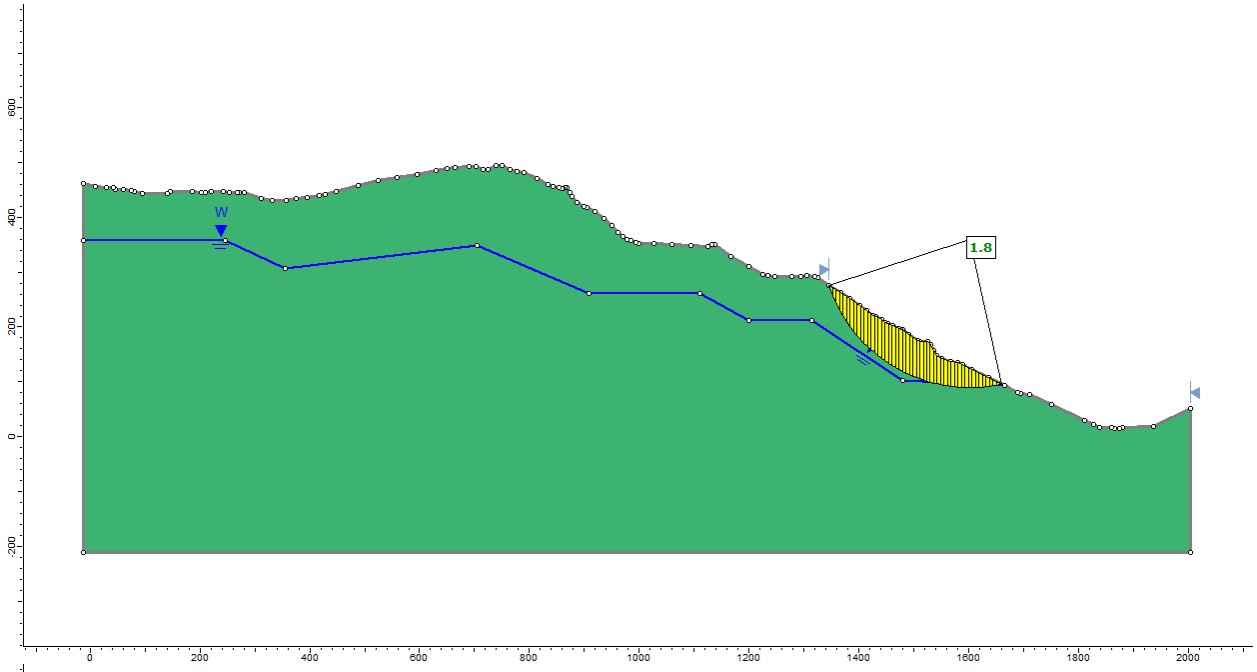
Memo

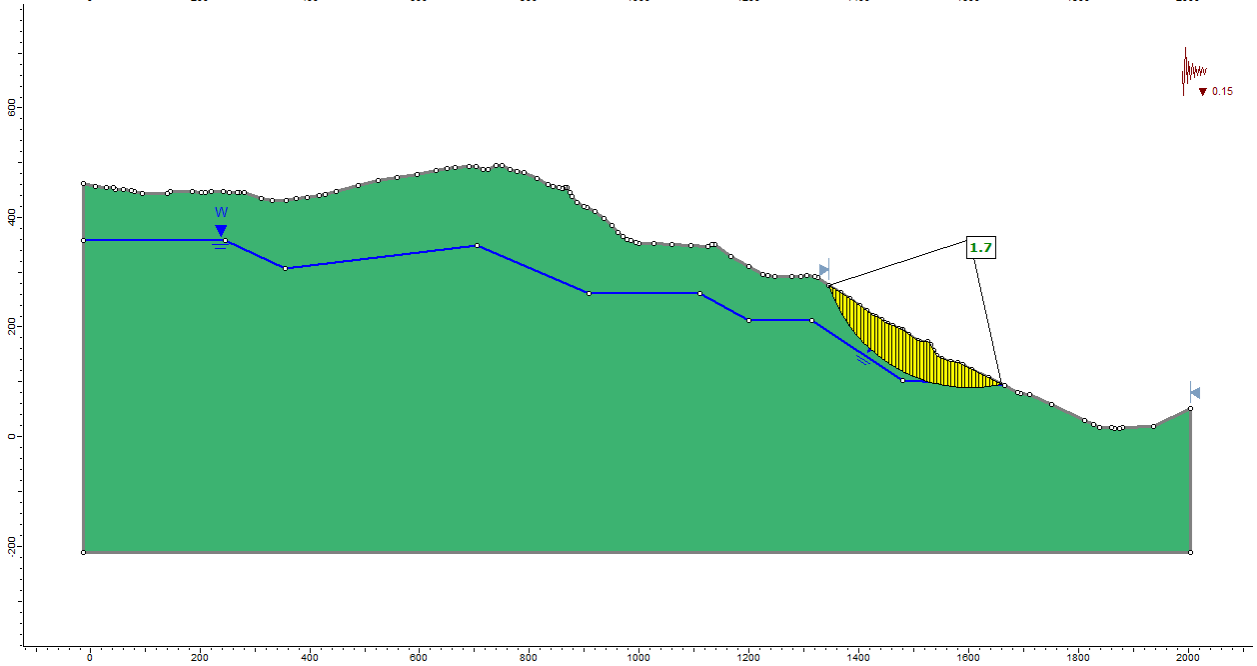
## Attachment A

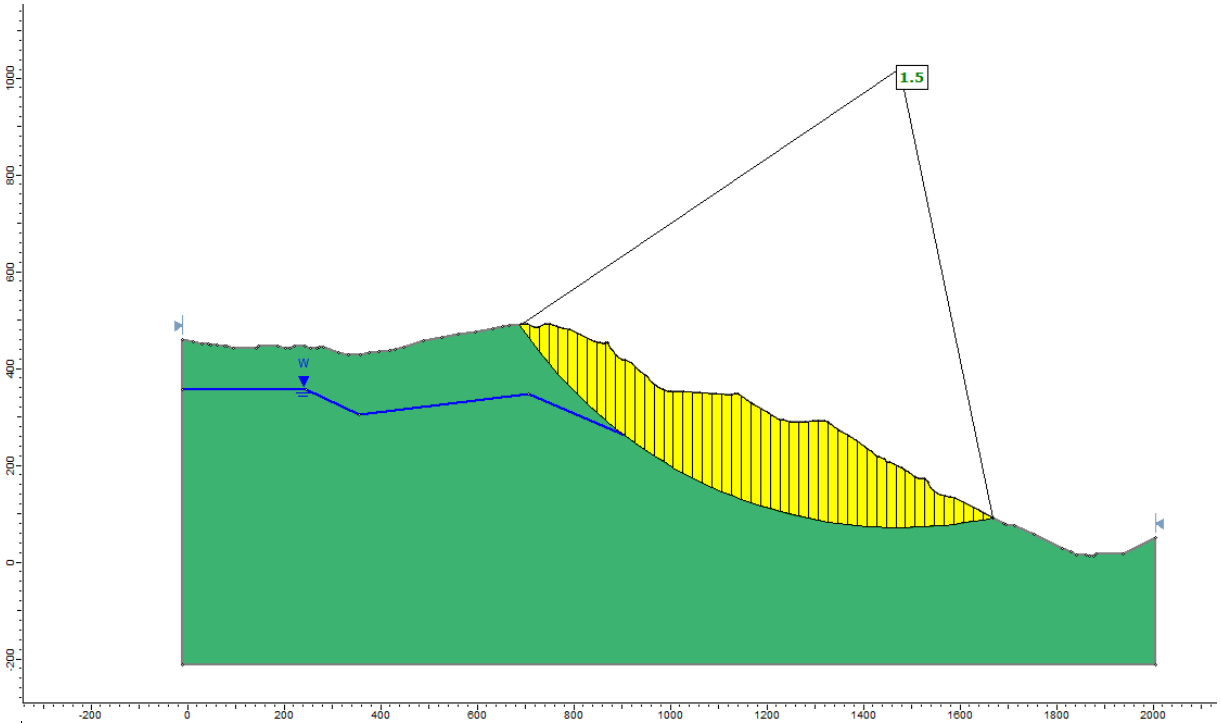
## Stability Model Reports

Design with community in mind

## SECTION A (Rock Pile Removal Area)

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1800
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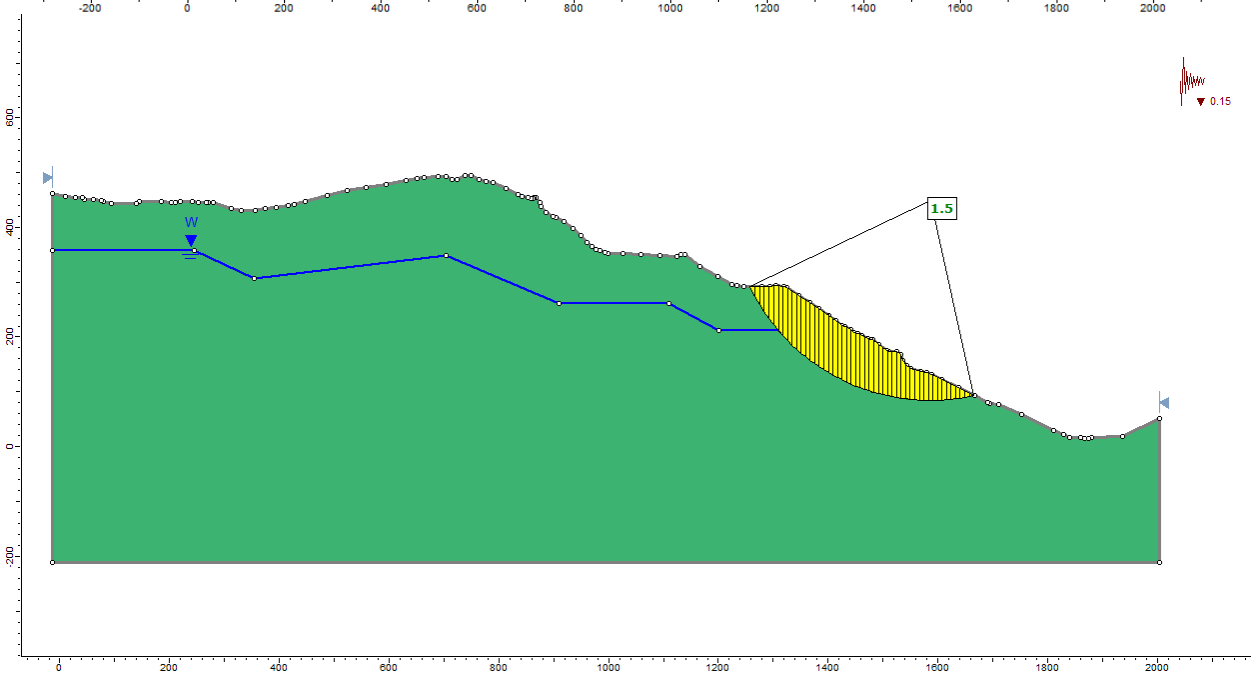
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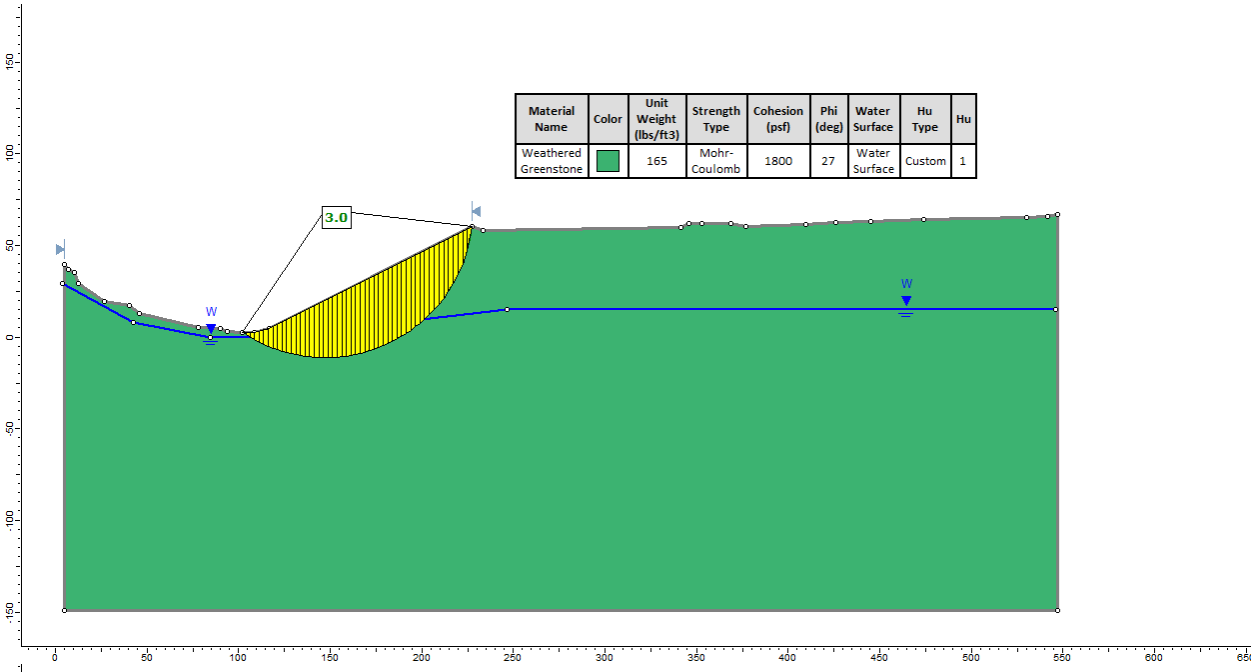
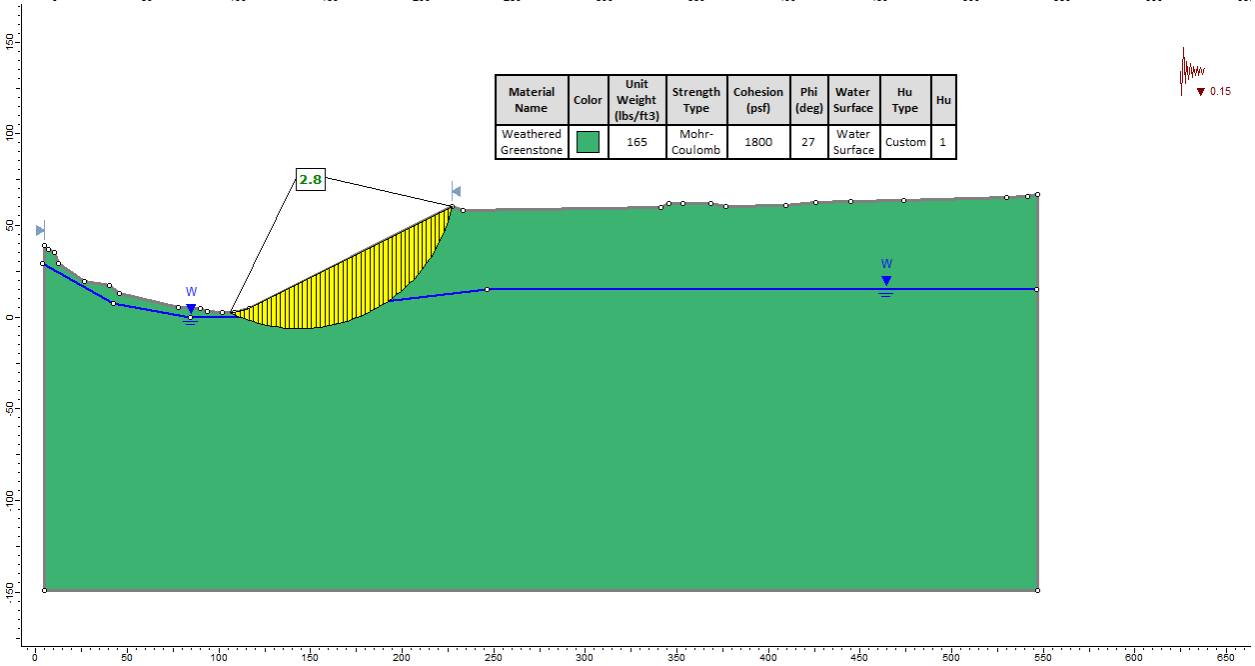
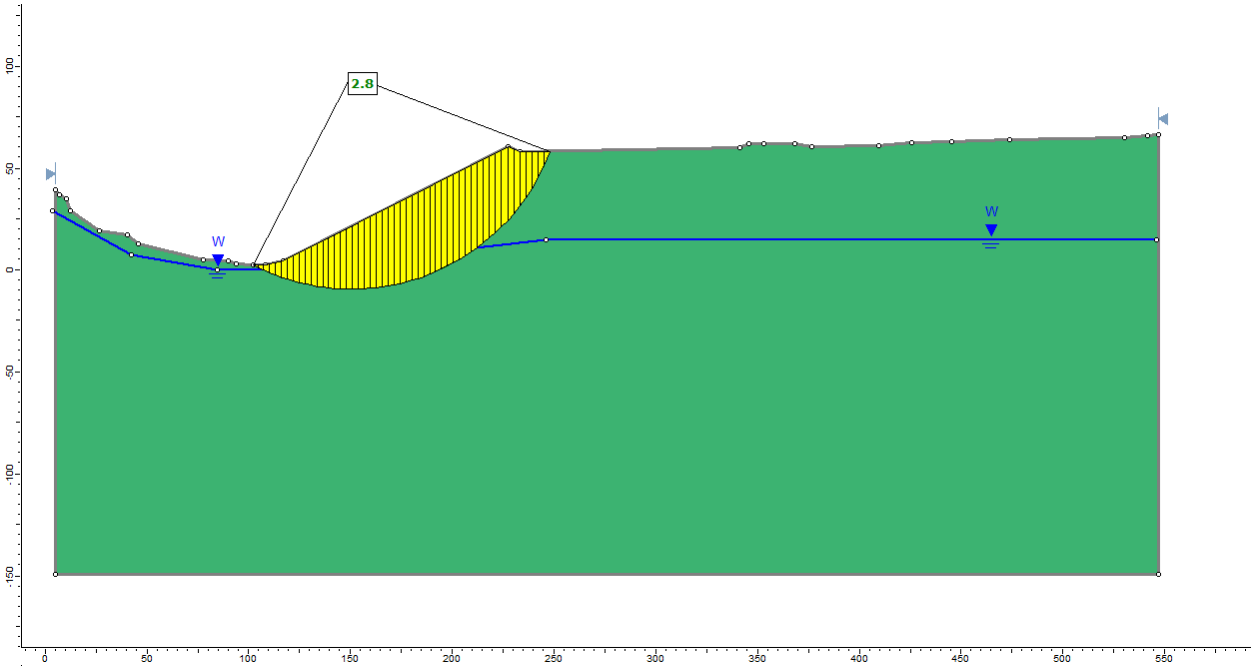
## SECTION C (Pond 1250 Area)

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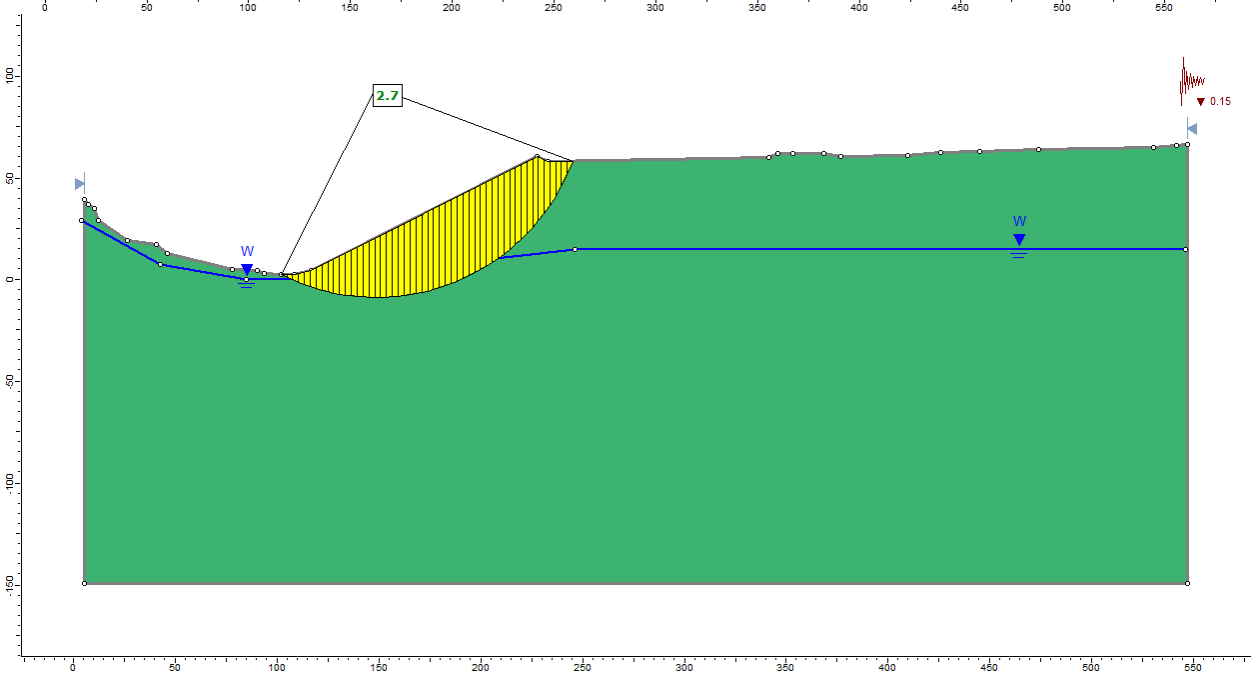
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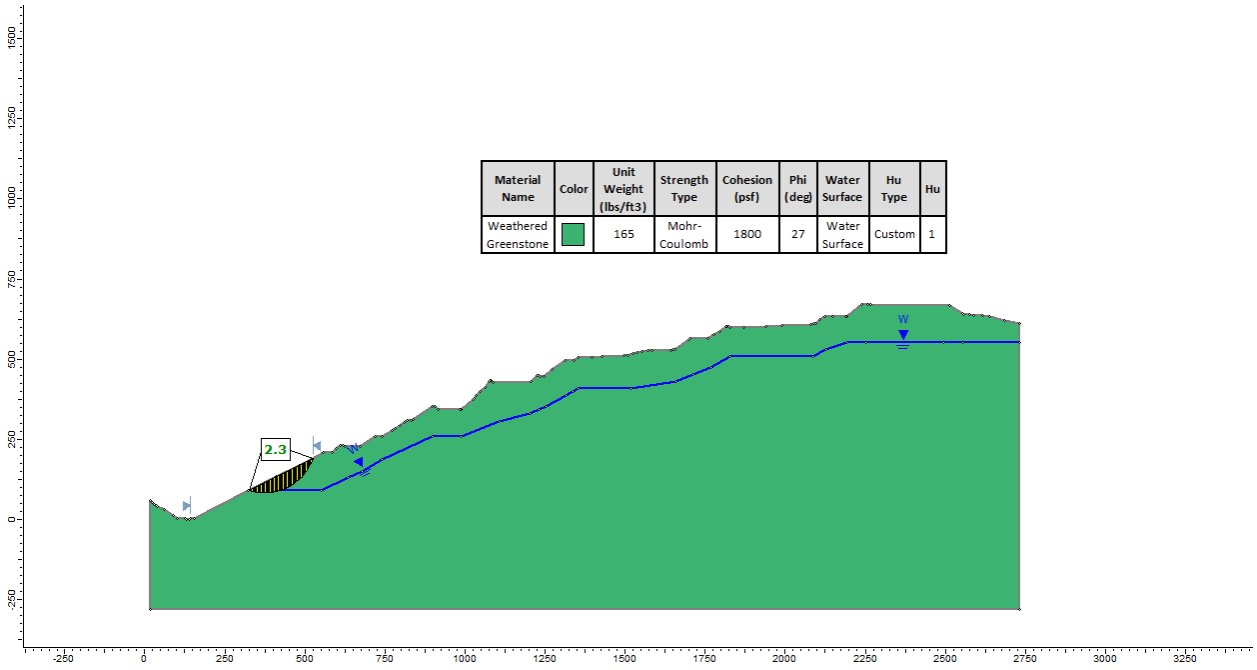
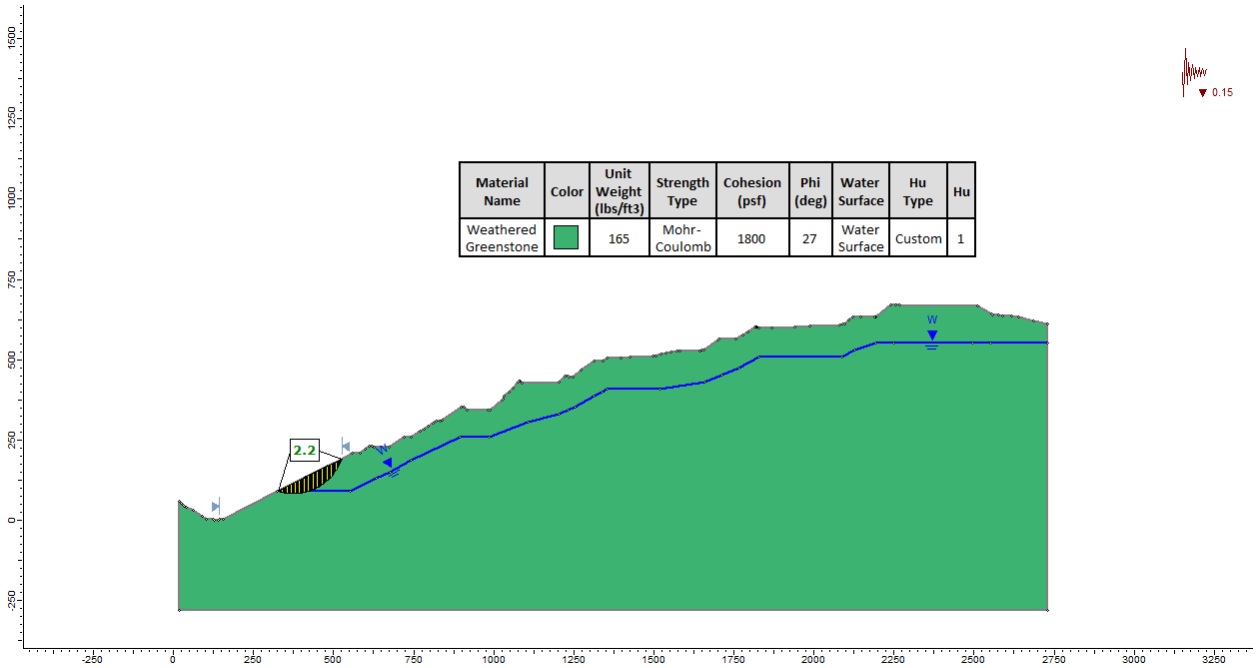
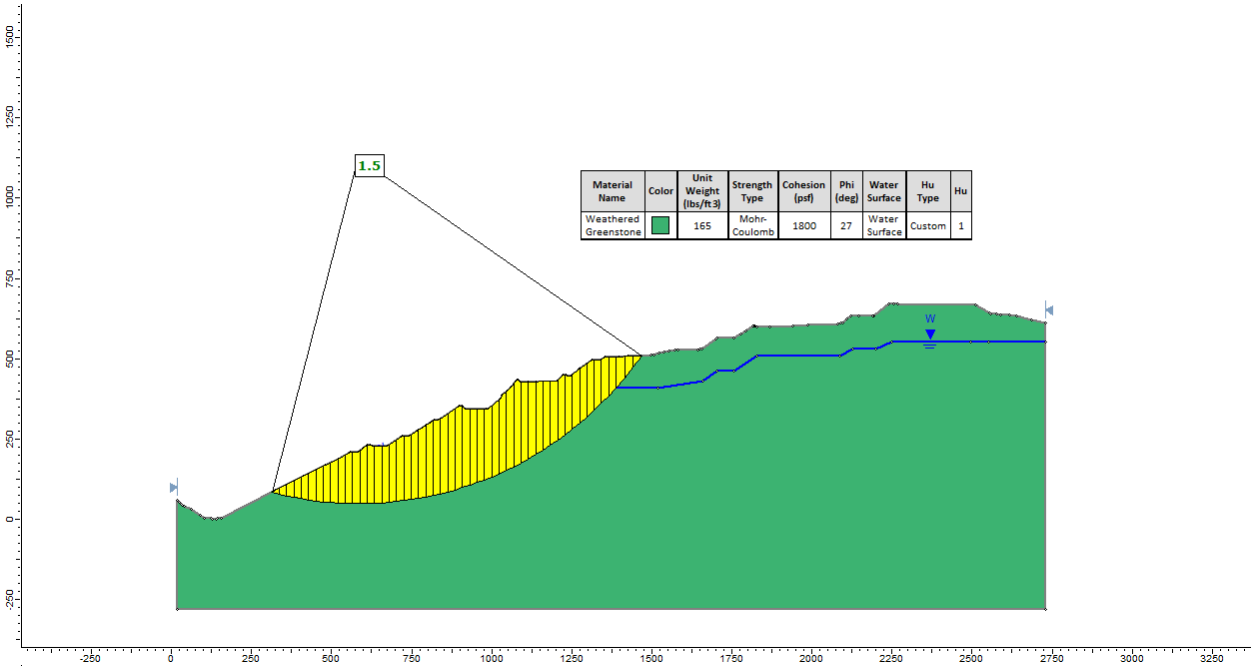
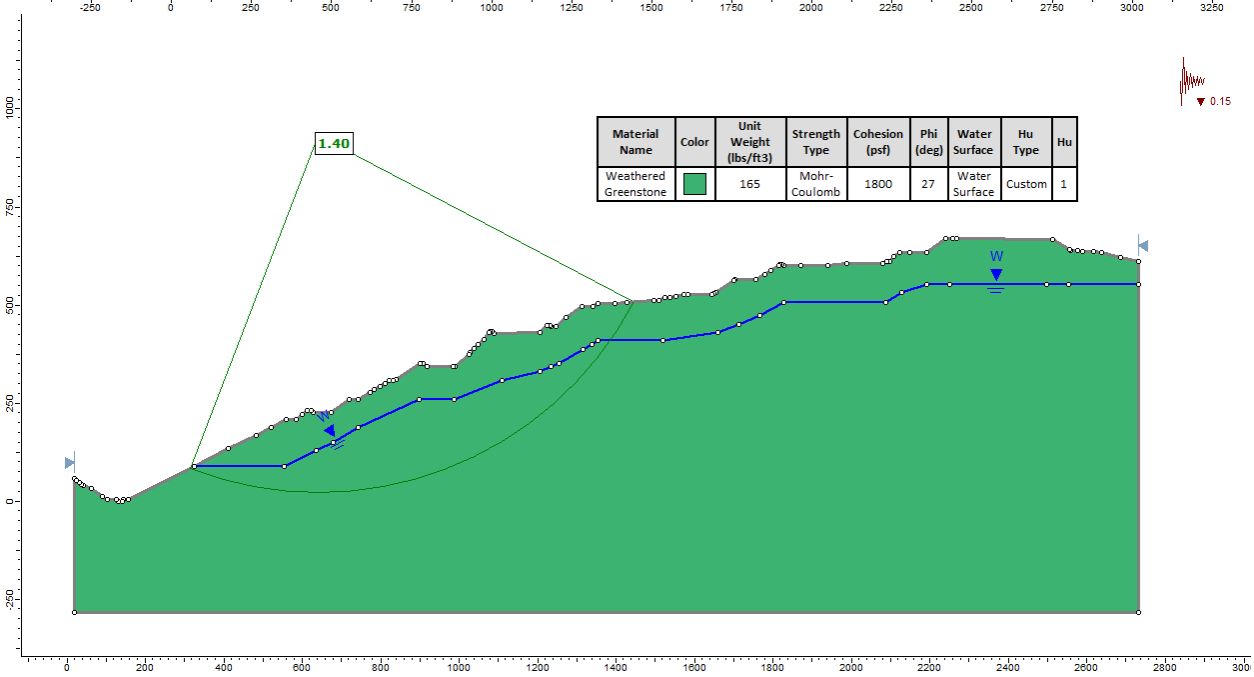
## SECTION E (Pond 1250 Area)



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# APPENDIX L

**Material Removal Area**

**Lower Limit of Potential Finished Grade Figures**

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| MADRONE | 12" | 1 |
| MADRONE | 18" | 1 |
| WILLOW | 4" | 1 |
| WILLOW | 6" | 2 |
| WILLOW | 10" | 1 |
| WILLOW | 12" | 1 |

### NOTES:

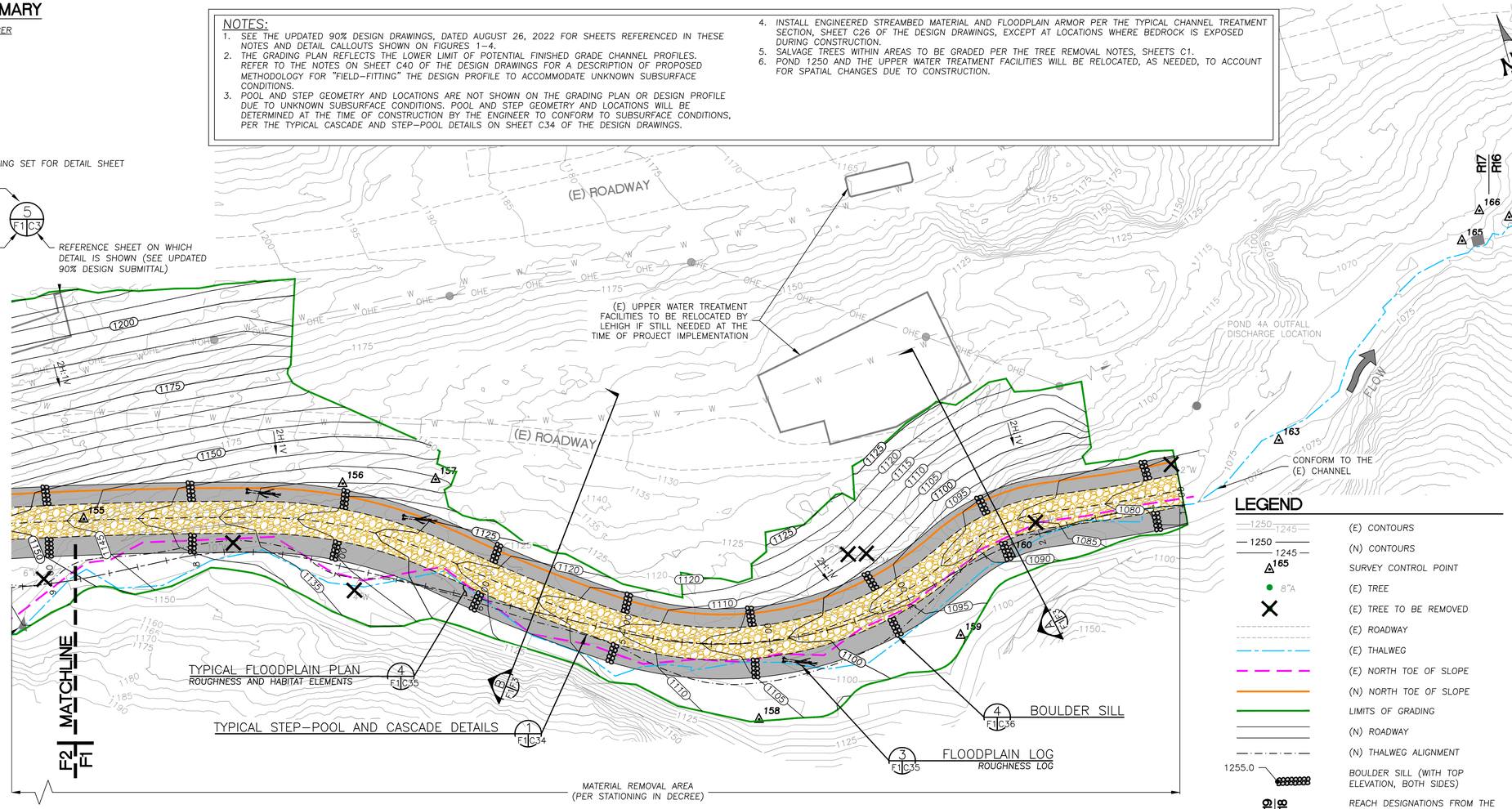
1. SEE THE UPDATED 90% DESIGN DRAWINGS, DATED AUGUST 26, 2022 FOR SHEETS REFERENCED IN THESE NOTES AND DETAIL CALLOUTS SHOWN ON FIGURES 1–4.
2. THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C40 OF THE DESIGN DRAWINGS FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD–FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
3. POOL AND STEP GEOMETRY AND LOCATIONS ARE NOT SHOWN ON THE GRADING PLAN OR DESIGN PROFILE DUE TO UNKNOWN SUBSURFACE CONDITIONS. POOL AND STEP GEOMETRY AND LOCATIONS WILL BE DETERMINED AT THE TIME OF CONSTRUCTION BY THE ENGINEER TO CONFORM TO SUBSURFACE CONDITIONS, PER THE TYPICAL CASCADE AND STEP–POOL DETAILS ON SHEET C34 OF THE DESIGN DRAWINGS.
4. INSTALL ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR PER THE TYPICAL CHANNEL TREATMENT SECTION, SHEET C26 OF THE DESIGN DRAWINGS, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.
5. SALVAGE TREES WITHIN AREAS TO BE GRADED PER THE TREE REMOVAL NOTES, SHEETS C1.
6. POND 1250 AND THE UPPER WATER TREATMENT FACILITIES WILL BE RELOCATED, AS NEEDED, TO ACCOUNT FOR SPATIAL CHANGES DUE TO CONSTRUCTION.

### DETAIL CALLOUT NOTES:

1. REFER TO THE COMPLETE DRAWING SET FOR DETAIL SHEET REFERENCES AS SHOWN BELOW.

DETAIL IDENTIFICATION (NUMBER OR LETTER) — 5 — REFERENCE SHEET ON WHICH DETAIL IS SHOWN (SEE UPDATED 90% DESIGN SUBMITTAL)

F1 C3 — REFERENCE FIGURE FROM WHICH DETAIL IS TAKEN

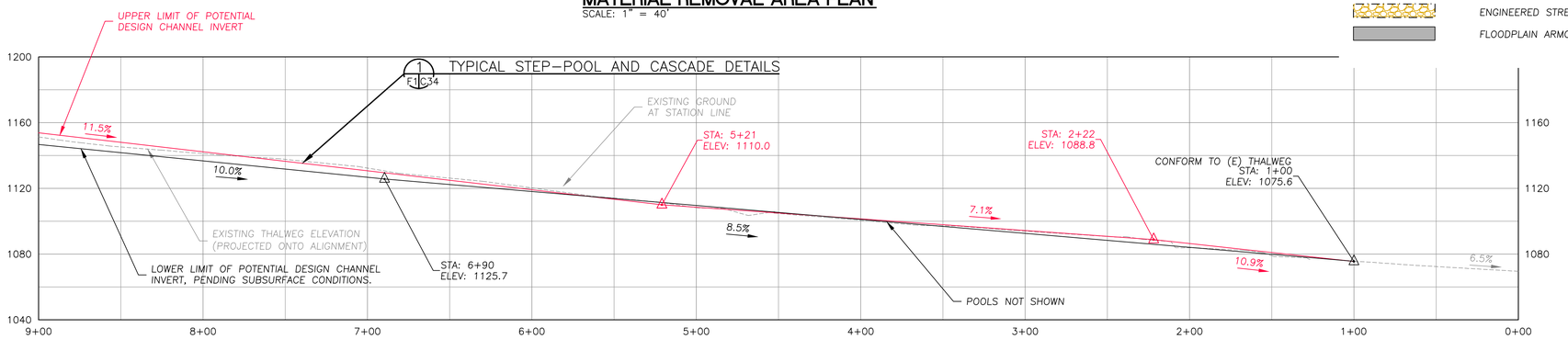



## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'

### LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG–TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 40'

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

PERMANENTE CREEK RESTORATION PLAN

MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
F1

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| BAY | 16" | 1 |
| MAPLE | 14" | 2 |
| MAPLE | 18" | 2 |
| MAPLE | 30" | 1 |
| OAK | 16" | 1 |
| WILLOW | 20" | 1 |
| WILLOW | 16" | 1 |
| WILLOW | 14" | 2 |
| WILLOW | 12" | 2 |

## LEGEND

- (E) CONTOURS
- (N) CONTOURS
- SURVEY CONTROL POINT
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT
- BOULDER SILL (WITH TOP ELEVATION, BOTH SIDES)
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- ENGINEERED STREAMBED MATERIAL
- FLOODPLAIN ARMOR

POND 1250 AND THE UPPER WATER TREATMENT FACILITIES TO BE REMOVED BY LEHIGH PRIOR TO START OF CONSTRUCTION

12 INCH DIA HDPE PIPE
INV. IN: 1224.8
INV. OUT: NOT SURVEYED

(E) UPPER WATER TREATMENT FACILITIES TO BE REMOVED BY LEHIGH PRIOR TO START OF CONSTRUCTION

POND 1250

(N) NORTH TOE

LIMITS OF GRADING (APPROX.)

(E) BASIN AT YEAGAR YARD

(E) NORTH TOE

CONFORM TO THE (E) THALWEG GRADE

CONFORM TRIBUTARY CHANNEL TO PERMANENTE CREEK AT THE DIRECTION OF THE ENGINEER

(E) THALWEG

(N) THALWEG ALIGNMENT

FLOW

REMOVE (E) RELIC CONCRETE STRUCTURES

1 TYPICAL STEP-POOL AND CASCADE DETAILS F2|C34

FLOODPLAIN LOG
ROUGHNESS LOG 3 F2|C35

4 BOULDER SILL F2|C36

TYPICAL FLOODPLAIN PLAN
ROUGHNESS AND HABITAT ELEMENTS 4 F2|C35

FLOODPLAIN LOG
LIVE LOG 3 F2|C35

A MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE F2|C26

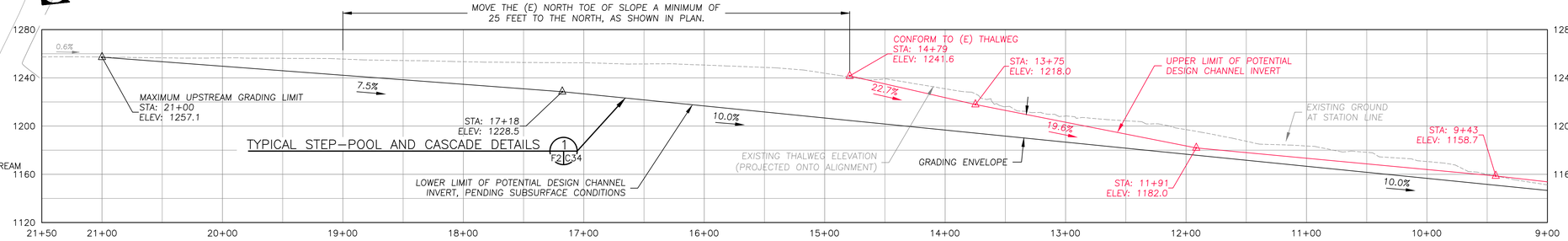
F2|MATCHLINE|F1

MATERIAL REMOVAL AREA
(PER STATIONING IN DEGREE)

## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'

MOVE THE (E) NORTH TOE OF SLOPE A MINIMUM OF 25 FEET TO THE NORTH, AS SHOWN IN PLAN.




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'

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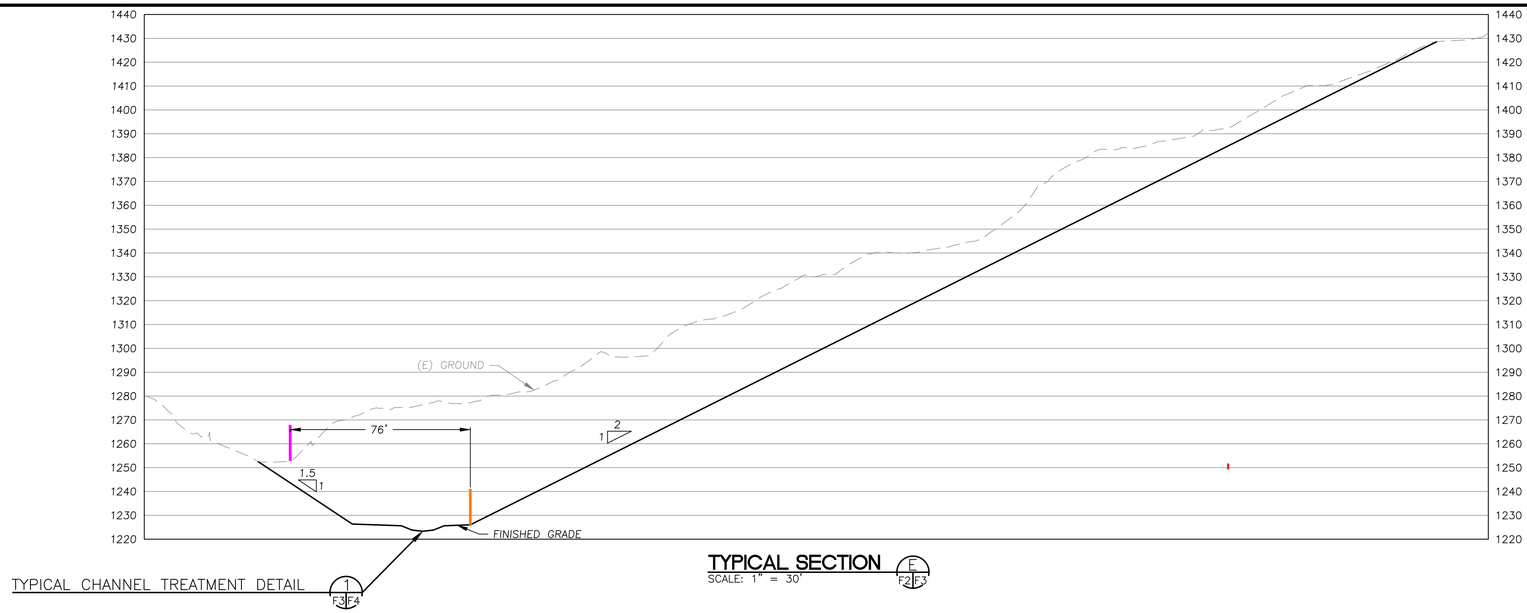
MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. USE FOR SCALES FOR REDUCED PLOTS

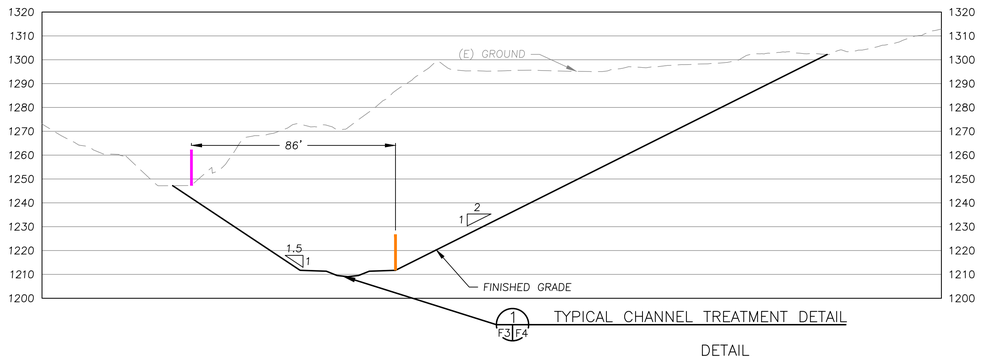
0 1"

FIGURE
F2



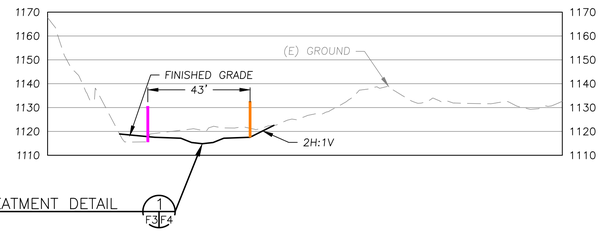

TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION E F2 F3
SCALE: 1" = 30'



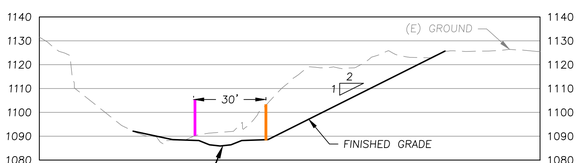

TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

DETAIL



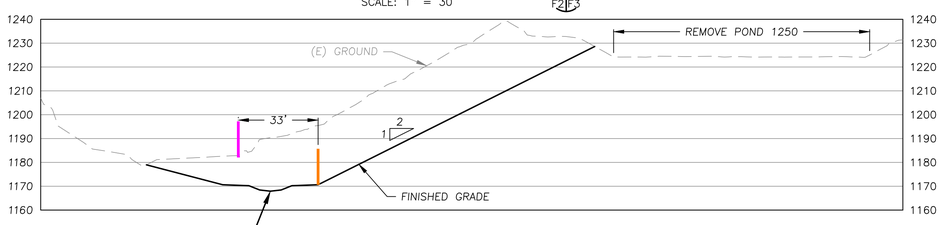

TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION B F1 F3
SCALE: 1" = 30'




TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION A F1 F3
SCALE: 1" = 30'




TYPICAL CHANNEL TREATMENT DETAIL 1 F3 F4

TYPICAL SECTION C F2 F3
SCALE: 1" = 30'

TYPICAL SECTION D F2 F3
SCALE: 1" = 30'

## LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

NOTE:
1. FINISHED GRADE SHOWN REPRESENTS THE LOWER LIMIT OF POTENTIAL DESIGN CHANNEL INVERT.

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PERMANENTE CREEK RESTORATION PLAN

MATERIAL REMOVAL AREA SITE PLANS, PROFILES AND SECTIONS
THAT REFLECT THE LOWER LIMIT OF POTENTIAL FINISHED GRADE
CHANNEL PROFILE

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
F3

# Appendix D

## Air Quality and Greenhouse Gas Emissions (Environmental Science Associates, November 2021)

# PERMANENTE CREEK RESTORATION PLAN

## Air Quality and Greenhouse Gas Emissions Technical Report
## File No. PLN17-22580

Prepared for
County of Santa Clara
Department of Planning and Development

February 2023

# PERMANENTE CREEK RESTORATION PLAN

## Air Quality and Greenhouse Gas Emissions Technical Report
## File No. PLN17-22580

Prepared for
Count of Santa Clara
Department of Planning and Development

February 2023

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# EXECUTIVE SUMMARY

In 2012, the County of Santa Clara (County) prepared the Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report (2012 EIR), which included consideration of Lehigh Southwest Cement Company (Lehigh)'s 2011 Creek Restoration Plan. The 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project then under consideration. Since 2012, the proposed creek restoration activities have been further developed and refined. The further developed and refined plan is called the Permanente Creek Restoration Plan (PCRP or Project).

On the behalf of the County, Environmental Science Associates (ESA) has conducted this analysis of potential impacts associated with air quality and greenhouse gas (GHG) emissions that would result from implementation of the PCRP. This analysis was prepared for the County to inform its consideration of the Grading Approval that would be required for Lehigh to implement the PCRP.

This technical report documents details of the air quality analysis, including analysis associated with criteria air pollutants and health risks associated with toxic air contaminants (TAC), as well as analysis of GHG emissions to support the County's environmental impact analysis for the PCRP as required by the California Environmental Quality Act (CEQA) and its implementing regulations (CEQA Guidelines).

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# CHAPTER 1
# Introduction

## 1.1 Project Context and Overview

In March 2011, Lehigh Southwest Cement Company (Lehigh) proposed the Permanente Creek Long-term Restoration Plan (2011 Creek Restoration Plan). The 2011 Creek Restoration Plan focused on the long-term removal of structures in and adjacent to the creek and the restoration of the creek's riparian zone. Some of the activities that would occur under the 2011 Creek Restoration Plan overlapped with the activities analyzed in the 2012 Lehigh Permanente Quarry Reclamation Plan Amendment Environmental Impact Report prepared by the County of Santa Clara (County) (2012 EIR). Where that was true, the 2012 EIR described and analyzed the associated environmental effects as direct and indirect impacts of the project then under consideration. Since 2012, the proposed creek restoration activities have been further developed and refined, in part, to fulfill the requirements set forth in an Amended Consent Decree between the Sierra Club and Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. lodged February 22, 2019 (the Consent Decree). The further developed and refined plan is called the Permanente Creek Restoration Plan (PCRP or Project).

The PCRP would restore and modify specific segments of Permanente Creek located within and outside of the existing reclamation plan boundary for the Lehigh Permanente Quarry. The PCRP would also modify the creek restoration work to occur in the seven subareas collectively referred to in the 2012 EIR as the Permanente Creek Restoration Area (PCRA) and supplements that work. The PCRP would require Grading Approval from the County to authorize activities proposed outside Lehigh's existing reclamation plan boundary. Because only minor additions or changes would be necessary to make the 2012 EIR adequately apply to the PCRP, the County is preparing a Supplemental Environmental Impact Report (SEIR) for the PCRP pursuant to the California Environmental Quality Act (CEQA).

## 1.2 Emissions Analysis for the County's SEIR

This Air Quality and Greenhouse Gas Emissions Technical Study has been prepared to inform the County's consideration of the PCRP's air quality and greenhouse gas (GHG) impacts in its SEIR. The study describes the existing environmental and regulatory setting noting any changes that have occurred subsequent to the certification of the 2012 EIR, and quantitatively evaluates the PCRP's air pollutant and GHG emissions that were not evaluated in the 2012 EIR.

Pursuant to CEQA Guidelines Section 15163 , the County's SEIR will focus on the information necessary to analyze the project modifications, changed circumstances, or new information that triggered the need for additional environmental review. Therefore, this technical report evaluates air quality and GHG emissions to determine whether they would have the potential for significant direct, indirect, and/or cumulative environmental effects that are new or substantially more severe compared with the project analyzed in the 2012 EIR.

The 2012 EIR evaluated impacts of Permanente Creek restoration within the reclamation plan boundary specifically within seven subareas called the Permanente Creek Restoration Area (PCRA) for mapping and illustrative purposes. The PCRP uses different nomenclature following the convention established in the Consent Decree: rather than referring to "subareas," the PCRP refers to segments of the creek as "reaches." The PCRA subareas and PCRP reaches are illustrated in Figure 2-1. As shown in the figure, some of the disturbance area within the PCRA that was evaluated in the 2012 EIR overlaps with the newly defined PCRP reaches. Given the similar scope of activities proposed in the PCRA disturbance areas evaluated in the 2012 EIR relative to the scope of activities described for the PCRP in those locations, the emissions-generating activities within the proposed PCRP where overlaps exist with the analyses in the PCRA 2012 EIR were not reevaluated as part of this assessment.

Emissions are estimated for the activities of each proposed PCRP phase and then scaled based on the percentage of PCRA area overlap associated with the 2012 EIR's assessed regions. These scaling values, referred to as Emissions Applicability Factors, are determined for each PCRP phase. **Table 1-1** provides the area of each PCRP reach, the area of each reach without overlap in the PCRA 2012 EIR, the percent of emissions determined to be evaluated in the 2012 EIR, and the Emission Applicability Factors. Refer to Exhibit A for additional information about these factors.

**TABLE 1-1**
**EMISSIONS APPLICABILITY FACTORS**

| PCRP Phase | Acres | | Percent Emissions Evaluated in 2012 EIR | Percent Emissions Evaluated for SEIR |
|---|---|---|---|---|
| | PCRP Outside of 2012 Disturbance Area | PCRP Creek Reach Area | | |
| Concrete Channel | 0.66 | 0.66 | 0% | 100% |
| Rock Pile Area | 12.42 | 13.93 | 11% | 89% |
| Channel Widening | 12.24 | 13.93 | 11% | 89% |
| Old Crusher | 0.00 | <0.01 | 100% | 0% |
| Material Removal | 3.15 | 15.68 | 80% | 20% |

SOURCE: See Exhibit A.

# CHAPTER 2
# Criteria Pollutants and Health Risk Assessment Analysis

## 2.1 Environmental Setting

This section describes the environmental and regulatory setting of the area where the PCRP would be implemented (the Project site) and surrounding area with respect to air quality, including criteria air pollutants (CAPs) toxic air contaminants (TACs), and odors. An analysis of potential impacts to air resources stemming from the Project is also provided, including identification of the appropriate CEQA baseline, a review and summary of the criteria used for determining the significance of environmental impacts, and an analysis of potential impacts relevant to PCRP implementation. 2012 EIR mitigation measures are also provided, as relevant, to reduce the intensity of potential impacts associated with the PCRP. For a discussion of potential impacts associated with greenhouse gas (GHG) emissions, please refer to Chapter 3, Greenhouse Gas Emissions Technical Report.

### 2.1.1 Introduction

#### Criteria Air Pollutants

The U.S. Environmental Protection Agency (U.S. EPA) has identified certain air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants (CAPs) because standards have been established for each of them to meet specific public health and welfare criteria (see Section 2.3, *Regulatory Setting*, below). The CAPs were described in Section 4.3 of the Draft 2012 EIR are supplemented with the health-related information provided below.

##### *Ozone*

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections in humans. It can also cause substantial damage to vegetation and other materials, when present in sufficiently high atmospheric concentrations. Ozone is not emitted directly into the atmosphere. Instead, it is a secondary air pollutant that is produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides ($NO_X$). ROG and $NO_X$ are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately 3 hours.

Ozone is a regional air pollutant because it is not emitted directly by sources but is formed downwind from sources of ROG and $NO_X$ under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath (U.S. EPA 2021a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of asthma attacks; and make the lungs more susceptible to infection (U.S. EPA 2021a). Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development, and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (U.S. EPA 2021a). Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (California Air Resources Board [CARB] 2021).

People most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (U.S. EPA 2022). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (U.S. EPA 2021a).

### *Nitrogen Oxides*

Nitrogen dioxide ($NO_2$) is an air quality pollutant of concern because it acts as a respiratory irritant. $NO_2$ is a major component of the group of gaseous nitrogen compounds commonly referred to as $NO_X$. A precursor to ozone formation, $NO_X$ is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, $NO_X$ emitted from fuel combustion is in the form of nitric oxide (NO) and $NO_2$, with the vast majority (95 percent) of the $NO_X$ emissions being comprised of NO. NO is converted to $NO_2$ in the atmosphere when it reacts with ozone or undergoes photochemical reactions. Short-term exposures to $NO_2$ can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms, while longer exposures to elevated concentrations of $NO_2$ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (U.S. EPA 2021b).

### *Carbon Monoxide*

Carbon monoxide (CO) is a non-reactive pollutant that is a product of incomplete combustion; it is mostly associated with emissions from motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO

emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

### *Particulate Matter*

Particulate matter less than 10 microns in diameter ($PM_{10}$) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$) represent fractions of particulate matter that can be inhaled into air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a study prepared by CARB, exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 14,000 to 24,000 premature annual deaths per year statewide (CARB 2010). Particulate matter also can damage materials and reduce visibility.

## Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (i.e., injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes over 200 compounds, including DPM emissions from diesel-fueled engines (CARB 2021).

The main TAC of concern for the PCRP is DPM from off-road diesel equipment and on-road diesel vehicles, in addition to some trace metals found in fugitive dust in disturbance areas and on paved and unpaved roads.

# 2.1.2 Regional Topography, Meteorology, and Climate

The *General Climate and Meteorology* discussion presented in Section 4.3.1.1 of the 2012 EIR remains relevant and accurate; nonetheless, additional details are provided below. The PCRP would occur in the western foothills of Santa Clara County near the southern end of Santa Clara Valley (Valley), which is oriented northwest-southeast and bounded by the Santa Cruz Mountains to the west, the Diablo Range to the east, the San Francisco Bay to the north and the convergence of the Gabilan Range and the Diablo Range to the south. The climate includes warm, dry summers and cool winters with modest rainfall (Bay Area Air Quality Management District [BAAQMD] 2019). Approximately 10 miles to the east-northeast of the Project area is the City of San Jose, where average maximum and minimum winter (i.e., January) temperatures of 58 degrees Fahrenheit (°F) and 41°F, respectively, while average summer (i.e., July) maximum and minimum temperatures are 82°F and 56°F, respectively. Total precipitation in the area averages 15 inches per year, with most

precipitation occurring from November through April (Western Regional Climate Center [WRCC] 2021).

As a result of the Valley's northwest-southeast axis, wind patterns in the Valley include north-northwesterly sea breeze typically developing during the daytime with stronger winds in the spring and summer (BAAQMD 2019). Based on data from January 2015 through December 2015 from the San José Station, winds blow from the southwest most of the time. Specifically, the winds from the southwest direction comprise about 36 percent of all hourly wind directions. The station rarely experienced winds at speeds greater than 13 mph (WRCC 2016).

Air pollution in Santa Clara County can be high because of the large population base and extent of mobile sources in the area. Ozone is the primary pollutant of concern in the summer and $PM_{2.5}$ is the primary pollutant of concern in the winter. Ozone frequently forms on hot summer days when the prevailing seasonal northerly winds carry ozone precursors southward across the county, causing health standards to be exceeded. The high population density, wood smoke, industrial and freeway traffic, and poor wintertime air circulation caused by extensive hills to the east and west that block wind flow into the region can cause many exceedances of $PM_{2.5}$ during the winter months.

### 2.1.3 Existing Air Quality

BAAQMD's regional monitoring network measures the ambient concentrations of CAPs. Monitoring on the Project site has not been completed; however, existing levels of air quality at the Project site can be inferred from ambient air quality measurements conducted by BAAQMD at its closest air quality monitoring stations to the Project site, which are the Jackson Street San Jose Monitoring Station (approximately 11 miles to the east-northeast) and the University Avenue Los Gatos Monitoring Station (approximately 9 miles southeast). The San Jose station monitors ozone, $PM_{10}$, $PM_{2.5}$, and $NO_2$ and the Los Gatos station monitors ozone. **Table 2-1** shows a 3-year (2019 through 2021) summary of the most up-to-date available data monitored at the San Jose monitoring station. The data are compared to the California Ambient Air Quality Standards (state standards) and National Ambient Air Quality Standards (national standards). The data are similar to those disclosed in the 2012 EIR, with the exception of relatively high $PM_{10}$ and $PM_{2.5}$ concentrations experienced in 2020, which were likely a result of large wildfires that occurred in northern California that year (BAAQMD 2020).

As shown in Table 2-1, the state 1-hour ozone and federal 8-hour ozone standards were exceeded one to four times each year during the 3-year study period. The 24-hour state $PM_{10}$ standard was exceeded four times in 2019 and ten times in 2020, with no exceedances in 2021. There were no exceedances of the national 24-hour or state annual average $PM_{10}$ standards recorded during the 3-year study period, but there was insufficient data available for 2020 relative to state annual average. The $PM_{2.5}$ 24-hour national standard was exceeded 12 times in 2020 and once in 2021, with no exceedances in 2019. The $PM_{2.5}$ annual average concentration did not exceed the state standard during the 3-year study period. There were no exceedances of the $NO_2$ standards during the 3-year study period.

**TABLE 2-1**
**AIR QUALITY DATA SUMMARY (2019–2021) FOR THE PROJECT AREA**

| Pollutant | Standard | Monitoring Data by Year | | |
|---|---|---|---|---|
| | | 2019 | 2020 | 2021 |
| **Ozone** | | | | |
| Highest State 1-Hour Average (ppm) | 0.09 ppm | 0.095 | 0.106 | 0.098 |
| Days over State Standard | | 1 | 1 | 3 |
| Highest National 8-Hour Average (ppm) | 0.070 ppm | 0.081 | 0.085 | 0.084 |
| Days over National Standard | | 2 | 2 | 4 |
| **Respirable Particulate Matter ($PM_{10}$)** | | | | |
| Highest State 24-Hour Average (µg/m$^3$)<br>Highest 24-hour average, µg/m$^3$ | 50 µg/m$^3$ | 77.1 | 137.1 | 45.1 |
| Measured Days over State Standard | | 4 | 10 | 0 |
| Measured Days over National Standard | 150 µg/m$^3$ | 0 | 0 | 0 |
| State Annual Average (µg/m$^3$) | 20 µg/m$^3$ | 19.1 | * | 20.1 |
| **Fine Particulate Matter ($PM_{2.5}$)** | | | | |
| Highest National 24-Hour Average (µg/m$^3$)<br>Highest 24-hour average, µg/m$^3$ | 35 µg/m$^3$ | 27.6 | 120.5 | 38.1 |
| Measured Days over National Standard | | 0 | 12 | 1 |
| State Annual Average (µg/m$^3$) | 12 µg/m$^3$ | 9.1 | 11.5 | 8.9 |
| **Nitrogen Dioxide ($NO_2$)** | | | | |
| Highest National Hourly Average (ppm)<br>Highest 24-hour average, µg/m$^3$ | 0.100 ppm | 0.060 | 0.052 | 0.048 |
| Measured Days over National Standard | | 0 | 0 | 0 |

NOTES:

Measurements are from the Jackson Street Monitoring Station in San José.

ppm = Parts per million
µg/m$^3$ = Micrograms per cubic meter
* = There was insufficient data available to determine the value.

SOURCE: CARB 2022

## 2.1.4 Sensitive Receptors

For the purposes of this air quality analysis, sensitive receptors are defined as facilities and land uses that include members of the population that are particularly sensitive to the effects of air pollutants, such as children, the elderly, and people with illnesses. Examples include schools, hospitals, and daycare centers. The reasons for greater than average sensitivity include pre-existing health problems, proximity to emissions sources, and/or duration of exposure to air pollutants. Schools, hospitals, and convalescent homes are relatively sensitive to poor air quality because children, elderly people, and the infirm are more susceptible to respiratory distress and other air quality-related health problems than the general public. Residential areas are considered sensitive to poor air quality because these sensitive individuals may be present at a residence. In addition, the

majority of each 24-hour period tends to be spent by individuals in and around the residence, leading to greater exposure durations of the location's ambient air quality concentrations.

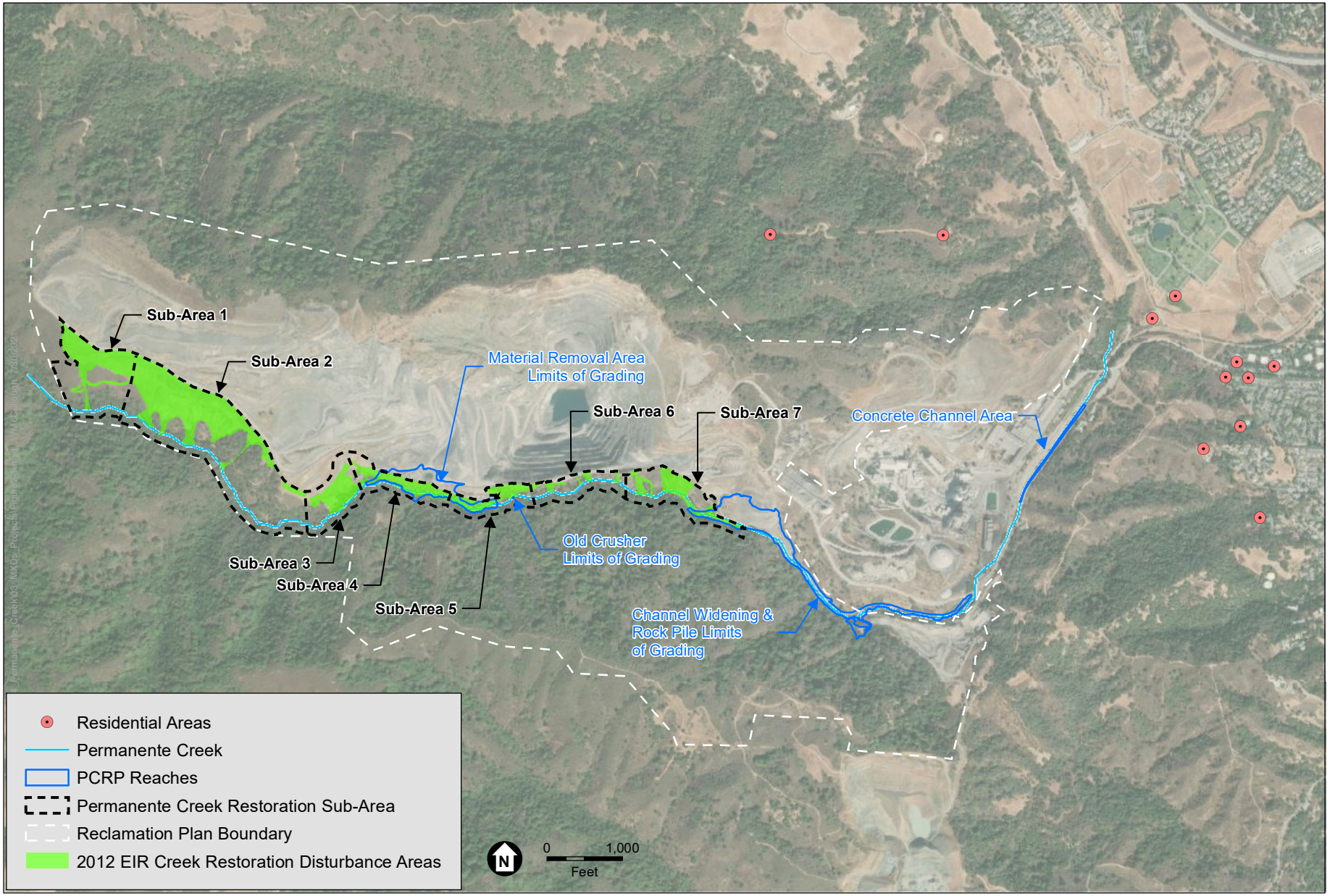
The description of sensitive residential land uses in the vicinity of the Project site presented in Draft 2012 EIR Section 4.3.1.1 remains accurate with one exception. The 2012 EIR identified the caretaker's residence associated with the Historical Society that is located approximately 700 feet east of the East Materials Storage Area (EMSA) on the north side of Permanente Road as the closest residence. The Applicant has recently clarified that this residence would not serve as a dwelling during implementation of the PCRP. The next closest residences are approximately 2,000 feet to the east, south of Permanente Road. Residential areas in the vicinity of the Project site are shown in **Figure 2-1**.

# 2.2 Regulatory Setting

Established federal, state, and regional regulations provide the framework for analyzing and controlling air pollutant emissions and thus general air quality. The U.S. EPA is responsible for implementing the programs established under the federal Clean Air Act (CAA), such as establishing and reviewing the federal ambient air quality standards and reviewing State Implementation Plans (SIPs), described further below. However, the U.S. EPA has delegated the authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented. In California, CARB is responsible for establishing and reviewing the state ambient air quality standards, developing and managing the California SIP, securing approval of this plan from the U.S. EPA, and identifying TACs. CARB also regulates mobile emissions sources in California, such as construction equipment, trucks, and automobiles, and oversees the activities of air quality management districts, which are organized at the county or regional level. An air quality management district is primarily responsible for regulating stationary emission sources at facilities within its geographic areas, and for preparing the air quality plans that are required under the federal CAA and the 1988 California CAA. The BAAQMD is the regional agency with regulatory authority over emission sources in the nine county San Francisco Bay Area.

## Federal and State Ambient Air Quality Standards

Regulation of criteria air pollutants is achieved through both national and state ambient air quality standards and emissions limits for individual sources. Regulations implementing the federal CAA and its subsequent amendments established national ambient air quality standards (national standards) for six criteria pollutants: ozone, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. California has adopted more stringent state standards for most of the criteria air pollutants. In addition, California has established state ambient air quality standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. Because of the meteorological conditions in the state, there is considerable difference between some of state and federal standards in California, as shown in **Table 2-2**. As noted in the table, the federal primary standard for 8-hour ozone is now 0.070 parts per million (ppm), which is a reduction from the 0.075 ppm standard that was in place at the time of the 2012 EIR. All other ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.




SOURCE: Benchmark Resources, 2021



**Figure 2-1**
Residential Areas in the Vicinity of the Project Site

ESA

**TABLE 2-2**
**AMBIENT AIR QUALITY STANDARDS AND SAN FRANCISCO BAY AREA AIR BASIN ATTAINMENT STATUS**

| Pollutant | Averaging Time | State Standard | SF Air Basin Attainment Status for State Standard | National Primary Standard | SF Air Basin Attainment Status for National Standard |
|---|---|---|---|---|---|
| Ozone | 8 hour | 0.070 ppm | Non-Attainment | 0.070 ppm | Non-Attainment |
| | 1 hour | 0.090 ppm | Non-Attainment | --- | --- |
| Carbon Monoxide | 8 hour | 9.0 ppm | Attainment | 9 ppm | Attainment |
| | 1 Hour | 20 ppm | Attainment | 35 ppm | Attainment |
| Nitrogen Dioxide | Annual Average | 0.030 ppm | --- | 0.053 ppm | Attainment |
| | 1 Hour | 0.18 ppm | Attainment | 0.100 ppm | Unclassified |
| Sulfur Dioxide | Annual Average | --- | --- | 0.030 ppm | Attainment |
| | 24 Hour | 0.04 ppm | Attainment | 0.14 ppm | Attainment |
| | 1 Hour | 0.25 ppm | Attainment | 0.075 ppm | Attainment |
| Respirable Particulate Matter (PM10) | Annual Arithmetic Mean | 20 μg/m3 | Non-Attainment | --- | --- |
| | 24 hour | 50 μg/m3 | Non-Attainment | 150 μg/m3 | Unclassified |
| Fine Particulate Matter (PM2.5) | Annual Arithmetic Mean | 12 μg/m3 | Non-Attainment | 15 μg/m3 | Unclassified/Attainment |
| | 24 hour | --- | --- | 35 μg/m3 | Non-Attainment |
| Sulfates | 24 hour | 25 μg/m3 | Attainment | --- | --- |
| Lead | Calendar Quarter | --- | --- | 1.5 μg/m3 | Attainment |
| | 30 Day Average | 1.5 μg/m3 | --- | --- | Attainment |
| | 3-month Rolling Average | --- | --- | 0.15 μg/m3 | Attainment |
| Hydrogen Sulfide | 1 hour | 0.03 ppm | Unclassified | --- | --- |
| Vinyl Chloride | 24 hour | 0.010 ppm | No information available | --- | --- |
| Visibility Reducing Particles | 8 hour | Extinction of 0.23/km; visibility of 10 miles or more | Unclassified | --- | --- |

NOTES: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

SOURCE: BAAQMD, 2017a.

The ambient air quality standards are intended to protect public health and welfare, and they incorporate a margin of safety. They are designed to protect those segments of the public most susceptible to respiratory distress, known as sensitive receptors, including people with asthma, the very young, elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

### *Attainment Status*

Under amendments to the federal CAA, U.S. EPA has classified air basins or portions thereof as either "attainment" or "non-attainment" for each criteria air pollutant, based on whether the national standards have been achieved. The California CAA, which is patterned after the federal CAA, also requires areas to be designated as "attainment" or "non-attainment" for the state standards. Thus, areas in California have two sets of attainment / non-attainment designations: one set with respect to the national standards and one set with respect to the state standards. Table 2-2 shows the attainment status of the San Francisco Bay Area Air Basin (SFBAAB) with respect to the national and state ambient air quality standards for different criteria pollutants. The attainment status relative to the state and federal ambient air quality standards are essentially the same as they were at the time of the 2012 EIR.

#### Federal

The U.S. EPA is responsible for implementing programs established by the federal CAA, such as establishing and reviewing the national standards for the following air pollutants: CO, ozone, $NO_2$, $SO_2$, $PM_{10}$, $PM_{2.5}$, and lead. The federal CAA also requires the U.S. EPA to designate areas (counties or air basins) as attainment or non-attainment with respect to each CAP, depending on whether the area meets the national standards. If an area is designated as non-attainment, it does not meet the national standards and is required to create and maintain a SIP for achieving compliance with the national standards. Conformity to the SIP is defined under the 1990 CAA amendments as conformity with the plan's purpose in eliminating or reducing the severity and number of violations of the national standards and achieving expeditious attainment of these standards. Air quality within the SFBAAB is classified as nonattainment for the federal 8-hour ozone and 24-hour $PM_{2.5}$ standards.

#### State

CARB is the agency delegated responsibility for preparing and submitting the SIP to the U.S. EPA. CARB also oversees air quality policies in California and has established state standards for $NO_2$, CO, $SO_2$, $PM_{10}$, $PM_{2.5}$, ozone, lead, sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. The state standards are at least as stringent (and typically more stringent) than the national standards.

The California CAA was approved in 1988. It requires each local air district in the state to prepare an air quality plan to achieve compliance with the state standards. Similar to the U.S. EPA, the CARB designates counties or air basins in California as attainment or non-attainment with respect to the state standards. Air quality within the basin does not attain the state standards for ozone, $PM_{10}$, and $PM_{2.5}$.

## Toxic Air Contaminants

TACs are airborne substances that can cause short-term (acute) or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects, either injury or illness. TACs include both organic and inorganic chemical substances. They may be emitted by a variety of common sources: gasoline stations, automobiles, diesel engines, dry cleaners, industrial operations, and painting operations. TACs are regulated differently than criteria air pollutants at both the federal and State levels. At the federal level, these pollutants are called "hazardous air pollutants." California's list of TACs identifies 243 substances and the federal list of hazardous air pollutants identifies 189 substances.

CARB identified DPM as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic and carcinogenic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and DPM concentrations are higher near heavily traveled highways and rail lines with diesel locomotive operations. The risk from DPM, as determined by CARB, declined from 750 in one million in 1990 to 540 in one million in 2000, but still remains the highest risk TAC to California's ambient air quality. In 2000, CARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Further regulations of diesel emissions by CARB include the On-Road Heavy Duty Diesel Vehicle (In-Use) Regulation, the On-Road Heavy Duty (New) Vehicle Program, the In-Use Off-road Diesel Vehicle Regulation, and the New Off-road Compression Ignition Diesel Engines and Equipment Program. All of these regulations and programs have timetables by which manufacturers must comply and existing operators must upgrade their diesel-powered equipment.

In 2004, CARB adopted a measure to limit idling of diesel-fueled commercial motor vehicles. Heavy-duty diesel vehicles with a Gross Vehicle Weight Rating of 10,000 pounds or heavier are prohibited from idling for more than 5 minutes within California's borders. Exceptions to the rule apply for certain circumstances.

## Local Regulations

### *Bay Area Air Quality Management District*

The Project is within the jurisdiction of the BAAQMD, which is the local agency delegated responsibility for preparing, adopting, and implementing stationary and area air emission control measures and standards. Specifically, BAAQMD conducts monitoring, evaluation, and education programs; implements control measures to reduce emissions from stationary sources; issues permits to operate for stationary sources and inspects emissions sources; and enforces air quality regulations.

#### BAAQMD Air Quality Plans

The 1977 CAA amendments require that regional planning and air pollution control agencies prepare a regional Air Quality Plan to outline the measures by which both stationary and mobile sources of pollutants can be controlled to achieve all standards specified in the CAA. The California CAA also requires development of air quality plans and strategies to meet state air

quality standards in areas designated as non-attainment (except for areas designated as non-attainment for the state PM standards). Maintenance plans are required for attainment areas that had previously been designated non-attainment to ensure continued attainment of the standards. (As indicated above, air quality plans developed to meet federal requirements are referred to as SIPs).

For state air quality planning purposes, the SFBAAB is classified as a serious non-attainment area for the 1-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that the BAAQMD update the Clean Air Plan every 3 years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. BAAQMD also must review the Bay Area's record of progress in implementing previous measures. The plans for the SFBAAB are prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). After the certification of the 2012 EIR, the BAAQMD adopted the most recent revision to the Clean Air Plan - the 2017 Bay Area Clean Air Plan (2017 CAP) (BAAQMD 2017b). The 2017 CAP serves to:

- Protect the environment and offer a long-range vision of how the Bay Area could function in a year 2050 post-carbon economy and describes a control strategy that the BAAQMD will implement over the next 3 to 5 years.
- Update the most recent BAAQMD ozone plan, the 2010 Clean Air Plan, to fulfill State ozone planning requirements. The 2017 control strategy includes all feasible measures to reduce emissions of ROG and $NO_x$ and reduce transport of ozone and its precursors to neighboring air basins.
- Build upon and enhance the BAAQMD's efforts to reduce emissions of fine particulate matter and toxic air contaminants.

Under the California CAA, the BAAQMD is required to develop an air quality attainment plan for non-attainment criteria pollutants within the air district. The Project is subject to BAAQMD rules and regulations governing CAPs, TACs, and odorous compounds even though permits may not be required.

### Santa Clara County General Plan

The 2012 EIR identifies air quality policies associated with the Health and Safety Chapter of the *Santa Clara County General Plan, 1995-2010* (Santa Clara County 1994), that apply to the Reclamation Plan Amendment. The Santa Clara County General Plan, 1995-2010 remains current.

## 2.3 CEQA Baseline Emissions

The CEQA baseline for this air quality analysis includes the baseline conditions identified in the 2012 EIR, the 2012 EIR Reclamation Plan Amendment emissions, as well as the approved 2012 EIR Mitigation Measures that are conditions of the 2012 Reclamation Plan approval.

### 2.3.1 2012 EIR Baseline

The baseline for the 2012 EIR reflects the physical environmental conditions in the vicinity of the PCRP as they existed on June 29, 2007, when the County published a NOP in connection with the Applicant's first proposed amendment of the 1985 Reclamation Plan. As described in Draft 2012 EIR Section 4.3.2, documentation pertinent to the air quality analysis establishes that, by 2007, some materials storage already had occurred in the EMSA. The 2012 Reclamation Plan Amendment involved an existing quarry operation characterized by fluctuating production and associated air emissions, in response to continually changing market demands. The baseline air pollutant emissions identified in the 2012 EIR air quality analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The daily and annual 2012 EIR baseline criteria pollutant emissions are shown in **Tables 2-3 and 2-4**.

The 2012 EIR included a health risk assessment and modeling of $PM_{2.5}$ concentrations. The 2012 EIR baseline health risk impacts are shown in **Tables 2-5** and **2-6**. The 2012 EIR baseline $PM_{2.5}$ concentrations are shown in **Table 2-7**.

### 2.3.2 2012 Emissions and Analysis

#### Criteria Pollutants

Baseline and maximum daily 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD daily thresholds (as disclosed in the 2012 EIR) are summarized in **Table 2-3**. Baseline and maximum annual 2012 Reclamation Plan Amendment emissions and the net change in emissions compared to the BAAQMD annual thresholds are summarized in **Table 2-4**. The 2012 Reclamation Plan Amendment emissions identified in the tables below include emissions associated with creek restoration activities proposed within the disturbance areas of the PCRAs. As shown in Tables 2-3 and 2-4, the Reclamation Plan Amendment (including the proposed creek restoration work) was found to result in net emissions reductions for all nonattainment air pollutants ($PM_{10}$, $PM_{2.5}$, and the ozone precursors $NO_x$ and ROG), and therefore was disclosed to not exceed the BAAQMD daily or annual thresholds of significance. Reclamation Plan Amendment-related criteria pollutant emissions were found to result in a less-than-significant impact.

**TABLE 2-3**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM DAILY CRITERIA AIR POLLUTANT EMISSIONS (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Baseline Emissions | 5,411 | 893 | 2,440 | 167 | 2,641 | 27 |
| Reclamation Plan Amendment Emissions | 1,970 | 311 | 2,124 | 123 | 1,891 | 32 |
| Maximum Daily Incremental Change | (3,441) | (582) | (316) | (44) | (750) | 5 |
| BAAQMD Threshold | 82 | 54 | 54 | 54 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | -- | -- |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3.

**TABLE 2-4**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL CRITERIA AIR POLLUTANT EMISSIONS (TONS/YEAR)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Baseline Emissions | 754 | 122 | 324 | 24 | 288 | 1 |
| Reclamation Plan Amendment Emissions | 291 | 45 | 301 | 18 | 222 | 3 |
| Maximum Annual Incremental Change | (463) | (77) | (23) | (6) | (66) | 2 |
| BAAQMD Threshold | 15 | 10 | 10 | 10 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | -- | -- |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4.

## Toxic Air Contaminants

A health risk assessment (HRA) was conducted to analyze potential health risks from emissions associated with the 2012 Reclamation Plan Amendment. This HRA was part of the impact analysis in the 2012 EIR. The HRA was conducted in accordance with technical guidelines developed by federal, state, and regional agencies, including U.S. EPA, *Haul Road Workgroup Recommendations Final Report* (U.S. EPA 2011) Office of Environmental Health Hazard Assessment (OEHHA) *Air Toxics Hot Spots Program Guidance* (OEHHA 2003), and the BAAQMD's *Health Risk Screening Analysis Guidelines* (BAAQMD 2005).

The reported health risks for that analysis were associated with off-road equipment used for the quarrying and overburden activities. On-road haul truck activity included in the HRA analysis consists of trucks hauling material to customers from the rock plant and trucks associated with importing mulched green waste to mix with the West Materials Storage Area (WMSA) material as it is used to backfill the Quarry pit in Phase 2. A summary of the 2012 EIR HRA impacts are shown in **Tables 2-5** and **2-6**.

**TABLE 2-5**
**2012 RECLAMATION PLAN AMENDMENT HEALTH RISK SUMMARY**

| Risk | MEIR - Child Resident South of Stevens Creek Blvd. (per million) | Caretaker's Residence (per million) |
|---|---|---|
| Cancer – Draft 2012 EIR | 8.98 | 8.61 |
| BAAQMD significance thresholds | 10 | 10 |
| Exceeds threshold? | No | No |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-8 and 4.3-11.

MEIR: maximally exposed individual receptor.

**TABLE 2-6**
**2012 RECLAMATION PLAN AMENDMENT ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS**

| Health Risk | Location | 2012 EIR Value[a] |
|---|---|---|
| Chronic | MEIR | 0.13 |
| Acute | MEIR | 0.52 |

SOURCE: Draft 2012 EIR Section 4.3.5.1, Tables 4.3-10 and 4.3-13.

[a]The chronic and acute risk values from the 2012 EIR were reported for the caretaker's house.

### $PM_{2.5}$ Concentrations

As shown in **Table 2-7**, the 2012 EIR determined that the maximum incremental annual $PM_{2.5}$ exhaust concentration at the maximally exposed individual receptor (MEIR) at the caretaker's residence would be 0.40 µg/m$^3$ without mitigation, which would exceed the BAAQMD threshold of 0.3 µg/m$^3$. The 2012 EIR included Mitigation Measures 4.3-3a and 4.3-3b (see Section 2.3.3, below), which would reduce $PM_{2.5}$ concentrations to below the threshold.

**TABLE 2-7**
**ESTIMATED $PM_{2.5}$ CONCENTRATION IMPACTS (µG/M$^3$)**

| Location | Annual Average Concentration |
|---|---|
| 2012 EIR Value[a] (Unmitigated) | 0.40 |
| 2012 EIR Value[a] (Mitigated) | 0.29 |

SOURCE: Draft 2012 EIR. Section 4.3.5.1, Table 4.3-15.

[a]The $PM_{2.5}$ concentration from the Draft 2012 EIR is reported for the caretaker's residence.

## 2.3.3 2012 EIR Mitigation Measures

As stated above in Section 2.3.2, no significant impacts associated with criteria pollutants were identified related to the 2012 Reclamation Plan Amendment, so the 2012 EIR did not identify mitigation measures to reduce criteria pollutant emissions. However, the 2012 EIR did identify a significant health risk impact, which was mitigated to a less-than-significant level with implementation of Mitigation Measures 4.3-3a through 4.3-3c. Mitigation Measures 4.3-3a through 4.3-3c are described below followed by a summary of how the mitigation measures are considered for the County's PCRP SEIR relative to the CEQA baseline.

> **Mitigation Measure 4.3-3a.** Within 90 days of [Reclamation Plan Amendment] Project approval, the Applicant shall submit to the County and the BAAQMD a comprehensive inventory of all Project-related off-road construction equipment expected to be used during any portion of the Project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the Project.

**SEIR Baseline Consideration**

The Applicant would be required to implement 2012 EIR Mitigation Measure 4.3-3a as defined above during the implementation of the proposed PCRP.

**Mitigation Measure 4.3-3b.** Within 90 days of [Reclamation Plan Amendment] Project approval, the Applicant shall provide a plan for approval by the County and the BAAQMD demonstrating that Project-related off-road equipment would achieve a Project (EMSA-specific) wide fleet-average 35 percent reduction in DPM emissions compared to the proposed fleet in the ALG report (ALG 2011a) during Phase 1 of the Project. The plan shall be updated and submitted annually throughout the duration of the Project. Options for reducing emissions may include, but are not limited to:

- Using newer model engines (e.g., engines that meet U.S. EPA interim/final Tier 4 engine standards);
- Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (http://www.arb.ca.gov/diesel/verdev/verdev.htm);
- Use of low-emissions diesel products or alternative fuels;
- Use of alternative material handling options (e.g., conveyor system); or
- Other options as may become commercially available and verifiable.

**SEIR Baseline Consideration**

The Applicant has stated that all off-road equipment and vehicles that would be associated with PCRP implementation would be equipped with engines that meet U.S. EPA Tier 4 Final emissions standards (Lehigh 2021). Therefore, the PCRP would be implemented consistent with the requirements of 2012 EIR Mitigation Measure 4.3-3a. Alternatively, the 2012 EIR states that in lieu of Mitigation Measures 4.3-3a and 4.3-3b, the Applicant may implement 2012 EIR Mitigation Measure 4.3-3c (see below).

**Mitigation Measure 4.3-3c.** The Applicant shall submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the [Reclamation Plan Amendment] Project.

**SEIR Baseline Consideration**

To date, no evidence has been submitted to the County indicating that there are legally-binding restrictions precluding any occupancy of the caretaker's residence; however, the Applicant has stated that the residence would not serve as a dwelling during implementation of the PCRP (Lehigh 2021).

# 2.4 Analysis, Impacts, and Mitigation

## 2.4.1 Significance Criteria

Subsequent to the 2012 EIR, the air quality criteria in the CEQA Guidelines Appendix G environmental checklist have been revised as shown below, resulting in the combination of two

of the criteria in place in 2012 (related to violations of air quality standards and cumulatively considerable net increases in non-attainment pollutants) into one criterion (second bullet below). For relevant purposes, the revised criteria shown below are consistent with and comparable to the criteria used in the 2012 EIR evaluation:

a) Conflict with or obstruct implementation of an applicable air quality plan;

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);

c) Expose sensitive receptors to substantial pollutant concentrations; or

d) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people.

## 2.4.2 Methodology

### Air Quality Plans

Before approving a project where an air quality plan consistency determination is required, BAAQMD recommends that the lead agency analyze the project with respect to the following questions:

(1) does the project support the primary goals of the 2017 CAP?

(2) does the project include applicable control measures from the 2017 CAP?

(3) does the project disrupt or hinder implementation of any 2017 CAP control measures?

If the first two questions are concluded in the affirmative and the third question is concluded in the negative, then the BAAQMD considers the project consistent with the 2017 Clean Air Plan.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 CAP. Whether the PCRP supports these goals will be determined by whether it is consistent with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the Project would not be considered to support the 2017 Clean Air Plan goals, and the associated impact would be significant.

### Criteria Pollutants

The analysis of criteria pollutants considers the impacts related to emissions of non-attainment pollutants and their precursors. Although ozone would not be directly emitted by PCRP-related construction equipment, the ozone precursors ROG and $NO_x$ would be emitted and are therefore, along with particulate matter, the focus of the impact assessment. Given that ozone formation occurs through a complex photo-chemical reaction between $NO_x$ and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basin-wide or regional basis instead of a localized basis. The ambient air quality standards for ozone are concentration-based; they are not based on the mass of their precursor pollutants (i.e., $NO_x$ and

ROG). It is not necessarily the mass of precursor pollutants that causes human health effects, as opposed to the concentration of resulting ozone or particulate matter. Because of the complexity of ozone formation and the non-linear relationship of ozone concentration with its precursor gases and given the state of environmental science modeling in use at this time, it is infeasible to convert specific emissions levels of $NO_x$ or ROG emitted in a particular area to a particular concentration of ozone in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone (South Coast Air Quality Management District [SCAQMD] 2014, San Joaquin Valley Air Pollution Control District [SJVAPCD] 2014).

### *Significance Thresholds*

The 2012 EIR relied on the methods and significance thresholds identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After certification of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in California Building Industry Association v. BAAQMD (2015) 62 Cal.4$^{th}$ 369 (BAAQMD 2017c). However, as it pertains to projects such as the PCRP that do not include proposed residences, the methods and significance criteria identified in the 2017 BAAQMD CEQA Guidelines are essentially the same as those identified in the 2010 BAAQMD CEQA Guidelines. The analysis presented in this report uses the same general methodologies as those used for the 2012 EIR.

Impacts related to the PCRP contributing to an existing or projected air quality violation and whether the PCRP would result in a cumulatively considerable net increase of any criteria pollutant or associated precursors are judged by comparing estimated direct and indirect PCRP exhaust emissions to the significance thresholds, which for short-term construction emissions are 54 pounds per day for ROG, $NO_x$, and $PM_{2.5}$; and 82 pounds per day for $PM_{10}$. Only the exhaust portion of $PM_{2.5}$ and $PM_{10}$ emissions are compared against the construction thresholds. The BAAQMD considers implementation of its recommended mitigation measures for fugitive dust sufficient to ensure that construction-related fugitive dust is reduced to a less-than-significant level. Therefore, the BAAQMD recommends that analyses focus on implementation of dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold. For long-term operations, the BAAQMD has two sets of significance thresholds, including daily thresholds that are the same as the construction thresholds, and annual thresholds that are 10 tons per year for ROG, $NO_x$, and $PM_{2.5}$; and 15 tons per year for $PM_{10}$. These significance thresholds are the same as those used in the 2012 EIR to evaluate impacts associated with criteria pollutants. Although emissions resulting from implementation of the PCRP would be considered short-term construction emissions and appropriately evaluated with respect to the BAAQMD construction significance thresholds, for purposes of continuity with the 2012 EIR, this analysis compares the PCRP emissions to the average daily significance thresholds as well as the annual significance thresholds.

### *Emission Estimates*

Project-related air quality impacts typically fall into two categories: short-term impacts due to construction or decommissioning, and long-term impacts due to project operations. The PCRP would

generate air pollutant emissions on a short-term basis during construction over a period of approximately 6 years; there would be no long-term sustained operational impacts. During construction (short-term), the PCRP would generate ozone precursors and affect local particulate concentrations primarily due to fugitive dust and diesel exhaust emissions from construction equipment.

The Applicant provided the County with scheduling assumptions for the five main phases that would be associated with the PCRP (Lehigh 2023). The Project is proposed to occur 5 days a week, approximately 132 workdays per year during the dry seasons (i.e., April 15 through October 15) of 2024 through 2029. Below is a list of the PCRP phases by anticipated year of construction:

- 2024: Concrete Channel/Channel Widening (Phase 1);
- 2025: Rock Pile Area (Phase 1);
- 2026: Rock Pile Area (Phase 2);
- 2027: Channel Widening (Phase 2) and Old Crusher Foundation;
- 2028: Material Removal Area (Phase 1); and
- 2029: Material Removal Area (Phase 2).

The Applicant provided a list of 12 types of off-road construction equipment that would be used during PCRP construction and indicated that each piece of equipment would be compliant with U.S. EPA Tier 4 non-road engine standards and would operate between 4 and 8 hours each workday for a specified number of days per year based on the applicable construction phase (Lehigh 2023, 2021). The average hours per day each equipment type would operate for a given construction phase were estimated by dividing the total operation hours per year by the estimated number of workdays for that phase. Engine horsepower ratings for the equipment types were estimated by ESA based on specification sheets found online for the provided equipment types or CalEEMod model defaults were used. **Table 2-8** lists the assumed engine horsepower ratings, types, and amounts of construction equipment that would be required to complete each phase of the PCRP.

With regard to on-road vehicle trips that would be associated with the PCRP, the Applicant has indicated that each construction phase would require between 8 and 16 worker one-way daily trips; 216 vendor truck one-way daily trips except for the Concrete Channel and Older Crusher Foundation phases, which would require 25 vendor truck one-way daily trips; and as described in Table 2-8, 2 to 1,481 haul truck one-way total trips (Lehigh 2023). For the purposes of the on-road emissions estimates, it is assumed that worker vehicles would be light duty trucks (i.e., LDT1), vendor trucks would be a mix of heavy-duty trucks (i.e., LHDT1, LHDT2, and MHDT), and haul trucks would be heavy-heavy duty trucks (i.e., HHDT).

**TABLE 2-8**
**PCRP OFF-ROAD EQUIPMENT AND HAUL TRUCK TRIP REQUIREMENTS**

| Equipment/Haul Truck | Concrete Channel | Channel Widening | Rock Pile Area | Old Crusher | Material Removal |
|---|---|---|---|---|---|
| 81 hp Clearing Saw | 1 | - | - | - | - |
| 84 hp Generator | 1 | - | - | 1 | - |
| 286 hp Caterpillar 350 Excavator | - | 1 | 2 | - | 2 |
| 108 hp Caterpillar 313 Excavator | - | 1 | 1 | - | 1 |
| 452 hp Caterpillar 740 (40-ton Truck) | - | 2 | 4 | - | 4 |
| 393 hp Caterpillar 980 Loader | - | 1 | 1 | - | 1 |
| 110 hp Caterpillar 299 (tracked skid steer loader) | - | 2 | 1 | - | 1 |
| 402 hp Dump Truck | - | 1 | 1 | - | 1 |
| 402 hp Hydroseeding Truck (1.5 k gal) | - | 1 | 1 | - | 1 |
| 402 hp Water Truck (3,000 gallons | - | 1 | 1 | - | 1 |
| 347 hp Caterpillar D8 Bulldozer | - | 1 | 1 | - | 1 |
| Caterpillar Compactor CP56 | - | - | 1 | - | - |
| Haul Truck Trips (one-way) | 2 | 343 | 1,481 | 2 | 1,276 |

NOTE: hp = horsepower

SOURCE: Exhibit A.

Construction-related on-site exhaust emissions were estimated based on the assumptions described above using the California Emissions Estimator Model (CalEEMod) version 2020.4.0. To estimate on-road mobile exhaust emissions, CalEEMod version 2020.4.0 uses vehicle emission factors from CARB's EMFAC2017 model. However, CARB and U.S. EPA have adopted the EMFAC2021 version of the model. The proposed PCRP's on-road vehicle exhaust emissions were estimated outside of CalEEMod using emissions factors for the vehicle types described above obtained from the EMFAC2021 model.

In addition, fugitive dust from bulldozing on the disturbance areas and travel on paved and unpaved roads were calculated using factors from U.S. EPA's AP-42, which is a compilation of emission factors for various industries and activities. Emission factors for grading equipment passes from Chapter 11 were used to estimate fugitive $PM_{10}$ and $PM_{2.5}$ bulldozing emissions, and factors from Chapter 13 were used to estimate paved and unpaved road re-suspended $PM_{10}$ and $PM_{2.5}$ (U.S. EPA 1998, 2006, and 2011). The 2012 EIR also reported metals sampled from overburden and road dust, which were speciated from the $PM_{10}$ fugitive calculations. This information was also used in the HRA for the PCRP, as discussed below.

The modeled emissions for each construction phase of the PCRP were multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable emissions in the County's SEIR (see Section 1.1, *Emissions Analysis for the SEIR*).

Calculated emissions for the County's SEIR were then summed and added to the baseline emissions (see Section 2.3, *CEQA Baseline Emissions*) for comparison to BAAQMD's applicable regional significance thresholds and to determine if the PCRP could cause a new or substantially more severe significant direct, indirect, and/or cumulative environmental effects compared with the project analyzed in the 2012 EIR. Detailed emissions assumptions and summaries, including the CalEEMod and EMFAC2021 assumptions and output, are included in Exhibit A.

As identified in the 2012 EIR, the Applicant has committed to the following fugitive dust emission reduction measures as part of the 2012 Reclamation Plan Amendment, which for purposes of this analysis are considered equivalent to the BAAQMD's basic measures for dust control:

- Water unpaved roads; and
- Water active areas consistent with a dust mitigation plan submitted by the Applicant to the BAAQMD in 2010.

Therefore, due to BAAQMD guidance, estimates of PCRP fugitive dust-related $PM_{10}$ emissions have been estimated mainly for disclosure, but also for the purpose of estimating metals that could be entrained in the atmosphere with dust during construction for the HRA (see below).

### *Health Impacts*

After certification of the 2012 EIR, the California Supreme Court published a decision in Sierra Club v. County of Fresno (2018) 6 Cal.5th 502 (known as the "Friant Ranch" case), which held that CEQA requires that a connection be drawn between potential project emissions and human health impacts. The Court found that while there will be some scientific limits to the analytical tools available to draw and quantify these connections, the EIR "must adequately explain what the agency does know and why, given existing scientific constraints, it cannot translate potential health impacts further" and that it did not "indicate the concentrations at which such pollutants would trigger identified symptoms." The Court concluded that "the public would have no idea of the health consequences that result when more pollutants are added to a nonattainment basin." The Court found that even if it were impossible to do more, the Friant Ranch EIR would have been found insufficient "because it failed to explain why it was not feasible to provide an analysis that connected the air quality effects to human health consequences."

Same as expressed in the amicus curiae brief submitted for the Friant Ranch case, the significance thresholds described above were set at emission levels tied to the region's attainment status. They are emission levels at which stationary pollution sources permitted by the BAAQMD must offset their emissions and CEQA projects must use feasible mitigations; they are not intended to be indicative of any localized human health impact that a project may have. Therefore, a PCRP-related exceedance of the mass regional emissions threshold (e.g., pounds per day or tons per year $NO_x$ thresholds) prior to mitigation from construction-related activities could indicate that the PCRP could cause or contribute to the exposure of sensitive receptors to ground-level concentrations greater than health-protective levels.

Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot necessarily accurately quantify ozone-related health impacts caused by PCRP-

related $NO_x$ or VOCs emissions. Therefore, it is currently infeasible to connect $NO_x$ emissions associated with a project of limited scope, such as the short-term PCRP, to ozone-related health impacts.

The primary health concern with exposure to $NO_x$ emissions is the secondary formation of ozone. As the amicus curiae briefs submitted by SCAQMD and SJVAPCD for the Friant Ranch case suggested, because of the complexity of ozone formation and given the state of environmental science modeling in use at this time, it is infeasible to determine whether, or the extent to which, a single project's precursor (i.e., $NO_x$ and ROG) emissions would result in the formation of secondary ground-level ozone and the geographic and temporal distribution of such secondary formed emissions (SCAQMD 2014, SJVAPCD 2014). Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone. Furthermore, available models today are designed to determine regional, population-wide health impacts, and cannot accurately quantify ozone-related health impacts caused by $NO_x$ or ROG emissions from local level project of limited scope.

## Community Health Risk Due to TACs

Impacts associated with the Project exposing sensitive receptors or the general public to substantial pollutant concentrations are evaluated by assessing the health risks posed by the placement of new sources of TAC emissions near existing sensitive receptors. Specifically, according to the BAAQMD, the Project would have a significant air quality impact if the construction phase would expose persons to substantial levels of TACs, such that the probability of contracting cancer exceeds 10 in one million, or if it would expose persons to pollutants such that a chronic Hazard Index of 1.0 would be exceeded. In addition, a significant impact would occur if the Project would result in an incremental increase in annual average concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$) at a sensitive receptor location. (BAAQMD 2017c).

In addition, for assessing community risks and hazards relative to the criteria discussed above, the BAAQMD recommends use of a 1,000-foot radius around the project property boundary where the siting of a new source or receptor should be quantitatively assessed, considering both individual and nearby cumulative sources (i.e., proposed project plus existing and foreseeable future projects). For this analysis, the closest sensitive receptors were evaluated, even though they are located farther than 1,000 feet from where PCRP activities would occur on site. Haul trucks and vendor trucks arriving and departing from the site are a source of TACs and would travel closer than 1,000 feet from sensitive receptors for brief periods of time along the truck route.

An HRA was conducted to evaluate the cancer risks and non-cancer health effects associated with exposure to TACs that would be emitted because of the PCRP. TACs associated with the Project include various metals within fugitive dust (such as mercury and chromium), crystalline silica, and DPM. Cancer risks are evaluated based on assumed lifetime exposure to TACs over the expected lifespan of the Project. Non-cancer health risks evaluated include adverse health effects from both acute (highest 1-hour exposure) and chronic (average annual exposure). As recommended by BAAQMD, the HRA also calculated the annual average $PM_{2.5}$ concentrations.

The HRA follows the protocols outlined by the BAAQMD, CARB, OEHHA, and U.S. EPA. Consistent with guidelines and recommendations from these agencies, the HRA evaluated the incremental increase in lifetime cancer risks and non-cancer chronic and acute health risk from exposure to TAC emissions. At the time of the 2012 EIR, the OEHHA *2003 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* was the applicable guidance document for conducting HRAs (OEHHA 2003). Consistent with the 2012 EIR, this HRA assesses impacts from the PCRP based on the 2003 OEHHA guidance. After the 2012 EIR was certified, OEHHA released the *2015 Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*, which revised some of the exposure parameters, such as breathing rates and age sensitivity factors. The 2015 OEHHA guidance was not available nor was its release reasonably foreseeable at the time the 2012 EIR was certified. For information and disclosure purposes, this HRA presents the health risk values using the 2015 OEHHA Guidance.

Cancer risk is defined as the lifetime probability of developing cancer from exposure to carcinogenic substances. Cancer risks are expressed as the chances in one million of contracting cancer, for example, 10 cancer cases among one million people exposed. Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the Project to published reference exposure levels (RELs) that can cause adverse chronic (long-term) and acute (short-term) health effects.

## *Emissions Sources*

The emissions sources described below are associated with PCRP work that would occur outside of the 2012 EIR PCRA disturbance areas, specifically related to the concrete channel, rock pile and channel widening area, and material removal area. These areas are described in Chapter 1, *Introduction*. These emissions sources were included in the HRA, as described below. The HRA calculations, including the emissions as calculated for the HRA, are included in Exhibit B.

### DPM and $PM_{2.5}$ Emissions from Off-road Equipment

Off-road diesel equipment would be used for the creek restoration and includes graders, loaders, excavators, and backhoes. DPM emissions from off-road equipment can lead to increased cancer and chronic, non-cancer health risks. Off-road equipment emissions were calculated using CalEEMod version 2020.4.0, which is a land use emissions model developed by CARB and California air districts. Emissions of exhaust $PM_{10}$ were assumed to be DPM. DPM can also increase $PM_{2.5}$ concentrations ($PM_{2.5}$ being a subset of $PM_{10}$) that can lead to adverse health effects, so these emissions were used to analyze $PM_{2.5}$ concentrations.

### DPM and $PM_{2.5}$ Emissions from On-road Haul and Vendor Trucks

On-road diesel trucks modeled in the HRA include vendor trucks bringing materials to the site and haul trucks importing clean soil for PCRP restoration activities. As with off-road diesel equipment, DPM emissions from on-road diesel trucks can lead to increased cancer and chronic, non-cancer health risks. Emissions of DPM and $PM_{2.5}$ from on-road trucks were calculated using the CARB on-road emissions model EMFAC2021 and analyzed in the HRA for cancer and chronic health risks and $PM_{2.5}$ concentrations.

### Fugitive Dust Emissions and Metals

Fugitive dust would be generated during grading of creek restoration areas as part of PCRP implementation, plus from travel on paved and unpaved roads, due to re-suspended road dust.

Fugitive dust was included in the HRA because trace amounts of metals in the dust can pose cancer and non-cancer acute and chronic health effects. These metals were analyzed in samples taken for the 2012 EIR from overburden and unpaved road on site, and these metals fractions were used in this HRA (see Exhibit B). It was conservatively assumed that the same metals fraction on unpaved roads would be found on paved roads, which was incorporated in the HRA. Fugitive $PM_{10}$ emissions were calculated using U.S. EPA AP-42 factors from Chapter 11 for grading and Chapter 13 for paved and unpaved road travel (U.S. EPA 1998, 2006, and 2011), as described above.

The PCRP would incorporate fugitive dust control measures with watering of disturbance areas and unpaved roads. Watering of disturbance areas would achieve a control efficiency of approximately 50 percent, and watering of unpaved roads would achieve a control efficiency of approximately 75 percent as stated in 2012 EIR Exhibit B.

## *Sensitive Receptors*

Cancer, chronic, and acute risks were modeled at residences, which are considered sensitive receptors, in the vicinity of the PCRA disturbance areas. The closest residential area is approximately 3,000 to 3,500 feet to the east of the proposed PCRP disturbance areas, south of Stevens Creek Boulevard and west of South Foothill Boulevard. These receptors were modeled for cancer, chronic, and acute health risks.

In addition, the HRA modeled risks for the Historical Society caretaker's residence. A site caretaker once resided here, but the residence is no longer occupied and is not anticipated to be occupied during implementation of the PCRP. This analysis evaluates risk impacts at this location for informational purposes and for comparison to the 2012 EIR.

Non-residential receptors, where the public could have access on a short-term basis, were modeled for acute impacts from metals in fugitive dust. These areas include the PG&E trail approximately 3,400 feet north of the site and the Gate of Heaven cemetery to the northeast of the site.

## *HRA Methodology*

Cancer risks are a function of exposure duration, exposure frequency, breathing rate, and age sensitivity factors, which are age-dependent. These factors together with the TAC concentration represent an inhalation dose. Chronic and acute impacts, however, do not factor in exposure duration, exposure frequency, breathing rate, and age sensitivity factors; thus, there is no difference for chronic and acute impacts between a child and adult exposed to the same pollutant concentration.

The HRA was conducted in the following three steps:

- Estimate the TAC emissions to which sensitive receptors are exposed (described above);

- Calculate the ground-level TAC concentrations of these emissions at the sensitive receptors, using a dispersion model; and
- Calculate the health risks from the modeled TAC concentrations using OEHHA toxicity and dose factors.

The concentrations were calculated using the U.S. EPA AERMOD dispersion model (version 19191) with 5 years of measured meteorology from the Moffett Field station in Mountain View. Concentrations were modeled at specific locations where residences are located and were defined by a Cartesian coordinate system. In addition, some locations where the public could have access on a short-term basis were modeled for acute impacts.

DPM, $PM_{2.5}$, and metals in $PM_{10}$ fugitive dust would be emitted from the PCRP disturbance areas, plus paved and unpaved roads on site. The HRA included a portion of distance on Stevens Creek Boulevard approaching the property, as there are many residences (sensitive receptors) present along this road that trucks would travel past on their way to and from the site.

TAC emissions from PCRP-proposed creek restoration activities were modeled as polygon area sources, and TAC emissions from paved and unpaved roads were modeled as line area sources, as described in more detail below.

PCRP disturbance areas:

- Polygon area source of 1.5 acres for concrete channel, 3.4 acres for rock pile and channel widening, and 3.9 acres for material removal;
- Release height of 5 meters for construction equipment exhaust;
- Initial vertical dimension of 1.4 meters;
- Receptor flagpole height of 1.5 meters (ground-level receptor at breathing height); and
- Emissions occurring only between the hours of 8 a.m. and 6 p.m.[1];

Paved and unpaved roads:

- Line-area source of 1.6 miles paved from Stevens Creek Boulevard and Stonebridge/ Ridgeway Drive to the western end of the on-site paved road, and line area source of 1 mile unpaved to the material removal area;
- Release height of 2.55 meters for haul and vendor truck exhaust and re-suspended road dust;
- Initial vertical dimension of 2.37 meters;
- Emissions occurring only between the hours of 8 a.m. and 6 p.m.; and
- Receptor flagpole height of 1.5 meters (ground-level receptor at breathing height).

The sources were modeled with an emission rate of one gram per second to obtain a dispersion factor (unit concentration) at each receptor location. The DPM and $PM_{2.5}$ concentrations were calculated using the dispersion factors and the DPM and $PM_{2.5}$ emissions described above.

1 Construction hours would be limited to typical active workday hours for construction projects.

As discussed previously, for information and disclosure purposes, this HRA presents the health risk values using the 2015 OEHHA guidance. The 2015 OEHHA guidance for HRAs provides age sensitivity factors to apply to the cancer risk calculation. These factors reflect the increased sensitivity of children to the effects of carcinogens. To estimate the worst-case lifetime excess cancer risk, the resident at each receptor was assumed to be in the child age group below 2 years of age. In addition, children have higher breathing rates, which increases the intake of pollutants. The modeling exposure assumptions conservatively assume a child in the age group from birth to 2 years of age, which is the age group most susceptible to DPM emissions from a cancer risk perspective, could be living at the residence east of the Project site.

Figure 2-1 shows the locations of residents (sensitive receptors) closest to the Project site. Modeling assumptions, equations, the cancer risk calculations, and an illustration of the Project sites that were modeled as polygon area sources, in addition to the on-site roadways that were modeled as line area sources, are included in Exhibit B.

### Odors

Impacts related to the PCRP creating or exposing a substantial number of people to objectionable odors is evaluated based on the potential for the PCRP to generate odors that could affect nearby sensitive receptors.

## 2.4.3 Impact Analysis

**a) Implementation of the proposed project could conflict with or obstruct the implementation of an applicable air quality plan.**

The most recently adopted air quality plan for the PCRP area is the 2017 CAP. The 2017 CAP focuses on two closely-related goals: protecting public health and protecting the climate. The 2017 CAP is an update to the BAAQMD's 2010 Ozone Strategy to comply with State air quality planning requirements. The 2017 CAP also serves as a multi-pollutant air quality plan to protect public health and the climate. The 2017 CAP control strategy includes revised, updated, and new measures in the three control measure categories: stationary sources, transportation, and buildings and energy.

Any project that would not support the 2017 Clean Air Plan goals would not be considered consistent with the 2017 CAP. The BAAQMD-recommended measure for determining PCRP support of these goals is consistency with CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the PCRP would not be considered to support the 2017 Clean Air Plan goals, and the associated impact would be significant. As presented in the Impact AQ-1 discussions below, the PCRP would not exceed the BAAQMD significance thresholds; therefore, the PCRP would be considered to support the primary goals of the 2017 CAP, and there would be no impact.

2017 CAP Transportation Control Measure TR22, *Construction, Freight, and Farming Equipment*, appears to be the only measure applicable to the PCRP. It provides incentives for the early deployment of electric, Tier 3, and Tier 4 off-road engines used in construction, freight, and framing equipment. Lack of consistency with these incentives could be considered a significant

impact associated with conflict or obstruction of implementation of the applicable air quality plan. The Applicant has committed to using off-road diesel construction equipment compliant with U.S. EPA Tier 4 Final engine standards. Therefore, the PCRP would be consistent with the intent of Transportation Measure TR22, and there would be no impact.

In summary and same as disclosed in the 2012 EIR, the PCRP would support the primary goals of the 2017 CAP, it would include all applicable 2017 CAP control measures, and it would not disrupt or hinder implementation of any 2017 CAP control measures. Therefore, the PCRP would not conflict with or obstruct implementation of the 2017 CAP and there would be no impact.

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**b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)**

**Impact AQ-1: The PCRP would generate emissions of criteria air pollutants which could contribute to existing nonattainment conditions and further degrade air quality. (Less than Significant Impact)**

As presented in the *Emissions Estimates* discussion in Section 2.4.2.2, *Criteria Pollutants*, the criteria pollutant emissions that would be generated associated with the PCPR would be short-term and periodic in nature and would occur during the dry seasons of years 2024 through 2029. Below are summaries of the PCRP emissions estimate results in terms of total PCRP emissions estimates, PCRP emissions estimates that were not considered in the 2012 EIR and are applicable to the County's SEIR, and PCRP emission estimates compared to the SEIR CEQA baseline.

### *PCRP Total Emissions Estimates*

**Table 2-9** presents a summary of the PCRP total average pounds per day emissions estimates, prior to the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR.

**TABLE 2-9**
**PCRP TOTAL AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 41.32 | 5.50 | 0.72 | 0.10 | 0.67 | 0.00 |
| Channel Widening - Phase 1 (2024) | 173.72 | 23.68 | 7.18 | 0.75 | 12.06 | 0.05 |
| Rock Pile Area - Phase 1 (2025) | 186.97 | 25.07 | 9.54 | 1.27 | 31.29 | 0.09 |
| Rock Pile Area - Phase 2 (2026) | 186.96 | 25.07 | 9.06 | 1.24 | 31.17 | 0.09 |
| Channel Widening - Phase 2 (2027) | 173.70 | 23.67 | 5.81 | 0.67 | 11.74 | 0.05 |
| Old Crusher (2028) | 38.21 | 3.87 | 0.52 | 0.08 | 0.60 | 0.00 |
| Material Removal - Phase 1 (2028) | 366.33 | 42.91 | 7.80 | 1.11 | 27.46 | 0.09 |
| Material Removal - Phase 2 (2029) | 367.61 | 43.03 | 7.49 | 1.09 | 27.24 | 0.09 |

SOURCE: Exhibit A.

**Table 2-10** presents a summary of the PCRP total annual tons emissions estimates, prior to the use of applicability factors to remove the emissions considered to have already been evaluated in the 2012 EIR.

**TABLE 2-10**
**PCRP TOTAL ANNUAL CRITERIA POLLUTANT EMISSIONS (TONS/YEAR)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 1.90 | 0.28 | 0.05 | 0.01 | 0.04 | 0.00 |
| Channel Widening - Phase 1 (2024) | 10.72 | 1.61 | 0.47 | 0.05 | 0.80 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 11.64 | 1.75 | 0.63 | 0.08 | 2.06 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 11.63 | 1.77 | 0.60 | 0.08 | 2.06 | 0.01 |
| Channel Widening - Phase 2 (2027) | 11.12 | 1.66 | 0.38 | 0.04 | 0.78 | 0.00 |
| Old Crusher (2028) | 1.67 | 0.25 | 0.03 | 0.01 | 0.04 | 0.00 |
| Material Removal - Phase 1 (2028) | 23.21 | 2.90 | 0.51 | 0.07 | 1.79 | 0.01 |
| Material Removal - Phase 2 (2029) | 23.38 | 2.92 | 0.49 | 0.07 | 1.78 | 0.01 |

SOURCE: Exhibit A.

## *PCRP Emission Estimates Applicable to the County's SEIR*

**Table 2-11** presents a summary of the PCRP average pounds per day emissions estimates that are applicable to the County's environmental review of the PCRP. The emissions are estimated using the identified applicability factors applied to the total PCRP emissions presented in Table 2-9.

**TABLE 2-11**
**PCRP AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (POUNDS/DAY)**

| Scenario | % Covered in SIER | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 41.32 | 5.50 | 0.72 | 0.10 | 0.67 | 0.00 |
| Channel Widening - Phase 1 (2024) | 89% | 154.88 | 21.12 | 6.40 | 0.67 | 10.75 | 0.04 |
| Rock Pile Area - Phase 1 (2025) | 89% | 166.70 | 22.36 | 8.51 | 1.13 | 27.90 | 0.08 |
| Rock Pile Area - Phase 2 (2026) | 89% | 166.70 | 22.35 | 8.08 | 1.11 | 27.79 | 0.08 |
| Channel Widening - Phase 2 (2027) | 89% | 154.87 | 21.10 | 5.18 | 0.59 | 10.47 | 0.04 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 73.61 | 8.62 | 1.57 | 0.22 | 5.52 | 0.02 |
| Material Removal - Phase 2 (2029) | 20% | 73.87 | 8.65 | 1.51 | 0.22 | 5.47 | 0.02 |

SOURCE Exhibit A.

**Table 2-12** presents a summary of the PCRP tons per year emissions estimates that are applicable to the County's environmental review of the PCRP. The emissions are estimated using the identified applicability factors applied to the total PCRP emissions presented in Table 2-10.

**TABLE 2-12**
**PCRP ANNUAL CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (TONS/YEAR)**

| Scenario | % Covered in SIER | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 1.90 | 0.28 | 0.05 | 0.01 | 0.04 | 0.00 |
| Channel Widening - Phase 1 (2024) | 89% | 9.55 | 1.44 | 0.42 | 0.04 | 0.71 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 89% | 10.37 | 1.56 | 0.56 | 0.07 | 1.84 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 89% | 10.37 | 1.58 | 0.53 | 0.07 | 1.83 | 0.01 |
| Channel Widening - Phase 2 (2027) | 89% | 9.92 | 1.48 | 0.34 | 0.04 | 0.69 | 0.00 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 4.66 | 0.58 | 0.10 | 0.01 | 0.36 | 0.00 |
| Material Removal - Phase 2 (2029) | 20% | 4.70 | 0.59 | 0.10 | 0.01 | 0.36 | 0.00 |

SOURCE: Exhibit A.

For the PCRP emissions estimates to be compared to the CEQA baseline, the total emissions generated for each year must be combined. **Table 2-13** presents a summary of the PCRP combined average pounds per day emissions estimates that are applicable to the County's environmental review of the PCRP for each year.

**TABLE 2-13**
**PCRP COMBINED AVERAGE DAILY CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Concrete Channel and Channel Widening - Phase 1 (2024) | 196.20 | 26.62 | 7.12 | 0.77 | 11.42 | 0.05 |
| Rock Pile Area - Phase 1 (2025) | 166.70 | 22.36 | 8.51 | 1.13 | 27.90 | 0.08 |
| Rock Pile Area - Phase 2 (2026) | 166.70 | 22.35 | 8.08 | 1.11 | 27.79 | 0.08 |
| Channel Widening - Phase 2 (2027) | 154.87 | 21.10 | 5.18 | 0.59 | 10.47 | 0.04 |
| Old Crusher and Material Removal - Phase 1 (2028) | 73.61 | 8.62 | 1.57 | 0.22 | 5.52 | 0.02 |
| Material Removal - Phase 2 (2029) | 73.87 | 8.65 | 1.51 | 0.22 | 5.47 | 0.02 |

SOURCE Exhibit A.

**Table 2-14** presents a summary of the PCRP combined tons per year emissions estimates that are applicable to the County's environmental review of the PCRP.

**TABLE 2-14**
**PCRP COMBINED ANNUAL CRITERIA POLLUTANT EMISSIONS APPLICABLE TO SEIR (TONS/YEAR)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Concrete Channel and Channel Widening - Phase 1 (2024) | 11.45 | 1.71 | 0.47 | 0.05 | 0.75 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 10.37 | 1.56 | 0.56 | 0.07 | 1.84 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 10.37 | 1.58 | 0.53 | 0.07 | 1.83 | 0.01 |
| Channel Widening - Phase 2 (2027) | 9.92 | 1.48 | 0.34 | 0.04 | 0.69 | 0.00 |
| Old Crusher and Material Removal - Phase 1 (2028) | 4.66 | 0.58 | 0.10 | 0.01 | 0.36 | 0.00 |
| Material Removal - Phase 2 (2029) | 4.70 | 0.59 | 0.10 | 0.01 | 0.36 | 0.00 |

SOURCE: Exhibit A.

## *PCRP Emission Estimates Compared to CEQA Baseline*

**Table 2-15** presents the net maximum pounds per day emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum daily incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum daily emissions are not substantial and reflect a slight increase in net emissions compared to the maximum daily incremental change emissions disclosed in the 2012 EIR.

**TABLE 2-15**
**MAXIMUM DAILY NET CRITERIA POLLUTANT EMISSIONS FOR SEIR CONSIDERATION (POUNDS/DAY)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a] | (3,441) | (582) | (316) | (44) | (750) | 5 |
| PCRP Maximum Daily Emissions not Evaluated in the 2012 EIR | 196.20 | 26.62 | 8.51 | 1.13 | 27.90 | 0.08 |
| Net Emissions | (3,245) | (555) | (307) | (43) | (722) | 5 |
| BAAQMD Threshold | 82 | 54 | 54 | 54 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | --[b] | --[c] |

NOTES:

a. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b. See Impact AQ-2 for a discussion of CO significance.
c. The Bay Area is attainment for $SO_2$ standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-3; Exhibit A.

**Table 2-16** presents the net maximum tons per year emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP maximum annual emissions are not substantial and reflect only a slight increase in net emissions compared to the maximum annual incremental change emissions disclosed in the 2012 EIR.

**TABLE 2-16**
**MAXIMUM ANNUAL NET CRITERIA POLLUTANT EMISSIONS FOR SEIR CONSIDERATION (TONS/YEAR)**

| Scenario | PM10 | PM2.5 | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Reclamation Plan Amendment Maximum Daily Incremental Change Disclosed in 2012 EIR[a] | (463) | (77) | (23) | (6) | (66) | 2 |
| PCRP Maximum Annual Emissions (2023) not Evaluated in the 2012 EIR | 11.45 | 1.71 | 0.56 | 0.07 | 1.84 | 0.01 |
| Maximum Annual Incremental Change | (452) | (75) | (22) | (6) | (64) | 2 |
| BAAQMD Threshold | 15 | 10 | 10 | 10 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | --[c] | --[d] |

NOTES:

a. Values in (parentheses) are net reductions for Reclamation Plan Amendment Project presented in the 2012 EIR minus baseline emissions.
b. See Impact AQ-2 for a discussion of CO significance.
c. The Bay Area is attainment for $SO_2$ standards so a CEQA threshold of significance has not been established by the BAAQMD.

SOURCE: Draft 2012 EIR Section 4.3.5.1, Table 4.3-4; Exhibit A.

### *Impact Conclusion*

As can be seen from the data in Tables 2-15 and 2-16, implementation of the PCRP would continue to result in net emissions reductions for all nonattainment air pollutants ($PM_{10}$, $PM_{2.5}$, and the ozone precursors NOx and ROG), and therefore would not exceed the BAAQMD daily or annual thresholds of significance.

Same as identified in the County's 2012 EIR, this would be a less-than-significant impact and the PCRP would not have the potential to cause a new or more significant direct, indirect, and/or cumulative impacts relative to contributing to existing nonattainment conditions.

The significance of CO emissions from the Project is addressed in Impact AQ-2, below.

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**Impact AQ-2: PCRP-related traffic would generate localized CO emissions on roadways and at intersections in the PCRP vicinity. (Less than Significant Impact)**

The 2017 BAAQMD CEQA Air Quality Guidelines recommends use of the same screening criteria for the evaluation of CO emissions on roadways and intersections as recommended in the 2012 Guidelines that were used in the 2012 EIR analysis. The recommended criteria are a project would result in a less-than-significant impact to localized CO concentrations if the following screening criteria are met:

1. Project is consistent with an applicable congestion management program established by the county congestion management agency for designated roads or highways, regional transportation plan, and local congestion management agency plans.
2. The project traffic would not increase traffic volumes at affected intersections to more than 44,000 vehicles per hour.

3. The project traffic would not increase traffic volumes at affected intersections to more than 24,000 vehicles per hour where vertical and/or horizontal mixing is substantially limited (e.g., tunnel, parking garage, bridge underpass, natural or urban street canyon, below-grade roadway).

The PCRP would result in the temporary generation of vehicle trips but would not exceed the standards included in the Santa Clara County Congestion Management Plan established by the Santa Clara Valley Transportation Authority (SCVTA). In regard to the second and third criteria, intersection traffic volumes (including external PCRP traffic) would be substantially less than 44,000 and 24,000 vehicles per hour, respectively. The estimated increase in traffic volumes caused by reclamation-related traffic (a maximum of approximately 127 round trips per day) would not be substantial, nor would PCRP traffic significantly disrupt daily traffic flow on area roadways.

Based on the BAAQMD's criteria, PCRP-related traffic would not lead to violations of the CO standards and therefore, no further analysis is required for CO impacts of the PCRP and same as disclosed in the 2012 EIR, the impact continues to be less than significant.

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**Impact AQ-3a: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer.** ***(Less than Significant Impact)***

Cancer risks were modeled for activities that would emit DPM and metals, which include diesel equipment and fugitive dust containing metals at the PCRP disturbance areas, as well as diesel trucks and fugitive dust containing metals on paved and unpaved roads. Cancer risk was calculated using the resulting DPM and metals concentrations modeled with AERMOD, along with equations and factors from the OEHHA 2003 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2003; BAAQMD 2016). Cancer risk represents a cumulative exposure over the duration of the project.

**Table 2-17** presents the modeled cancer risk of 0.51 in one million at the maximally exposed individual receptor (MEIR) location, which is a residence just south of Stevens Creek Boulevard, approximately 2,500 feet east of the Permanente Quarry entrance. This represents the cancer risk for the PCRP duration from 2024 through 2029, as cancer risk is cumulative over the exposure duration.

The MEIR identified in the 2012 EIR was modeled at the caretaker's residence, and the second-highest cancer risk was modeled at a residence near Stevens Creek Boulevard. For the purposes of this analysis, this is assumed to be the same residence as this HRA's MEIR. Cancer risk values for the 2012 EIR and this HRA are shown for the caretaker's residence and the residence just south of Stevens Creek Boulevard.

As shown in **Table 2-17**, the incremental risk at the MEIR, when added to the value from the 2012 EIR, is below the BAAQMD CEQA threshold of 10 in one million. This is also true for the value

at the caretaker's residence. The majority of the cancer risk is due to DPM that would be generated from on-road diesel trucks traveling past neighborhoods close to Stevens Creek Boulevard.

**TABLE 2-17**
**ESTIMATED CANCER RISK AT THE MEIR AND CARETAKER'S RESIDENCE**

| Risk | MEIR - Child Resident South of Stevens Creek Blvd. (per million) | Caretaker's Residence (per million) |
|---|---|---|
| Cancer - PCRP | 0.51 | 0.03 |
| Cancer – Draft 2012 EIR | 8.98 | 8.66 |
| Combined Total | 9.49 | 8.70 |
| BAAQMD significance thresholds | 10 | 10 |
| Exceeds threshold? | No | No |

SOURCE: 2012 EIR Section 4.3.5.1; Tables 4.3-11 and 4.3-12; Exhibit B.

For information and disclosure purposes, while the 2015 OEHHA guidance was not available nor was its release reasonably foreseeable at the time the 2012 EIR was certified, the health risk values based on the exposure parameters from the OEHHA 2015 *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (OEHHA 2015), are provided herein. Using the exposure parameters from the 2015 OEHHA guidance, the cancer risk value for the 2012 EIR would be approximately 12.34 in one million and the cancer risk value for the PCRP would be approximately 0.78 in one million, for a total risk of approximately 13.12 in one million. The 2012 EIR risk was multiplied by a factor of 1.37 to adjust it to 2015 OEHHA exposure parameters. This factor was derived from breathing rate ratios from the 2015 OEHHA guidance to the 2003 OEHHA guidance. Based on the exposure parameters from the 2015 OEHHA guidance, the risk from the PCRP on its own would neither cause a new significant impact nor result in a substantially greater significant impact than disclosed in the 2012 EIR.

**Impact AQ-3b: The PCRP would expose sensitive receptors to increased levels of toxic air contaminants, which could increase chronic and acute health risks. (*Less than Significant Impact*)**

Chronic and acute, non-cancer health risks were evaluated based on emissions of pollutants with these health effects. DPM and some of the metals found in the fugitive dust at the PCRP disturbance areas and in road dust result in chronic health effects. In addition, some of the metals result in acute (short-term) health effects, but DPM does not have a short-term, acute health risk effect. Acute impacts were modeled at residential receptors and at locations where the public could have access on a short-term basis. These receptors include the trails north of the Project site and the Gate of Heaven cemetery to the northeast of the Project site, discussed above.

Non-cancer adverse health risks, both for acute (short-term) and chronic (long-term) timeframes, are measured against a hazard index, which is defined as the ratio of the incremental exposure concentrations of the various non-carcinogens from the project to published reference exposure

levels (RELs) that can cause adverse health effects. The RELs are established by OEHHA based on epidemiological evidence. The ratio (referred to as the Hazard Quotient) of each substance with a non-carcinogenic effect that affects a certain organ system is added to produce an overall Hazard Index for that organ system. As a worst case, it was assumed that all of the toxic substances with established RELs would affect the same organ and the individual Hazard Quotients were summed to calculate an overall Hazard Index. If the Hazard Index exceeds 1.0, the potential health impact would be significant.

**Table 2-18** presents the maximum chronic hazard index, plus the maximum acute hazard index. The maximum impact location for both the chronic and acute hazard indices is the MEIR located just south of Stevens Creek Boulevard. Both maximum chronic and acute hazard index values would occur based on activities in the years 2025 and 2029, respectively. As shown in **Table 2-18**, the maximum chronic and acute hazard indices for the PCRP combined with the 2012 EIR index values indicates that the impacts associated with the revised Reclamation Plan Amendment would continue to be less than significant, and there would be no new significant impact. The maximum acute hazard index would be due primarily to nickel (as a component in fugitive dust from the roadway).

**TABLE 2-18**
**ESTIMATED CHRONIC AND ACUTE HAZARD IMPACTS**

| Health Risk | PCRP Hazard Index | Location | Year | 2012 EIR Value[a] |
|---|---|---|---|---|
| Chronic | 0.01 | MEIR | 2025 | 0.13 |
| Acute | 0.06 | MEIR | 2029 | 0.52 |

NOTES:

a. The chronic and acute risk values from the 2012 EIR were reported for the caretaker's residence.

SOURCE: Draft 2012 EIR Section 4.3.5.1; Tables 4.3-13 and 4.3-14, Exhibit B.

### Impact AQ-3c: The PCRP would increase exhaust emissions of $PM_{2.5}$, which could adversely affect human health. *(Less than Significant)*

An analysis was conducted to determine the maximum annual increase in $PM_{2.5}$ exhaust concentrations for sensitive receptors in the vicinity of the PCRP. BAAQMD policy is to conduct this analysis for exhaust emissions only. Under the PCRP, the Applicant would continue to comply with its existing Fugitive Dust Control Plan (dated January 21, 2011).

As shown in **Table 2-19**, the maximum incremental annual $PM_{2.5}$ concentration at the MEIR south of Stevens Creek Boulevard would be 0.001 $\mu g/m^3$, which would be below the BAAQMD threshold of 0.3 $\mu g/m^3$ and would therefore result in a less-than-significant impact. Therefore, implementation of the PCRP would not result in a new or more significant $PM_{2.5}$ concentration impact than was disclosed in the 2012 EIR.

**TABLE 2-19**
**ESTIMATED PM2.5 CONCENTRATION IMPACTS (µg/m$^3$)**

| Location | Annual Average Concentration |
|---|---|
| PCRP MEIR – South of Stevens Creek Boulevard | 0.001 |
| 2012 EIR Value – South of Stevens Creek Boulevard | Not Reported |
| PCRP MEIR – Caretaker's Residence | <0.001 |
| 2012 EIR Value – Caretaker's Residence | 0.29 |
| Total at Caretaker's Residence | 0.29 |

SOURCE: See Exhibit B.

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**e) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people.**

Land uses that typically pose potential odor problems include agriculture, wastewater treatment plants, food processing and rendering facilities, chemical plants, composting facilities, landfills, waste transfer stations, and dairies. The PCRP does not include any of these land uses or similar land uses. In addition, in the context of existing Permanente Quarry operations, equipment emissions from PCRP implementation would not result in any new odor sources. Therefore, as disclosed in the 2012 EIR, the PCRP would not create objectionable odors that would affect a substantial number of people. There would be no impact.

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# CHAPTER 3
# Greenhouse Gas Emissions Technical Analysis

## 3.1 Greenhouse Gas Emissions

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to greenhouse gas (GHG) emissions, and documents an analysis of potential impacts related to GHG emissions from the Project. For the purposes of this assessment, the following topics are considered: an overview of climate change; a review of the various GHGs that have been identified as drivers of climate change; pertinent regulations, including those relevant at federal, state, and local levels; significance criteria for potential environmental impacts; and potential impacts and appropriate mitigation measures associated with project construction and operation. Air quality emissions, including criteria air pollutants, are considered in Section 3.3, *Air Quality*. If needed, best management practices (BMPs) identified by BAAQMD and mitigation measures to avoid or reduce significant impacts are also identified.

### 3.1.1 Environmental Setting

#### Climate Change

There is general scientific consensus that climate change is occurring and is almost certainly attributed to human activities. Man-made emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Strong scientific evidence documents that the climate is changing and that its impacts are widespread and occurring now. In California, this evidence includes increases in extreme heat, wildfires, extreme storms, coastal flooding and erosion, and reductions in Sierra Nevada springtime snowpack and threats to water availability (CARB 2014). Globally, climate change has the potential to adversely affect numerous environmental resources through potential, though uncertain, impacts related to future air and water temperatures, precipitation patterns, and an array of other factors. According to the International Panel on Climate Change (IPCC), several indicators of climate change are advancing faster than in previous assessments (IPCC 2014):

- Changing precipitation and snow melt patterns;
- Negative effect on crop yield;
- Increased heat waves, drought, flood, wildfires, and storm events;

- Reduced renewable water resources in most dry subtropical regions; and
- Ocean acidification damage to marine ecosystems.

Also, there are many secondary effects projected to result from global warming, including impacts to agriculture, changes in disease vectors, changes in habitat suitability, and potential for reduction of biodiversity. While the possible outcomes and the feedback mechanisms involved are not fully understood and much research remains to be done, the potential for substantial environmental, social, and economic consequences over the long term may be great.

## Greenhouse Gases

State-regulated GHG emissions that result from human activities primarily include carbon dioxide ($CO_2$), with much smaller amounts of nitrous oxide ($N_2O$), methane ($CH_4$, often from unburned natural gas), sulfur hexafluoride ($SF_6$) from high-voltage power equipment, nitrogen trifluoride ($NF_3$) from microelectronics and semi-conductor manufacturing, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and $CO_2$ is the most common reference gas for climate change, GHG emissions are often quantified and reported as $CO_2$-equivalent ($CO_2e$) emissions. For example, while $SF_6$ represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 22,800 times the global warming potential (GWP) of $CO_2$. Therefore, an emission of 1 metric ton of $SF_6$ would be reported as 22,800 metric tons $CO_2e$. The GWP of $CH_4$ and $N_2O$ are 25 times and 298 times that of $CO_2$, respectively (CARB 2016).

In 2019, the United States emitted about 6.56 billion tons of $CO_2e$, representing a 1.7 percent decrease from 2018. This decrease was driven largely by a decrease in emissions from fossil fuel combustion resulting from a decrease in total energy use in 2019 compared to 2018 and a continued shift from coal to natural gas and renewables in the electric power sector. Of the five major sectors nationwide (residential and commercial, industry, agriculture, transportation, and electricity), transportation accounts for the highest fraction of GHG emissions (approximately 29 percent), followed closely by the electric power industry (approximately 25 percent) and general industry (approximately 23 percent) (U.S. EPA 2021).

Statewide emissions of GHG from relevant source categories for 2014 through 2020 are summarized in **Table 3-1**. Specific contributions from individual air basins, such as the San Francisco Bay Area Air Basin, which encompasses the Project site, are included in the emissions inventory but are not itemized by air basin. In 2020, California produced 369.1 million gross metric tons of $CO_2e$ emissions, which was a 9 percent drop in emissions compared to 2019 due to the Covid-19 pandemic-related economic shutdown. Transportation was the source of 37 percent of the state's GHG emissions, followed by industrial at 20 percent, electricity generation at 16 percent, commercial and residential sources at 11 percent, agriculture at 9 percent, high global warming potential emissions at 6 percent, and recycling and waste comprising the remaining 2 percent (CARB 2022a).

**TABLE 3-1**
**CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS $CO_2E$)**

| Emission Inventory Category | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | |
|---|---|---|---|---|---|---|---|---|
| Transportation | 157.7 | 161.5 | 165.2 | 166.6 | 165.3 | 162.4 | 135.8 | 36.8% |
| Electric Power | 89.8 | 86.0 | 70.4 | 64.2 | 65.0 | 60.2 | 59.5 | 16.1% |
| Industrial | 85.2 | 83.2 | 81.6 | 81.7 | 81.9 | 80.4 | 73.3 | 19.9% |
| Commercial & Residential | 35.6 | 36.3 | 37.2 | 37.6 | 37.4 | 40.5 | 38.7 | 10.5% |
| Agriculture | 33.9 | 32.6 | 32.2 | 31.7 | 32.2 | 31.4 | 31.6 | 8.6% |
| High GWP | 17.7 | 18.6 | 19.4 | 20.1 | 20.5 | 20.7 | 21.3 | 5.8% |
| Recycling and Waste | 8.3 | 8.4 | 8.5 | 8.6 | 8.7 | 8.8 | 8.9 | 2.4% |
| **Total Gross Emissions** | 428.2 | 426.6 | 414.5 | 410.5 | 411.0 | 404.4 | 369.1 | 100.0% |

SOURCE: CARB 2022a.

# 3.2 Regulatory Setting

## 3.2.1 Federal Regulations

The federal regulation (i.e., the GHG Reporting Rule) identified in the 2012 EIR is supplemented with the following information.

### U.S. Environmental Protection Agency (U.S. EPA)

In Massachusetts v. U.S. EPA (2007) 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the U.S. EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the U.S. EPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time-to-time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.

On April 17, 2009, the U.S. EPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the Clean Air Act. The U.S. EPA found that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. The U.S. EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to 40 CFR Part 52, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, U.S. EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source $CO_2e$ emissions exceed 100,000 tons per year (U.S. EPA 2019).

### *U.S. Supreme Court Decision in Utility Air Regulatory Group v. U.S. EPA*

In Utility Air Regulatory Group v. U.S. EPA (2014), the U.S. Supreme Court held that U.S. EPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of best available control technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency, which vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed U.S. EPA to consider whether any further revisions to its regulations are appropriate, and if so, to undertake to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended judgment, the U.S. EPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules (U.S. EPA, 2019).

## 3.2.2 State Regulations

There are a variety of statewide rules and regulations that have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Under CEQA, analysis and mitigation of GHG emissions and climate change in relation to a proposed project is required where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere. State regulations identified in the 2012 EIR are supplemented with the following information.

### Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the state's Five-Year Infrastructure Plan;
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change;
- Factor climate change into state agencies' planning and investment decisions; and
- Implement measures under existing agency and departmental authority to reduce GHG emissions (OGB 2015).

Executive Order B-30-15 required CARB to update the Assembly Bill 32 (AB 32) Climate Change Scoping Plan to incorporate the State's target from 2020 to 2030. CARB adopted the 2017 Scoping Plan for achieving the 2030 target, which takes into account the key programs

associated with implementation of the AB 32 Scoping Plan--such as GHG reduction programs for cars, trucks, fuels, industry, and electrical generation--and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the State using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the State's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the energy, transportation, industry, water, waste management, agriculture, and natural and working lands sectors (CARB 2017). The 2017 Scoping Plan does not address construction or restoration projects such as the PCRP.

The 2022 Scoping Plan for Achieving Carbon Neutrality (2022 Scoping Plan) lays out a path to achieve targets for carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below 1990 levels no later than 2045. The actions and outcomes in the plan are intended to achieve significant reductions in fossil fuel combustion by deploying clean technologies and fuels, further reductions in short-lived climate pollutants, support for sustainable development, increased action on natural and working lands to reduce emissions and sequester carbon, and the capture and storage of carbon. The 2022 Scoping Plan identities a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045 (CARB 2022b).

## Senate Bill 32 and Assembly Bill 197

On August 23, 2016, the California Assembly passed SB 32, legislation that would extend California's landmark climate change legislation to require that California reduce its emissions to 40 percent below 1990 levels by 2030, an extension of AB 32's goal to reduce emissions to 1990 levels. SB 32 became fully enacted the next day when AB 197 was passed, as an amendment to SB 32 stated that it would only become operative if AB 197 was enacted. AB 197's key components are:

- Directs CARB to enact environmental justice and social costs when designing climate change regulations.
- Creates a new entity called the Joint Legislative Committee on Climate Change Policies, authorized to do fact-finding and make recommendations to the Legislature regarding the state's climate change programs.
- Makes substantial changes to how CARB functions, increasing the board member size, adjusting the terms of service, and strengthens the board member service disqualification process.
- Intention to decrease CARB's reliance on cap-and-trade to achieve reductions and instead directs CARB to prioritize direct emission reductions at large stationary sources.

### 3.2.3 Local Regulations

#### Bay Area Air Quality Management District

The BAAQMD lays the groundwork for GHG emissions reductions through the 2017 Clean Air Plan (2017 CAP). The 2017 CAP provides a long-term vision of how the Bay Area could and function in a year 2050 post-carbon economy and describes a control strategy to be implemented by BAAQMD. The 2017 CAP also includes measures designed for the purpose of reducing GHG emissions; however, the measures do not address construction or restoration projects such as the PCRP (BAAQMD 2017a).

#### County of Santa Clara

In September 2009, the County released its *County of Santa Clara Climate Action Plan for Operations and Facilities* (County of Santa Clara 2009). This plan presented several solutions and policies that focus on County operations, facilities, and employee actions to reduce GHG emissions associated with energy and water consumption, solid waste, and fuel consumption. Since the plan focuses primarily on steps needed to reach the 10 percent reduction (13,346 MT) goal by 2015, it is now outdated. In addition, this plan applies to County government operations and facilities only, it would not pertain to the PCRP.

On December 18, 2018, the Board of Supervisors of the County of Santa Clara adopted Resolution BOS-2018-145 to reaffirm and augment the County's GHG emissions reduction targets and establish a 100 percent carbon neutral by 2045 commitment for County of Santa Clara operations (County of Santa Clara 2018). The resolution applies to County government operations and facilities only, it would not pertain to the PCRP.

## 3.3 CEQA Baseline Emissions

The CEQA baseline for this GHG emissions analysis includes the baseline conditions identified in the 2012 EIR, the 2012 Reclamation Plan Amendment emissions, as well as the approved 2012 EIR Mitigation Measures that are conditions of the 2012 Reclamation Plan approval.

### 3.3.1 2012 EIR Baseline

The baseline for the 2012 EIR reflects the same physical environmental conditions in the vicinity of the PCRP as identified in the Section 2.3.1 for the air quality analysis. The baseline GHG emissions identified in the 2012 EIR analysis are based on an average over the 11-year period from January 1, 2000, to December 31, 2010, which includes periods of relatively high production as well as relatively low production at the Permanente Quarry in response to changing market demands. The annual 2012 EIR baseline GHG emissions are shown in **Table 3-2**.

### 3.3.2 2012 Emissions and Analysis

Baseline and maximum annual 2012 Reclamation Plan Amendment GHG emissions are summarized in **Table 3-2**, and the net change is compared to the BAAQMD annual significant

threshold. As shown in Table 3-2, the 2012 Reclamation Plan Amendment was found to result in net GHG emissions that would exceed the significance threshold, and therefore was disclosed to result in a significant impact.

**TABLE 3-2**
**2012 RECLAMATION PLAN AMENDMENT MAXIMUM ANNUAL GHG EMISSIONS (METRIC TONS/YEAR)**

| Scenario | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|
| Baseline Emissions | 15,707 | <1 | <1 | 15,842 |
| Reclamation Plan Amendment Emissions | 20,587 | 1 | <1 | 20,762 |
| Maximum Annual Incremental Change | 4,880 | <1 | <1 | 4,920 |
| BAAQMD Threshold | -- | -- | -- | 1,100 |
| Significant Impact (Yes or No)? | -- | -- | -- | Yes |

SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2.

## 3.3.3 2012 EIR Mitigation Measures

As stated above in Section 3.3.2, the 2012 EIR identified a significant GHG emissions impact, which was mitigated to a less-than-significant level by the implementation of Mitigation Measures 4.8-1a and 4.8-1b. Mitigation Measures 4.8-1a and 4.8-1b are described below followed by a summary of how the mitigation measures will be considered for the County's environmental review process for the PCRP.

> **Mitigation Measure 4.8-1a: Develop Annual GHG Inventory.** The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the [2012 Reclamation Plan Amendment] Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.
>
> **SEIR Baseline Consideration**
>
> The Applicant would be required to implement 2012 EIR Mitigation Measure 4.8-1a as defined above during implementation of the PCRP.
>
> **Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan.** The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the [2012 Reclamation Plan Amendment] Project-related incremental increase of GHG emissions does not exceed 1,100 MT $CO_2e$ per year. The GHG Plan shall include, but not be limited to, the following measures:
>
> 1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.

2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the WMSA to reclaim the Quarry pit.

If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT $CO_2e$ per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):

1. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.
2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.
3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.

**SEIR Baseline Consideration**

The Applicant would be required to implement 2012 EIR Mitigation Measure 4.8-1b as defined above during implementation of the PCRP.

# 3.4 Analysis, Impacts, and Mitigation

## 3.4.1 Significance Criteria

Consistent with CEQA Guidelines Appendix G, the PCRP would have a significant impact if it would:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.

## 3.4.2 Methodology

### Greenhouse Gas Emissions

#### *Significance Thresholds*

The 2012 EIR relied on the methods and significance threshold identified in the BAAQMD's 2010 CEQA Guidelines as supported by Appendix D of the BAAQMD Guidelines and BAAQMD's Revised Draft Options and Justification Report. After adoption of the 2012 EIR, the BAAQMD updated its CEQA Guidelines in 2017 to address the California Supreme Court's opinion in California Building Industry Association v. BAAQMD (2015) 62 Cal.4$^{th}$ 369 (BAAQMD 2017b). However, the methods and GHG emissions significance criteria identified in the 2017 BAAQMD CEQA Guidelines for GHG emissions are the same as those identified in the 2010 BAAQMD CEQA Air Quality Guidelines (BAAQMD 2010).

In accordance with the BAAQMD *CEQA Air Quality Guidelines*, the 2012 EIR considered implementation of the Reclamation Plan Amendment to have a significant impact if it would emit GHG emissions greater than the BAAQMD's 1,100 MT per year $CO_2e$ from operational sources other than permitted stationary sources (the 2012 Reclamation Plan Amendment did not propose any new or expanded stationary sources that emit GHGs). The 1,100 MT $CO_2e$ per year significance threshold was designed for the BAAQMD to meet the AB 32 goal of reducing GHG emissions to 1990 levels by 2020 by accounting for the Bay Area's share of land use sector GHG emissions reductions beyond that achievable at the state level. It is based on the AB 32 GHG reduction goals and a "gap analysis" that attributes an appropriate share of GHG emissions reductions to new land use development projects in BAAQMD's jurisdiction. The BAAQMD has not yet developed a corresponding mass emissions threshold that extends beyond 2020 to be aligned with the SB 32 target for 2030. Although use of the 1,100 MT $CO_2e$ significance threshold was appropriate at the time of the 2012 EIR certification, that threshold is no longer appropriate for analyzing the GHG impacts of post-2020 proposed projects without an adjustment to be consistent with SB 32.

The PCRP would not involve long-term operational emissions and short-term construction emissions would cease in 2027. AB 32 includes a statewide GHG reduction target to achieve 1990 levels by the year 2020, while SB 32 extends the statewide target to a reduction of 40 percent below 1990 levels by 2030. Since emissions associated with the PCRP would no longer be generated by 2030, a 2020 GHG significance threshold based on AB 32 is more appropriate for the PCRP than a threshold based on the SB 32 reduction target. An even more appropriate threshold is one that is adjusted to account for the SB 32 target, recognizing that important State initiatives (most notably, the vehicle fuel efficiency standards and the Renewables Portfolio Standard) are scheduled to reduce emissions substantially as the decade progresses. The most conservative approach would be to use a threshold based on the 2030 target, which would be consistent with a 2016 white paper by the Association of Environmental Professionals (AEP) Climate Change Committee recommendation that when a project is built out before the next milestone target year adopted by the State, the milestone year should be used as the basis for the project-level threshold (AEP 2016). Note that the AEP white paper is advisory only and is not binding guidance or an adopted set of CEQA thresholds.

Because BAAQMD has not adopted GHG-related CEQA significance thresholds for the SB 32 horizon year of 2030, and the County does not currently have a "qualified" GHG reduction strategy available, a specific project-level threshold has been identified consistent with CEQA Guidelines section 15064.4. The 2020 mass emission threshold is adjusted downward by 40 percent to be consistent with the 2030 SB 32 horizon year target, as shown below. Since the significance threshold used in 2012 EIR was appropriate at the time of its certification, the total 2012 Reclamation Plan Amendment emissions, as revised to include the proposed PCRP emissions, are evaluated in this analysis using the 1,100 MT $CO_2e$ significance threshold; however, for purposes of full disclosure, the proposed PCRP would also be deemed to result in a new significant impact if its incremental emissions beyond the emissions estimated for the 2012 Reclamation Plan Amendment in the 2012 EIR would exceed the adjusted 2030 emissions threshold that is 40 percent below the 2020 mass emissions threshold of 1,100 MT $CO_2e$ per year, which is equivalent to 660 MT $CO_2e$ per year.

The significance thresholds discussed above are designed for long-term operational emissions. Because the PCRP would result in short-term activities to restore and modify approximately 9,000 linear feet of Permanente Creek and would not involve long-term operations, its total short-term emissions were amortized over the 20-year life of the 2012 Reclamation Plan Amendment (see 2012 EIR Section 2.1) before comparison to the significance thresholds.

### *Emission Estimates*

Project-related GHG emissions typically fall into two categories: short-term emissions due to construction, and long-term emissions due to project operations; however, regarding the PCRP, GHG emissions would be generated on a short-term basis during construction over a period of approximately 6 years, and there would be no long-term sustained operational emissions. The PCRP would generate GHG exhaust emissions from construction equipment and vehicles. The construction-related scheduling, equipment, and trips assumptions and methods used to estimate GHG emissions associated with the PCRP are generally the same as those described for the air quality analysis (see Section 2.4.2.1, *Criteria Pollutants*). To estimate $CO_2e$ emissions, global warming potentials from the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4) were applied to the $CH_4$ and $N_2O$ emissions.

Same as for the criteria pollutants, the modeled GHG emissions for each construction phase were then multiplied by the percent of emissions to be evaluated for the given construction phase based on the proposed creek reach area outside of the previously evaluated 2012 EIR disturbance areas to allow for evaluation of the applicable emissions in the County's environmental review of the PCRP (see Section 1.1, *Emissions Analysis for the SEIR*). Calculated emissions for the County's consideration were then summed, amortized over the 20-year life of the 2012 Reclamation Plan Amendment, and added to the baseline emissions (see Section 2.3, *CEQA Baseline Emissions*) for comparison to BAAQMD's regional significance threshold to determine if the PCRP would have the potential for new significant direct, indirect, and/or cumulative environmental effects compared with the creek restoration project previously analyzed in the 2012 EIR. The incremental amortized PCRP emissions are also compared to the adjusted emissions threshold for full disclosure (refer to *Significance Thresholds* discussion above). Detailed emissions

assumptions and summaries, including the CalEEMod and EMFAC2021 assumptions and output are included in Exhibit A.

## Conflicts with Applicable Plans, Policies, or Regulations

The BAAQMD CEQA Guidelines state that a project or plan that is consistent with an adopted GHG Reduction Strategy would be considered to have a less-than-significant impact. As noted above in Section 3.2, *Regulatory Setting*, the State has adopted the 2017 Scoping Plan and the 2022 Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not directly applicable to emissions generated by projects such as the PCRP.

Regarding SB 32, California's climate change legislation updated to require California to reduce its emissions to 40 percent below 1990 levels by 2030, PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 MT $CO_2e$ (see Section 3.4.2.2, above).

# 3.4.3 Impact Analysis

**a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment**

**Impact GHG-1: The PCRP could result in an increase in greenhouse gas emissions and contribute to climate change.** ***(Less than Significant Impact with Mitigation Incorporated)***

As presented in the *Emissions Estimates* discussion in Section 3.4.2.2, *GHG Emissions*, the GHG emissions that would be generated by the PCPR would be short-term and periodic in nature and would occur during the dry seasons of 2024 through 2029. Below are summaries of the PCRP GHG emissions estimate results in terms of total PCRP emissions, PCRP emissions that were not considered in the 2012 EIR and are applicable to the County's environmental review of the PCRP, and PCRP emissions relative to the SEIR CEQA baseline.

### *PCRP Total Emissions*

**Table 3-3** presents a summary of the PCRP total annual emissions estimates, prior to the use of Applicability Factors to remove the emissions considered to have already been evaluated in the 2012 EIR. For the percent of PCRP total annal emissions already evaluated in the 2012 EIR, refer to Table 1-1, *Emissions Applicability Factors*.

**TABLE 3-3**
**PCRP TOTAL ANNUAL GHG EMISSIONS (METRIC TONS/YEAR)**

| Scenario | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|
| Concrete Channel (2024) | 24.62 | 0.00 | 0.00 | 25.61 |
| Channel Widening - Phase 1 (2024) | 300.17 | 0.04 | 0.03 | 309.57 |
| Rock Pile Area - Phase 1 (2025) | 561.51 | 0.12 | 0.03 | 573.83 |
| Rock Pile Area - Phase 2 (2026) | 559.87 | 0.12 | 0.03 | 572.11 |
| Channel Widening - Phase 2 (2027) | 296.41 | 0.04 | 0.03 | 305.63 |
| Old Crusher (2028) | 24.03 | 0.00 | 0.00 | 24.97 |
| Material Removal - Phase 1 (2028) | 503.71 | 0.10 | 0.03 | 515.12 |
| Material Removal - Phase 2 (2029) | 503.90 | 0.10 | 0.03 | 515.32 |

SOURCE: Exhibit A.

## *PCRP Emissions Applicable to the County's SEIR*

**Table 3-4** presents a summary of the PCRP annual emissions estimates that are applicable to the County's SEIR analysis. The table presents the emissions by calendar year, and total amortized emissions assuming a Project life of 20 years. The emissions are estimated by applying the applicability factors described in Table 1-1 and presented below in Table 3-4, to the total PCRP emissions presented in Table 3-3, above.

**TABLE 3-4**
**PCRP GHG EMISSIONS APPLICABLE TO SEIR (METRIC TONS/YEAR)**

| Scenario | % Covered in SIER | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 24.62 | 0.00 | 0.00 | 25.61 |
| Channel Widening - Phase 1 (2024) | 89% | 267.63 | 0.03 | 0.03 | 276.01 |
| Rock Pile Area - Phase 1 (2025) | 89% | 500.65 | 0.10 | 0.03 | 511.62 |
| Rock Pile Area - Phase 2 (2026) | 89% | 499.18 | 0.10 | 0.03 | 510.09 |
| Channel Widening - Phase 2 (2027) | 89% | 264.28 | 0.03 | 0.02 | 272.50 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 101.21 | 0.02 | 0.01 | 103.51 |
| Material Removal - Phase 2 (2029) | 20% | 101.25 | 0.02 | 0.01 | 103.55 |
| Total Emissions | | 1,758.82 | 0.32 | 0.12 | 1,802.89 |
| Amortized Emissions (20 years) | | 87.94 | 0.02 | 0.01 | 90.14 |

SOURCE: Exhibit A.

### *PCRP Emissions Compared to CEQA Baseline*

**Table 3-5** presents the net annual emissions relative to the PCRP emissions that were not evaluated in the 2012 EIR combined with the 2012 Reclamation Plan Amendment maximum annual incremental change emissions disclosed in 2012 EIR. As shown in the table, the PCRP amortized emissions would not be substantial and reflect a slight increase of approximately nine percent in emissions compared to the maximum annual emissions disclosed in the 2012 EIR.

**TABLE 3-5**
**MAXIMUM ANNUAL NET GHG EMISSIONS FOR SEIR CONSIDERATION (METRIC TONS/YEAR)**

| Scenario | $CO_2$ | $CH_4$ | $N_2O$ | Total $CO_2e$ |
|---|---|---|---|---|
| Reclamation Plan Amendment Maximum Annual Incremental Change Disclosed in 2012 EIR* | 1,060 | <1 | <1 | 1,100 |
| PCRP Amortized Emissions not Evaluated in the 2012 EIR | 87.90 | <1 | <1 | 90.14 |
| Net Emissions | 1,148 | <1 | <1 | 1,190 |
| BAAQMD Threshold | --- | --- | --- | 1,100 |
| Significant Impact (Yes or No)? | | | | Yes |

* Reclamation Plan Amendment emissions reflect implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b.

SOURCE: Draft 2012 EIR Section 4.8.5, Table 4.8-2, Exhibit A.

### *Impact Conclusion*

As shown in the data in Table 3-5, implementation of the PCRP would result in revised emissions that would continue to exceed the BAAQMD's annual operational significance threshold of 1,100 MT $CO_2e$ per year, requiring the continued implementation of 2012 EIR Mitigation Measures 4.8-1a and 4.8-1b to reduce the impact to a less-than-significant level. In addition, the proposed PCRP incremental amortized emissions would be substantially less than the adjusted significance threshold of 660 MT $CO_2e$ per year, indicating that the proposed PCRP would be aligned with the SB 32 emissions reduction target for 2030. Implementation of the PCRP would not result in a new or more severe significant impact than was disclosed in the 2012 EIR.

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**Impact GHG-2: The PCRP could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG.** ***(Less than Significant Impact)***

As noted above in Section 3.2, *Regulatory Setting*, the State has adopted the 2017 Climate Change Scoping Plan, the BAAQMD has adopted the 2017 CAP, and the County has adopted a Climate Action Plan for reducing GHG emissions. These plans, however, are not applicable or have limited applicability to emissions generated by projects such as the PCRP. Regarding SB 32, the PCRP's consistency with this goal is addressed through the comparison of its estimated incremental emissions to the adjusted significance threshold of 660 MT $CO_2e$ per year (see Impact GHG-1, above).

Also, the 2017 Climate Change Scoping Plan includes a mobile source strategy that relies on the implementation of the federal phase 2 standards for medium- and heavy-duty vehicles and deploying increasing numbers of zero-emission trucks primarily for classes 3 through 7 last mile delivery trucks. While these strategies are not applied at a project-level, truck fleets would be subject to regulations adopted pursuant to these strategies including those truck fleets used to transport materials to and from the Project site.

In addition, the 2022 Scoping Plan identities a construction equipment sector action for the Scoping Plan Scenario that commits to 25 percent of energy demand to be electrified by 2030 and 75 percent electrified by 2045. A similar commitment is not proposed for the PCRP-related construction equipment. However, the PCRP would be completed prior to the 2030 compliance date associated with the construction equipment sector action; therefore, it would not be directly applicable to the PCRP.

In summary, the PCPR would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. Therefore, this impact would be less than significant and implementation of the PCRP would not result in a new or more sever significant impact than was disclosed in the 2012 EIR.

## 3.4.4 References

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# Exhibit A
## Criteria Pollutants and Greenhouse Gas Emissions

ESA

# A-1 Criteria Pollutant and Greenhouse Gas Emissions Calculations Excel Worksheets

# Permanente Creek Restoration Plan Supplemental EIR -
# Constrution Assumptions

## Estimated Construction Schedule

| Construction Phases | From | To | No. of workdays/ week | No. of Workdays* |
|---|---|---|---|---|
| Concrete Channel/Channel Widening (Phase 1) | 4/15/2024 | 10/15/2024 | 5 | 132 |
| Rock Pile Area Year (Phase 1) | 4/15/2025 | 10/15/2025 | 5 | 132 |
| Rock Pile Area Year (Phase 2) | 4/15/2026 | 10/15/2026 | 5 | 132 |
| Channel Widening (Phase 2) | 4/15/2027 | 10/15/2027 | 5 | 132 |
| Material Removal Area (Phase 1)/Old Crusher Foundation | 4/15/2028 | 10/15/2028 | 5 | 130 |
| Material Removal Area (Phase 2) | 4/15/2029 | 10/15/2029 | 5 | 131 |

Source: Lehigh Responses to Data Request provided 1/24/2023.
*Some workdays are 1 to 2 days greater than provided by the Applicant due to adjustments assocaited with the provided construction schedule.

## Modeled Construction Equipment for Each Phase-Year

### Concrete Channel

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/day - Phase |
|---|---|---|---|---|---|---|
| Clearing Saw | 1 | 81 | 4 | 8 | 32 | 0.2 |

### Channel Widening

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/ day - Phase |
|---|---|---|---|---|---|---|
| Caterpillar 350 Excavator | 1 | 286 | 63 | 6 | 378 | 2.9 |
| Caterpillar 313 Excavator | 1 | 108 | 31 | 6 | 186 | 1.4 |
| Caterpillar 740 (40 ton truck) | 2 | 452 | 59 | 6 | 708 | 5.4 |
| Caterpillar 980 Loader | 1 | 393 | 7 | 4 | 28 | 0.2 |
| Caterpillar 299 (tracked skid ste | 2 | 110 | 48 | 4 | 384 | 2.9 |
| Dump truck (10 cy) | 1 | 402 | 9 | 4 | 36 | 0.3 |
| Hydroseeding Truck (1.5K g) | 1 | 402 | 1 | 8 | 8 | 0.1 |
| Water Truck (3,000 gallons) | 1 | 402 | 60 | 4 | 240 | 1.8 |
| Caterpillar D8 Bulldozer | 1 | 347 | 13 | 6 | 78 | 0.6 |

### Rock Pile Area

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/day - Phase |
|---|---|---|---|---|---|---|
| Caterpillar 350 Excavator | 2 | 286 | 72 | 8 | 1152 | 8.7 |
| Caterpillar 313 Excavator | 1 | 108 | 71 | 8 | 568 | 4.3 |
| Caterpillar 740 (40 ton truck) | 4 | 452 | 95 | 8 | 3040 | 23.0 |
| Caterpillar 980 Loader | 1 | 393 | 13 | 4 | 52 | 0.4 |
| Caterpillar 299 (tracked skid ste | 1 | 110 | 46 | 4 | 184 | 1.4 |
| Dump truck (10 cy) | 1 | 402 | 13 | 4 | 52 | 0.4 |
| Hydroseeding Truck (1.5K g) | 1 | 402 | 1 | 8 | 8 | 0.1 |
| Water Truck (3,000 gallons) | 1 | 402 | 60 | 4 | 240 | 1.8 |
| Caterpillar Compactor CP56 | 1 | 156 | 8 | 6 | 48 | 0.4 |
| Caterpillar D8 Bulldozer | 1 | 347 | 20 | 6 | 120 | 0.9 |

### Old Crusher Foundation

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/day - Phase |
|---|---|---|---|---|---|---|
| 7500 Watt Generator | 1 | 84 | 7 | 6 | 42 | 0.3 |

# Permanente Creek Restoration Plan Supplemental EIR -

# Constrution Assumptions

**Material Removal Area (Phase 1)**

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/ day - Phase |
|---|---|---|---|---|---|---|
| Caterpillar 350 Excavator | 2 | 286 | 61 | 8 | 976 | 7.5 |
| Caterpillar 313 Excavator | 1 | 108 | 60 | 8 | 480 | 3.7 |
| Caterpillar 740 (40 ton truck) | 4 | 452 | 82 | 8 | 2624 | 20.2 |
| Caterpillar 980 Loader | 1 | 393 | 14 | 4 | 56 | 0.4 |
| Caterpillar 299 (tracked skid ste | 1 | 110 | 37 | 4 | 148 | 1.1 |
| Dump truck (10 cy) | 1 | 402 | 9 | 4 | 36 | 0.3 |
| Hydroseeding Truck (1.5K g) | 1 | 402 | 3 | 8 | 24 | 0.2 |
| Water Truck (3,000 gallons) | 1 | 402 | 60 | 4 | 240 | 1.8 |
| Caterpillar D8 Bulldozer | 1 | 347 | 20 | 6 | 120 | 0.9 |

**Material Removal Area (Phase 2)**

| Equipment | Number | Horsepower | No. of Days used | Hrs/day used | Total Hrs | Ave Hrs/ day - Phase |
|---|---|---|---|---|---|---|
| Caterpillar 350 Excavator | 2 | 286 | 61 | 8 | 976 | 7.5 |
| Caterpillar 313 Excavator | 1 | 108 | 60 | 8 | 480 | 3.7 |
| Caterpillar 740 (40 ton truck) | 4 | 452 | 82 | 8 | 2624 | 20.0 |
| Caterpillar 980 Loader | 1 | 393 | 14 | 4 | 56 | 0.4 |
| Caterpillar 299 (tracked skid ste | 1 | 110 | 37 | 4 | 148 | 1.1 |
| Dump truck (10 cy) | 1 | 402 | 9 | 4 | 36 | 0.3 |
| Hydroseeding Truck (1.5K g) | 1 | 402 | 3 | 8 | 24 | 0.2 |
| Water Truck (3,000 gallons) | 1 | 402 | 60 | 4 | 240 | 1.8 |
| Caterpillar D8 Bulldozer | 1 | 347 | 20 | 6 | 120 | 0.9 |

**Equipment Specifications**

Caterpillar 350 Excavator Specs, Dimensions, Comparisons : CEG (constructionequipmentguide.com)
Caterpillar D8T Crawler Tractor Specs & Dimensions :: RitchieSpecs
Caterpillar 14M Motor Grader Specs & Dimensions :: RitchieSpecs
Water Truck, 4,000 to 4,999 gal. for Rent - United Rentals
740 GC Articulated Haul Truck | Cat | Caterpillar
980M Wheel Loader | Cat | Caterpillar
Stihl FS 70 R String Trimmer (mainstreetmower.com)
313 Hydraulic Excavator | Cat | Caterpillar

## Vehicle Trips

| Construction Phase | Worker Commute trips/day | Vendor Truck Trips/day | Haul Truck Trips Total | Haul Trips/ year |
|---|---|---|---|---|
| Concrete Channel | 8 | 25 | 2 | 2 |
| Channel Widening (Phase 1) | 12 | 216 | | 171.5 |
| Channel Widening (Phase 2) | 12 | 216 | 343 | 171.5 |
| Rock Pile Area (Phase 1) | 16 | 216 | | 740.5 |
| Rock Pile Area (Phase 2) | 16 | 216 | 1481 | 740.5 |
| Old Crusher Foundation | 8 | 25 | 2 | 2 |
| Material Removal Area (Phase 1) | 16 | 216 | | 638 |
| Material Removal Area (Phase 2) | 16 | 216 | 1276 | 638 |
| Average miles per trip (CalEEMod default values)* | 10.8 | 6.6 | 20 | 20 |

*Per revised assumptions provided January 24, 2023, the Applicant does not know the average miles per trip.

**PCRP Acres Compared to PCRA Acres Addressed by 2012 EIR**

| Area | Acres |
|---|---|
| Total PCRP Project Site | 135.55 |
| PCRP Outside Existing Rec. Plan Boundary | 2.57 |
| PCRP Outside of PCRA, but Inside Rec. Plan Boundary | 12.79 |
| PCRP Outside of PCRA Disturbance Area, but Inside Rec. Plan Boundary | 13.66 |

| Phase (Year) | PCRP Outside of PCRA Disturbance (Acres) | PCRP Disturbance Area (Acres) | % Covered in 2012 EIR | % Covered in SEIR | Notes |
|---|---|---|---|---|---|
| Concrete Channel | 0.66 | 0.66 | 0% | 100% | Completely outside of PCRA Disturbance Area |
| Rock Pile Area | 12.42 | 13.93 | 11% | 89% | The 2012 EIR analyzed the types of activities proposed, so the percent of emissions presented in the SEIR is equal the percent of area not covered in |
| Channel Widening | 12.42 | 13.93 | 11% | 89% | |
| Old Crusher | 0 | 0.002 | 100% | 0% | Completely within PCRA Disturbance Area and the 2012 analyzed the types of activities proposed. |
| Material Removal | 3.1509 | 15.6809 | 80% | 20% | The 2012 EIR analyzed the types of activities proposed, so the percent of emissions presented in the SEIR is equal the percent of area not covered in the 2012 EIR. |

| Reach | PCRA Sub Area | PCRA Acres | PCRA Disturbance Area | Creek Reaches (blue lines) | Creek Reaches Acres | Creek Reaches Outside Rec. Plan Boundary | Creek Reaches Outside of PCRA | Creek Reaches Outside of PCRA Disturbance Areas |
|---|---|---|---|---|---|---|---|---|
| 6 | | | | Concrete Channel | 0.66 | 0.66 | 0.66 | 0.66 |
| 7 | | | | | | | | |
| 8 | | | | | 1.83 | 1.79 | 1.83 | 1.83 |
| 9 | | | | | 2.28 | 0.12 | 2.28 | 2.28 |
| 10 | | | | | 1.68 | 0 | 1.68 | 1.68 |
| 11 | 7 | 0.18 | 0.02 | Channel Widening and Rock Pile Limits | 3.74 | 0 | 3.56 | 3.72 |
| 12 | 7 | 1.06 | 0.42 | | 3.14 | 0 | 2.71 | 2.73 |
| 13 | 7 | 3.81 | 1.07 | | 0.69 | 0 | 0.02 | 0.18 |
| 14 | 7 | 4.48 | 2.47 | | | 0 | 0 | 0 |
| 15 | 6 | 2.64 | 1.21 | | | 0 | 0 | 0 |
| | 7 | 3.46 | | | | | | |
| 16 | 5 | 1.66 | 1.52 | | | 0 | 0 | 0 |
| | 6 | 5.36 | | | | | | |
| 17 | 4 | 3.9 | 5.8 | Material Grading | 6.65 | 0 | 2.62 | 2.89 |
| | 5 | 5.35 | | Old Crusher | 0.002 | 0 | 0 | 0 |
| 18 | 4 | 2.77 | 1.44 | Material Grading | 1.06 | 0 | | 0.26 |
| 19 | 2 | 10.3 | 5.29 | Material Grading | 0.01 | 0 | 0 | 0.0009 |
| | 3 | 10.58 | | | | | | |
| | 4 | 1.56 | | | | | | |
| 20 | 2 | 23.04 | 7.5 | | | 0 | 0 | 0 |
| 21 | 1 | 14.13 | 19.41 | | | 0 | 0 | 0 |
| | 2 | 20.42 | | | | | | |
| 22 | 1 | 5.49 | 2.95 | | | 0 | 0 | 0 |
| Total | | 120.19 | 49.10 | | | 2.57 | 15.36 | 16.23 |

**Maximum Annual Criteria Pollutant Emissions for SEIR (tons/year)**

| Scenario | PM10 | PM2.5 | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Maximum Daily Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR | -463 | -77 | -23 | -6 | -66 | 2 |
| PCRP Emissions not Evaluated in the 2012 EIR | 11.45 | 1.71 | 0.56 | 0.07 | 1.84 | 0.01 |
| Maximum Annual Incremental Change | -452 | -75 | -22 | -6 | -64 | 2 |
| BAAQMD Threshold | 15 | 10 | 10 | 10 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | -- | -- |

**Maximum Daily Criteria Pollutant Emissions for SEIR (pounds/day)**

| Scenario | $PM_{10}$ | $PM_{2.5}$ | $NO_x$ | ROG | CO | $SO_2$ |
|---|---|---|---|---|---|---|
| Maximum Daily Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR | -3,441 | -582 | -316 | -44 | -750 | 5 |
| PCRP Emissions not Evaluated in the 2012 EIR | 196.20 | 26.62 | 8.51 | 1.13 | 27.90 | 0.08 |
| Net Emissions | -3245 | -555 | -307 | -43 | -722 | 5 |
| BAAQMD Threshold | 82 | 54 | 54 | 54 | None | None |
| Significant Impact (Yes or No)? | No | No | No | No | --[b] | --[c] |

**Emissions Summary for SEIR - Tons/Year**

| Phase (Year) | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Concrete Channel and Channel Widening - Phase 1 (2024) | 0.05 | 0.47 | 11.45 | 1.71 | 0.75 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 0.07 | 0.56 | 10.37 | 1.56 | 1.84 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 0.07 | 0.53 | 10.37 | 1.58 | 1.83 | 0.01 |
| Channel Widening - Phase 2 (2027) | 0.04 | 0.34 | 9.92 | 1.48 | 0.69 | 0.00 |
| Old Crusher and Material Removal - Phase 1 (2028) | 0.01 | 0.10 | 4.66 | 0.58 | 0.36 | 0.00 |
| Material Removal - Phase 2 (2029) | 0.01 | 0.10 | 4.70 | 0.59 | 0.36 | 0.00 |

**Emissions Summary for SEIR - Average Pounds/Day**

| Phase (Year) | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Concrete Channel and Channel Widening - Phase 1 (2024) | 0.77 | 7.12 | 196.20 | 26.62 | 11.42 | 0.05 |
| Rock Pile Area - Phase 1 (2025) | 1.13 | 8.51 | 166.70 | 22.36 | 27.90 | 0.08 |
| Rock Pile Area - Phase 2 (2026) | 1.11 | 8.08 | 166.70 | 22.35 | 27.79 | 0.08 |
| Channel Widening - Phase 2 (2027) | 0.59 | 5.18 | 154.87 | 21.10 | 10.47 | 0.04 |
| Old Crusher and Material Removal - Phase 1 (2028) | 0.22 | 1.57 | 73.61 | 8.62 | 5.52 | 0.02 |
| Material Removal - Phase 2 (2029) | 0.22 | 1.51 | 73.87 | 8.65 | 5.47 | 0.02 |

**Emissions Summary for SEIR - Tons/Phase-Year**

| Phase (Year) | % Covered in SEIR | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 0.01 | 0.05 | 1.90 | 0.28 | 0.04 | 0.00 |
| Channel Widening - Phase 1 (2024) | 89% | 0.04 | 0.42 | 9.55 | 1.44 | 0.71 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 89% | 0.07 | 0.56 | 10.37 | 1.56 | 1.84 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 89% | 0.07 | 0.53 | 10.37 | 1.58 | 1.83 | 0.01 |
| Channel Widening - Phase 2 (2027) | 89% | 0.04 | 0.34 | 9.92 | 1.48 | 0.69 | 0.00 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 0.01 | 0.10 | 4.66 | 0.58 | 0.36 | 0.00 |
| Material Removal - Phase 2 (2029) | 20% | 0.01 | 0.10 | 4.70 | 0.59 | 0.36 | 0.00 |

**Off-road Equipment Exhaust Emissions Summary for SEIR - Total Tons/Year**

| Phase (Year) | % Covered in SEIR | PM10 | PM2.5 |
|---|---|---|---|
| Concrete Channel (2024) | 100% | 0.0000 | 0.0000 |
| Channel Widening - Phase 1 (2024) | 89% | 0.0019 | 0.0019 |
| Rock Pile Area - Phase 1 (2025) | 89% | 0.0059 | 0.0059 |
| Rock Pile Area - Phase 2 (2026) | 89% | 0.0059 | 0.0219 |
| Channel Widening - Phase 2 (2027) | 89% | 0.0019 | 0.0019 |
| Old Crusher (2028) | 0% | 0.0000 | 0.0000 |
| Material Removal - Phase 1 (2028) | 20% | 0.0012 | 0.0012 |
| Material Removal - Phase 2 (2029) | 20% | 0.0012 | 0.0012 |

**Emissions Summary for SEIR - Average Pounds/Phase-Day**

| Phase (Year) | % Covered in SEIR | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 0.10 | 0.72 | 41.32 | 5.50 | 0.67 | 0.00 |
| Channel Widening - Phase 1 (2024) | 89% | 0.67 | 6.40 | 154.88 | 21.12 | 10.75 | 0.04 |
| Rock Pile Area - Phase 1 (2025) | 89% | 1.13 | 8.51 | 166.70 | 22.36 | 27.90 | 0.08 |
| Rock Pile Area - Phase 2 (2026) | 89% | 1.11 | 8.08 | 166.70 | 22.35 | 27.79 | 0.08 |
| Channel Widening - Phase 2 (2027) | 89% | 0.59 | 5.18 | 154.87 | 21.10 | 10.47 | 0.04 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 0.22 | 1.57 | 73.61 | 8.62 | 5.52 | 0.02 |
| Material Removal - Phase 2 (2029) | 20% | 0.22 | 1.51 | 73.87 | 8.65 | 5.47 | 0.02 |

**Total Off-road Equipment Exhaust Emissions Summary - Tons/Year**

| Phase (Year) | PM10 | PM2.5 |
|---|---|---|
| Concrete Channel (2024) | 0.0000 | 0.0000 |
| Channel Widening - Phase 1 (2024) | 0.0022 | 0.0022 |
| Rock Pile Area - Phase 1 (2025) | 0.0066 | 0.0066 |
| Rock Pile Area - Phase 2 (2026) | 0.0066 | 0.0246 |
| Channel Widening - Phase 2 (2027) | 0.0022 | 0.0022 |
| Old Crusher (2028) | 0.0000 | 0.0000 |
| Material Removal - Phase 1 (2028) | 0.0058 | 0.0058 |
| Material Removal - Phase 2 (2029) | 0.0058 | 0.0058 |

**Total Emissions Summary - Tons/Phase-Year**

| Phase (Year) | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 0.01 | 0.05 | 1.90 | 0.28 | 0.04 | 0.00 |
| Channel Widening - Phase 1 (2024) | 0.05 | 0.47 | 10.72 | 1.61 | 0.80 | 0.00 |
| Rock Pile Area - Phase 1 (2025) | 0.08 | 0.63 | 11.64 | 1.75 | 2.06 | 0.01 |
| Rock Pile Area - Phase 2 (2026) | 0.08 | 0.60 | 11.63 | 1.77 | 2.06 | 0.01 |
| Channel Widening - Phase 2 (2027) | 0.04 | 0.38 | 11.12 | 1.66 | 0.78 | 0.00 |
| Old Crusher (2028) | 0.01 | 0.03 | 1.67 | 0.25 | 0.04 | 0.00 |
| Material Removal - Phase 1 (2028) | 0.07 | 0.51 | 23.21 | 2.90 | 1.79 | 0.01 |
| Material Removal - Phase 2 (2029) | 0.07 | 0.49 | 23.38 | 2.92 | 1.78 | 0.01 |

**Total Emissions Summary - Average Pounds/Phase-Day**

| Phase (Year) | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Concrete Channel (2024) | 0.10 | 0.72 | 41.32 | 5.50 | 0.67 | 0.00 |
| Channel Widening - Phase 1 (2024) | 0.75 | 7.18 | 173.72 | 23.68 | 12.06 | 0.05 |
| Rock Pile Area - Phase 1 (2025) | 1.27 | 9.54 | 186.97 | 25.07 | 31.29 | 0.09 |
| Rock Pile Area - Phase 2 (2026) | 1.24 | 9.06 | 186.96 | 25.07 | 31.17 | 0.09 |
| Channel Widening - Phase 2 (2027) | 0.67 | 5.81 | 173.70 | 23.67 | 11.74 | 0.05 |
| Old Crusher (2028) | 0.08 | 0.52 | 38.21 | 3.87 | 0.60 | 0.00 |
| Material Removal - Phase 1 (2028) | 1.11 | 7.80 | 366.33 | 42.91 | 27.46 | 0.09 |
| Material Removal - Phase 2 (2029) | 1.09 | 7.49 | 367.61 | 43.03 | 27.24 | 0.09 |

**Concrete Channel (2024 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| On-road Vehicles | 0.01 | 0.05 | 0.00 | 0.00 | 0.04 | 0.00 |
| Fugitive Dust | | | 1.89 | 0.27 | | |
| Total | 0.01 | 0.05 | 1.90 | 0.28 | 0.04 | 0.00 |

**Concrete Channel (2024 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.00 | 0.01 | 0.00 | 0.00 | 0.10 | 0.00 |
| On-road Vehicles | 0.10 | 0.71 | 0.05 | 0.02 | 0.57 | 0.00 |
| Fugitive Dust | | | 41.27 | 5.48 | | |
| Total | 0.10 | 0.72 | 41.32 | 5.50 | 0.67 | 0.00 |

**Channel Widening - Phase 1 (2024 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.02 | 0.07 | 0.00 | 0.00 | 0.63 | 0.00 |
| On-road Vehicles | 0.03 | 0.40 | 0.02 | 0.01 | 0.16 | 0.00 |
| Fugitive Dust | | | 10.69 | 1.60 | | |
| Total | 0.05 | 0.47 | 10.72 | 1.61 | 0.80 | 0.00 |

**Channel Widening - Phase 1 (2024 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.25 | 1.07 | 0.03 | 0.03 | 9.60 | 0.02 |
| On-road Vehicles | 0.50 | 6.11 | 0.37 | 0.19 | 2.46 | 0.03 |
| Fugitive Dust | | | 173.31 | 23.47 | | |
| Total | 0.75 | 7.18 | 173.72 | 23.68 | 12.06 | 0.05 |

**Rock Pile Area - Phase 1 (2025 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.05 | 0.22 | 0.01 | 0.01 | 1.88 | 0.00 |
| On-road Vehicles | 0.03 | 0.41 | 0.03 | 0.01 | 0.19 | 0.00 |
| Fugitive Dust | | | 11.60 | 1.73 | | |
| Total | 0.08 | 0.63 | 11.64 | 1.75 | 2.06 | 0.01 |

**Rock Pile Area - Phase 1 (2025 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.75 | 3.26 | 0.10 | 0.10 | 28.42 | 0.06 |
| On-road Vehicles | 0.52 | 6.28 | 0.39 | 0.19 | 2.87 | 0.03 |
| Fugitive Dust | | | 186.47 | 24.78 | | |
| Total | 1.27 | 9.54 | 186.97 | 25.07 | 31.29 | 0.09 |

**Rock Pile Area - Phase 2 (2026 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.05 | 0.22 | 0.01 | 0.02 | 1.88 | 0.00 |
| On-road Vehicles | 0.03 | 0.38 | 0.03 | 0.01 | 0.18 | 0.00 |
| Fugitive Dust | | | 11.60 | 1.73 | | |
| Total | 0.08 | 0.60 | 11.63 | 1.77 | 2.06 | 0.01 |

**Rock Pile Area - Phase 2 (2026 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.75 | 3.26 | 0.10 | 0.10 | 28.42 | 0.06 |
| On-road Vehicles | 0.49 | 5.80 | 0.39 | 0.18 | 2.75 | 0.03 |
| Fugitive Dust | | | 186.47 | 24.78 | | |
| Total | 1.24 | 9.06 | 186.96 | 25.07 | 31.17 | 0.09 |

**Channel Widening - Phase 2 (2027 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.02 | 0.07 | 0.00 | 0.00 | 0.63 | 0.00 |
| On-road Vehicles | 0.03 | 0.31 | 0.02 | 0.01 | 0.14 | 0.00 |
| Fugitive Dust | | | 11.10 | 1.64 | | |
| Total | 0.04 | 0.38 | 11.12 | 1.66 | 0.78 | 0.00 |

**Channel Widening - Phase 2 (2027 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.25 | 1.07 | 0.03 | 0.03 | 9.60 | 0.02 |
| On-road Vehicles | 0.42 | 4.75 | 0.35 | 0.17 | 2.14 | 0.03 |
| Fugitive Dust | | | 173.31 | 23.47 | | |
| Total | 0.67 | 5.81 | 173.70 | 23.67 | 11.74 | 0.05 |

**Old Crusher (2028 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 |
| On-road Vehicles | 0.01 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 |
| Fugitive Dust | | | 1.66 | 0.25 | | |
| Total | 0.01 | 0.03 | 1.67 | 0.25 | 0.04 | 0.00 |

**Old Crusher (2028 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.00 | 0.01 | 0.00 | 0.00 | 0.15 | 0.00 |
| On-road Vehicles | 0.08 | 0.51 | 0.04 | 0.02 | 0.45 | 0.00 |
| Fugitive Dust | | | 38.17 | 3.85 | | |
| Total | 0.08 | 0.52 | 38.21 | 3.87 | 0.60 | 0.00 |

**Materal Removal Area - Phase 1 (2028 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.04 | 0.19 | 0.01 | 0.01 | 1.62 | 0.00 |
| On-road Vehicles | 0.03 | 0.32 | 0.02 | 0.01 | 0.16 | 0.00 |
| Fugitive Dust | | | 23.18 | 2.88 | | |
| Total | 0.07 | 0.51 | 23.21 | 2.90 | 1.79 | 0.01 |

**Material Removal Area - Phase 1 (2028 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.66 | 2.87 | 0.09 | 0.09 | 24.96 | 0.05 |
| On-road Vehicles | 0.44 | 4.92 | 0.37 | 0.17 | 2.50 | 0.03 |
| Fugitive Dust | | | 365.87 | 42.65 | | |
| Total | 1.11 | 7.80 | 366.33 | 42.91 | 27.46 | 0.09 |

**Material Removal Area - Phase 2 (2029 tons)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.04 | 0.19 | 0.01 | 0.01 | 1.62 | 0.00 |
| On-road Vehicles | 0.03 | 0.30 | 0.02 | 0.01 | 0.16 | 0.00 |
| Fugitive Dust | | | 23.35 | 2.90 | | |
| Total | 0.07 | 0.49 | 23.38 | 2.92 | 1.78 | 0.01 |

**Material Removal Area - Phase 2 (2029 average daily pounds)**

| Source | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.66 | 2.85 | 0.09 | 0.09 | 24.79 | 0.05 |
| On-road Vehicles | 0.43 | 4.64 | 0.37 | 0.17 | 2.44 | 0.03 |
| Fugitive Dust | | | 367.15 | 42.77 | | |
| Total | 1.09 | 7.49 | 367.61 | 43.03 | 27.24 | 0.09 |

**Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

## Emissions Summary

**Tons Per Year**

| Construction Phase(s) | Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|---|
| Concrete Channel | 2024 | 0.01 | 0.05 | 0.00 | 0.00 | 0.04 | 0.00 |
| Channel Widening (Phase 1) | 2024 | 0.03 | 0.40 | 0.02 | 0.01 | 0.16 | 0.00 |
| Rock Pile Area (Phase 1) | 2025 | 0.03 | 0.41 | 0.03 | 0.01 | 0.19 | 0.00 |
| Rock Pile Area (Phase 2) | 2026 | 0.03 | 0.38 | 0.03 | 0.01 | 0.18 | 0.00 |
| Channel Widening (Phase 2) | 2027 | 0.03 | 0.31 | 0.02 | 0.01 | 0.14 | 0.00 |
| Old Crusher Foundation | 2028 | 0.01 | 0.03 | 0.00 | 0.00 | 0.03 | 0.00 |
| Material Removal Area (Phase 1) | 2028 | 0.03 | 0.32 | 0.02 | 0.01 | 0.16 | 0.00 |
| Material Removal Area (Phase 2) | 2029 | 0.03 | 0.30 | 0.02 | 0.01 | 0.16 | 0.00 |

**Average Daily Pounds**

| Construction Phase(s) | Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|---|
| Concrete Channel | 2024 | 0.10 | 0.71 | 0.05 | 0.02 | 0.57 | 0.00 |
| Channel Widening (Phase 1) | 2024 | 0.50 | 6.11 | 0.37 | 0.19 | 2.46 | 0.03 |
| Rock Pile Area (Phase 1) | 2025 | 0.52 | 6.28 | 0.39 | 0.19 | 2.87 | 0.03 |
| Rock Pile Area (Phase 2) | 2026 | 0.49 | 5.80 | 0.39 | 0.18 | 2.75 | 0.03 |
| Channel Widening (Phase 2) | 2027 | 0.42 | 4.75 | 0.35 | 0.17 | 2.14 | 0.03 |
| Old Crusher Foundation | 2028 | 0.08 | 0.51 | 0.04 | 0.02 | 0.45 | 0.00 |
| Material Removal Area (Phase 1) | 2028 | 0.44 | 4.92 | 0.37 | 0.17 | 2.50 | 0.03 |
| Material Removal Area (Phase 2) | 2029 | 0.43 | 4.64 | 0.37 | 0.17 | 2.44 | 0.03 |

## Background Information

**Conversions**

| Tons | Pounds | Grams |
|---|---|---|
| 1 | 2000 | 907185 |

| Annual Work Days | Year |
|---|---|
| 132 | 2024 |
| 132 | 2025 |
| 132 | 2026 |
| 132 | 2027 |
| 130 | 2028 |
| 131 | 2029 |

**One-Way Trip Info**

| | Concrete Channel | Channel Widening (Phase 1) | Channel Widening (Phase 2) | Rock Pile Area (Phase 1) | Rock Pile Area (Phase 2) | Old Crusher | Material Removal (Phase 1) | Material Removal (Phase 2) |
|---|---|---|---|---|---|---|---|---|
| *Employee Trips* | | | | | | | | |
| Daily One-Way Trips | 8 | 12 | 12 | 16 | 16 | 8 | 16 | 16 |
| Annual One-Way Trips | 1,056 | 1,584 | 1,584 | 2,112 | 2,112 | 1,040 | 2,080 | 2,096 |
| Trip Length | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| *Vendor Truck Trips* | | | | | | | | |
| Daily One-Way Trips | 25 | 216 | 216 | 216 | 216 | 25 | 216 | 216 |
| Annual One-Way Trips | 3,300 | 28,512 | 28,512 | 28,512 | 28,512 | 3,250 | 28,080 | 28,296 |
| Trip Length | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| *Haul Truck Trips* | | | | | | | | |
| Annual One-Way Trips | 2 | 171.5 | 171.5 | 740.5 | 740.5 | 2 | 638 | 638 |
| Trip Length | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

**On-Site Roads Length**

| | meters | miles |
|---|---|---|
| Paved Road[1] | 2639.5 | 1.64 |
| Unpaved Road | 1612.3 | 1.00 |
| Paved Road to Concrete Channel[1] | 800.91 | 0.50 |
| Unpaved Road near Concrete Channel | 242.7 | 0.15 |

[1]Paved road modeling sources measured from Ridgeway Drive along Stevens Creek Blvd into the Plant.

## EMFAC2021 Output for 2024

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2024 | HHDT | Aggregate | Aggregate | Diesel | 1.89457 | 62.32042 | 2.89887 | 0.02567 | 0.03017 | 0.00000 | 0.00877 | 0.02745 | 0.02683 | 0.03153 | 0.00000 | 0.03508 | 0.07844 | 0.01673 | 5.09458 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.08252 | 74.10576 | 0.00000 | 0.01547 | 0.11360 | 0.00000 |
| Santa Clara | 2024 | LDT1 | Aggregate | Aggregate | Gasoline | 0.12836 | 0.00000 | 0.38129 | 0.00174 | 0.00000 | 0.00268 | 0.00200 | 0.00324 | 0.00189 | 0.00000 | 0.00291 | 0.00800 | 0.00926 | 0.02774 | 0.00000 | 0.53932 | 0.16533 | 0.47248 | 2.66716 | 1.42762 | 0.00000 | 5.25305 | 0.00324 | 0.00000 | 0.00085 |
| Santa Clara | 2024 | LHDT1 | Aggregate | Aggregate | Diesel | 1.56302 | 1.92168 | 0.00000 | 0.03506 | 0.02680 | 0.00000 | 0.00300 | 0.02730 | 0.03664 | 0.02802 | 0.00000 | 0.01200 | 0.07800 | 0.17236 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.47359 | 0.90975 | 0.00000 | 0.00598 | 0.00124 | 0.00000 |
| Santa Clara | 2024 | LHDT2 | Aggregate | Aggregate | Diesel | 1.26610 | 1.89540 | 0.00000 | 0.03205 | 0.02700 | 0.00000 | 0.00300 | 0.03185 | 0.03350 | 0.02822 | 0.00000 | 0.01200 | 0.09100 | 0.15944 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.41186 | 0.90975 | 0.00000 | 0.00717 | 0.00199 | 0.00000 |
| Santa Clara | 2024 | MHDT | Aggregate | Aggregate | Diesel | 1.23282 | 13.11952 | 1.64273 | 0.01440 | 0.02990 | 0.00000 | 0.00300 | 0.01594 | 0.01505 | 0.03125 | 0.00000 | 0.01200 | 0.04555 | 0.03245 | 0.24932 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.12087 | 7.55603 | 0.00000 | 0.01086 | 0.02129 | 0.00000 |
| | | HDT Mix | | | | 1.35398 | 5.64553 | 0.54758 | 0.02717 | 0.02790 | 0.00000 | 0.00300 | 0.02503 | 0.02840 | 0.02916 | 0.00000 | 0.01200 | 0.07152 | 0.12142 | 0.15628 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.33544 | 3.12517 | 0.00000 | 0.00801 | 0.00817 | 0.00000 |

## Emissions Calcs for Concrete Channel

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | Tons per Year | | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 2 | 20 | 40 | 2 | 1 | 0.00000 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00008 | 0.00007 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00008 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 4 | LDT1 | 1,056 | 10.8 | 11,405 | 1,056 | 528 | 0.00035 | 0.00000 | 0.00063 | 0.00019 | 0.00055 | 0.00155 | 0.00161 | 0.00000 | 0.00044 | 0.00002 | 0.00000 | 0.00000 | 0.00010 | 0.00012 | 0.00002 | 0.00000 | 0.00000 | 0.00003 | 0.00004 | 0.01795 | 0.00000 | 0.00611 | 0.00004 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 3,300 | 6.6 | 21,780 | 3,300 | 1,650 | 0.00292 | 0.00028 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.03251 | 0.01027 | 0.00199 | 0.00068 | 0.00005 | 0.00000 | 0.00029 | 0.00172 | 0.00065 | 0.00005 | 0.00000 | 0.00007 | 0.00060 | 0.00805 | 0.00568 | 0.00000 | 0.00019 | 0.00001 | 0.00000 |

## *Off-Site Exhaust Emissions for Concrete Channel*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0000 | 0.0002 | 0.0000 | 0.0000 | 0.0001 | 0.0000 |
| LDT1 | 0.0033 | 0.0021 | 0.0002 | 0.0001 | 0.0241 | 0.0000 |
| HDT Mix | 0.0032 | 0.0448 | 0.0027 | 0.0014 | 0.0137 | 0.0002 |
| **Total** | 0.0065 | 0.0470 | 0.0030 | 0.0015 | 0.0379 | 0.0002 |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0001 | 0.0024 | 0.0001 | 0.0000 | 0.0013 | 0.0000 |
| LDT1 | 0.0496 | 0.0312 | 0.0037 | 0.0014 | 0.3646 | 0.0006 |
| HDT Mix | 0.0485 | 0.6783 | 0.0415 | 0.0208 | 0.2081 | 0.0031 |
| **Total** | 0.0981 | 0.7119 | 0.0453 | 0.0223 | 0.5740 | 0.0038 |

**For HRA paved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 1.55E-07 | 6.87E-08 |
| 2.07E-04 | 1.04E-04 |
| total DPM **2.07E-04** | **1.04E-04** |

**For HRA unpaved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 4.69E-08 | 2.08E-08 |
| 6.26E-05 | 3.14E-05 |
| total DPM **6.27E-05** | **3.15E-05** |

## Emissions Calcs for Channel Widening (Phase 1)

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | Tons per Year | | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 172 | 20 | 3,430 | 172 | 86 | 0.00006 | 0.00048 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00716 | 0.00589 | 0.00055 | 0.00010 | 0.00000 | 0.00000 | 0.00013 | 0.00030 | 0.00010 | 0.00000 | 0.00000 | 0.00003 | 0.00010 | 0.00031 | 0.00700 | 0.00000 | 0.00006 | 0.00001 | 0.00000 |
| 4 | LDT1 | 1,584 | 10.8 | 17,107 | 1,584 | 792 | 0.00052 | 0.00000 | 0.00094 | 0.00029 | 0.00082 | 0.00233 | 0.00242 | 0.00000 | 0.00067 | 0.00004 | 0.00000 | 0.00001 | 0.00015 | 0.00017 | 0.00003 | 0.00000 | 0.00000 | 0.00004 | 0.00006 | 0.02692 | 0.00000 | 0.00917 | 0.00006 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 0.02519 | 0.00246 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.28086 | 0.08872 | 0.01721 | 0.00589 | 0.00046 | 0.00000 | 0.00249 | 0.01483 | 0.00564 | 0.00044 | 0.00000 | 0.00062 | 0.00519 | 0.06958 | 0.04911 | 0.00000 | 0.00166 | 0.00013 | 0.00000 |

**Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

## *Off-Site Exhaust Emissions for Channel Widening (Phase 1)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0005 | 0.0136 | 0.0005 | 0.0002 | 0.0073 | 0.0001 |
| LDT1 | 0.0049 | 0.0031 | 0.0004 | 0.0001 | 0.0361 | 0.0001 |
| HDT Mix | 0.0276 | 0.3868 | 0.0237 | 0.0119 | 0.1187 | 0.0018 |
| **Total** | 0.0331 | 0.4035 | 0.0246 | 0.0123 | 0.1621 | 0.0019 |

| For HRA paved road (tpy) | | |
|---|---|---|
| | PM10 | PM2.5 |
| | 1.33E-05 | 5.89E-06 |
| | 1.79E-03 | 8.96E-04 |
| total DPM | **1.80E-03** | **9.02E-04** |

| For HRA unpaved road (tpy) | | |
|---|---|---|
| | PM10 | PM2.5 |
| | 4.02E-06 | 1.79E-06 |
| | 5.41E-04 | 2.72E-04 |
| total DPM | **5.45E-04** | **2.73E-04** |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0083 | 0.2061 | 0.0081 | 0.0036 | 0.1109 | 0.0010 |
| LDT1 | 0.0743 | 0.0468 | 0.0055 | 0.0021 | 0.5469 | 0.0009 |
| HDT Mix | 0.4188 | 5.8604 | 0.3587 | 0.1801 | 1.7984 | 0.0271 |
| **Total** | 0.5014 | 6.1132 | 0.3723 | 0.1858 | 2.4561 | 0.0291 |

**EMFAC2021 Output for 2025**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2025 | HHDT | Aggregate | Aggregate | Diesel | 1.82519 | 60.91449 | 2.93199 | 0.02533 | 0.02894 | 0.00000 | 0.00877 | 0.02742 | 0.02648 | 0.03025 | 0.00000 | 0.03509 | 0.07835 | 0.01614 | 5.07867 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.07808 | 74.00904 | 0.00000 | 0.01523 | 0.11132 | 0.00000 |
| Santa Clara | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 0.11536 | 0.00000 | 0.35972 | 0.00164 | 0.00000 | 0.00254 | 0.00200 | 0.00324 | 0.00178 | 0.00000 | 0.00277 | 0.00800 | 0.00926 | 0.02471 | 0.00000 | 0.49882 | 0.15696 | 0.44230 | 2.52236 | 1.31742 | 0.00000 | 4.88612 | 0.00318 | 0.00000 | 0.00083 |
| Santa Clara | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 1.37924 | 1.82341 | 0.00000 | 0.03235 | 0.02669 | 0.00000 | 0.00300 | 0.02730 | 0.03381 | 0.02790 | 0.00000 | 0.01200 | 0.07800 | 0.16078 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.43509 | 0.90975 | 0.00000 | 0.00595 | 0.00123 | 0.00000 |
| Santa Clara | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 1.13929 | 1.80266 | 0.00000 | 0.03030 | 0.02700 | 0.00000 | 0.00300 | 0.03185 | 0.03167 | 0.02823 | 0.00000 | 0.01200 | 0.09100 | 0.15162 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.38790 | 0.90975 | 0.00000 | 0.00711 | 0.00196 | 0.00000 |
| Santa Clara | 2025 | MHDT | Aggregate | Aggregate | Diesel | 1.12815 | 12.48973 | 1.64656 | 0.01246 | 0.02479 | 0.00000 | 0.00300 | 0.01594 | 0.01302 | 0.02591 | 0.00000 | 0.01200 | 0.04555 | 0.02820 | 0.23590 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.10965 | 7.53539 | 0.00000 | 0.01081 | 0.02111 | 0.00000 |
| | | HDT Mix | | | | 1.21556 | 5.37193 | 0.54885 | 0.02503 | 0.02616 | 0.00000 | 0.00300 | 0.02503 | 0.02617 | 0.02735 | 0.00000 | 0.01200 | 0.07152 | 0.11353 | 0.15181 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.31088 | 3.11829 | 0.00000 | 0.00796 | 0.00810 | 0.00000 |

**Emissions Calcs for Rock Pile Area (Phase 1)**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 741 | 20 | 14,810 | 741 | 370 | 0.00026 | 0.00207 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.02980 | 0.02486 | 0.00239 | 0.00043 | 0.00001 | 0.00000 | 0.00057 | 0.00128 | 0.00041 | 0.00001 | 0.00000 | 0.00014 | 0.00045 | 0.00127 | 0.03021 | 0.00000 | 0.00025 | 0.00005 | 0.00000 |
| 4 | LDT1 | 2,112 | 10.8 | 22,810 | 2,112 | 1,056 | 0.00062 | 0.00000 | 0.00116 | 0.00037 | 0.00103 | 0.00294 | 0.00290 | 0.00000 | 0.00084 | 0.00004 | 0.00000 | 0.00001 | 0.00020 | 0.00023 | 0.00004 | 0.00000 | 0.00001 | 0.00005 | 0.00008 | 0.03312 | 0.00000 | 0.01138 | 0.00008 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 0.02355 | 0.00239 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.25215 | 0.08442 | 0.01725 | 0.00543 | 0.00043 | 0.00000 | 0.00249 | 0.01483 | 0.00519 | 0.00041 | 0.00000 | 0.00062 | 0.00519 | 0.06449 | 0.04900 | 0.00000 | 0.00165 | 0.00013 | 0.00000 |

## *Off-Site Exhaust Emissions for Rock Pile Area (Phase 1)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0023 | 0.0571 | 0.0023 | 0.0010 | 0.0315 | 0.0003 |
| LDT1 | 0.0061 | 0.0037 | 0.0005 | 0.0002 | 0.0445 | 0.0001 |
| HDT Mix | 0.0259 | 0.3538 | 0.0232 | 0.0114 | 0.1135 | 0.0018 |
| **Total** | 0.0344 | 0.4146 | 0.0260 | 0.0126 | 0.1895 | 0.0022 |

| For HRA paved road (tpy) | | |
|---|---|---|
| | PM10 | PM2.5 |
| | 1.88E-04 | 8.33E-05 |
| | 5.76E-03 | 2.84E-03 |
| total DPM | **5.95E-03** | **2.92E-03** |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0354 | 0.8644 | 0.0348 | 0.0154 | 0.4770 | 0.0045 |
| LDT1 | 0.0926 | 0.0566 | 0.0074 | 0.0027 | 0.6742 | 0.0012 |
| HDT Mix | 0.3930 | 5.3608 | 0.3512 | 0.1730 | 1.7195 | 0.0269 |
| **Total** | 0.5210 | 6.2819 | 0.3934 | 0.1911 | 2.8707 | 0.0326 |

**EMFAC2021 Output for 2026**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2026 | HHDT | Aggregate | Aggregate | Diesel | 1.76111 | 59.43678 | 2.95547 | 0.02520 | 0.02777 | 0.00000 | 0.00877 | 0.02751 | 0.02633 | 0.02902 | 0.00000 | 0.03510 | 0.07861 | 0.01560 | 5.06551 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.07407 | 73.94194 | 0.00000 | 0.01499 | 0.10915 | 0.00000 |
| Santa Clara | 2026 | LDT1 | Aggregate | Aggregate | Gasoline | 0.10400 | 0.00000 | 0.34004 | 0.00155 | 0.00000 | 0.00242 | 0.00200 | 0.00324 | 0.00168 | 0.00000 | 0.00263 | 0.00800 | 0.00926 | 0.02205 | 0.00000 | 0.46164 | 0.14873 | 0.41724 | 2.37730 | 1.21935 | 0.00000 | 4.54917 | 0.00312 | 0.00000 | 0.00082 |
| Santa Clara | 2026 | LHDT1 | Aggregate | Aggregate | Diesel | 1.21928 | 1.73248 | 0.00000 | 0.03002 | 0.02660 | 0.00000 | 0.00300 | 0.02730 | 0.03138 | 0.02781 | 0.00000 | 0.01200 | 0.07800 | 0.15058 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.40172 | 0.90975 | 0.00000 | 0.00592 | 0.00121 | 0.00000 |
| Santa Clara | 2026 | LHDT2 | Aggregate | Aggregate | Diesel | 1.03007 | 1.71794 | 0.00000 | 0.02877 | 0.02701 | 0.00000 | 0.00300 | 0.03185 | 0.03007 | 0.02824 | 0.00000 | 0.01200 | 0.09100 | 0.14468 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.36731 | 0.90975 | 0.00000 | 0.00706 | 0.00194 | 0.00000 |
| Santa Clara | 2026 | MHDT | Aggregate | Aggregate | Diesel | 1.02886 | 11.86253 | 1.64414 | 0.01080 | 0.02038 | 0.00000 | 0.00300 | 0.01594 | 0.01128 | 0.02130 | 0.00000 | 0.01200 | 0.04555 | 0.02442 | 0.22431 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.09956 | 7.52082 | 0.00000 | 0.01075 | 0.02093 | 0.00000 |
| | | HDT Mix | | | | 1.09274 | 5.10432 | 0.54805 | 0.02320 | 0.02467 | 0.00000 | 0.00300 | 0.02503 | 0.02425 | 0.02578 | 0.00000 | 0.01200 | 0.07152 | 0.10656 | 0.14794 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.28953 | 3.11344 | 0.00000 | 0.00791 | 0.00803 | 0.00000 |

**Emissions Calcs for Rock Pile Area (Phase 2)**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 741 | 20 | 14,810 | 741 | 370 | 0.00025 | 0.00207 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.02875 | 0.02426 | 0.00241 | 0.00043 | 0.00001 | 0.00000 | 0.00057 | 0.00128 | 0.00041 | 0.00001 | 0.00000 | 0.00014 | 0.00045 | 0.00121 | 0.03018 | 0.00000 | 0.00024 | 0.00004 | 0.00000 |
| 4 | LDT1 | 2,112 | 10.8 | 22,810 | 2,112 | 1,056 | 0.00055 | 0.00000 | 0.00107 | 0.00035 | 0.00097 | 0.00277 | 0.00261 | 0.00000 | 0.00079 | 0.00004 | 0.00000 | 0.00001 | 0.00020 | 0.00023 | 0.00004 | 0.00000 | 0.00001 | 0.00005 | 0.00008 | 0.03066 | 0.00000 | 0.01059 | 0.00008 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 0.02210 | 0.00232 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.22667 | 0.08021 | 0.01722 | 0.00503 | 0.00041 | 0.00000 | 0.00249 | 0.01483 | 0.00481 | 0.00039 | 0.00000 | 0.00062 | 0.00519 | 0.06006 | 0.04893 | 0.00000 | 0.00164 | 0.00013 | 0.00000 |

## *Off-Site Exhaust Emissions for Rock Pile Area (Phase 2)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0023 | 0.0554 | 0.0023 | 0.0010 | 0.0314 | 0.0003 |
| LDT1 | 0.0057 | 0.0034 | 0.0005 | 0.0002 | 0.0412 | 0.0001 |
| HDT Mix | 0.0244 | 0.3241 | 0.0228 | 0.0110 | 0.1090 | 0.0018 |
| **Total** | 0.0325 | 0.3829 | 0.0255 | 0.0122 | 0.1816 | 0.0021 |

| For HRA paved road (tpy) | | |
|---|---|---|
| | PM10 | PM2.5 |
| | 1.88E-04 | 8.32E-05 |
| | 5.66E-03 | 2.74E-03 |
| total DPM | **5.84E-03** | **2.82E-03** |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0352 | 0.8397 | 0.0348 | 0.0154 | 0.4756 | 0.0044 |
| LDT1 | 0.0866 | 0.0516 | 0.0073 | 0.0027 | 0.6250 | 0.0012 |
| HDT Mix | 0.3701 | 4.9107 | 0.3448 | 0.1669 | 1.6513 | 0.0268 |
| **Total** | 0.4919 | 5.8020 | 0.3869 | 0.1849 | 2.7518 | 0.0324 |

**EMFAC2021 Output for 2027**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2027 | HHDT | Aggregate | Aggregate | Diesel | 1.70404 | 58.05742 | 2.95803 | 0.02506 | 0.02678 | 0.00000 | 0.00878 | 0.02767 | 0.02620 | 0.02800 | 0.00000 | 0.03511 | 0.07906 | 0.01510 | 5.05686 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.07046 | 73.92424 | 0.00000 | 0.01474 | 0.10712 | 0.00000 |
| Santa Clara | 2027 | LDT1 | Aggregate | Aggregate | Gasoline | 0.09363 | 0.00000 | 0.32228 | 0.00145 | 0.00000 | 0.00229 | 0.00200 | 0.00324 | 0.00158 | 0.00000 | 0.00250 | 0.00800 | 0.00926 | 0.01964 | 0.00000 | 0.42772 | 0.14096 | 0.39724 | 2.28612 | 1.12869 | 0.00000 | 4.23978 | 0.00307 | 0.00000 | 0.00080 |
| Santa Clara | 2027 | LHDT1 | Aggregate | Aggregate | Diesel | 1.08439 | 1.64968 | 0.00000 | 0.02806 | 0.02651 | 0.00000 | 0.00300 | 0.02730 | 0.02933 | 0.02771 | 0.00000 | 0.01200 | 0.07800 | 0.14181 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.37372 | 0.90975 | 0.00000 | 0.00590 | 0.00120 | 0.00000 |
| Santa Clara | 2027 | LHDT2 | Aggregate | Aggregate | Diesel | 0.93974 | 1.64220 | 0.00000 | 0.02750 | 0.02701 | 0.00000 | 0.00300 | 0.03185 | 0.02874 | 0.02823 | 0.00000 | 0.01200 | 0.09100 | 0.13873 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.35053 | 0.90975 | 0.00000 | 0.00701 | 0.00193 | 0.00000 |
| Santa Clara | 2027 | MHDT | Aggregate | Aggregate | Diesel | 0.93945 | 11.29117 | 1.63578 | 0.00940 | 0.01681 | 0.00000 | 0.00300 | 0.01594 | 0.00983 | 0.01757 | 0.00000 | 0.01200 | 0.04555 | 0.02124 | 0.21502 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.09092 | 7.51207 | 0.00000 | 0.01069 | 0.02075 | 0.00000 |
| | | HDT Mix | | | | 0.98786 | 4.86102 | 0.54526 | 0.02165 | 0.02344 | 0.00000 | 0.00300 | 0.02503 | 0.02263 | 0.02450 | 0.00000 | 0.01200 | 0.07152 | 0.10060 | 0.14485 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.27173 | 3.11052 | 0.00000 | 0.00787 | 0.00796 | 0.00000 |

**Emissions Calcs for Channel Widening (Phase 2)**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 172 | 20 | 3,430 | 172 | 86 | 0.00006 | 0.00048 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00644 | 0.00549 | 0.00056 | 0.00010 | 0.00000 | 0.00000 | 0.00013 | 0.00030 | 0.00009 | 0.00000 | 0.00000 | 0.00003 | 0.00010 | 0.00027 | 0.00699 | 0.00000 | 0.00006 | 0.00001 | 0.00000 |
| 4 | LDT1 | 1,584 | 10.8 | 17,107 | 1,584 | 792 | 0.00037 | 0.00000 | 0.00075 | 0.00025 | 0.00069 | 0.00200 | 0.00177 | 0.00000 | 0.00056 | 0.00003 | 0.00000 | 0.00000 | 0.00015 | 0.00017 | 0.00003 | 0.00000 | 0.00000 | 0.00004 | 0.00006 | 0.02128 | 0.00000 | 0.00740 | 0.00006 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 0.02087 | 0.00228 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.20491 | 0.07639 | 0.01714 | 0.00469 | 0.00039 | 0.00000 | 0.00249 | 0.01483 | 0.00449 | 0.00037 | 0.00000 | 0.00062 | 0.00519 | 0.05636 | 0.04888 | 0.00000 | 0.00163 | 0.00013 | 0.00000 |

**Permanente Creek Restoration Project - EMFAC2021 Criteria Pollutant Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

## *Off-Site Exhaust Emissions for Channel Widening (Phase 2)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0005 | 0.0125 | 0.0005 | 0.0002 | 0.0073 | 0.0001 |
| LDT1 | 0.0041 | 0.0023 | 0.0004 | 0.0001 | 0.0287 | 0.0001 |
| HDT Mix | 0.0231 | 0.2984 | 0.0224 | 0.0107 | 0.1052 | 0.0018 |
| **Total** | 0.0277 | 0.3133 | 0.0233 | 0.0110 | 0.1412 | 0.0019 |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0081 | 0.1892 | 0.0081 | 0.0036 | 0.1099 | 0.0010 |
| LDT1 | 0.0614 | 0.0353 | 0.0054 | 0.0020 | 0.4347 | 0.0009 |
| HDT Mix | 0.3507 | 4.5218 | 0.3394 | 0.1617 | 1.5946 | 0.0266 |
| **Total** | 0.4202 | 4.7463 | 0.3530 | 0.1673 | 2.1392 | 0.0285 |

**For HRA paved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 4.37E-05 | 1.93E-05 |
| 5.57E-03 | 2.65E-03 |
| total DPM **5.61E-03** | **2.67E-03** |

**EMFAC2021 Output for 2028**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2028 | HHDT | Aggregate | Aggregate | Diesel | 1.64973 | 56.82184 | 2.94011 | 0.02493 | 0.02582 | 0.00000 | 0.00878 | 0.02783 | 0.02606 | 0.02699 | 0.00000 | 0.03512 | 0.07951 | 0.01462 | 5.05308 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.06712 | 73.97201 | 0.00000 | 0.01447 | 0.10520 | 0.00000 |
| Santa Clara | 2028 | LDT1 | Aggregate | Aggregate | Gasoline | 0.08431 | 0.00000 | 0.30583 | 0.00136 | 0.00000 | 0.00217 | 0.00200 | 0.00324 | 0.00148 | 0.00000 | 0.00236 | 0.00800 | 0.00926 | 0.01759 | 0.00000 | 0.39718 | 0.13556 | 0.39042 | 2.26173 | 1.05141 | 0.00000 | 3.96401 | 0.00302 | 0.00000 | 0.00078 |
| Santa Clara | 2028 | LHDT1 | Aggregate | Aggregate | Diesel | 0.96940 | 1.57457 | 0.00000 | 0.02642 | 0.02645 | 0.00000 | 0.00300 | 0.02730 | 0.02761 | 0.02764 | 0.00000 | 0.01200 | 0.07800 | 0.13422 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.35015 | 0.90975 | 0.00000 | 0.00588 | 0.00119 | 0.00000 |
| Santa Clara | 2028 | LHDT2 | Aggregate | Aggregate | Diesel | 0.86504 | 1.57490 | 0.00000 | 0.02645 | 0.02700 | 0.00000 | 0.00300 | 0.03185 | 0.02765 | 0.02822 | 0.00000 | 0.01200 | 0.09100 | 0.13371 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.33717 | 0.90975 | 0.00000 | 0.00697 | 0.00191 | 0.00000 |
| Santa Clara | 2028 | MHDT | Aggregate | Aggregate | Diesel | 0.86061 | 10.76300 | 1.60803 | 0.00825 | 0.01392 | 0.00000 | 0.00300 | 0.01594 | 0.00862 | 0.01455 | 0.00000 | 0.01200 | 0.04555 | 0.01862 | 0.20752 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.08370 | 7.50718 | 0.00000 | 0.01063 | 0.02058 | 0.00000 |
| | | HDT Mix | | | | 0.89835 | 4.63749 | 0.53601 | 0.02037 | 0.02246 | 0.00000 | 0.00300 | 0.02503 | 0.02129 | 0.02347 | 0.00000 | 0.01200 | 0.07152 | 0.09552 | 0.14235 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.25701 | 3.10889 | 0.00000 | 0.00783 | 0.00789 | 0.00000 |

**Emissions Calcs for Material Removal Area (Phase 1)**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 638 | 20 | 12,760 | 638 | 319 | 0.00021 | 0.00178 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.02320 | 0.01998 | 0.00207 | 0.00037 | 0.00001 | 0.00000 | 0.00049 | 0.00112 | 0.00035 | 0.00001 | 0.00000 | 0.00012 | 0.00039 | 0.00094 | 0.02601 | 0.00000 | 0.00020 | 0.00004 | 0.00000 |
| 4 | LDT1 | 2,080 | 10.8 | 22,464 | 2,080 | 1,040 | 0.00044 | 0.00000 | 0.00091 | 0.00031 | 0.00090 | 0.00259 | 0.00209 | 0.00000 | 0.00070 | 0.00004 | 0.00000 | 0.00001 | 0.00020 | 0.00023 | 0.00003 | 0.00000 | 0.00000 | 0.00005 | 0.00008 | 0.02604 | 0.00000 | 0.00909 | 0.00007 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,080 | 6.6 | 185,328 | 28,080 | 14,040 | 0.01951 | 0.00220 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.18352 | 0.07177 | 0.01659 | 0.00435 | 0.00036 | 0.00000 | 0.00245 | 0.01461 | 0.00416 | 0.00035 | 0.00000 | 0.00061 | 0.00511 | 0.05250 | 0.04811 | 0.00000 | 0.00160 | 0.00012 | 0.00000 |

## *Off-Site Exhaust Emissions Material Removal Area (Phase 1)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0020 | 0.0453 | 0.0020 | 0.0009 | 0.0270 | 0.0002 |
| LDT1 | 0.0051 | 0.0028 | 0.0005 | 0.0002 | 0.0351 | 0.0001 |
| HDT Mix | 0.0217 | 0.2719 | 0.0218 | 0.0102 | 0.1006 | 0.0017 |
| **Total** | 0.0288 | 0.3199 | 0.0242 | 0.0113 | 0.1627 | 0.0020 |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0305 | 0.6962 | 0.0306 | 0.0135 | 0.4147 | 0.0037 |
| LDT1 | 0.0792 | 0.0429 | 0.0072 | 0.0026 | 0.5404 | 0.0012 |
| HDT Mix | 0.3341 | 4.1829 | 0.3350 | 0.1575 | 1.5480 | 0.0265 |
| **Total** | 0.4437 | 4.9220 | 0.3728 | 0.1735 | 2.5030 | 0.0314 |

**For HRA paved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 1.63E-04 | 7.17E-05 |
| 5.41E-03 | 2.54E-03 |
| total DPM **5.57E-03** | **2.62E-03** |

**For HRA unpaved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 9.96E-05 | 4.38E-05 |
| 3.31E-03 | 1.55E-03 |
| total DPM **3.40E-03** | **1.60E-03** |

**Emissions Calcs for Old Crusher**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 2 | 20 | 40 | 2 | 1 | 0.00000 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00007 | 0.00006 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00008 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| 4 | LDT1 | 1,040 | 10.8 | 11,232 | 1,040 | 520 | 0.00022 | 0.00000 | 0.00046 | 0.00016 | 0.00045 | 0.00130 | 0.00104 | 0.00000 | 0.00035 | 0.00002 | 0.00000 | 0.00000 | 0.00010 | 0.00011 | 0.00002 | 0.00000 | 0.00000 | 0.00002 | 0.00004 | 0.01302 | 0.00000 | 0.00454 | 0.00004 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 3,250 | 6.6 | 21,450 | 3,250 | 1,625 | 0.00226 | 0.00025 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.02124 | 0.00831 | 0.00192 | 0.00050 | 0.00004 | 0.00000 | 0.00028 | 0.00169 | 0.00048 | 0.00004 | 0.00000 | 0.00007 | 0.00059 | 0.00608 | 0.00557 | 0.00000 | 0.00019 | 0.00001 | 0.00000 |

## *Off-Site Exhaust Emissions for Old Crusher*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0000 | 0.0001 | 0.0000 | 0.0000 | 0.0001 | 0.0000 |
| LDT1 | 0.0026 | 0.0014 | 0.0002 | 0.0001 | 0.0176 | 0.0000 |
| HDT Mix | 0.0025 | 0.0315 | 0.0025 | 0.0012 | 0.0116 | 0.0002 |
| **Total** | 0.0051 | 0.0330 | 0.0028 | 0.0013 | 0.0293 | 0.0002 |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0001 | 0.0022 | 0.0001 | 0.0000 | 0.0013 | 0.0000 |
| LDT1 | 0.0396 | 0.0215 | 0.0036 | 0.0013 | 0.2702 | 0.0006 |
| HDT Mix | 0.0387 | 0.4841 | 0.0388 | 0.0182 | 0.1792 | 0.0031 |
| **Total** | 0.0783 | 0.5078 | 0.0425 | 0.0196 | 0.4506 | 0.0037 |

**For HRA paved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 5.11E-07 | 2.25E-07 |
| 6.26E-04 | 2.94E-04 |
| total DPM **6.27E-04** | **2.95E-04** |

**For HRA unpaved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 3.12E-07 | 1.37E-07 |
| 3.83E-04 | 1.80E-04 |
| total DPM **3.83E-04** | **1.80E-04** |

**EMFAC2021 Output for 2029**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2029 | HHDT | Aggregate | Aggregate | Diesel | 1.60316 | 55.79259 | 2.91198 | 0.02484 | 0.02508 | 0.00000 | 0.00878 | 0.02799 | 0.02596 | 0.02622 | 0.00000 | 0.03513 | 0.07996 | 0.01424 | 5.05503 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.06432 | 74.08532 | 0.00000 | 0.01421 | 0.10349 | 0.00000 |
| Santa Clara | 2029 | LDT1 | Aggregate | Aggregate | Gasoline | 0.07554 | 0.00000 | 0.29064 | 0.00127 | 0.00000 | 0.00205 | 0.00200 | 0.00324 | 0.00138 | 0.00000 | 0.00223 | 0.00800 | 0.00925 | 0.01567 | 0.00000 | 0.36864 | 0.12860 | 0.37501 | 2.19293 | 0.97851 | 0.00000 | 3.70420 | 0.00297 | 0.00000 | 0.00077 |
| Santa Clara | 2029 | LHDT1 | Aggregate | Aggregate | Diesel | 0.87313 | 1.50655 | 0.00000 | 0.02501 | 0.02636 | 0.00000 | 0.00300 | 0.02730 | 0.02614 | 0.02755 | 0.00000 | 0.01200 | 0.07800 | 0.12766 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.33053 | 0.90975 | 0.00000 | 0.00586 | 0.00118 | 0.00000 |
| Santa Clara | 2029 | LHDT2 | Aggregate | Aggregate | Diesel | 0.80264 | 1.51432 | 0.00000 | 0.02558 | 0.02692 | 0.00000 | 0.00300 | 0.03185 | 0.02673 | 0.02814 | 0.00000 | 0.01200 | 0.09100 | 0.12947 | 0.10976 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.32647 | 0.90975 | 0.00000 | 0.00693 | 0.00190 | 0.00000 |
| Santa Clara | 2029 | MHDT | Aggregate | Aggregate | Diesel | 0.79158 | 10.29665 | 1.57412 | 0.00730 | 0.01157 | 0.00000 | 0.00300 | 0.01594 | 0.00763 | 0.01209 | 0.00000 | 0.01200 | 0.04555 | 0.01647 | 0.20145 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.07775 | 7.50557 | 0.00000 | 0.01057 | 0.02042 | 0.00000 |
| | | HDT Mix | | | | 0.82245 | 4.43917 | 0.52471 | 0.01930 | 0.02162 | 0.00000 | 0.00300 | 0.02503 | 0.02017 | 0.02259 | 0.00000 | 0.01200 | 0.07152 | 0.09120 | 0.14032 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.24492 | 3.10835 | 0.00000 | 0.00779 | 0.00783 | 0.00000 |

**Emissions Calcs for Material Removal Area (Phase 2)**

| | | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | | | | | Tons per Year | | | | | | Tons per Year | | | Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tons/Year | g/ton | 907185 | | | | | ROG | ROG | ROG | ROG | ROG | ROG | NOx | NOx | NOx | PM10 | PM10 | PM10 | PM10 | PM10 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | PM2.5 | CO | CO | CO | SOx | SOx | SOx |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/trip | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/mi | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_RESTLOSS | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
| 3 | HHDT | 638 | 20 | 12,760 | 638 | 319 | 0.00020 | 0.00178 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.02255 | 0.01962 | 0.00205 | 0.00037 | 0.00001 | 0.00000 | 0.00049 | 0.00112 | 0.00035 | 0.00001 | 0.00000 | 0.00012 | 0.00039 | 0.00090 | 0.02605 | 0.00000 | 0.00020 | 0.00004 | 0.00000 |
| 4 | LDT1 | 2,096 | 10.8 | 22,637 | 2,096 | 1,048 | 0.00039 | 0.00000 | 0.00085 | 0.00030 | 0.00087 | 0.00253 | 0.00188 | 0.00000 | 0.00067 | 0.00003 | 0.00000 | 0.00001 | 0.00020 | 0.00023 | 0.00003 | 0.00000 | 0.00000 | 0.00005 | 0.00008 | 0.02442 | 0.00000 | 0.00856 | 0.00007 | 0.00000 | 0.00000 |
| 5 | HDT Mix | 28,296 | 6.6 | 186,754 | 28,296 | 14,148 | 0.01877 | 0.00219 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.16931 | 0.06923 | 0.01637 | 0.00415 | 0.00035 | 0.00000 | 0.00247 | 0.01472 | 0.00397 | 0.00034 | 0.00000 | 0.00062 | 0.00515 | 0.05042 | 0.04848 | 0.00000 | 0.00160 | 0.00012 | 0.00000 |

## *Off-Site Exhaust Emissions Material Removal Area (Phase 2)*

| Tons/Year | ROG | NOx | PM10 | PM2.5 | CO | SOx |
|---|---|---|---|---|---|---|
| HHDT | 0.0020 | 0.0442 | 0.0020 | 0.0009 | 0.0270 | 0.0002 |
| LDT1 | 0.0049 | 0.0026 | 0.0005 | 0.0002 | 0.0330 | 0.0001 |
| HDT Mix | 0.0210 | 0.2549 | 0.0217 | 0.0101 | 0.0989 | 0.0017 |
| **Total** | 0.0279 | 0.3017 | 0.0242 | 0.0111 | 0.1588 | 0.0020 |

| Ave. Daily Pounds | ROG | NOx | PM10 | PM2.5 | PM2.5 | PM2.5 |
|---|---|---|---|---|---|---|
| HHDT | 0.0304 | 0.6802 | 0.0307 | 0.0135 | 0.4147 | 0.0036 |
| LDT1 | 0.0760 | 0.0393 | 0.0072 | 0.0026 | 0.5073 | 0.0012 |
| HDT Mix | 0.3225 | 3.9217 | 0.3338 | 0.1551 | 1.5215 | 0.0265 |
| **Total** | 0.4289 | 4.6412 | 0.3717 | 0.1711 | 2.4435 | 0.0313 |

**For HRA paved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 1.63E-04 | 7.18E-05 |
| 5.39E-03 | 2.50E-03 |
| total DPM **5.56E-03** | **2.58E-03** |

**For HRA unpaved road (tpy)**

| PM10 | PM2.5 |
|---|---|
| 9.98E-05 | 4.38E-05 |
| 3.29E-03 | 1.53E-03 |
| total DPM **3.39E-03** | **1.57E-03** |

**Permanente Creek Restoration Project**

**TRAVEL ON PAVED ROADS**

Road Dust Equation

E [lb/VMT] = k*(sL)^0.91 * (W)^1.02 * (1-P/4N)

Where:
E = the particulate emission factor in units of pounds of particulate matter per VMT
k = the U.S. EPA AP-42 particle size multiplier ($PM_{10}$ = 0.0022 lb/VMT),
*Table 13.2.1-1 Particle Size Multipliers for Paved Road Equation of USEPA, 2011.*
sL = the roadway-specific silt loading in grams/square meter ($g/m^2$)
W = the average weight of vehicles traveling the road (California statewide default 2.4 tons)
P = number of "wet" days, when at least one site per county received at least 0.01 inch of precipitation during the annual averaging period,[9] and
N = the number of days in the annual averaging period (default = 365)

Calculation Methodology: USEPA AP-42, Paved Roads, Section 13.2.1, Revised January 2011:
http://www.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf
*Source: California Air Resources Board (CARB), Miscellaneous Process Methodology 7.9 — Entrained Road Travel, Paved Road Dust. Revised and updated March 2018.*

No assumed control on paved roads

**Silt Loading Factor**

*Source: CARB, 2018.*

**Table 3: California Default Statewide and Local Silt Loading Values**

| Silt Loadings (g/m2) | | | |
|---|---|---|---|
| **Freeway** | **Major** | **Collector** | **Local** |
| 0.015 | 0.032 | 0.032 | 0.32 |

| | |
|---|---|
| Total On-Site Paved Road Length | 2639.5 meters 1.64 miles |
| Paved Road Length to Concrete Channel | 800.9 meters 0.50 miles |

**Re-entrained PAVED Road Dust Emission Factors**

| | Pollutant | k | sL | W | P | N | $E_{ext}$ (g/mi) |
|---|---|---|---|---|---|---|---|
| Employee | PM10 | 1.00 | 0.032 | 2.4 | 67 | 365 | **0.10165** |
| Employee | PM2.5 | 0.15 | 0.032 | 2.4 | 67 | 365 | **0.01525** |
| Vendor Truck | PM10 | 1.00 | 0.032 | 2.4 | 67 | 365 | **0.10165** |
| Vendor Truck | PM2.5 | 0.15 | 0.032 | 2.4 | 67 | 365 | **0.01525** |
| Haul Truck | PM10 | 1.00 | 0.032 | 2.4 | 67 | 365 | **0.10165** |
| Haul Truck | PM2.5 | 0.15 | 0.032 | 2.4 | 67 | 365 | **0.01525** |

| | Concrete Channel | Channel Widening (Phase 1) | Rock Pile Area (Phase 1) | Rock Pile Area (Phase 2) | Channel Widening (Phase 2) | Old Crusher | Material Removal (Phase 1) | Material Removal (Phase 2) |
|---|---|---|---|---|---|---|---|---|
| Annual One-Way Trips | 1,056 | 1,584 | 2,112 | 2,112 | 1,584 | 1,040 | 2,080 | 2,096 |
| Trip Length | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| Vendor Annual One-Way Trips | 3,300 | 28,512 | 28,512 | 28,512 | 28,512 | 3,250 | 28,080 | 28,296 |
| Trip Length | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| Haul Truck Annual One- | 2 | 171.5 | 740.5 | 740.5 | 171.5 | 2 | 638 | 638 |
| Trip Length | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| Days/Year | 132 | 132 | 132 | 132 | 132 | 130 | 130 | 131 |

**TRAVEL ON UNPAVED ROADS**

Travel on Unpaved Surfaces

E [lb/VMT] = k*(s/12)^a * (W/3)^b

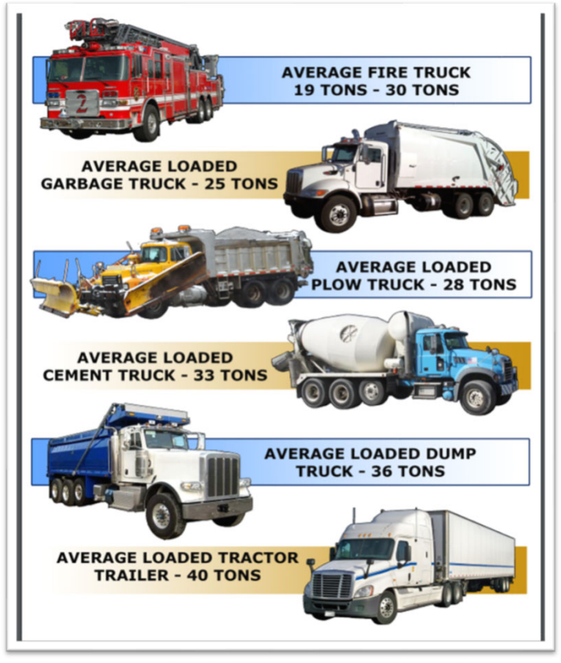
Where:
k = 1.5 for PM10 and 0.15 for PM2.5
a = 0.9 for both PM10 and PM2.5
b = 0.45 for both PM10 and PM2.5
s = surface material silt content (%)= 8.3
W = mean vehicle weight (tons) = 36
Calculation Methodology: USEPA AP-42, Unpaved Roads, Section 13.2.2, updated November 2006:
https://www.epa.gov/sites/production/files/2020-10/documents/13.2.2_unpaved_roads.pdf
Assumed control from watering= 75%
Unpaved Road Length 1612.3 meters 1.00 miles
Unpaved at Concrete Channel 242.7 meters 0.15 miles

**Travel on Unpaved Surfaces**

E [lb/VMT] = k*(s/12)^a * (W/3)^b

| Area | Year | Pollutant | k | a | b | s | W | E (lb/VMT) | On-Site Round Trip VMT (Mi/Yr) | Emissions (ton/yr) | Controlled Emissions (ton/yr) | Emissions (lb/day) | Controlled Emissions (lb/day) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel Planting | 2024 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 498.0 | 0.82 | **0.20** | 12.42 | **3.11** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 498.0 | 0.08 | **0.02** | 1.24 | **0.31** |
| Channel Widening[1] | 2024 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 0 | 0 | **0** | 0 | **0** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 0 | 0 | **0** | 0 | **0** |
| Rock Pile Area[1] | 2025 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 0 | 0 | **0** | 0 | **0** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 0 | 0 | **0** | 0 | **0** |
| Rock Pile Area[1] | 2026 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 0 | 0 | **0** | 0 | **0** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 0 | 0 | **0** | 0 | **0** |
| Channel Widening[1] | 2027 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 0 | 0 | **0** | 0 | **0** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 0 | 0 | **0** | 0 | **0** |
| Old Crusher[1] | 2028 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 0 | 0 | **0** | 0 | **0** |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 0 | 0 | **0** | 0 | **0** |
| Material Removal (Outside Subarea 4) | 2028 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 28770.8 | 47.38 | **11.84** | 723.29 | 180.82 |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 28770.8 | 4.74 | **1.18** | 72.33 | 18.08 |
| Material Removal (Outside Subarea 4) | 2029 | PM10 | 1.50 | 0.9 | 0.45 | 8.3 | 36 | 3.293 | 28987.2 | 47.73 | **11.93** | 728.73 | 182.18 |
| | | PM2.5 | 0.15 | 0.9 | 0.45 | 8.3 | 36 | 0.329 | 28987.2 | 4.77 | **1.19** | 72.87 | 18.22 |

[1]Road to Rock Pile, Channel Widening, and Old Crusher Area is paved




https://www.dot.state.pa.us/public/pdf/InfoBridge/Approximate%20vehicle%20weights.pdf

**Re-entrained PAVED Road Dust Emissions By Activity/Year in Air Basin**

| | | Concrete Channel | | | Channel Widening (Phase 1) | | | Rock Pile Area (Phase 1) | | | Rock Pile Area (Phase 2) | | | Channel Widening (Phase 2) | | | Old Crusher | | | Material Removal (Phase 1) | | | Material Removal (Phase 2) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pollutant | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) |
| Employee | PM10 | 11,405 | 0.58 | 8.78 | 17,107 | 0.87 | 13.17 | 22,810 | 1.16 | 17.56 | 22,810 | 1.16 | 17.56 | 17,107 | 0.87 | 13.17 | 11,232 | 0.57 | 8.78 | 22,464 | 1.14 | 17.56 | 22,637 | 1.15 | 17.56 |
| Employee | PM2.5 | 11,405 | 0.09 | 1.32 | 17,107 | 0.13 | 1.98 | 22,810 | 0.17 | 2.63 | 22,810 | 0.17 | 2.63 | 17,107 | 0.13 | 1.98 | 11,232 | 0.09 | 1.32 | 22,464 | 0.17 | 2.63 | 22,637 | 0.17 | 2.63 |
| Vendor Truck | PM10 | 21,780 | 1.11 | 16.77 | 188,179 | 9.56 | 144.91 | 188,179 | 9.56 | 144.91 | 188,179 | 9.56 | 144.91 | 188,179 | 9.56 | 144.91 | 21,450 | 1.09 | 16.77 | 185,328 | 9.42 | 144.91 | 186,754 | 9.49 | 144.91 |
| Vendor Truck | PM2.5 | 21,780 | 0.17 | 2.52 | 188,179 | 1.43 | 21.74 | 188,179 | 1.43 | 21.74 | 188,179 | 1.43 | 21.74 | 188,179 | 1.43 | 21.74 | 21,450 | 0.16 | 2.52 | 185,328 | 1.41 | 21.74 | 186,754 | 1.42 | 21.74 |
| Haul Truck | PM10 | 40 | 0.00 | 0.03 | 3,430 | 0.17 | 2.64 | 14,810 | 0.75 | 11.40 | 14,810 | 0.75 | 11.40 | 3,430 | 0.17 | 2.64 | 40 | 0.00 | 0.03 | 12,760 | 0.65 | 9.98 | 12,760 | 0.65 | 9.90 |
| Haul Truck | PM2.5 | 40 | 0.00 | 0.00 | 3,430 | 0.03 | 0.40 | 14,810 | 0.11 | 1.71 | 14,810 | 0.11 | 1.71 | 3,430 | 0.03 | 0.40 | 40 | 0.00 | 0.00 | 12,760 | 0.10 | 1.50 | 12,760 | 0.10 | 1.49 |
| | total PM10 | | 1.689 | 25.585 | | 10.608 | 160.725 | | 11.476 | 173.879 | | 11.476 | 173.879 | | 10.608 | 160.725 | | 1.663 | 25.586 | | 11.209 | 172.452 | | 11.291 | 172.376 |
| | total PM2.5 | | 0.253 | 3.838 | | 1.591 | 22.133 | | 1.721 | 23.447 | | 1.721 | 23.447 | | 1.591 | 22.133 | | 0.249 | 2.520 | | 1.681 | 23.233 | | 1.694 | 23.222 |

**Re-entrained PAVED Road Dust Emissions By Activity/Year On Site**

| | | Concrete Channel | | | Channel Widening (Phase 1) | | | Rock Pile Area (Phase 1) | | | Rock Pile Area (Phase 2) | | | Channel Widening (Phase 2) | | | Old Crusher | | | Material Removal (Phase 1) | | | Material Removal (Phase 2) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Pollutant | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) | Distance Traveled (Mi/Yr) | Emissions (ton/yr) | Emissions (lb/day) |
| Vendor Truck | PM10 | 1,642 | 0.08 | 1.26 | 46,763 | 2.38 | 36.01 | 46,763 | 2.38 | 36.01 | 46,763 | 2.38 | 36.01 | 46,763 | 2.38 | 36.01 | 5,330 | 0.27 | 4.17 | 46,054 | 2.34 | 36.01 | 46,409 | 2.36 | 36.01 |
| Vendor Truck | PM2.5 | 1,642 | 0.01 | 0.19 | 46,763 | 0.36 | 5.40 | 46,763 | 0.36 | 5.40 | 46,763 | 0.36 | 5.40 | 46,763 | 0.36 | 5.40 | 5,330 | 0.04 | 0.63 | 46,054 | 0.35 | 5.40 | 46,409 | 0.35 | 5.40 |
| Haul Truck | PM10 | 1 | 0.00 | 0.00 | 281 | 0.01 | 0.22 | 1,215 | 0.06 | 0.94 | 1,215 | 0.06 | 0.94 | 281 | 0.01 | 0.22 | 3 | 0.00 | 0.00 | 1,046 | 0.05 | 0.82 | 1,046 | 0.05 | 0.81 |
| Haul Truck | PM2.5 | 1 | 0.00 | 0.00 | 3,430 | 0.03 | 0.40 | 1,215 | 0.01 | 0.14 | 1,215 | 0.01 | 0.14 | 281 | 0.00 | 0.03 | 3 | 0.00 | 0.00 | 1,046 | 0.01 | 0.12 | 1,046 | 0.01 | 0.12 |
| | total PM10 | | 0.084 | 1.265 | | 2.391 | 36.227 | | 2.438 | 36.946 | | 2.438 | 36.946 | | 2.391 | 36.227 | | 0.271 | 4.170 | | 2.394 | 36.829 | | 2.412 | 36.822 |
| | total PM2.5 | | 0.013 | 0.190 | | 0.383 | 5.798 | | 0.366 | 5.542 | | 0.366 | 5.542 | | 0.359 | 5.434 | | 0.041 | 0.626 | | 0.359 | 5.524 | | 0.362 | 5.523 |

**Dozer Equipment Passes**

$EF_{PM10}$ [lb/VMT]= 0.052 * (S)^2.0 * $F_{PM10}$

$EF_{PM2.5}$ [lb/VMT] = 0.04 * (S)^2.5 * $F_{PM2.5}$

Where:

S = mean vehicle speed (mph) = 7.1 (AP-42 default)

$F_{PM2.5}$ = PM2.5 scaling factor = 0.031 (AP-42 default)

$F_{PM10}$ = PM10 scaling factor = 0.6 (AP-42 default)

VMT/Day: 16

Calculation Methodology: USEPA AP-42, Section 11.9, Western Surface Coal Mining.

Assumed control efficiency from watering = 50%

**Dust from Dozer Equipment**

| Area | Year | Pollutant | F | S | $W_b$ | EF (lb/VMT) | No. of Grader Work Days | VMT | Emissions (lb/day) | Emissions (ton/yr) | Controlled Emissions (lb/day) | Controlled Emissions (ton/yr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel Planting | 2024 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 0.0 | 0 | 25.2 | 0.0 | **12.58** | **0.00** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 0.0 | 0 | 2.7 | 0.0 | **1.33** | **0.00** |
| Channel Widening | 2024 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 13.0 | 208 | 25.2 | 0.2 | **12.58** | **0.08** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 13.0 | 208 | 2.7 | 0.0 | **1.33** | **0.01** |
| Rock Pile Area | 2025 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 20.0 | 320 | 25.2 | 0.3 | **12.58** | **0.13** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 20.0 | 320 | 2.7 | 0.0 | **1.33** | **0.01** |
| Rock Pile Area | 2026 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 20.0 | 320 | 25.2 | 0.3 | **12.58** | **0.13** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 20.0 | 320 | 2.7 | 0.0 | **1.33** | **0.01** |
| Channel Widening | 2027 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 78.0 | 1248 | 25.2 | 1.0 | **12.58** | **0.49** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 78.0 | 1248 | 2.7 | 0.1 | **1.33** | **0.05** |
| Old Crusher | 2028 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 0.0 | 0 | 25.2 | 0.0 | **12.58** | **0.00** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 0.0 | 0 | 2.7 | 0.0 | **1.33** | **0.00** |
| Material Removal | 2028 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 20.0 | 320 | 25.2 | 0.3 | **12.58** | **0.13** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 20.0 | 320 | 2.7 | 0.0 | **1.33** | **0.01** |
| Material Removal | 2029 | PM10 | 0.60 | 7.1 | 12.0 | 1.6 | 20.0 | 320 | 25.2 | 0.3 | **12.58** | **0.13** |
| | | PM2.5 | 0.031 | 7.1 | 12.0 | 0.2 | 20.0 | 320 | 2.7 | 0.0 | **1.33** | **0.01** |

| | Channel Planting | Channel Widening | Rock Pile Area | Rock Pile Area | Channel Widening | Old Crusher | Material Removal | Material Removal |
|---|---|---|---|---|---|---|---|---|
| Employee Annual One-Way Trips | 1,056 | 1,584 | 2,112 | 2,112 | 1,584 | 1,040 | 2,080 | 2,096 |
| Trip Length | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| Vendor Annual One-Way Trips | 3,300 | 28,512 | 28,512 | 28,512 | 28,512 | 3,250 | 28,080 | 28,296 |
| Trip Length | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| Haul Truck Annual One-Way Trips | 2 | 171.5 | 740.5 | 740.5 | 171.5 | 2 | 638 | 638 |
| Trip Length | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

**DUST FROM MATERIAL MOVEMENT**

Truck Loading

E [lb/ton] = k * 0.0032 * { [(U/5)^1.3] / (M/2)^1.4] }

Where:

E = particulate emission factor, lb/ton

k = particle size multiplier, PM10 0.35 PM2.5 = 0.053

U = mean wind speed = 4.9 mi/hr (2.2 m/s from CalEEMod App. D, converted to mi/hr)

M = material moisture content, 12 %, CalEEMod Appendix A pg. 11, ref: Table 13.2.2-1, Stone quarrying and processing, haul road to/from the pit

Calculation Methodology: USEPA AP-42, drop operation, page 13.2. ref:https://www.dot.state.pa.us/public/pdf/InfoBridge/Approximate%20vehicle%20weights.pdf 13.2.4_aggregate_handling_and_storage_piles.pdf.

Tons per cubic yard of dirt = 1.5

Source: https://www.soildirect.com/calculator/cubic-yard-calculator/#:~:text=As%20a%20general%20guide%2C%201,is%20equivalent%20to%201.5%20tons.

Total clean material brought to site = 27,099 cu. Yds.

Material transferred at pick-up and drop-off = 54,198 cu. Yds.

NOT IN HRA

**Truck Loading**

E [lb/ton] = k * 0.0032 * { [(U/5)^1.3] / (M/2)^1.4] }

| | Pollutant | Variables k | U | M | E (lb/ton) | Amount Loaded (cu. Yds) | Amount Loaded (tons) | Emissions tons/yr | Emissions lb/day |
|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel Planting | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 35 | 52 | 0.0000 | 0.0000 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 35 | 52 | 0.0000 | 0.0000 |
| Channel Widening | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 2,995 | 4,492 | 0.0002 | 0.0030 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 2,995 | 4,492 | 0.0000 | 0.0005 |
| Rock Pile Area | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 12,930 | 19,394 | 0.0009 | 0.0130 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 12,930 | 19,394 | 0.0001 | 0.0020 |
| Rock Pile Area | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 12,930 | 19,394 | 0.0009 | 0.0130 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 12,930 | 19,394 | 0.0001 | 0.0020 |
| Channel Widening | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 2,995 | 4,492 | 0.0002 | 0.0030 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 2,995 | 4,492 | 0.0000 | 0.0005 |
| Old Crusher | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 35 | 52 | 0.0000 | 0.0000 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 35 | 52 | 0.0000 | 0.0000 |
| Material Removal | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 11,140 | 16,710 | 0.0007 | 0.0114 |
| | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 11,140 | 16,710 | 0.0001 | 0.0017 |
| | PM10 | 0.35 | 4.9 | 12.0 | 0.00009 | 11,140 | 16,710 | 0.0007 | 0.0113 |

13.2.4.3 Predictive Emission Factor Equations

Total dust emissions from aggregate storage piles result from several distinct source activities within the storage cycle:

1. Loading of aggregate onto storage piles (batch or continuous drop operations).
2. Equipment traffic in storage area.
3. Wind erosion of pile surfaces and ground areas around piles.
4. Loadout of aggregate for shipment or for return to the process stream (batch or continuous drop operations).

Either adding aggregate material to a storage pile or removing it usually involves dropping the material onto a receiving surface. Truck dumping on the pile or loading out from the pile to a truck with a front-end loader are examples of batch drop operations. Adding material to the pile by a conveyor stacker is an example of a continuous drop operation.

(1)

$$E = k(0.0032)\ \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}\ \text{(pound [lb]/ton)}$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

| Aerodynamic Particle Size Multiplier (k) For Equation 1 | | | | |
|---|---|---|---|---|
| < 30 μm | < 15 μm | < 10 μm | < 5 μm | < 2.5 μm |
| 0.74 | 0.48 | 0.35 | 0.20 | 0.053[a] |

[a] Multiplier for < 2.5 μm taken from Reference 14.

The equation retains the assigned quality rating if applied within the ranges of source conditions that were tested in developing the equation, as follows. Note that silt content is included, even though silt content does not appear as a correction parameter in the equation. While it is reasonable to expect that silt content and emission factors are interrelated, no significant correlation between the 2 was found during the derivation of the equation, probably because most tests with high silt contents were conducted under lower winds, and vice versa. It is recommended that estimates from the equation be reduced 1 quality rating level if the silt content used in a particular application falls outside the range given:

| Ranges Of Source Conditions For Equation 1 | | | |
|---|---|---|---|
| Silt Content (%) | Moisture Content (%) | Wind Speed | |
| | | m/s | mph |
| 0.44 - 19 | 0.25 - 4.8 | 0.6 - 6.7 | 1.3 - 15 |

To retain the quality rating of the equation when it is applied to a specific facility, reliable correction parameters must be determined for specific sources of interest. The field and laboratory procedures for aggregate sampling are given in Reference 3. In the event that site-specific values for

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Material Removal | PM2.5 | 0.053 | 4.9 | 12.0 | 0.00001 | 11,140 | 16,710 | 0.0001 | 0.0017 |

**GHG Emissions Summary**

**Maximum Annual GHG Emissions for SEIR (metric tons/year)**

| Scenario | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Maximum Annual Incremental Change for Reclamation Plan Amendment Disclosed in 2012 EIR | 1,060 | 0 | 0 | 1,100 |
| PCRP Amortized Emissions not Evaluated in the 2012 EIR | 87.94 | 0.02 | 0.01 | 90.14 |
| Maximum Annual Incremental Change | 1,148 | 0 | 0 | 1,190 |
| BAAQMD Threshold | | | | 1,100 |
| Significant Impact (Yes or No)? | | | | Yes |

**Emissions Summary for SEIR - Metric Tons/Phase-Year**

| Phase (Year) | % Covered in SEIR | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Concrete Channel (2024) | 100% | 24.62 | 0.00 | 0.00 | 25.61 |
| Channel Widening - Phase 1 (2024) | 89% | 267.63 | 0.03 | 0.03 | 276.01 |
| Rock Pile Area - Phase 1 (2025) | 89% | 500.65 | 0.10 | 0.03 | 511.62 |
| Rock Pile Area - Phase 2 (2026) | 89% | 499.18 | 0.10 | 0.03 | 510.09 |
| Channel Widening - Phase 2 (2027) | 89% | 264.28 | 0.03 | 0.02 | 272.50 |
| Old Crusher (2028) | 0% | 0.00 | 0.00 | 0.00 | 0.00 |
| Material Removal - Phase 1 (2028) | 20% | 101.21 | 0.02 | 0.01 | 103.51 |
| Material Removal - Phase 2 (2029) | 20% | 101.25 | 0.02 | 0.01 | 103.55 |
| Total | | 1758.82 | 0.32 | 0.12 | 1802.89 |
| Amortized (20 years) | | 87.94 | 0.02 | 0.01 | 90.14 |

**Total Emissions Summary - Metric Tons/Phase-Year**

| Phase (Year) | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Concrete Channel (2024) | 24.62 | 0.00 | 0.00 | 25.61 |
| Channel Widening - Phase 1 (2024) | 300.17 | 0.04 | 0.03 | 309.57 |
| Rock Pile Area - Phase 1 (2025) | 561.51 | 0.12 | 0.03 | 573.83 |
| Rock Pile Area - Phase 2 (2026) | 559.87 | 0.12 | 0.03 | 572.11 |
| Channel Widening - Phase 2 (2027) | 296.41 | 0.04 | 0.03 | 305.63 |
| Old Crusher (2028) | 24.03 | 0.00 | 0.00 | 24.97 |
| Material Removal - Phase 1 (2028) | 503.71 | 0.10 | 0.03 | 515.12 |
| Material Removal - Phase 2 (2029) | 503.90 | 0.10 | 0.03 | 515.32 |

**Concrete Channel (2024 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 0.89 | 0.00 | 0.00 | 0.89 |
| On-road Vehicles | 23.73 | 0.00 | 0.00 | 24.72 |
| Total | 24.62 | 0.00 | 0.00 | 25.61 |

**Channel Widening - Phase 1 (2024 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 116.45 | 0.04 | 0.00 | 117.39 |
| On-road Vehicles | 183.72 | 0.00 | 0.03 | 192.18 |
| Total | 300.17 | 0.04 | 0.03 | 309.57 |

**Rock Pile Area - Phase 1 (2025 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 355.57 | 0.12 | 0.00 | 358.45 |
| On-road Vehicles | 205.94 | 0.00 | 0.03 | 215.38 |
| Total | 561.51 | 0.12 | 0.03 | 573.83 |

**GHG Emissions Summary**

**Rock Pile Area - Phase 2 (2026 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 355.57 | 0.12 | 0.00 | 358.45 |
| On-road Vehicles | 204.30 | 0.00 | 0.03 | 213.66 |
| Total | 559.87 | 0.12 | 0.03 | 572.11 |

**Channel Widening - Phase 2 (2027 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 116.42 | 0.04 | 0.00 | 117.36 |
| On-road Vehicles | 179.98 | 0.00 | 0.03 | 188.26 |
| Total | 296.41 | 0.04 | 0.03 | 305.63 |

**Old Crusher (2028 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 1.38 | 0.00 | 0.00 | 1.38 |
| On-road Vehicles | 22.65 | 0.00 | 0.00 | 23.59 |
| Total | 24.03 | 0.00 | 0.00 | 24.97 |

**Materal Removal Area - Phase 1 (2028 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 308.85 | 0.10 | 0.00 | 311.35 |
| On-road Vehicles | 194.86 | 0.00 | 0.03 | 203.78 |
| Total | 503.71 | 0.10 | 0.03 | 515.12 |

**Material Removal Area - Phase 2 (2029 metric tons)**

| Source | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Off-road Equipment Exhaust | 309.09 | 0.10 | 0.00 | 311.59 |
| On-road Vehicles | 194.82 | 0.00 | 0.03 | 203.73 |
| Total | 503.90 | 0.10 | 0.03 | 515.32 |

**Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

## Emissions Summary

**Tons Per Year**

| Construction Phase(s) | Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Concrete Channel | 2024 | 23.73 | 0.00 | 0.00 | 24.72 |
| Channel Widening (Phase 1) | 2024 | 183.72 | 0.00 | 0.03 | 192.18 |
| Rock Pile Area (Phase 1) | 2025 | 205.94 | 0.00 | 0.03 | 215.38 |
| Rock Pile Area (Phase 2) | 2026 | 204.30 | 0.00 | 0.03 | 213.66 |
| Channel Widening (Phase 2) | 2027 | 179.98 | 0.00 | 0.03 | 188.26 |
| Old Crusher Foundation | 2028 | 22.65 | 0.00 | 0.00 | 23.59 |
| Material Removal Area (Phase 1) | 2028 | 194.86 | 0.00 | 0.03 | 203.78 |
| Material Removal Area (Phase 2) | 2029 | 194.82 | 0.00 | 0.03 | 203.73 |

## Background Information

**Conversions**

| Metric Ton | Pounds | Grams |
|---|---|---|
| 1 | 2,205 | 0 |

| Annual Work Days | Year |
|---|---|
| 132 | 2024 |
| 132 | 2025 |
| 132 | 2026 |
| 132 | 2027 |
| 130 | 2028 |
| 131 | 2029 |

**Global Warming Potential Factors**

| CO2 | CH4 | N2O |
|---|---|---|
| 1 | 25 | 298 |

**One-Way Trip Info**

| | Concrete Channel | Channel Widening (Phase 1) | Channel Widening (Phase 2) | Rock Pile Area (Phase 1) | Rock Pile Area (Phase 2) | Old Crusher | Material Removal (Phase 1) | Material Removal (Phase 2) |
|---|---|---|---|---|---|---|---|---|
| *Employee Trips* | | | | | | | | |
| Daily One-Way Trips | 8 | 12 | 12 | 16 | 16 | 8 | 16 | 16 |
| Annual One-Way Trips | 1,056 | 1,584 | 1,584 | 2,112 | 2,112 | 1,040 | 2,080 | 2,096 |
| Trip Length | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 | 10.8 |
| *Vendor Truck Trips* | | | | | | | | |
| Daily One-Way Trips | 25 | 216 | 216 | 216 | 216 | 25 | 216 | 216 |
| Annual One-Way Trips | 3,300 | 28,512 | 28,512 | 28,512 | 28,512 | 3,250 | 28,080 | 28,296 |
| Trip Length | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 | 6.6 |
| *Haul Truck Trips* | | | | | | | | |
| Annual One-Way Trips | 2 | 171.5 | 171.5 | 740.5 | 740.5 | 2 | 638 | 638 |
| Trip Length | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |

## EMFAC2021 Output for 2024

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2024 | HHDT | Aggregate | Aggregate | Diesel | 1634.10047 | 11997.01133 | 0.00000 | 0.00078 | 0.23663 | 0.00000 | 0.25745 | 1.89013 | 0.00000 |
| Santa Clara | 2024 | LDT1 | Aggregate | Aggregate | Gasoline | 327.25709 | 0.00000 | 86.38434 | 0.00626 | 0.00000 | 0.10537 | 0.00942 | 0.00000 | 0.03869 |
| Santa Clara | 2024 | LHDT1 | Aggregate | Aggregate | Diesel | 631.40078 | 131.15033 | 0.00000 | 0.00801 | 0.00510 | 0.00000 | 0.09948 | 0.02066 | 0.00000 |
| Santa Clara | 2024 | LHDT2 | Aggregate | Aggregate | Diesel | 756.86825 | 209.56182 | 0.00000 | 0.00741 | 0.00510 | 0.00000 | 0.11924 | 0.03302 | 0.00000 |
| Santa Clara | 2024 | MHDT | Aggregate | Aggregate | Diesel | 1147.30919 | 2248.54716 | 0.00000 | 0.00151 | 0.01158 | 0.00000 | 0.18076 | 0.35426 | 0.00000 |
| | | HDT Mix | | | | 845.19274 | 863.08644 | 0.00000 | 0.00564 | 0.00726 | 0.00000 | 0.13316 | 0.13598 | 0.00000 |

**Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

**Emissions Calcs for Concrete Channel**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 2 | 20 | 40 | 2 | 1 | 0.06536 | 0.01200 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00001 | 0.00000 | 0.00000 |
| 4 | LDT1 | 1,056 | 10.8 | 11,405 | 1,056 | 528 | 3.73230 | 0.00000 | 0.09122 | 0.00007 | 0.00000 | 0.00011 | 0.00011 | 0.00000 | 0.00004 |
| 5 | HDT Mix | 3,300 | 6.6 | 21,780 | 3,300 | 1,650 | 18.40830 | 1.42409 | 0.00000 | 0.00012 | 0.00001 | 0.00000 | 0.00290 | 0.00022 | 0.00000 |

## *Off-Site Exhaust Emissions for Concrete Channel*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 0.0774 | 0.0000 | 0.0000 | 0.0810 |
| LDT1 | 3.8235 | 0.0002 | 0.0001 | 3.8723 |
| HDT Mix | 19.8324 | 0.0001 | 0.0031 | 20.7669 |
| **Total** | 23.7333 | 0.0003 | 0.0033 | 24.7202 |

**Emissions Calcs for Channel Widening (Phase 1)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 172 | 20 | 3,430 | 172 | 86 | 5.60496 | 1.02874 | 0.00000 | 0.00000 | 0.00002 | 0.00000 | 0.00088 | 0.00016 | 0.00000 |
| 4 | LDT1 | 1,584 | 10.8 | 17,107 | 1,584 | 792 | 5.59845 | 0.00000 | 0.13683 | 0.00011 | 0.00000 | 0.00017 | 0.00016 | 0.00000 | 0.00006 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 159.04769 | 12.30416 | 0.00000 | 0.00106 | 0.00010 | 0.00000 | 0.02506 | 0.00194 | 0.00000 |

## *Off-Site Exhaust Emissions for Channel Widening (Phase 1)*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 6.6337 | 0.0000 | 0.0010 | 6.9457 |
| LDT1 | 5.7353 | 0.0003 | 0.0002 | 5.8084 |
| HDT Mix | 171.3519 | 0.0012 | 0.0270 | 179.4259 |
| **Total** | 183.7208 | 0.0015 | 0.0283 | 192.1801 |

**EMFAC2021 Output for 2025**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2025 | HHDT | Aggregate | Aggregate | Diesel | 1608.77639 | 11755.33723 | 0.00000 | 0.00075 | 0.23589 | 0.00000 | 0.25346 | 1.85206 | 0.00000 |
| Santa Clara | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 321.48897 | 0.00000 | 84.45547 | 0.00562 | 0.00000 | 0.09855 | 0.00869 | 0.00000 | 0.03751 |
| Santa Clara | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 628.07000 | 129.54724 | 0.00000 | 0.00747 | 0.00510 | 0.00000 | 0.09895 | 0.02041 | 0.00000 |
| Santa Clara | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 750.35710 | 207.23965 | 0.00000 | 0.00704 | 0.00510 | 0.00000 | 0.11822 | 0.03265 | 0.00000 |
| Santa Clara | 2025 | MHDT | Aggregate | Aggregate | Diesel | 1141.32802 | 2229.37376 | 0.00000 | 0.00131 | 0.01096 | 0.00000 | 0.17982 | 0.35124 | 0.00000 |
| | | HDT Mix | | | | 839.91837 | 855.38688 | 0.00000 | 0.00527 | 0.00705 | 0.00000 | 0.13233 | 0.13477 | 0.00000 |

**Emissions Calcs for Rock Pile Area (Phase 1)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 741 | 20 | 14,810 | 741 | 370 | 23.82598 | 4.35241 | 0.00000 | 0.00001 | 0.00009 | 0.00000 | 0.00375 | 0.00069 | 0.00000 |
| 4 | LDT1 | 2,112 | 10.8 | 22,810 | 2,112 | 1,056 | 7.33303 | 0.00000 | 0.17837 | 0.00013 | 0.00000 | 0.00021 | 0.00020 | 0.00000 | 0.00008 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 158.05517 | 12.19440 | 0.00000 | 0.00099 | 0.00010 | 0.00000 | 0.02490 | 0.00192 | 0.00000 |

**Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

## *Off-Site Exhaust Emissions for Rock Pile Area (Phase 1)*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 28.1784 | 0.0001 | 0.0044 | 29.5038 |
| LDT1 | 7.5114 | 0.0003 | 0.0003 | 7.6025 |
| HDT Mix | 170.2496 | 0.0011 | 0.0268 | 178.2701 |
| **Total** | 205.9394 | 0.0015 | 0.0315 | 215.3764 |

**EMFAC2021 Output for 2026**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2026 | HHDT | Aggregate | Aggregate | Diesel | 1583.15114 | 11526.41341 | 0.00000 | 0.00072 | 0.23528 | 0.00000 | 0.24943 | 1.81599 | 0.00000 |
| Santa Clara | 2026 | LDT1 | Aggregate | Aggregate | Gasoline | 315.79255 | 0.00000 | 82.57769 | 0.00506 | 0.00000 | 0.09224 | 0.00804 | 0.00000 | 0.03641 |
| Santa Clara | 2026 | LHDT1 | Aggregate | Aggregate | Diesel | 625.22799 | 128.06640 | 0.00000 | 0.00699 | 0.00510 | 0.00000 | 0.09850 | 0.02018 | 0.00000 |
| Santa Clara | 2026 | LHDT2 | Aggregate | Aggregate | Diesel | 744.68422 | 205.11327 | 0.00000 | 0.00672 | 0.00510 | 0.00000 | 0.11733 | 0.03232 | 0.00000 |
| Santa Clara | 2026 | MHDT | Aggregate | Aggregate | Diesel | 1134.95201 | 2210.32904 | 0.00000 | 0.00113 | 0.01042 | 0.00000 | 0.17881 | 0.34824 | 0.00000 |
| | | HDT Mix | | | | 834.95474 | 847.83623 | 0.00000 | 0.00495 | 0.00687 | 0.00000 | 0.13155 | 0.13358 | 0.00000 |

**Emissions Calcs for Rock Pile Area (Phase 2)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 741 | 20 | 14,810 | 741 | 370 | 23.44647 | 4.26765 | 0.00000 | 0.00001 | 0.00009 | 0.00000 | 0.00369 | 0.00067 | 0.00000 |
| 4 | LDT1 | 2,112 | 10.8 | 22,810 | 2,112 | 1,056 | 7.20310 | 0.00000 | 0.17440 | 0.00012 | 0.00000 | 0.00019 | 0.00018 | 0.00000 | 0.00008 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 157.12111 | 12.08675 | 0.00000 | 0.00093 | 0.00010 | 0.00000 | 0.02475 | 0.00190 | 0.00000 |

## *Off-Site Exhaust Emissions for Rock Pile Area (Phase 2)*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 27.7141 | 0.0001 | 0.0044 | 29.0177 |
| LDT1 | 7.3775 | 0.0003 | 0.0003 | 7.4628 |
| HDT Mix | 169.2079 | 0.0010 | 0.0267 | 177.1779 |
| **Total** | 204.2995 | 0.0014 | 0.0313 | 213.6585 |

**EMFAC2021 Output for 2027**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2027 | HHDT | Aggregate | Aggregate | Diesel | 1556.12285 | 11312.43773 | 0.00000 | 0.00070 | 0.23488 | 0.00000 | 0.24517 | 1.78228 | 0.00000 |
| Santa Clara | 2027 | LDT1 | Aggregate | Aggregate | Gasoline | 310.25293 | 0.00000 | 80.77512 | 0.00455 | 0.00000 | 0.08645 | 0.00745 | 0.00000 | 0.03541 |
| Santa Clara | 2027 | LHDT1 | Aggregate | Aggregate | Diesel | 622.79522 | 126.72063 | 0.00000 | 0.00659 | 0.00510 | 0.00000 | 0.09812 | 0.01996 | 0.00000 |
| Santa Clara | 2027 | LHDT2 | Aggregate | Aggregate | Diesel | 739.76861 | 203.20660 | 0.00000 | 0.00644 | 0.00510 | 0.00000 | 0.11655 | 0.03202 | 0.00000 |
| Santa Clara | 2027 | MHDT | Aggregate | Aggregate | Diesel | 1128.56265 | 2191.46242 | 0.00000 | 0.00099 | 0.00999 | 0.00000 | 0.17781 | 0.34527 | 0.00000 |
| | | HDT Mix | | | | 830.37550 | 840.46321 | 0.00000 | 0.00467 | 0.00673 | 0.00000 | 0.13083 | 0.13242 | 0.00000 |

**Emissions Calcs for Channel Widening (Phase 2)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 172 | 20 | 3,430 | 172 | 86 | 5.33750 | 0.97004 | 0.00000 | 0.00000 | 0.00002 | 0.00000 | 0.00084 | 0.00015 | 0.00000 |
| 4 | LDT1 | 1,584 | 10.8 | 17,107 | 1,584 | 792 | 5.30756 | 0.00000 | 0.12795 | 0.00008 | 0.00000 | 0.00014 | 0.00013 | 0.00000 | 0.00006 |
| 5 | HDT Mix | 28,512 | 6.6 | 188,179 | 28,512 | 14,256 | 156.25940 | 11.98164 | 0.00000 | 0.00088 | 0.00010 | 0.00000 | 0.02462 | 0.00189 | 0.00000 |

## *Off-Site Exhaust Emissions for Channel Widening (Phase 2)*

**Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 6.3075 | 0.0000 | 0.0010 | 6.6042 |
| LDT1 | 5.4355 | 0.0002 | 0.0002 | 5.4956 |
| HDT Mix | 168.2410 | 0.0010 | 0.0265 | 176.1643 |
| **Total** | 179.9841 | 0.0012 | 0.0277 | 188.2642 |

**EMFAC2021 Output for 2028**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2028 | HHDT | Aggregate | Aggregate | Diesel | 1527.99982 | 11109.89941 | 0.00000 | 0.00068 | 0.23470 | 0.00000 | 0.24074 | 1.75037 | 0.00000 |
| Santa Clara | 2028 | LDT1 | Aggregate | Aggregate | Gasoline | 304.98057 | 0.00000 | 79.07292 | 0.00411 | 0.00000 | 0.08117 | 0.00693 | 0.00000 | 0.03448 |
| Santa Clara | 2028 | LHDT1 | Aggregate | Aggregate | Diesel | 620.69309 | 125.50144 | 0.00000 | 0.00623 | 0.00510 | 0.00000 | 0.09779 | 0.01977 | 0.00000 |
| Santa Clara | 2028 | LHDT2 | Aggregate | Aggregate | Diesel | 735.49806 | 201.50966 | 0.00000 | 0.00621 | 0.00510 | 0.00000 | 0.11588 | 0.03175 | 0.00000 |
| Santa Clara | 2028 | MHDT | Aggregate | Aggregate | Diesel | 1122.13522 | 2173.47316 | 0.00000 | 0.00086 | 0.00964 | 0.00000 | 0.17679 | 0.34243 | 0.00000 |
| | | HDT Mix | | | | 826.10879 | 833.49475 | 0.00000 | 0.00444 | 0.00661 | 0.00000 | 0.13015 | 0.13132 | 0.00000 |

**Emissions Calcs for Material Removal Area (Phase 1)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 638 | 20.0 | 12,760 | 638 | 319 | 19.49728 | 3.54406 | 0.00000 | 0.00001 | 0.00007 | 0.00000 | 0.00307 | 0.00056 | 0.00000 |
| 4 | LDT1 | 2,080 | 10.8 | 22,464 | 2,080 | 1,040 | 6.85108 | 0.00000 | 0.16447 | 0.00009 | 0.00000 | 0.00017 | 0.00016 | 0.00000 | 0.00007 |
| 5 | HDT Mix | 28,080 | 6.6 | 185,328 | 28,080 | 14,040 | 153.10109 | 11.70227 | 0.00000 | 0.00082 | 0.00009 | 0.00000 | 0.02412 | 0.00184 | 0.00000 |

## *Off-Site Exhaust Emissions Material Removal Area (Phase 1)*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 23.0413 | 0.0001 | 0.0036 | 24.1252 |
| LDT1 | 7.0156 | 0.0003 | 0.0002 | 7.0898 |
| HDT Mix | 164.8034 | 0.0009 | 0.0260 | 172.5638 |
| **Total** | 194.8602 | 0.0013 | 0.0298 | 203.7788 |

**Emissions Calcs for Old Crusher**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 2 | 20 | 40 | 2 | 1 | 0.06112 | 0.01111 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00001 | 0.00000 | 0.00000 |
| 4 | LDT1 | 1,040 | 10.8 | 11,232 | 1,040 | 520 | 3.42554 | 0.00000 | 0.08224 | 0.00005 | 0.00000 | 0.00008 | 0.00008 | 0.00000 | 0.00004 |
| 5 | HDT Mix | 3,250 | 6.6 | 21,450 | 3,250 | 1,625 | 17.72003 | 1.35443 | 0.00000 | 0.00010 | 0.00001 | 0.00000 | 0.00279 | 0.00021 | 0.00000 |

## *Off-Site Exhaust Emissions for Old Crusher*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 0.0722 | 0.0000 | 0.0000 | 0.0756 |
| LDT1 | 3.5078 | 0.0001 | 0.0001 | 3.5449 |
| HDT Mix | 19.0745 | 0.0001 | 0.0030 | 19.9727 |
| **Total** | 22.6545 | 0.0002 | 0.0031 | 23.5932 |

**Permanente Creek Restoration Project - EMFAC2021 GHG Emissions Calculations for *Off-Site Exhaust Emissions***

*Accounts for trucks and passenger vehicles driving to and from the site*

**EMFAC2021 Output for 2029**

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2029 | HHDT | Aggregate | Aggregate | Diesel | 1500.67840 | 10929.24419 | 0.00000 | 0.00066 | 0.23479 | 0.00000 | 0.23643 | 1.72191 | 0.00000 |
| Santa Clara | 2029 | LDT1 | Aggregate | Aggregate | Gasoline | 299.95366 | 0.00000 | 77.43555 | 0.00370 | 0.00000 | 0.07622 | 0.00644 | 0.00000 | 0.03362 |
| Santa Clara | 2029 | LHDT1 | Aggregate | Aggregate | Diesel | 618.85111 | 124.39819 | 0.00000 | 0.00593 | 0.00510 | 0.00000 | 0.09750 | 0.01960 | 0.00000 |
| Santa Clara | 2029 | LHDT2 | Aggregate | Aggregate | Diesel | 731.73671 | 200.00244 | 0.00000 | 0.00601 | 0.00510 | 0.00000 | 0.11529 | 0.03151 | 0.00000 |
| Santa Clara | 2029 | MHDT | Aggregate | Aggregate | Diesel | 1115.70279 | 2156.34660 | 0.00000 | 0.00077 | 0.00936 | 0.00000 | 0.17578 | 0.33973 | 0.00000 |
| | | HDT Mix | | | | 822.09687 | 826.91574 | 0.00000 | 0.00424 | 0.00652 | 0.00000 | 0.12952 | 0.13028 | 0.00000 |

**Emissions Calcs for Material Removal Area (Phase 2)**

| | | | | | | | Metric Tons per Year | | | Metric Tons per Year | | | Metric Tons per Year | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Metric Tons/Year | g/MT | 1,000,000 | | | | | CO2 | CO2 | CO2 | CH4 | CH4 | CH4 | N2O | N2O | N2O |
| | | | | g/mi | g/trip | g/vehicle/day | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip | g/mi | g/vehicle/day | g/trip |
| Row Index No. | | Trips | mi/trip | tot mi | tot trip | tot veh | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX | N2O_RUNEX | N2O_IDLEX | N2O_STREX |
| 3 | HHDT | 638 | 20 | 12,760 | 638 | 319 | 19.14866 | 3.48643 | 0.00000 | 0.00001 | 0.00007 | 0.00000 | 0.00302 | 0.00055 | 0.00000 |
| 4 | LDT1 | 2,096 | 10.8 | 22,637 | 2,096 | 1,048 | 6.78999 | 0.00000 | 0.16230 | 0.00008 | 0.00000 | 0.00016 | 0.00015 | 0.00000 | 0.00007 |
| 5 | HDT Mix | 28,296 | 6.6 | 186,754 | 28,296 | 14,148 | 153.52955 | 11.69920 | 0.00000 | 0.00079 | 0.00009 | 0.00000 | 0.02419 | 0.00184 | 0.00000 |

## *Off-Site Exhaust Emissions Material Removal Area (Phase 2)*

| Metric Tons/Year | CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| HHDT | 22.6351 | 0.0001 | 0.0036 | 23.6999 |
| LDT1 | 6.9523 | 0.0002 | 0.0002 | 7.0228 |
| HDT Mix | 165.2288 | 0.0009 | 0.0260 | 173.0083 |
| **Total** | 194.8161 | 0.0012 | 0.0298 | 203.7310 |

# A-2 CalEEMod Output Files

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Permanente Creek Restoration Project

**Santa Clara County, Annual**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| User Defined Recreational | 1.00 | User Defined Unit | 0.00 | 0.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 58 |
| **Climate Zone** | 4 | | | **Operational Year** | 2027 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project information

Land Use - Placeholder land use. There will be no operational phase of the project, and construction data is custom to the Project.

Construction Phase - Obtained revised schedule from Lehigh on 1/24/23 - Construction Assumptions Attachment. Using the Applicant-provided schedule, some of the modeled workdays are 1 to 2 days more per phase than workdays provided by Applicant.

Off-road Equipment - Applicant-provided equipment list.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Equipment list, number of equipment operation days, and hours/day used provided by Applicant. Average hours/day per phase estimated based on phase days.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on Applicant-provided equipment list.

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Based on 1/24/23 Applicant data.

Off-road Equipment - Per 1/24/23 Applicant provided data

Trips and VMT - On-road vehicle emissions are estimated outside of CalEEMod using EMFAC 2020.4.0 and AP-42 emission factors.

Construction Off-road Equipment Mitigation - All trucks and equipment would be Tier 4 Final per Lehigh (6/8/21).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Parking | 150 | 0 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 12.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 24.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 6.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 12.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 130.00 |
| tblConstructionPhase | NumDays | 0.00 | 130.00 |
| tblConstructionPhase | NumDays | 0.00 | 131.00 |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 80.00 | 156.00 |
| tblOffRoadEquipment | HorsePower | 80.00 | 156.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblTripsAndVMT | WorkerTripNumber | 3.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 23.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 25.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 25.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 3.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 23.00 | 0.00 |

## 2.0 Emissions Summary

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2024 | 0.0544 | 0.3996 | 0.4165 | 1.3400e-003 | 0.0499 | 0.0167 | 0.0666 | 0.0186 | 0.0154 | 0.0339 | 0.0000 | 117.3322 | 117.3322 | 0.0377 | 0.0000 | 118.2748 |
| 2025 | 0.1435 | 0.9201 | 1.0778 | 4.0500e-003 | 0.0447 | 0.0343 | 0.0790 | 0.0246 | 0.0316 | 0.0561 | 0.0000 | 355.5745 | 355.5745 | 0.1150 | 0.0000 | 358.4495 |
| 2026 | 0.1435 | 0.9201 | 1.0778 | 4.0500e-003 | 0.0447 | 0.0343 | 0.0790 | 0.0246 | 0.0316 | 0.0561 | 0.0000 | 355.5745 | 355.5745 | 0.1150 | 0.0000 | 358.4495 |
| 2027 | 0.0519 | 0.3432 | 0.4058 | 1.3300e-003 | 0.0298 | 0.0139 | 0.0437 | 0.0164 | 0.0128 | 0.0292 | 0.0000 | 116.6513 | 116.6513 | 0.0378 | 7.0000e-005 | 117.6165 |
| 2028 | 0.1259 | 0.8089 | 0.9408 | 3.5300e-003 | 0.0440 | 0.0302 | 0.0742 | 0.0242 | 0.0278 | 0.0520 | 0.0000 | 310.2259 | 310.2259 | 0.0999 | 0.0000 | 312.7244 |
| 2029 | 0.1263 | 0.8045 | 0.9397 | 3.5200e-003 | 0.0444 | 0.0300 | 0.0744 | 0.0244 | 0.0276 | 0.0520 | 0.0000 | 309.3015 | 309.3015 | 0.1001 | 6.0000e-005 | 311.8227 |
| **Maximum** | **0.1435** | **0.9201** | **1.0778** | **4.0500e-003** | **0.0499** | **0.0343** | **0.0790** | **0.0246** | **0.0316** | **0.0561** | **0.0000** | **355.5745** | **355.5745** | **0.1150** | **7.0000e-005** | **358.4495** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | tons/yr | | | | | | | | | | MT/yr | | | | | |
| 2024 | 0.0164 | 0.0709 | 0.6402 | 1.3400e-003 | 0.0499 | 2.1800e-003 | 0.0521 | 0.0186 | 2.1800e-003 | 0.0207 | 0.0000 | 117.3321 | 117.3321 | 0.0377 | 0.0000 | 118.2747 |
| 2025 | 0.0496 | 0.2151 | 1.8755 | 4.0500e-003 | 0.0447 | 6.6200e-003 | 0.0513 | 0.0246 | 6.6200e-003 | 0.0312 | 0.0000 | 355.5741 | 355.5741 | 0.1150 | 0.0000 | 358.4491 |
| 2026 | 0.0496 | 0.2151 | 1.8755 | 4.0500e-003 | 0.0447 | 6.6200e-003 | 0.0513 | 0.0246 | 6.6200e-003 | 0.0312 | 0.0000 | 355.5741 | 355.5741 | 0.1150 | 0.0000 | 358.4491 |
| 2027 | 0.0175 | 0.0710 | 0.6409 | 1.3300e-003 | 0.0298 | 2.1700e-003 | 0.0320 | 0.0164 | 2.1700e-003 | 0.0186 | 0.0000 | 116.6512 | 116.6512 | 0.0378 | 7.0000e-005 | 117.6164 |
| 2028 | 0.0433 | 0.1875 | 1.6323 | 3.5300e-003 | 0.0440 | 5.7700e-003 | 0.0498 | 0.0242 | 5.7700e-003 | 0.0300 | 0.0000 | 310.2256 | 310.2256 | 0.0999 | 0.0000 | 312.7240 |
| 2029 | 0.0442 | 0.1874 | 1.6305 | 3.5200e-003 | 0.0444 | 5.7600e-003 | 0.0502 | 0.0244 | 5.7600e-003 | 0.0302 | 0.0000 | 309.3012 | 309.3012 | 0.1001 | 6.0000e-005 | 311.8223 |
| **Maximum** | **0.0496** | **0.2151** | **1.8755** | **4.0500e-003** | **0.0499** | **6.6200e-003** | **0.0521** | **0.0246** | **6.6200e-003** | **0.0312** | **0.0000** | **355.5741** | **355.5741** | **0.1150** | **7.0000e-005** | **358.4491** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **65.83** | **77.44** | **-70.73** | **0.00** | **0.00** | **81.72** | **31.23** | **0.00** | **80.14** | **42.07** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

| Quarter | Start Date | End Date | Maximum Unmitigated ROG + NOX (tons/quarter) | Maximum Mitigated ROG + NOX (tons/quarter) |
|---|---|---|---|---|
| **5** | **4-15-2024** | **7-14-2024** | 0.2236 | 0.0430 |
| **6** | **7-15-2024** | **10-14-2024** | 0.2260 | 0.0434 |
| **7** | **10-15-2024** | **1-14-2025** | 0.0025 | 0.0005 |
| **9** | **4-15-2025** | **7-14-2025** | 0.5237 | 0.1303 |
| **10** | **7-15-2025** | **10-14-2025** | 0.5295 | 0.1318 |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | |
|---|---|---|---|---|
| **11** | **10-15-2025** | **1-14-2026** | 0.0058 | 0.0014 |
| **13** | **4-15-2026** | **7-14-2026** | 0.5237 | 0.1303 |
| **14** | **7-15-2026** | **10-14-2026** | 0.5295 | 0.1318 |
| **15** | **10-15-2026** | **1-14-2027** | 0.0058 | 0.0014 |
| **17** | **4-15-2027** | **7-14-2027** | 0.1946 | 0.0437 |
| **18** | **7-15-2027** | **10-14-2027** | 0.1968 | 0.0441 |
| **19** | **10-15-2027** | **1-14-2028** | 0.0021 | 0.0005 |
| **21** | **4-15-2028** | **7-14-2028** | 0.4674 | 0.1154 |
| **22** | **7-15-2028** | **10-14-2028** | 0.4725 | 0.1166 |
| **23** | **10-15-2028** | **1-14-2029** | 0.0051 | 0.0013 |
| **25** | **4-15-2029** | **7-14-2029** | 0.4619 | 0.1150 |
| **26** | **7-15-2029** | **9-30-2029** | 0.3959 | 0.0986 |
| | | **Highest** | 0.5295 | 0.1318 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

**Unmitigated Operational**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.0000e-005** | **2.0000e-005** | **0.0000** | **0.0000** | **2.0000e-005** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Area | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Waste | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Water | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **1.0000e-005** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **2.0000e-005** | **2.0000e-005** | **0.0000** | **0.0000** | **2.0000e-005** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

## 3.0 Construction Detail

### Construction Phase

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Concrete Channel | Grading | 4/15/2024 | 10/15/2024 | 5 | 132 | |
| 2 | Channel Widening (Phase 1) | Grading | 4/15/2024 | 10/15/2024 | 5 | 132 | |
| 3 | Rock Pile Area (Phase 1) | Grading | 4/15/2025 | 10/15/2025 | 5 | 132 | |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 4 | Rock Pile Area (Phase 2) | Grading | 4/15/2026 | 10/15/2026 | 5 | 132 | |
| 5 | Channel Widening (Phase 2) | Grading | 4/15/2027 | 10/15/2027 | 5 | 132 | |
| 6 | Old Crusher Foundation | Grading | 4/15/2028 | 10/15/2028 | 5 | 130 | |
| 7 | Material Removal Area (Phase 1) | Grading | 4/15/2028 | 10/15/2028 | 5 | 130 | |
| 8 | Material Removal Area (Phase 2) | Grading | 4/15/2029 | 10/15/2029 | 5 | 131 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 37.95**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Concrete Channel | Concrete/Industrial Saws | 1 | 0.20 | 81 | 0.73 |
| Channel Widening (Phase 1) | Excavators | 1 | 2.90 | 286 | 0.38 |
| Channel Widening (Phase 1) | Excavators | 1 | 1.40 | 108 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 5.40 | 452 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Channel Widening (Phase 1) | Rubber Tired Dozers | 1 | 0.60 | 347 | 0.40 |
| Channel Widening (Phase 1) | Rubber Tired Loaders | 1 | 0.20 | 393 | 0.36 |
| Channel Widening (Phase 1) | Rubber Tired Loaders | 1 | 2.90 | 110 | 0.36 |
| Rock Pile Area (Phase 1) | Excavators | 1 | 8.70 | 286 | 0.38 |
| Rock Pile Area (Phase 1) | Excavators | 1 | 4.30 | 108 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 0.40 | 402 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 23.00 | 452 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | |
|---|---|---|---|---|---|
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Rock Pile Area (Phase 1) | Rollers | 1 | 0.40 | 156 | 0.38 |
| Rock Pile Area (Phase 1) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Rock Pile Area (Phase 1) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Rock Pile Area (Phase 1) | Rubber Tired Loaders | 1 | 1.40 | 110 | 0.36 |
| Rock Pile Area (Phase 2) | Excavators | 1 | 8.70 | 286 | 0.38 |
| Rock Pile Area (Phase 2) | Excavators | 1 | 4.30 | 108 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 0.40 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 23.00 | 452 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Rollers | 1 | 0.40 | 156 | 0.38 |
| Rock Pile Area (Phase 2) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Rock Pile Area (Phase 2) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Rock Pile Area (Phase 2) | Rubber Tired Loaders | 1 | 1.40 | 110 | 0.36 |
| Channel Widening (Phase 2) | Excavators | 1 | 2.90 | 286 | 0.38 |
| Channel Widening (Phase 2) | Excavators | 1 | 1.40 | 108 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 5.40 | 452 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Channel Widening (Phase 2) | Rubber Tired Dozers | 1 | 0.60 | 347 | 0.40 |
| Channel Widening (Phase 2) | Rubber Tired Loaders | 1 | 0.20 | 393 | 0.36 |
| Channel Widening (Phase 2) | Rubber Tired Loaders | 1 | 2.90 | 110 | 0.36 |
| Old Crusher Foundation | Generator Sets | 1 | 0.30 | 84 | 0.74 |
| Material Removal Area (Phase 1) | Excavators | 1 | 7.50 | 286 | 0.38 |
| Material Removal Area (Phase 1) | Excavators | 1 | 3.70 | 108 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 20.20 | 452 | 0.38 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | |
|---|---|---|---|---|---|
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 0.20 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Material Removal Area (Phase 1) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Material Removal Area (Phase 1) | Rubber Tired Loaders | 1 | 1.10 | 110 | 0.36 |
| Material Removal Area (Phase 2) | Excavators | 1 | 7.50 | 286 | 0.38 |
| Material Removal Area (Phase 2) | Excavators | 1 | 3.70 | 108 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 20.00 | 452 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 0.20 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Material Removal Area (Phase 2) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Material Removal Area (Phase 2) | Rubber Tired Loaders | 1 | 1.10 | 110 | 0.36 |

**Trips and VMT**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel | 1 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Channel Widening (Phase 1) | 9 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Rock Pile Area (Phase 1) | 10 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Rock Pile Area (Phase 2) | 10 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Channel Widening (Phase 2) | 9 | 23.00 | | 0.00 | | | | LD_Mix | HDT_Mix | HHDT |
| Old Crusher Foundation | 1 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Material Removal Area (Phase 1) | 9 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Material Removal Area (Phase 2) | 9 | 23.00 | | 0.00 | | | | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Use Cleaner Engines for Construction Equipment

## 3.2 Concrete Channel - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 5.2000e-004 | 3.9800e-003 | 6.0200e-003 | 1.0000e-005 | | 1.8000e-004 | 1.8000e-004 | | 1.8000e-004 | 1.8000e-004 | 0.0000 | 0.8871 | 0.8871 | 4.0000e-005 | 0.0000 | 0.8882 |
| **Total** | **5.2000e-004** | **3.9800e-003** | **6.0200e-003** | **1.0000e-005** | | **1.8000e-004** | **1.8000e-004** | | **1.8000e-004** | **1.8000e-004** | **0.0000** | **0.8871** | **0.8871** | **4.0000e-005** | **0.0000** | **0.8882** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Concrete Channel - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 1.0000e-004 | 4.5000e-004 | 6.3700e-003 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | | 1.0000e-005 | 1.0000e-005 | 0.0000 | 0.8871 | 0.8871 | 4.0000e-005 | 0.0000 | 0.8882 |
| **Total** | **1.0000e-004** | **4.5000e-004** | **6.3700e-003** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | | **1.0000e-005** | **1.0000e-005** | **0.0000** | **0.8871** | **0.8871** | **4.0000e-005** | **0.0000** | **0.8882** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Channel Widening (Phase 1) - 2024

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0499 | 0.0000 | 0.0499 | 0.0186 | 0.0000 | 0.0186 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0538 | 0.3957 | 0.4105 | 1.3300e-003 | | 0.0165 | 0.0165 | | 0.0152 | 0.0152 | 0.0000 | 116.4451 | 116.4451 | 0.0377 | 0.0000 | 117.3866 |
| **Total** | **0.0538** | **0.3957** | **0.4105** | **1.3300e-003** | **0.0499** | **0.0165** | **0.0664** | **0.0186** | **0.0152** | **0.0337** | **0.0000** | **116.4451** | **116.4451** | **0.0377** | **0.0000** | **117.3866** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Channel Widening (Phase 1) - 2024

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0499 | 0.0000 | 0.0499 | 0.0186 | 0.0000 | 0.0186 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0163 | 0.0705 | 0.6339 | 1.3300e-003 | | 2.1700e-003 | 2.1700e-003 | | 2.1700e-003 | 2.1700e-003 | 0.0000 | 116.4450 | 116.4450 | 0.0377 | 0.0000 | 117.3865 |
| **Total** | **0.0163** | **0.0705** | **0.6339** | **1.3300e-003** | **0.0499** | **2.1700e-003** | **0.0521** | **0.0186** | **2.1700e-003** | **0.0207** | **0.0000** | **116.4450** | **116.4450** | **0.0377** | **0.0000** | **117.3865** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Rock Pile Area (Phase 1) - 2025

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0447 | 0.0000 | 0.0447 | 0.0246 | 0.0000 | 0.0246 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1435 | 0.9201 | 1.0778 | 4.0500e-003 | | 0.0343 | 0.0343 | | 0.0316 | 0.0316 | 0.0000 | 355.5745 | 355.5745 | 0.1150 | 0.0000 | 358.4495 |
| **Total** | **0.1435** | **0.9201** | **1.0778** | **4.0500e-003** | **0.0447** | **0.0343** | **0.0790** | **0.0246** | **0.0316** | **0.0561** | **0.0000** | **355.5745** | **355.5745** | **0.1150** | **0.0000** | **358.4495** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Rock Pile Area (Phase 1) - 2025

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0447 | 0.0000 | 0.0447 | 0.0246 | 0.0000 | 0.0246 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0496 | 0.2151 | 1.8755 | 4.0500e-003 | | 6.6200e-003 | 6.6200e-003 | | 6.6200e-003 | 6.6200e-003 | 0.0000 | 355.5741 | 355.5741 | 0.1150 | 0.0000 | 358.4491 |
| **Total** | **0.0496** | **0.2151** | **1.8755** | **4.0500e-003** | **0.0447** | **6.6200e-003** | **0.0513** | **0.0246** | **6.6200e-003** | **0.0312** | **0.0000** | **355.5741** | **355.5741** | **0.1150** | **0.0000** | **358.4491** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Rock Pile Area (Phase 2) - 2026

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0447 | 0.0000 | 0.0447 | 0.0246 | 0.0000 | 0.0246 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1435 | 0.9201 | 1.0778 | 4.0500e-003 | | 0.0343 | 0.0343 | | 0.0316 | 0.0316 | 0.0000 | 355.5745 | 355.5745 | 0.1150 | 0.0000 | 358.4495 |
| **Total** | **0.1435** | **0.9201** | **1.0778** | **4.0500e-003** | **0.0447** | **0.0343** | **0.0790** | **0.0246** | **0.0316** | **0.0561** | **0.0000** | **355.5745** | **355.5745** | **0.1150** | **0.0000** | **358.4495** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

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**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Rock Pile Area (Phase 2) - 2026

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0447 | 0.0000 | 0.0447 | 0.0246 | 0.0000 | 0.0246 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0496 | 0.2151 | 1.8755 | 4.0500e-003 | | 6.6200e-003 | 6.6200e-003 | | 6.6200e-003 | 6.6200e-003 | 0.0000 | 355.5741 | 355.5741 | 0.1150 | 0.0000 | 358.4491 |
| **Total** | **0.0496** | **0.2151** | **1.8755** | **4.0500e-003** | **0.0447** | **6.6200e-003** | **0.0513** | **0.0246** | **6.6200e-003** | **0.0312** | **0.0000** | **355.5741** | **355.5741** | **0.1150** | **0.0000** | **358.4491** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.6 Channel Widening (Phase 2) - 2027

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0298 | 0.0000 | 0.0298 | 0.0164 | 0.0000 | 0.0164 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0507 | 0.3427 | 0.3988 | 1.3300e-003 | | 0.0139 | 0.0139 | | 0.0128 | 0.0128 | 0.0000 | 116.4230 | 116.4230 | 0.0377 | 0.0000 | 117.3643 |
| **Total** | **0.0507** | **0.3427** | **0.3988** | **1.3300e-003** | **0.0298** | **0.0139** | **0.0437** | **0.0164** | **0.0128** | **0.0292** | **0.0000** | **116.4230** | **116.4230** | **0.0377** | **0.0000** | **117.3643** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2000e-003 | 5.6000e-004 | 7.0100e-003 | 0.0000 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 1.0000e-005 | 1.0000e-005 | 1.0000e-005 | 0.0000 | 0.2283 | 0.2283 | 1.3000e-004 | 7.0000e-005 | 0.2522 |
| **Total** | **1.2000e-003** | **5.6000e-004** | **7.0100e-003** | **0.0000** | **1.0000e-005** | **1.0000e-005** | **2.0000e-005** | **1.0000e-005** | **1.0000e-005** | **1.0000e-005** | **0.0000** | **0.2283** | **0.2283** | **1.3000e-004** | **7.0000e-005** | **0.2522** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.6 Channel Widening (Phase 2) - 2027

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0298 | 0.0000 | 0.0298 | 0.0164 | 0.0000 | 0.0164 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0163 | 0.0705 | 0.6339 | 1.3300e-003 | | 2.1700e-003 | 2.1700e-003 | | 2.1700e-003 | 2.1700e-003 | 0.0000 | 116.4228 | 116.4228 | 0.0377 | 0.0000 | 117.3642 |
| **Total** | **0.0163** | **0.0705** | **0.6339** | **1.3300e-003** | **0.0298** | **2.1700e-003** | **0.0320** | **0.0164** | **2.1700e-003** | **0.0186** | **0.0000** | **116.4228** | **116.4228** | **0.0377** | **0.0000** | **117.3642** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.2000e-003 | 5.6000e-004 | 7.0100e-003 | 0.0000 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 1.0000e-005 | 1.0000e-005 | 1.0000e-005 | 0.0000 | 0.2283 | 0.2283 | 1.3000e-004 | 7.0000e-005 | 0.2522 |
| **Total** | **1.2000e-003** | **5.6000e-004** | **7.0100e-003** | **0.0000** | **1.0000e-005** | **1.0000e-005** | **2.0000e-005** | **1.0000e-005** | **1.0000e-005** | **1.0000e-005** | **0.0000** | **0.2283** | **0.2283** | **1.3000e-004** | **7.0000e-005** | **0.2522** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.7 Old Crusher Foundation - 2028

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 6.5000e-004 | 5.8400e-003 | 8.9200e-003 | 2.0000e-005 | | 2.3000e-004 | 2.3000e-004 | | 2.3000e-004 | 2.3000e-004 | 0.0000 | 1.3777 | 1.3777 | 5.0000e-005 | 0.0000 | 1.3790 |
| **Total** | **6.5000e-004** | **5.8400e-003** | **8.9200e-003** | **2.0000e-005** | | **2.3000e-004** | **2.3000e-004** | | **2.3000e-004** | **2.3000e-004** | **0.0000** | **1.3777** | **1.3777** | **5.0000e-005** | **0.0000** | **1.3790** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.7 Old Crusher Foundation - 2028

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Off-Road | 1.6000e-004 | 6.9000e-004 | 9.8900e-003 | 2.0000e-005 | | 2.0000e-005 | 2.0000e-005 | | 2.0000e-005 | 2.0000e-005 | 0.0000 | 1.3777 | 1.3777 | 5.0000e-005 | 0.0000 | 1.3790 |
| **Total** | **1.6000e-004** | **6.9000e-004** | **9.8900e-003** | **2.0000e-005** | | **2.0000e-005** | **2.0000e-005** | | **2.0000e-005** | **2.0000e-005** | **0.0000** | **1.3777** | **1.3777** | **5.0000e-005** | **0.0000** | **1.3790** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

Permanente Creek Restoration Project - Santa Clara County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.8 Material Removal Area (Phase 1) - 2028

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0440 | 0.0000 | 0.0440 | 0.0242 | 0.0000 | 0.0242 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1252 | 0.8031 | 0.9319 | 3.5200e-003 | | 0.0299 | 0.0299 | | 0.0275 | 0.0275 | 0.0000 | 308.8482 | 308.8482 | 0.0999 | 0.0000 | 311.3454 |
| **Total** | **0.1252** | **0.8031** | **0.9319** | **3.5200e-003** | **0.0440** | **0.0299** | **0.0740** | **0.0242** | **0.0275** | **0.0517** | **0.0000** | **308.8482** | **308.8482** | **0.0999** | **0.0000** | **311.3454** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

Permanente Creek Restoration Project - Santa Clara County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.8 Material Removal Area (Phase 1) - 2028

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0440 | 0.0000 | 0.0440 | 0.0242 | 0.0000 | 0.0242 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0431 | 0.1868 | 1.6224 | 3.5200e-003 | | 5.7500e-003 | 5.7500e-003 | | 5.7500e-003 | 5.7500e-003 | 0.0000 | 308.8479 | 308.8479 | 0.0999 | 0.0000 | 311.3451 |
| **Total** | **0.0431** | **0.1868** | **1.6224** | **3.5200e-003** | **0.0440** | **5.7500e-003** | **0.0498** | **0.0242** | **5.7500e-003** | **0.0300** | **0.0000** | **308.8479** | **308.8479** | **0.0999** | **0.0000** | **311.3451** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.9 Material Removal Area (Phase 2) - 2029

### Unmitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0444 | 0.0000 | 0.0444 | 0.0244 | 0.0000 | 0.0244 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.1253 | 0.8040 | 0.9332 | 3.5200e-003 | | 0.0300 | 0.0300 | | 0.0276 | 0.0276 | 0.0000 | 309.0866 | 309.0866 | 0.1000 | 0.0000 | 311.5857 |
| **Total** | **0.1253** | **0.8040** | **0.9332** | **3.5200e-003** | **0.0444** | **0.0300** | **0.0743** | **0.0244** | **0.0276** | **0.0520** | **0.0000** | **309.0866** | **309.0866** | **0.1000** | **0.0000** | **311.5857** |

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0400e-003 | 5.0000e-004 | 6.5300e-003 | 0.0000 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.2150 | 0.2150 | 1.1000e-004 | 6.0000e-005 | 0.2370 |
| **Total** | **1.0400e-003** | **5.0000e-004** | **6.5300e-003** | **0.0000** | **1.0000e-005** | **1.0000e-005** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.2150** | **0.2150** | **1.1000e-004** | **6.0000e-005** | **0.2370** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.9 Material Removal Area (Phase 2) - 2029

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Fugitive Dust | | | | | 0.0444 | 0.0000 | 0.0444 | 0.0244 | 0.0000 | 0.0244 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Off-Road | 0.0431 | 0.1869 | 1.6240 | 3.5200e-003 | | 5.7500e-003 | 5.7500e-003 | | 5.7500e-003 | 5.7500e-003 | 0.0000 | 309.0862 | 309.0862 | 0.1000 | 0.0000 | 311.5853 |
| **Total** | **0.0431** | **0.1869** | **1.6240** | **3.5200e-003** | **0.0444** | **5.7500e-003** | **0.0501** | **0.0244** | **5.7500e-003** | **0.0301** | **0.0000** | **309.0862** | **309.0862** | **0.1000** | **0.0000** | **311.5853** |

### Mitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Hauling | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | | | | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 1.0400e-003 | 5.0000e-004 | 6.5300e-003 | 0.0000 | 1.0000e-005 | 1.0000e-005 | 2.0000e-005 | 1.0000e-005 | 0.0000 | 1.0000e-005 | 0.0000 | 0.2150 | 0.2150 | 1.1000e-004 | 6.0000e-005 | 0.2370 |
| **Total** | **1.0400e-003** | **5.0000e-004** | **6.5300e-003** | **0.0000** | **1.0000e-005** | **1.0000e-005** | **2.0000e-005** | **1.0000e-005** | **0.0000** | **1.0000e-005** | **0.0000** | **0.2150** | **0.2150** | **1.1000e-004** | **6.0000e-005** | **0.2370** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| User Defined Recreational | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| User Defined Recreational | 14.70 | 6.60 | 6.60 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| User Defined Recreational | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Electricity Mitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Electricity Unmitigated | | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | tons/yr | | | | | | | | | | MT/yr | | | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.3 Energy by Land Use - Electricity

**Unmitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | Electricity Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | kWh/yr | MT/yr | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 6.0 Area Detail

### 6.1 Mitigation Measures Area

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Mitigated | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |
| Unmitigated | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |
| **Total** | **0.0000** | **0.0000** | **1.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.0000e-005** | **2.0000e-005** | **0.0000** | **0.0000** | **2.0000e-005** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | tons/yr | | | | | | | | | | MT/yr | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Landscaping | 0.0000 | 0.0000 | 1.0000e-005 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 2.0000e-005 | 2.0000e-005 | 0.0000 | 0.0000 | 2.0000e-005 |
| **Total** | **0.0000** | **0.0000** | **1.0000e-005** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **2.0000e-005** | **2.0000e-005** | **0.0000** | **0.0000** | **2.0000e-005** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

Permanente Creek Restoration Project - Santa Clara County, Annual

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| Category | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 7.2 Water by Land Use

**Unmitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| User Defined Recreational | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### 7.2 Water by Land Use

**Mitigated**

| | Indoor/Outdoor Use | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | Mgal | MT/yr | | | |
| User Defined Recreational | 0 / 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

**Category/Year**

| | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|
| | MT/yr | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.2 Waste by Land Use

**Unmitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**Mitigated**

| | Waste Disposed | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|
| Land Use | tons | MT/yr | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# Permanente Creek Restoration Project

**Santa Clara County, Winter**

## 1.0 Project Characteristics

### 1.1 Land Usage

| Land Uses | Size | Metric | Lot Acreage | Floor Surface Area | Population |
|---|---|---|---|---|---|
| User Defined Recreational | 1.00 | User Defined Unit | 0.00 | 0.00 | 0 |

### 1.2 Other Project Characteristics

| | | | | | |
|---|---|---|---|---|---|
| **Urbanization** | Rural | **Wind Speed (m/s)** | 2.2 | **Precipitation Freq (Days)** | 58 |
| **Climate Zone** | 4 | | | **Operational Year** | 2027 |
| **Utility Company** | Pacific Gas & Electric Company | | | | |
| **CO2 Intensity (lb/MWhr)** | 641.35 | **CH4 Intensity (lb/MWhr)** | 0.029 | **N2O Intensity (lb/MWhr)** | 0.006 |

### 1.3 User Entered Comments & Non-Default Data

Project Characteristics - Project information

Land Use - Placeholder land use. There will be no operational phase of the project, and construction data is custom to the Project.

Construction Phase - Obtained revised schedule from Lehigh on 1/24/23 - Construction Assumptions Attachment. Using the Applicant-provided schedule, some of the modeled workdays are 1 to 2 days more per phase than workdays provided by Applicant.

Off-road Equipment - Applicant-provided equipment list.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Based on 1/24/23 Applicant provided data.

Off-road Equipment - Equipment list, number of equipment operation days, and hours/day used provided by Applicant. Average hours/day per phase estimated based on phase days.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on 1/24/23 Applicant-proposed data.

Off-road Equipment - Based on Applicant-provided equipment list.

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

Off-road Equipment - Based on 1/24/23 Applicant data.

Off-road Equipment - Per 1/24/23 Applicant provided data

Trips and VMT - On-road vehicle emissions are estimated outside of CalEEMod using EMFAC 2020.4.0 and AP-42 emission factors.

Construction Off-road Equipment Mitigation - All trucks and equipment would be Tier 4 Final per Lehigh (6/8/21).

| Table Name | Column Name | Default Value | New Value |
|---|---|---|---|
| tblAreaCoating | Area_EF_Parking | 150 | 0 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 12.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 1.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 24.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 2.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 6.00 |
| tblConstEquipMitigation | NumberOfEquipmentMitigated | 0.00 | 12.00 |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstEquipMitigation | Tier | No Change | Tier 4 Final |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 132.00 |
| tblConstructionPhase | NumDays | 0.00 | 130.00 |
| tblConstructionPhase | NumDays | 0.00 | 130.00 |
| tblConstructionPhase | NumDays | 0.00 | 131.00 |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 286.00 |
| tblOffRoadEquipment | HorsePower | 158.00 | 108.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 402.00 | 452.00 |
| tblOffRoadEquipment | HorsePower | 80.00 | 156.00 |
| tblOffRoadEquipment | HorsePower | 80.00 | 156.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 247.00 | 347.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | |
|---|---|---|---|
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 393.00 |
| tblOffRoadEquipment | HorsePower | 203.00 | 110.00 |
| tblProjectCharacteristics | UrbanizationLevel | Urban | Rural |
| tblTripsAndVMT | WorkerTripNumber | 3.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 23.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 25.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 25.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 3.00 | 0.00 |
| tblTripsAndVMT | WorkerTripNumber | 23.00 | 0.00 |

## 2.0 Emissions Summary

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction (Maximum Daily Emission)

**Unmitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2024 | 0.8235 | 6.0551 | 6.3107 | 0.0203 | 0.7566 | 0.2528 | 1.0093 | 0.2812 | 0.2328 | 0.5140 | 0.0000 | 1,959.6463 | 1,959.6463 | 0.6297 | 0.0000 | 1,975.3888 |
| 2025 | 2.1740 | 13.9405 | 16.3308 | 0.0614 | 0.6775 | 0.5198 | 1.1973 | 0.3724 | 0.4782 | 0.8506 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | 0.0000 | 5,986.7115 |
| 2026 | 2.1740 | 13.9405 | 16.3308 | 0.0614 | 0.6775 | 0.5198 | 1.1973 | 0.3724 | 0.4782 | 0.8506 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | 0.0000 | 5,986.7115 |
| 2027 | 0.7852 | 5.2011 | 6.1657 | 0.0201 | 0.4519 | 0.2109 | 0.6628 | 0.2484 | 0.1940 | 0.4424 | 0.0000 | 1,948.2919 | 1,948.2919 | 0.6312 | 1.2300e-003 | 1,964.4381 |
| 2028 | 1.9362 | 12.4452 | 14.4743 | 0.0544 | 0.6775 | 0.4638 | 1.1413 | 0.3724 | 0.4270 | 0.7994 | 0.0000 | 5,261.0082 | 5,261.0082 | 1.6948 | 0.0000 | 5,303.3788 |
| 2029 | 1.9280 | 12.2831 | 14.3636 | 0.0538 | 0.6777 | 0.4574 | 1.1351 | 0.3725 | 0.4208 | 0.7933 | 0.0000 | 5,205.3079 | 5,205.3079 | 1.6844 | 1.1500e-003 | 5,247.7600 |
| **Maximum** | **2.1740** | **13.9405** | **16.3308** | **0.0614** | **0.7566** | **0.5198** | **1.1973** | **0.3725** | **0.4782** | **0.8506** | **0.0000** | **5,938.6942** | **5,938.6942** | **1.9207** | **1.2300e-003** | **5,986.7115** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.1 Overall Construction (Maximum Daily Emission)

**Mitigated Construction**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | lb/day | | | | | | | | | | lb/day | | | | | |
| 2024 | 0.2479 | 1.0744 | 9.7003 | 0.0203 | 0.7566 | 0.0331 | 0.7896 | 0.2812 | 0.0331 | 0.3143 | 0.0000 | 1,959.6463 | 1,959.6463 | 0.6297 | 0.0000 | 1,975.3888 |
| 2025 | 0.7519 | 3.2584 | 28.4160 | 0.0614 | 0.6775 | 0.1003 | 0.7777 | 0.3724 | 0.1003 | 0.4727 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | 0.0000 | 5,986.7115 |
| 2026 | 0.7519 | 3.2584 | 28.4160 | 0.0614 | 0.6775 | 0.1003 | 0.7777 | 0.3724 | 0.1003 | 0.4727 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | 0.0000 | 5,986.7115 |
| 2027 | 0.2639 | 1.0768 | 9.7275 | 0.0201 | 0.4519 | 0.0329 | 0.4848 | 0.2484 | 0.0329 | 0.2813 | 0.0000 | 1,948.2919 | 1,948.2919 | 0.6312 | 1.2300e-003 | 1,964.4381 |
| 2028 | 0.6656 | 2.8841 | 25.1118 | 0.0544 | 0.6775 | 0.0887 | 0.7662 | 0.3724 | 0.0887 | 0.4611 | 0.0000 | 5,261.0082 | 5,261.0082 | 1.6948 | 0.0000 | 5,303.3788 |
| 2029 | 0.6738 | 2.8620 | 24.9092 | 0.0538 | 0.6777 | 0.0879 | 0.7656 | 0.3725 | 0.0879 | 0.4604 | 0.0000 | 5,205.3079 | 5,205.3079 | 1.6844 | 1.1500e-003 | 5,247.7600 |
| **Maximum** | **0.7519** | **3.2584** | **28.4160** | **0.0614** | **0.7566** | **0.1003** | **0.7896** | **0.3725** | **0.1003** | **0.4727** | **0.0000** | **5,938.6942** | **5,938.6942** | **1.9207** | **1.2300e-003** | **5,986.7115** |

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Percent Reduction** | **65.84** | **77.43** | **-70.71** | **0.00** | **0.00** | **81.72** | **31.24** | **0.00** | **80.14** | **42.07** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** | **0.00** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 2.2 Overall Operational

### Unmitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **1.0000e-005** | **0.0000** | **1.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **2.2000e-004** | **2.2000e-004** | **0.0000** | **0.0000** | **2.3000e-004** |

### Mitigated Operational

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Area | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |
| Energy | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Mobile | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **1.0000e-005** | **0.0000** | **1.0000e-004** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **2.2000e-004** | **2.2000e-004** | **0.0000** | **0.0000** | **2.3000e-004** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio-CO2 | Total CO2 | CH4 | N20 | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Percent Reduction | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

## 3.0 Construction Detail

**Construction Phase**

| Phase Number | Phase Name | Phase Type | Start Date | End Date | Num Days Week | Num Days | Phase Description |
|---|---|---|---|---|---|---|---|
| 1 | Concrete Channel | Grading | 4/15/2024 | 10/15/2024 | 5 | 132 | |
| 2 | Channel Widening (Phase 1) | Grading | 4/15/2024 | 10/15/2024 | 5 | 132 | |
| 3 | Rock Pile Area (Phase 1) | Grading | 4/15/2025 | 10/15/2025 | 5 | 132 | |
| 4 | Rock Pile Area (Phase 2) | Grading | 4/15/2026 | 10/15/2026 | 5 | 132 | |
| 5 | Channel Widening (Phase 2) | Grading | 4/15/2027 | 10/15/2027 | 5 | 132 | |
| 6 | Old Crusher Foundation | Grading | 4/15/2028 | 10/15/2028 | 5 | 130 | |
| 7 | Material Removal Area (Phase 1) | Grading | 4/15/2028 | 10/15/2028 | 5 | 130 | |
| 8 | Material Removal Area (Phase 2) | Grading | 4/15/2029 | 10/15/2029 | 5 | 131 | |

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 37.95**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

| Phase Name | Offroad Equipment Type | Amount | Usage Hours | Horse Power | Load Factor |
|---|---|---|---|---|---|
| Concrete Channel | Concrete/Industrial Saws | 1 | 0.20 | 81 | 0.73 |
| Channel Widening (Phase 1) | Excavators | 1 | 2.90 | 286 | 0.38 |
| Channel Widening (Phase 1) | Excavators | 1 | 1.40 | 108 | 0.38 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | |
|---|---|---|---|---|---|
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 5.40 | 452 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Channel Widening (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Channel Widening (Phase 1) | Rubber Tired Dozers | 1 | 0.60 | 347 | 0.40 |
| Channel Widening (Phase 1) | Rubber Tired Loaders | 1 | 0.20 | 393 | 0.36 |
| Channel Widening (Phase 1) | Rubber Tired Loaders | 1 | 2.90 | 110 | 0.36 |
| Rock Pile Area (Phase 1) | Excavators | 1 | 8.70 | 286 | 0.38 |
| Rock Pile Area (Phase 1) | Excavators | 1 | 4.30 | 108 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 0.40 | 402 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 23.00 | 452 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Rock Pile Area (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Rock Pile Area (Phase 1) | Rollers | 1 | 0.40 | 156 | 0.38 |
| Rock Pile Area (Phase 1) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Rock Pile Area (Phase 1) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Rock Pile Area (Phase 1) | Rubber Tired Loaders | 1 | 1.40 | 110 | 0.36 |
| Rock Pile Area (Phase 2) | Excavators | 1 | 8.70 | 286 | 0.38 |
| Rock Pile Area (Phase 2) | Excavators | 1 | 4.30 | 108 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 0.40 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 23.00 | 452 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Rock Pile Area (Phase 2) | Rollers | 1 | 0.40 | 156 | 0.38 |
| Rock Pile Area (Phase 2) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Rock Pile Area (Phase 2) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Rock Pile Area (Phase 2) | Rubber Tired Loaders | 1 | 1.40 | 110 | 0.36 |
| Channel Widening (Phase 2) | Excavators | 1 | 2.90 | 286 | 0.38 |
| Channel Widening (Phase 2) | Excavators | 1 | 1.40 | 108 | 0.38 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| | | | | | |
|---|---|---|---|---|---|
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 5.40 | 452 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 0.10 | 402 | 0.38 |
| Channel Widening (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Channel Widening (Phase 2) | Rubber Tired Dozers | 1 | 0.60 | 347 | 0.40 |
| Channel Widening (Phase 2) | Rubber Tired Loaders | 1 | 0.20 | 393 | 0.36 |
| Channel Widening (Phase 2) | Rubber Tired Loaders | 1 | 2.90 | 110 | 0.36 |
| Old Crusher Foundation | Generator Sets | 1 | 0.30 | 84 | 0.74 |
| Material Removal Area (Phase 1) | Excavators | 1 | 7.50 | 286 | 0.38 |
| Material Removal Area (Phase 1) | Excavators | 1 | 3.70 | 108 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 20.20 | 452 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 0.20 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Material Removal Area (Phase 1) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Material Removal Area (Phase 1) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Material Removal Area (Phase 1) | Rubber Tired Loaders | 1 | 1.10 | 110 | 0.36 |
| Material Removal Area (Phase 2) | Excavators | 1 | 7.50 | 286 | 0.38 |
| Material Removal Area (Phase 2) | Excavators | 1 | 3.70 | 108 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 0.30 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 20.00 | 452 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 0.20 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Off-Highway Trucks | 1 | 1.80 | 402 | 0.38 |
| Material Removal Area (Phase 2) | Rubber Tired Dozers | 1 | 0.90 | 347 | 0.40 |
| Material Removal Area (Phase 2) | Rubber Tired Loaders | 1 | 0.40 | 393 | 0.36 |
| Material Removal Area (Phase 2) | Rubber Tired Loaders | 1 | 1.10 | 110 | 0.36 |

## Trips and VMT

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

| Phase Name | Offroad Equipment Count | Worker Trip Number | Vendor Trip Number | Hauling Trip Number | Worker Trip Length | Vendor Trip Length | Hauling Trip Length | Worker Vehicle Class | Vendor Vehicle Class | Hauling Vehicle Class |
|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel | 1 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Channel Widening (Phase 1) | 9 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Rock Pile Area (Phase 1) | 10 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Rock Pile Area (Phase 2) | 10 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Channel Widening (Phase 2) | 9 | 23.00 | | 0.00 | | | | LD_Mix | HDT_Mix | HHDT |
| Old Crusher Foundation | 1 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Material Removal Area (Phase 1) | 9 | 0.00 | 0.00 | 0.00 | 10.80 | 6.60 | 20.00 | LD_Mix | HDT_Mix | HHDT |
| Material Removal Area (Phase 2) | 9 | 23.00 | | 0.00 | | | | LD_Mix | HDT_Mix | HHDT |

## 3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

## 3.2 Concrete Channel - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 7.8200e-003 | 0.0604 | 0.0913 | 1.6000e-004 | | 2.7600e-003 | 2.7600e-003 | | 2.7600e-003 | 2.7600e-003 | | 14.8166 | 14.8166 | 7.0000e-004 | | 14.8342 |
| **Total** | **7.8200e-003** | **0.0604** | **0.0913** | **1.6000e-004** | | **2.7600e-003** | **2.7600e-003** | | **2.7600e-003** | **2.7600e-003** | | **14.8166** | **14.8166** | **7.0000e-004** | | **14.8342** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Concrete Channel - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 1.5600e-003 | 6.7800e-003 | 0.0965 | 1.6000e-004 | | 2.1000e-004 | 2.1000e-004 | | 2.1000e-004 | 2.1000e-004 | 0.0000 | 14.8166 | 14.8166 | 7.0000e-004 | | 14.8342 |
| **Total** | **1.5600e-003** | **6.7800e-003** | **0.0965** | **1.6000e-004** | | **2.1000e-004** | **2.1000e-004** | | **2.1000e-004** | **2.1000e-004** | **0.0000** | **14.8166** | **14.8166** | **7.0000e-004** | | **14.8342** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.2 Concrete Channel - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.3 Channel Widening (Phase 1) - 2024

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.7566 | 0.0000 | 0.7566 | 0.2812 | 0.0000 | 0.2812 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.8157 | 5.9947 | 6.2195 | 0.0201 | | 0.2500 | 0.2500 | | 0.2300 | 0.2300 | | 1,944.8297 | 1,944.8297 | 0.6290 | | 1,960.5546 |
| **Total** | **0.8157** | **5.9947** | **6.2195** | **0.0201** | **0.7566** | **0.2500** | **1.0066** | **0.2812** | **0.2300** | **0.5112** | | **1,944.8297** | **1,944.8297** | **0.6290** | | **1,960.5546** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Channel Widening (Phase 1) - 2024

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.7566 | 0.0000 | 0.7566 | 0.2812 | 0.0000 | 0.2812 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2464 | 1.0677 | 9.6038 | 0.0201 | | 0.0329 | 0.0329 | | 0.0329 | 0.0329 | 0.0000 | 1,944.8297 | 1,944.8297 | 0.6290 | | 1,960.5546 |
| **Total** | **0.2464** | **1.0677** | **9.6038** | **0.0201** | **0.7566** | **0.0329** | **0.7894** | **0.2812** | **0.0329** | **0.3140** | **0.0000** | **1,944.8297** | **1,944.8297** | **0.6290** | | **1,960.5546** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.3 Channel Widening (Phase 1) - 2024

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.4 Rock Pile Area (Phase 1) - 2025

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.1740 | 13.9405 | 16.3308 | 0.0614 | | 0.5198 | 0.5198 | | 0.4782 | 0.4782 | | 5,938.6942 | 5,938.6942 | 1.9207 | | 5,986.7115 |
| **Total** | **2.1740** | **13.9405** | **16.3308** | **0.0614** | **0.6775** | **0.5198** | **1.1973** | **0.3724** | **0.4782** | **0.8506** | | **5,938.6942** | **5,938.6942** | **1.9207** | | **5,986.7115** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Rock Pile Area (Phase 1) - 2025

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7519 | 3.2584 | 28.4160 | 0.0614 | | 0.1003 | 0.1003 | | 0.1003 | 0.1003 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | | 5,986.7115 |
| **Total** | **0.7519** | **3.2584** | **28.4160** | **0.0614** | **0.6775** | **0.1003** | **0.7777** | **0.3724** | **0.1003** | **0.4727** | **0.0000** | **5,938.6942** | **5,938.6942** | **1.9207** | | **5,986.7115** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.4 Rock Pile Area (Phase 1) - 2025

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.5 Rock Pile Area (Phase 2) - 2026

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 2.1740 | 13.9405 | 16.3308 | 0.0614 | | 0.5198 | 0.5198 | | 0.4782 | 0.4782 | | 5,938.6942 | 5,938.6942 | 1.9207 | | 5,986.7115 |
| **Total** | **2.1740** | **13.9405** | **16.3308** | **0.0614** | **0.6775** | **0.5198** | **1.1973** | **0.3724** | **0.4782** | **0.8506** | | **5,938.6942** | **5,938.6942** | **1.9207** | | **5,986.7115** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Rock Pile Area (Phase 2) - 2026

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7519 | 3.2584 | 28.4160 | 0.0614 | | 0.1003 | 0.1003 | | 0.1003 | 0.1003 | 0.0000 | 5,938.6942 | 5,938.6942 | 1.9207 | | 5,986.7115 |
| **Total** | **0.7519** | **3.2584** | **28.4160** | **0.0614** | **0.6775** | **0.1003** | **0.7777** | **0.3724** | **0.1003** | **0.4727** | **0.0000** | **5,938.6942** | **5,938.6942** | **1.9207** | | **5,986.7115** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.5 Rock Pile Area (Phase 2) - 2026

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.6 Channel Widening (Phase 2) - 2027

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.4517 | 0.0000 | 0.4517 | 0.2483 | 0.0000 | 0.2483 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.7677 | 5.1920 | 6.0419 | 0.0201 | | 0.2108 | 0.2108 | | 0.1939 | 0.1939 | | 1,944.4598 | 1,944.4598 | 0.6289 | | 1,960.1818 |
| **Total** | **0.7677** | **5.1920** | **6.0419** | **0.0201** | **0.4517** | **0.2108** | **0.6625** | **0.2483** | **0.1939** | **0.4422** | | **1,944.4598** | **1,944.4598** | **0.6289** | | **1,960.1818** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.6 Channel Widening (Phase 2) - 2027

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0175 | 9.1700e-003 | 0.1238 | 4.0000e-005 | 2.3000e-004 | 9.0000e-005 | 3.1000e-004 | 9.0000e-005 | 8.0000e-005 | 1.7000e-004 | | 3.8321 | 3.8321 | 2.3400e-003 | 1.2300e-003 | 4.2563 |
| **Total** | **0.0175** | **9.1700e-003** | **0.1238** | **4.0000e-005** | **2.3000e-004** | **9.0000e-005** | **3.1000e-004** | **9.0000e-005** | **8.0000e-005** | **1.7000e-004** | | **3.8321** | **3.8321** | **2.3400e-003** | **1.2300e-003** | **4.2563** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.4517 | 0.0000 | 0.4517 | 0.2483 | 0.0000 | 0.2483 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.2464 | 1.0677 | 9.6038 | 0.0201 | | 0.0329 | 0.0329 | | 0.0329 | 0.0329 | 0.0000 | 1,944.4598 | 1,944.4598 | 0.6289 | | 1,960.1818 |
| **Total** | **0.2464** | **1.0677** | **9.6038** | **0.0201** | **0.4517** | **0.0329** | **0.4845** | **0.2483** | **0.0329** | **0.2811** | **0.0000** | **1,944.4598** | **1,944.4598** | **0.6289** | | **1,960.1818** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.6 Channel Widening (Phase 2) - 2027

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0175 | 9.1700e-003 | 0.1238 | 4.0000e-005 | 2.3000e-004 | 9.0000e-005 | 3.1000e-004 | 9.0000e-005 | 8.0000e-005 | 1.7000e-004 | | 3.8321 | 3.8321 | 2.3400e-003 | 1.2300e-003 | 4.2563 |
| **Total** | **0.0175** | **9.1700e-003** | **0.1238** | **4.0000e-005** | **2.3000e-004** | **9.0000e-005** | **3.1000e-004** | **9.0000e-005** | **8.0000e-005** | **1.7000e-004** | | **3.8321** | **3.8321** | **2.3400e-003** | **1.2300e-003** | **4.2563** |

## 3.7 Old Crusher Foundation - 2028

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 9.9900e-003 | 0.0898 | 0.1372 | 2.5000e-004 | | 3.5800e-003 | 3.5800e-003 | | 3.5800e-003 | 3.5800e-003 | | 23.3638 | 23.3638 | 8.6000e-004 | | 23.3854 |
| **Total** | **9.9900e-003** | **0.0898** | **0.1372** | **2.5000e-004** | | **3.5800e-003** | **3.5800e-003** | | **3.5800e-003** | **3.5800e-003** | | **23.3638** | **23.3638** | **8.6000e-004** | | **23.3854** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.7 Old Crusher Foundation - 2028

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Off-Road | 2.4700e-003 | 0.0107 | 0.1521 | 2.5000e-004 | | 3.3000e-004 | 3.3000e-004 | | 3.3000e-004 | 3.3000e-004 | 0.0000 | 23.3638 | 23.3638 | 8.6000e-004 | | 23.3854 |
| **Total** | **2.4700e-003** | **0.0107** | **0.1521** | **2.5000e-004** | | **3.3000e-004** | **3.3000e-004** | | **3.3000e-004** | **3.3000e-004** | **0.0000** | **23.3638** | **23.3638** | **8.6000e-004** | | **23.3854** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.7 Old Crusher Foundation - 2028

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.8 Material Removal Area (Phase 1) - 2028

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.9262 | 12.3554 | 14.3371 | 0.0541 | | 0.4602 | 0.4602 | | 0.4234 | 0.4234 | | 5,237.6444 | 5,237.6444 | 1.6940 | | 5,279.9934 |
| **Total** | **1.9262** | **12.3554** | **14.3371** | **0.0541** | **0.6775** | **0.4602** | **1.1377** | **0.3724** | **0.4234** | **0.7958** | | **5,237.6444** | **5,237.6444** | **1.6940** | | **5,279.9934** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.8 Material Removal Area (Phase 1) - 2028

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6631 | 2.8734 | 24.9597 | 0.0541 | | 0.0884 | 0.0884 | | 0.0884 | 0.0884 | 0.0000 | 5,237.6444 | 5,237.6444 | 1.6940 | | 5,279.9934 |
| **Total** | **0.6631** | **2.8734** | **24.9597** | **0.0541** | **0.6775** | **0.0884** | **0.7659** | **0.3724** | **0.0884** | **0.4608** | **0.0000** | **5,237.6444** | **5,237.6444** | **1.6940** | | **5,279.9934** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.8 Material Removal Area (Phase 1) - 2028

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

## 3.9 Material Removal Area (Phase 2) - 2029

**Unmitigated Construction On-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 1.9128 | 12.2748 | 14.2475 | 0.0538 | | 0.4573 | 0.4573 | | 0.4207 | 0.4207 | | 5,201.6735 | 5,201.6735 | 1.6823 | | 5,243.7316 |
| **Total** | **1.9128** | **12.2748** | **14.2475** | **0.0538** | **0.6775** | **0.4573** | **1.1348** | **0.3724** | **0.4207** | **0.7931** | | **5,201.6735** | **5,201.6735** | **1.6823** | | **5,243.7316** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.9 Material Removal Area (Phase 2) - 2029

### Unmitigated Construction Off-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0152 | 8.2900e-003 | 0.1161 | 4.0000e-005 | 2.3000e-004 | 8.0000e-005 | 3.0000e-004 | 9.0000e-005 | 7.0000e-005 | 1.6000e-004 | | 3.6345 | 3.6345 | 2.0400e-003 | 1.1500e-003 | 4.0284 |
| **Total** | **0.0152** | **8.2900e-003** | **0.1161** | **4.0000e-005** | **2.3000e-004** | **8.0000e-005** | **3.0000e-004** | **9.0000e-005** | **7.0000e-005** | **1.6000e-004** | | **3.6345** | **3.6345** | **2.0400e-003** | **1.1500e-003** | **4.0284** |

### Mitigated Construction On-Site

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Fugitive Dust | | | | | 0.6775 | 0.0000 | 0.6775 | 0.3724 | 0.0000 | 0.3724 | | | 0.0000 | | | 0.0000 |
| Off-Road | 0.6586 | 2.8537 | 24.7931 | 0.0538 | | 0.0878 | 0.0878 | | 0.0878 | 0.0878 | 0.0000 | 5,201.6735 | 5,201.6735 | 1.6823 | | 5,243.7316 |
| **Total** | **0.6586** | **2.8537** | **24.7931** | **0.0538** | **0.6775** | **0.0878** | **0.7653** | **0.3724** | **0.0878** | **0.4602** | **0.0000** | **5,201.6735** | **5,201.6735** | **1.6823** | | **5,243.7316** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 3.9 Material Removal Area (Phase 2) - 2029

**Mitigated Construction Off-Site**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Hauling | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Vendor | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Worker | 0.0152 | 8.2900e-003 | 0.1161 | 4.0000e-005 | 2.3000e-004 | 8.0000e-005 | 3.0000e-004 | 9.0000e-005 | 7.0000e-005 | 1.6000e-004 | | 3.6345 | 3.6345 | 2.0400e-003 | 1.1500e-003 | 4.0284 |
| **Total** | **0.0152** | **8.2900e-003** | **0.1161** | **4.0000e-005** | **2.3000e-004** | **8.0000e-005** | **3.0000e-004** | **9.0000e-005** | **7.0000e-005** | **1.6000e-004** | | **3.6345** | **3.6345** | **2.0400e-003** | **1.1500e-003** | **4.0284** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

# 4.0 Operational Detail - Mobile

## 4.1 Mitigation Measures Mobile

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

## 4.2 Trip Summary Information

| | Average Daily Trip Rate | | | Unmitigated | Mitigated |
|---|---|---|---|---|---|
| Land Use | Weekday | Saturday | Sunday | Annual VMT | Annual VMT |
| User Defined Recreational | 0.00 | 0.00 | 0.00 | | |
| Total | 0.00 | 0.00 | 0.00 | | |

## 4.3 Trip Type Information

| | Miles | | | Trip % | | | Trip Purpose % | | |
|---|---|---|---|---|---|---|---|---|---|
| Land Use | H-W or C-W | H-S or C-C | H-O or C-NW | H-W or C-W | H-S or C-C | H-O or C-NW | Primary | Diverted | Pass-by |
| User Defined Recreational | 14.70 | 6.60 | 6.60 | 0.00 | 0.00 | 0.00 | 0 | 0 | 0 |

## 4.4 Fleet Mix

| Land Use | LDA | LDT1 | LDT2 | MDV | LHD1 | LHD2 | MHD | HHD | OBUS | UBUS | MCY | SBUS | MH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| User Defined Recreational | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.0 Energy Detail

Historical Energy Use: N

### 5.1 Mitigation Measures Energy

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| NaturalGas Mitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| NaturalGas Unmitigated | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

### 5.2 Energy by Land Use - NaturalGas

**Unmitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 5.2 Energy by Land Use - NaturalGas

**Mitigated**

| | NaturalGas Use | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Land Use | kBTU/yr | lb/day | | | | | | | | | | lb/day | | | | | |
| User Defined Recreational | 0 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| **Total** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | **0.0000** | **0.0000** | **0.0000** |

# 6.0 Area Detail

## 6.1 Mitigation Measures Area

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Category | lb/day | | | | | | | | | | lb/day | | | | | |
| Mitigated | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |
| Unmitigated | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Unmitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |
| **Total** | **1.0000e-005** | **0.0000** | **1.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **2.2000e-004** | **2.2000e-004** | **0.0000** | | **2.3000e-004** |

Permanente Creek Restoration Project - Santa Clara County, Winter

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 6.2 Area by SubCategory

**Mitigated**

| | ROG | NOx | CO | SO2 | Fugitive PM10 | Exhaust PM10 | PM10 Total | Fugitive PM2.5 | Exhaust PM2.5 | PM2.5 Total | Bio- CO2 | NBio- CO2 | Total CO2 | CH4 | N2O | CO2e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SubCategory | lb/day | | | | | | | | | | lb/day | | | | | |
| Architectural Coating | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Consumer Products | 0.0000 | | | | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | | 0.0000 | | | 0.0000 |
| Landscaping | 1.0000e-005 | 0.0000 | 1.0000e-004 | 0.0000 | | 0.0000 | 0.0000 | | 0.0000 | 0.0000 | | 2.2000e-004 | 2.2000e-004 | 0.0000 | | 2.3000e-004 |
| **Total** | **1.0000e-005** | **0.0000** | **1.0000e-004** | **0.0000** | | **0.0000** | **0.0000** | | **0.0000** | **0.0000** | | **2.2000e-004** | **2.2000e-004** | **0.0000** | | **2.3000e-004** |

# 7.0 Water Detail

## 7.1 Mitigation Measures Water

**EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Not Applied**

## 8.0 Waste Detail

### 8.1 Mitigation Measures Waste

## 9.0 Operational Offroad

| Equipment Type | Number | Hours/Day | Days/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

## 10.0 Stationary Equipment

**Fire Pumps and Emergency Generators**

| Equipment Type | Number | Hours/Day | Hours/Year | Horse Power | Load Factor | Fuel Type |
|---|---|---|---|---|---|---|

**Boilers**

| Equipment Type | Number | Heat Input/Day | Heat Input/Year | Boiler Rating | Fuel Type |
|---|---|---|---|---|---|

**User Defined Equipment**

| Equipment Type | Number |
|---|---|

## 11.0 Vegetation

# A-3 EMFAC2021 Output File

**Permanente Creek Restoration Project - EMFAC2021 Output**

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2024, 2025, 2026, 2027, 2028, 2029
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW and PMTW, g/trip for STREX, HOTSOAK and RUNLOSS, g/vehicle/day for IDLEX and DIURN. PHEV calculated based on total VMT.

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | Population | Total VMT | CVMT | EVMT | Trips | NOx_RUNEX | NOx_IDLEX | NOx_STREX | PM2.5_RUNEX | PM2.5_IDLEX | PM2.5_STREX | PM2.5_PMTW | PM2.5_PMBW | PM10_RUNEX | PM10_IDLEX | PM10_STREX | PM10_PMTW | PM10_PMBW | CO2_RUNEX | CO2_IDLEX | CO2_STREX | CH4_RUNEX | CH4_IDLEX | CH4_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2024 | HHDT | Aggregate | Aggregate | Diesel | 8486.693443 | 1001095.457 | 1001095.457 | 0 | 124748.3826 | 1.894566926 | 62.32042216 | 2.898867292 | 0.02567407 | 0.030169722 | 0 | 0.008770415 | 0.027453935 | 0.026834937 | 0.031533863 | 0 | 0.035081661 | 0.078439815 | 1634.100473 | 11997.01133 | 0 | 0.000777165 | 0.236630245 | 0 |
| Santa Clara | 2024 | LDT1 | Aggregate | Aggregate | Gasoline | 52693.36611 | 1706864.169 | 1706864.169 | 0 | 234793.4065 | 0.128356647 | 0 | 0.381293891 | 0.001737031 | 0 | 0.002678086 | 0.002000001 | 0.003240211 | 0.001889145 | 0 | 0.002912598 | 0.008000002 | 0.009257745 | 327.2570918 | 0 | 86.38433675 | 0.006260741 | 0 | 0.105365286 |
| Santa Clara | 2024 | LHDT1 | Aggregate | Aggregate | Diesel | 10107.73681 | 398004.1011 | 398004.1011 | 0 | 127142.6136 | 1.563015044 | 1.92167994 | 0 | 0.035057802 | 0.026804436 | 0 | 0.003000001 | 0.027300008 | 0.03664296 | 0.028016414 | 0 | 0.012000003 | 0.078000022 | 631.4007789 | 131.150333 | 0 | 0.008005976 | 0.005098128 | 0 |
| Santa Clara | 2024 | LHDT2 | Aggregate | Aggregate | Diesel | 4663.455482 | 183558.3761 | 183558.3761 | 0 | 58660.40334 | 1.266101505 | 1.895402893 | 0 | 0.032054602 | 0.027000214 | 0 | 0.003000001 | 0.031850009 | 0.033503969 | 0.028221043 | 0 | 0.012000003 | 0.091000026 | 756.8682466 | 209.5618158 | 0 | 0.007405628 | 0.005098128 | 0 |
| Santa Clara | 2024 | MHDT | Aggregate | Aggregate | Diesel | 10390.528 | 434043.5933 | 434043.5933 | 0 | 123938.9566 | 1.232824299 | 13.11951542 | 1.642732197 | 0.014397251 | 0.02990206 | 0 | 0.003000001 | 0.015940936 | 0.015048231 | 0.031254099 | 0 | 0.012000003 | 0.045545531 | 1147.309186 | 2248.547162 | 0 | 0.00150743 | 0.01158024 | 0 |
| Santa Clara | 2025 | HHDT | Aggregate | Aggregate | Diesel | 8692.574961 | 1008963.948 | 1008963.948 | 0 | 127877.0897 | 1.825194406 | 60.9144925 | 2.931994928 | 0.025334562 | 0.028938075 | 0 | 0.008771993 | 0.027420798 | 0.026480079 | 0.030246526 | 0 | 0.035087973 | 0.078345136 | 1608.776391 | 11755.33723 | 0 | 0.000749625 | 0.235891247 | 0 |
| Santa Clara | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 51680.85517 | 1664705.874 | 1664705.874 | 0 | 230185.983 | 0.115355426 | 0 | 0.359720012 | 0.00163888 | 0 | 0.002543391 | 0.002000001 | 0.00324103 | 0.001782432 | 0 | 0.002766169 | 0.008000002 | 0.009260087 | 321.4889695 | 0 | 84.45546982 | 0.005621132 | 0 | 0.098552424 |
| Santa Clara | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 10387.10281 | 408019.3319 | 408019.3319 | 0 | 130656.6864 | 1.379237433 | 1.823413625 | 0 | 0.032346958 | 0.026692484 | 0 | 0.003000001 | 0.027300008 | 0.033809544 | 0.0278994 | 0 | 0.012000003 | 0.078000022 | 628.0700002 | 129.5472379 | 0 | 0.007467887 | 0.005098128 | 0 |
| Santa Clara | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 4837.2356 | 188645.0475 | 188645.0475 | 0 | 60846.33861 | 1.13928853 | 1.802657825 | 0 | 0.030296284 | 0.027004879 | 0 | 0.003000001 | 0.031850009 | 0.031666148 | 0.02822592 | 0 | 0.012000003 | 0.091000026 | 750.3571027 | 207.2396473 | 0 | 0.007042571 | 0.005098128 | 0 |
| Santa Clara | 2025 | MHDT | Aggregate | Aggregate | Diesel | 10548.05912 | 435100.6189 | 435100.6189 | 0 | 125915.2277 | 1.128154524 | 12.48972596 | 1.646558812 | 0.012460624 | 0.02479153 | 0 | 0.003000001 | 0.015940886 | 0.013024038 | 0.025912493 | 0 | 0.012000003 | 0.045545388 | 1141.328021 | 2229.373761 | 0 | 0.001309599 | 0.010956747 | 0 |
| Santa Clara | 2026 | HHDT | Aggregate | Aggregate | Diesel | 8867.794797 | 1016011.772 | 1016011.772 | 0 | 130548.9889 | 1.761105227 | 59.43677827 | 2.955473393 | 0.025195217 | 0.027767082 | 0 | 0.008773873 | 0.02751348 | 0.026334433 | 0.029022586 | 0 | 0.035095492 | 0.078609942 | 1583.151138 | 11526.41341 | 0 | 0.000724695 | 0.235280043 | 0 |
| Santa Clara | 2026 | LDT1 | Aggregate | Aggregate | Gasoline | 50750.46627 | 1625960.476 | 1625960.476 | 0 | 225981.5443 | 0.104002405 | 0 | 0.340041536 | 0.00154812 | 0 | 0.002420563 | 0.002000001 | 0.003241466 | 0.001683722 | 0 | 0.002632583 | 0.008000002 | 0.00926133 | 315.7925465 | 0 | 82.57768697 | 0.005058439 | 0 | 0.092241428 |
| Santa Clara | 2026 | LHDT1 | Aggregate | Aggregate | Diesel | 10635.30661 | 416619.2958 | 416619.2958 | 0 | 133778.7779 | 1.21928089 | 1.732484181 | 0 | 0.030021689 | 0.026602873 | 0 | 0.003000001 | 0.027300008 | 0.031379137 | 0.027805736 | 0 | 0.012000003 | 0.078000022 | 625.2279894 | 128.0663971 | 0 | 0.006994052 | 0.005098128 | 0 |
| Santa Clara | 2026 | LHDT2 | Aggregate | Aggregate | Diesel | 4995.257652 | 193100.7206 | 193100.7206 | 0 | 62834.05723 | 1.030069118 | 1.717943561 | 0 | 0.028772746 | 0.027013649 | 0 | 0.003000001 | 0.031850009 | 0.030073722 | 0.028235087 | 0 | 0.012000003 | 0.091000026 | 744.6842158 | 205.1132679 | 0 | 0.006720178 | 0.005098128 | 0 |
| Santa Clara | 2026 | MHDT | Aggregate | Aggregate | Diesel | 10675.11434 | 435455.3677 | 435455.3677 | 0 | 127504.1973 | 1.028859701 | 11.86252673 | 1.644140559 | 0.010795948 | 0.02038247 | 0 | 0.003000001 | 0.015940874 | 0.011284093 | 0.021304075 | 0 | 0.012000003 | 0.045545353 | 1134.952009 | 2210.329037 | 0 | 0.00113435 | 0.01041873 | 0 |
| Santa Clara | 2027 | HHDT | Aggregate | Aggregate | Diesel | 9011.070537 | 1021241.459 | 1021241.459 | 0 | 132754.8218 | 1.704042548 | 58.05742484 | 2.958034339 | 0.025062276 | 0.0267847 | 0 | 0.00877634 | 0.027672005 | 0.026195481 | 0.027995786 | 0 | 0.035105361 | 0.07906287 | 1556.122851 | 11312.43773 | 0 | 0.000701453 | 0.234878082 | 0 |
| Santa Clara | 2027 | LDT1 | Aggregate | Aggregate | Gasoline | 49888.15483 | 1593479.412 | 1593479.412 | 0 | 222126.8834 | 0.093626232 | 0 | 0.322280877 | 0.001454777 | 0 | 0.002294769 | 0.002000001 | 0.003240788 | 0.001582203 | 0 | 0.002495771 | 0.008000002 | 0.009259396 | 310.252928 | 0 | 80.77512164 | 0.004546824 | 0 | 0.086445041 |
| Santa Clara | 2027 | LHDT1 | Aggregate | Aggregate | Diesel | 10848.43998 | 422662.2799 | 422662.2799 | 0 | 136459.7276 | 1.084389946 | 1.649679663 | 0 | 0.028062473 | 0.026509216 | 0 | 0.003000001 | 0.027300008 | 0.029331333 | 0.027707846 | 0 | 0.012000003 | 0.078000022 | 622.795222 | 126.7206258 | 0 | 0.006587033 | 0.005098128 | 0 |
| Santa Clara | 2027 | LHDT2 | Aggregate | Aggregate | Diesel | 5135.733672 | 196396.2345 | 196396.2345 | 0 | 64601.06884 | 0.939744901 | 1.64220307 | 0 | 0.027495523 | 0.027012499 | 0 | 0.003000001 | 0.031850009 | 0.028738749 | 0.028233885 | 0 | 0.012000003 | 0.091000026 | 739.7686125 | 203.206596 | 0 | 0.006443743 | 0.005098128 | 0 |
| Santa Clara | 2027 | MHDT | Aggregate | Aggregate | Diesel | 10767.25749 | 434295.527 | 434295.527 | 0 | 128657.1776 | 0.93944559 | 11.29117481 | 1.635782434 | 0.009400852 | 0.016811771 | 0 | 0.003000001 | 0.015940912 | 0.009825917 | 0.017571925 | 0 | 0.012000003 | 0.045545463 | 1128.562651 | 2191.462417 | 0 | 0.000986723 | 0.009986931 | 0 |
| Santa Clara | 2028 | HHDT | Aggregate | Aggregate | Diesel | 9119.078917 | 1024317.446 | 1024317.446 | 0 | 134474.3376 | 1.649728035 | 56.82183584 | 2.940108604 | 0.024929742 | 0.025824919 | 0 | 0.008779571 | 0.027829118 | 0.026056954 | 0.026992607 | 0 | 0.035118285 | 0.079511767 | 1527.999821 | 11109.89941 | 0 | 0.000679064 | 0.234702709 | 0 |
| Santa Clara | 2028 | LDT1 | Aggregate | Aggregate | Gasoline | 49081.00994 | 1563538.266 | 1563538.266 | 0 | 218519.1405 | 0.084307943 | 0 | 0.305828271 | 0.00136046 | 0 | 0.002171319 | 0.002000001 | 0.003239636 | 0.001479624 | 0 | 0.002361508 | 0.008000002 | 0.009256103 | 304.9805749 | 0 | 79.07291589 | 0.004110549 | 0 | 0.081168562 |
| Santa Clara | 2028 | LHDT1 | Aggregate | Aggregate | Diesel | 11024.69048 | 426298.0601 | 426298.0601 | 0 | 138676.7372 | 0.969402619 | 1.574570322 | 0 | 0.026417879 | 0.026447375 | 0 | 0.003000001 | 0.027300008 | 0.027612378 | 0.027643208 | 0 | 0.012000003 | 0.078000022 | 620.6930902 | 125.5014406 | 0 | 0.006234269 | 0.005098128 | 0 |
| Santa Clara | 2028 | LHDT2 | Aggregate | Aggregate | Diesel | 5257.649939 | 198606.7634 | 198606.7634 | 0 | 66134.62211 | 0.865041124 | 1.574904929 | 0 | 0.026453546 | 0.026999542 | 0 | 0.003000001 | 0.031850009 | 0.027649658 | 0.028220342 | 0 | 0.012000003 | 0.091000026 | 735.4980568 | 201.5096585 | 0 | 0.006210438 | 0.005098128 | 0 |
| Santa Clara | 2028 | MHDT | Aggregate | Aggregate | Diesel | 10803.07831 | 430729.4798 | 430729.4798 | 0 | 129114.2453 | 0.860612692 | 10.76300356 | 1.608029039 | 0.008247655 | 0.013920738 | 0 | 0.003000001 | 0.015941011 | 0.008620578 | 0.014550172 | 0 | 0.012000003 | 0.045545745 | 1122.135219 | 2173.473161 | 0 | 0.000864795 | 0.009638929 | 0 |
| Santa Clara | 2029 | HHDT | Aggregate | Aggregate | Diesel | 9189.951296 | 1025176.229 | 1025176.229 | 0 | 135692.8403 | 1.603158469 | 55.79259022 | 2.911980809 | 0.024838891 | 0.025083431 | 0 | 0.008783641 | 0.027987037 | 0.025961995 | 0.026217592 | 0 | 0.035134564 | 0.079962964 | 1500.678395 | 10929.24419 | 0 | 0.000661476 | 0.234793126 | 0 |
| Santa Clara | 2029 | LDT1 | Aggregate | Aggregate | Gasoline | 48318.69428 | 1536414.268 | 1536414.268 | 0 | 215179.526 | 0.075535195 | 0 | 0.290636212 | 0.001268957 | 0 | 0.002050251 | 0.002000001 | 0.003237853 | 0.001380107 | 0 | 0.002229835 | 0.008000002 | 0.009251008 | 299.9536579 | 0 | 77.43554551 | 0.003703947 | 0 | 0.076223756 |
| Santa Clara | 2029 | LHDT1 | Aggregate | Aggregate | Diesel | 11166.16036 | 427809.9107 | 427809.9107 | 0 | 140456.2503 | 0.873132816 | 1.506548613 | 0 | 0.025010224 | 0.026359497 | 0 | 0.003000001 | 0.027300008 | 0.026141075 | 0.027551357 | 0 | 0.012000003 | 0.078000022 | 618.8511137 | 124.3981938 | 0 | 0.00592954 | 0.005098128 | 0 |
| Santa Clara | 2029 | LHDT2 | Aggregate | Aggregate | Diesel | 5355.483243 | 199692.9236 | 199692.9236 | 0 | 67365.242 | 0.8026363 | 1.514320499 | 0 | 0.025577596 | 0.026920374 | 0 | 0.003000001 | 0.031850009 | 0.026734101 | 0.028137594 | 0 | 0.012000003 | 0.091000026 | 731.7367144 | 200.02436 | 0 | 0.006013785 | 0.005098128 | 0 |
| Santa Clara | 2029 | MHDT | Aggregate | Aggregate | Diesel | 10773.70764 | 424561.2947 | 424561.2947 | 0 | 128772.1002 | 0.791583378 | 10.29665014 | 1.574117129 | 0.007300054 | 0.011569913 | 0 | 0.003000001 | 0.015941141 | 0.00763013 | 0.012093053 | 0 | 0.012000003 | 0.045546118 | 1115.702794 | 2156.346596 | 0 | 0.000765027 | 0.009357026 | 0 |

**Permanente Creek Restoration Project - EMFAC2021 Output**

Source: EMFAC2021 (v1.0.2) Emission Rates
Region Type: County
Region: Santa Clara
Calendar Year: 2024, 2025, 2026, 2027, 2028, 2029
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for CVMT and EVMT, trips/day for Trips, g/mile for RUNEX, PMBW anc

| Region | Calendar Year | Vehicle Category | Model Year | Speed | Fuel | N2O_RUNEX | N2O_IDLEX | N2O_STREX | ROG_RUNEX | ROG_IDLEX | ROG_STREX | ROG_HOTSOAK | ROG_RUNLOSS | ROG_DIURN | TOG_RUNEX | TOG_IDLEX | TOG_STREX | TOG_HOTSOAK | TOG_RUNLOSS | TOG_DIURN | NH3_RUNEX | CO_RUNEX | CO_IDLEX | CO_STREX | SOx_RUNEX | SOx_IDLEX | SOx_STREX |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Santa Clara | 2024 | HHDT | Aggregate | Aggregate | Diesel | 0.257453195 | 1.89013402 | 0 | 0.016732148 | 5.094584291 | 0 | 0 | 0 | 0 | 0.019048277 | 5.799796409 | 0 | 0 | 0 | 0 | 0.215084464 | 0.082524175 | 74.10575716 | 0 | 0.015473954 | 0.113604523 | 0 |
| Santa Clara | 2024 | LDT1 | Aggregate | Aggregate | Gasoline | 0.009423658 | 0 | 0.038689754 | 0.027741271 | 0 | 0.539320629 | 0.165331716 | 0.472477354 | 2.667157548 | 0.040475389 | 0 | 0.590487693 | 0.165331716 | 0.472477354 | 2.667157548 | 0.036078996 | 1.427620935 | 0 | 5.253053402 | 0.00323527 | 0 | 0.000853997 |
| Santa Clara | 2024 | LHDT1 | Aggregate | Aggregate | Diesel | 0.09947745 | 0.020662788 | 0 | 0.172363946 | 0.109759705 | 0 | 0 | 0 | 0 | 0.196224893 | 0.124954127 | 0 | 0 | 0 | 0 | 0.172780847 | 0.473593645 | 0.909745076 | 0 | 0.005982843 | 0.001242716 | 0 |
| Santa Clara | 2024 | LHDT2 | Aggregate | Aggregate | Diesel | 0.1192449 | 0.033016549 | 0 | 0.159438817 | 0.109759705 | 0 | 0 | 0 | 0 | 0.181510493 | 0.124954127 | 0 | 0 | 0 | 0 | 0.184131895 | 0.411861281 | 0.909745076 | 0 | 0.007171711 | 0.001985705 | 0 |
| Santa Clara | 2024 | MHDT | Aggregate | Aggregate | Diesel | 0.18075903 | 0.354259521 | 0 | 0.032454559 | 0.249319387 | 0 | 0 | 0 | 0 | 0.036947045 | 0.283831143 | 0 | 0 | 0 | 0 | 0.210531717 | 0.120870515 | 7.556027258 | 0 | 0.010864332 | 0.021292397 | 0 |
| Santa Clara | 2025 | HHDT | Aggregate | Aggregate | Diesel | 0.253463376 | 1.852058168 | 0 | 0.016139221 | 5.078673859 | 0 | 0 | 0 | 0 | 0.018373274 | 5.781683593 | 0 | 0 | 0 | 0 | 0.215507348 | 0.078083371 | 74.00903847 | 0 | 0.01523415 | 0.111316014 | 0 |
| Santa Clara | 2025 | LDT1 | Aggregate | Aggregate | Gasoline | 0.00868741 | 0 | 0.037511317 | 0.024709715 | 0 | 0.498817786 | 0.156962689 | 0.442298672 | 2.522359711 | 0.036056358 | 0 | 0.546142689 | 0.156962689 | 0.442298672 | 2.522359711 | 0.036452995 | 1.317415745 | 0 | 4.886115041 | 0.003178246 | 0 | 0.000834928 |
| Santa Clara | 2025 | LHDT1 | Aggregate | Aggregate | Diesel | 0.098952684 | 0.02041022 | 0 | 0.16077922 | 0.109759705 | 0 | 0 | 0 | 0 | 0.183036452 | 0.124954127 | 0 | 0 | 0 | 0 | 0.178979738 | 0.43508667 | 0.909745076 | 0 | 0.005951282 | 0.001227526 | 0 |
| Santa Clara | 2025 | LHDT2 | Aggregate | Aggregate | Diesel | 0.118219067 | 0.032650691 | 0 | 0.151622408 | 0.109759705 | 0 | 0 | 0 | 0 | 0.172612031 | 0.124954127 | 0 | 0 | 0 | 0 | 0.188496169 | 0.387904259 | 0.909745076 | 0 | 0.007110015 | 0.001963701 | 0 |
| Santa Clara | 2025 | MHDT | Aggregate | Aggregate | Diesel | 0.179816695 | 0.351238744 | 0 | 0.028195298 | 0.235895752 | 0 | 0 | 0 | 0 | 0.032098201 | 0.268549357 | 0 | 0 | 0 | 0 | 0.211891256 | 0.109646491 | 7.535392538 | 0 | 0.010807694 | 0.021110836 | 0 |
| Santa Clara | 2026 | HHDT | Aggregate | Aggregate | Diesel | 0.249426106 | 1.815991127 | 0 | 0.015602474 | 5.065514804 | 0 | 0 | 0 | 0 | 0.017762229 | 5.766703011 | 0 | 0 | 0 | 0 | 0.215913666 | 0.074070339 | 73.94193824 | 0 | 0.014991495 | 0.109148242 | 0 |
| Santa Clara | 2026 | LDT1 | Aggregate | Aggregate | Gasoline | 0.008041011 | 0 | 0.03641187 | 0.02205146 | 0 | 0.461638025 | 0.148727252 | 0.417239536 | 2.377298253 | 0.032177439 | 0 | 0.50543553 | 0.148727252 | 0.417239536 | 2.377298253 | 0.036832712 | 1.219346167 | 0 | 4.549174395 | 0.003121931 | 0 | 0.000816365 |
| Santa Clara | 2026 | LHDT1 | Aggregate | Aggregate | Diesel | 0.098504924 | 0.020176913 | 0 | 0.150577832 | 0.109759705 | 0 | 0 | 0 | 0 | 0.171422851 | 0.124954127 | 0 | 0 | 0 | 0 | 0.184377336 | 0.40171955 | 0.909745076 | 0 | 0.005924353 | 0.001213494 | 0 |
| Santa Clara | 2026 | LHDT2 | Aggregate | Aggregate | Diesel | 0.117325301 | 0.032315679 | 0 | 0.144681466 | 0.109759705 | 0 | 0 | 0 | 0 | 0.16471023 | 0.124954127 | 0 | 0 | 0 | 0 | 0.192319501 | 0.367308649 | 0.909745076 | 0 | 0.007056261 | 0.001943552 | 0 |
| Santa Clara | 2026 | MHDT | Aggregate | Aggregate | Diesel | 0.178812151 | 0.34823824 | 0 | 0.024422247 | 0.224312398 | 0 | 0 | 0 | 0 | 0.027802869 | 0.25536259 | 0 | 0 | 0 | 0 | 0.213113233 | 0.099563391 | 7.520816284 | 0 | 0.010747317 | 0.020930494 | 0 |
| Santa Clara | 2027 | HHDT | Aggregate | Aggregate | Diesel | 0.245167789 | 1.782279171 | 0 | 0.015102101 | 5.056860706 | 0 | 0 | 0 | 0 | 0.017192592 | 5.75685098 | 0 | 0 | 0 | 0 | 0.216279576 | 0.070456077 | 73.92423642 | 0 | 0.014735553 | 0.107122021 | 0 |
| Santa Clara | 2027 | LDT1 | Aggregate | Aggregate | Gasoline | 0.007451405 | 0 | 0.035413004 | 0.019635123 | 0 | 0.427722873 | 0.140959034 | 0.397237361 | 2.28612425 | 0.028651525 | 0 | 0.468302708 | 0.140959034 | 0.397237361 | 2.28612425 | 0.037251041 | 1.12868955 | 0 | 4.239779613 | 0.003067166 | 0 | 0.000798544 |
| Santa Clara | 2027 | LHDT1 | Aggregate | Aggregate | Diesel | 0.098121641 | 0.019964886 | 0 | 0.141814947 | 0.109759705 | 0 | 0 | 0 | 0 | 0.161446888 | 0.124954127 | 0 | 0 | 0 | 0 | 0.188997721 | 0.373722264 | 0.909745076 | 0 | 0.005901301 | 0.001200742 | 0 |
| Santa Clara | 2027 | LHDT2 | Aggregate | Aggregate | Diesel | 0.116550846 | 0.032015282 | 0 | 0.138729986 | 0.109759705 | 0 | 0 | 0 | 0 | 0.157934866 | 0.124954127 | 0 | 0 | 0 | 0 | 0.19556073 | 0.350532101 | 0.909745076 | 0 | 0.007009684 | 0.001925486 | 0 |
| Santa Clara | 2027 | MHDT | Aggregate | Aggregate | Diesel | 0.177805505 | 0.345265796 | 0 | 0.021243866 | 0.215015876 | 0 | 0 | 0 | 0 | 0.024184524 | 0.244779208 | 0 | 0 | 0 | 0 | 0.214145614 | 0.090922465 | 7.512068444 | 0 | 0.010686813 | 0.020751839 | 0 |
| Santa Clara | 2028 | HHDT | Aggregate | Aggregate | Diesel | 0.240736994 | 1.750369176 | 0 | 0.014620069 | 5.053084964 | 0 | 0 | 0 | 0 | 0.016643836 | 5.752552584 | 0 | 0 | 0 | 0 | 0.216623025 | 0.067122188 | 73.97200661 | 0 | 0.014469245 | 0.105204104 | 0 |
| Santa Clara | 2028 | LDT1 | Aggregate | Aggregate | Gasoline | 0.00692695 | 0 | 0.034482073 | 0.017586415 | 0 | 0.397179186 | 0.135564821 | 0.390418252 | 2.261734877 | 0.025662056 | 0 | 0.434861215 | 0.135564821 | 0.390418252 | 2.261734877 | 0.037654401 | 1.051410755 | 0 | 3.96401297 | 0.003015043 | 0 | 0.000781716 |
| Santa Clara | 2028 | LHDT1 | Aggregate | Aggregate | Diesel | 0.097790449 | 0.019772803 | 0 | 0.134220132 | 0.109759705 | 0 | 0 | 0 | 0 | 0.152800697 | 0.124954127 | 0 | 0 | 0 | 0 | 0.192970221 | 0.350151046 | 0.909745076 | 0 | 0.005881382 | 0.00118919 | 0 |
| Santa Clara | 2028 | LHDT2 | Aggregate | Aggregate | Diesel | 0.115878018 | 0.031747929 | 0 | 0.133707083 | 0.109759705 | 0 | 0 | 0 | 0 | 0.152216624 | 0.124954127 | 0 | 0 | 0 | 0 | 0.198313767 | 0.337165852 | 0.909745076 | 0 | 0.006969218 | 0.001909406 | 0 |
| Santa Clara | 2028 | MHDT | Aggregate | Aggregate | Diesel | 0.176792861 | 0.342431582 | 0 | 0.018618805 | 0.207523499 | 0 | 0 | 0 | 0 | 0.021196093 | 0.236249707 | 0 | 0 | 0 | 0 | 0.215005219 | 0.08370472 | 7.507182664 | 0 | 0.010625949 | 0.020581461 | 0 |
| Santa Clara | 2029 | HHDT | Aggregate | Aggregate | Diesel | 0.236432492 | 1.721906873 | 0 | 0.014241396 | 5.055031616 | 0 | 0 | 0 | 0 | 0.016212745 | 5.754768699 | 0 | 0 | 0 | 0 | 0.216928931 | 0.064322083 | 74.08532071 | 0 | 0.014210527 | 0.103493407 | 0 |
| Santa Clara | 2029 | LDT1 | Aggregate | Aggregate | Gasoline | 0.006438624 | 0 | 0.033624233 | 0.015670381 | 0 | 0.368641942 | 0.128603222 | 0.375010124 | 2.192925083 | 0.022866183 | 0 | 0.403616524 | 0.128603222 | 0.375010124 | 2.192925083 | 0.038057874 | 0.978505452 | 0 | 3.70419774 | 0.002965347 | 0 | 0.000765529 |
| Santa Clara | 2029 | LHDT1 | Aggregate | Aggregate | Diesel | 0.097500245 | 0.019598986 | 0 | 0.127659495 | 0.109759705 | 0 | 0 | 0 | 0 | 0.145331848 | 0.124954127 | 0 | 0 | 0 | 0 | 0.196381599 | 0.330525697 | 0.909745076 | 0 | 0.005863929 | 0.001178736 | 0 |
| Santa Clara | 2029 | LHDT2 | Aggregate | Aggregate | Diesel | 0.115285417 | 0.031510465 | 0 | 0.129473251 | 0.109759705 | 0 | 0 | 0 | 0 | 0.147396689 | 0.124954127 | 0 | 0 | 0 | 0 | 0.200682393 | 0.326473591 | 0.909745076 | 0 | 0.006933577 | 0.001895125 | 0 |
| Santa Clara | 2029 | MHDT | Aggregate | Aggregate | Diesel | 0.17577943 | 0.339733284 | 0 | 0.016470811 | 0.201454208 | 0 | 0 | 0 | 0 | 0.018750764 | 0.229340281 | 0 | 0 | 0 | 0 | 0.215725467 | 0.077746423 | 7.505570598 | 0 | 0.010565038 | 0.020419313 | 0 |

# Exhibit B
## Health Risk Assessment

ESA

# B-1 Cancer Risk Calculations – 2003 OEHHA Guidance

# HRA Permanente Creek Restoration Project

Construction Year 2024

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 2.877E-07 | 8.36E-14 | 5.02E-14 | 8.36E-14 | 4.28E-13 | 9.37E-13 | 8.36E-14 | 1.34E-14 | 1.54E-12 | 1.67E-13 | 6.69E-15 | 2.48E-10 |
| Paved road | 2024_PAVED | 5.948E-06 | 3.00E-09 | 1.80E-09 | 3.00E-09 | 1.92E-09 | 6.01E-08 | 5.53E-09 | 3.36E-10 | 1.30E-07 | 6.01E-09 | 4.56E-09 | 1.71E-05 |
| Unpaved road | 2024_CCP_UNPV | 1.802E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 4.72E-09 | 1.47E-07 | 1.36E-08 | 8.26E-10 | 3.18E-07 | 1.47E-08 | 1.12E-08 | 4.19E-05 |
| Channel Widening 2024 | 2024_CHAN_RCK | 5.566E-05 | 5.889E-09 | 3.533E-09 | 5.889E-09 | 3.015E-08 | 6.595E-08 | 5.889E-09 | 9.422E-10 | 1.084E-07 | 1.178E-08 | 4.711E-10 | 1.749E-05 |
| Paved road | 2024_PAVED | 5.173E-05 | 8.597E-08 | 5.158E-08 | 8.597E-08 | 5.502E-08 | 1.719E-06 | 1.582E-07 | 9.629E-09 | 3.714E-06 | 1.719E-07 | 1.307E-07 | 4.883E-04 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2024 | 0.25 | 0.75 | 0 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.011 | 0.051 | 0.000 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 1.16E-05 | 5.58E-05 | 0.00E+00 | 0.00E+00 |
| | Arsenic | 1.26E-04 | 6.09E-04 | 0.00E+00 | 0.00E+00 |
| | Beryllium | 8.83E-05 | 4.26E-04 | 0.00E+00 | 0.00E+00 |
| | Cadmium | 1.58E-04 | 7.61E-04 | 0.00E+00 | 0.00E+00 |
| | Cobalt | 2.84E-04 | 1.37E-03 | 0.00E+00 | 0.00E+00 |
| | Lead | 4.20E-07 | 2.03E-06 | 0.00E+00 | 0.00E+00 |
| | Nickel | 9.56E-06 | 4.62E-05 | 0.00E+00 | 0.00E+00 |
| | Chromium VI | 5.36E-03 | 2.59E-02 | 0.00E+00 | 0.00E+00 |

| | Max | | UTM X | UTM Y |
|---|---|---|---|---|
| CT House | 0.036498396 | per million | 581336.22 | 4131207.48 |
| Res | 0.50981567 | per million | 581848.86 | 4130984.94 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 6.80E-05 | 1.05E-07 | 6.28E-08 | 1.05E-07 | 6.75E-08 | 1.92E-07 | 4.51E-06 | 1.59E-07 | 7.85631E-10 | 3.79323E-09 | 0 | 0 | 0.0046 | CT House | 0.0365 |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 4.73E-05 | 7.23E-08 | 4.34E-08 | 7.23E-08 | 4.74E-08 | 1.33E-07 | 3.12E-06 | 1.09E-07 | 5.47066E-10 | 2.64138E-09 | 0 | 0 | 0.0032 | Res | 0.0249 |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 4.22E-06 | 3.82E-09 | 2.29E-09 | 3.82E-09 | 3.36E-09 | 6.86E-09 | 1.60E-07 | 5.51E-09 | 4.8765E-11 | 2.3545E-10 | 0 | 0 | 0.0003 | Acute | 0.0022 |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 5.66E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 5.58E-09 | 1.44E-08 | 3.38E-07 | 1.18E-08 | 6.53906E-11 | 3.15722E-10 | 0 | 0 | 0.0004 | Acute | 0.0029 |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 2.14E-04 | 3.30E-07 | 1.98E-07 | 3.30E-07 | 2.12E-07 | 6.07E-07 | 1.43E-05 | 5.01E-07 | 2.47759E-09 | 1.19625E-08 | 0 | 0 | 0.0144 | Res | 0.1158 |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 4.33E-04 | 6.68E-07 | 4.01E-07 | 6.68E-07 | 4.28E-07 | 1.23E-06 | 2.88E-05 | 1.01E-06 | 5.00589E-09 | 2.41697E-08 | 0 | 0 | 0.0292 | Res | 0.2341 |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.97E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 1.95E-07 | 5.58E-07 | 1.31E-05 | 4.61E-07 | 2.27999E-09 | 1.10083E-08 | 0 | 0 | 0.0133 | Res | 0.1066 |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 5.24E-04 | 8.07E-07 | 4.84E-07 | 8.07E-07 | 5.17E-07 | 1.49E-06 | 3.49E-05 | 1.23E-06 | 6.05239E-09 | 2.92225E-08 | 0 | 0 | 0.0353 | Res | 0.2833 |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 3.68E-05 | 5.44E-08 | 3.27E-08 | 5.44E-08 | 3.63E-08 | 9.99E-08 | 2.34E-06 | 8.23E-08 | 4.25349E-10 | 2.0537E-09 | 0 | 0 | 0.0025 | Res | 0.0192 |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 1.05E-04 | 1.62E-07 | 9.74E-08 | 1.62E-07 | 1.05E-07 | 2.99E-07 | 7.01E-06 | 2.47E-07 | 1.21711E-09 | 5.87653E-09 | 0 | 0 | 0.0071 | Res | 0.0565 |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 2.49E-05 | 3.77E-08 | 2.26E-08 | 3.77E-08 | 2.46E-08 | 6.93E-08 | 1.63E-06 | 5.72E-08 | 2.87629E-10 | 1.38874E-09 | 0 | 0 | 0.0017 | Acute | 0.0133 |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.32E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.26E-08 | 3.20E-08 | 7.50E-07 | 2.62E-08 | 1.53105E-10 | 7.39232E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.24E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.17E-08 | 2.98E-08 | 6.98E-07 | 2.44E-08 | 1.43125E-10 | 6.91044E-10 | 0 | 0 | 0.0008 | Res | 0.0062 |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 1.09E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 1.34068E-10 | 6.47315E-10 | 0 | 0 | 0.0008 | Res | 0.0058 |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.09E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 1.02E-08 | 2.58E-08 | 6.05E-07 | 2.11E-08 | 1.25812E-10 | 6.07453E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.03E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 9.59E-09 | 2.42E-08 | 5.68E-07 | 1.98E-08 | 1.18724E-10 | 5.73229E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 9.65E-06 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 8.97E-09 | 2.26E-08 | 5.30E-07 | 1.85E-08 | 1.1154E-10 | 5.38544E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 9.01E-06 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 8.34E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 | 1.04164E-10 | 5.02929E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 1.37E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.28E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 1.58592E-10 | 7.65722E-10 | 0 | 0 | 0.0009 | Res | 0.0069 |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 1.34E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.27E-08 | 3.22E-08 | 7.55E-07 | 2.64E-08 | 1.55086E-10 | 7.48795E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.26E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.11E-07 | 2.48E-08 | 1.46018E-10 | 7.0501E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.18E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.11E-08 | 2.82E-08 | 6.61E-07 | 2.31E-08 | 1.36781E-10 | 6.60416E-10 | 0 | 0 | 0.0008 | Res | 0.0060 |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.10E-05 | 1.43E-08 | 8.59E-09 | 1.43E-08 | 1.03E-08 | 2.61E-08 | 6.12E-07 | 2.14E-08 | 1.27469E-10 | 6.15452E-10 | 0 | 0 | 0.0007 | Res | 0.0056 |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.03E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 9.61E-09 | 2.43E-08 | 5.69E-07 | 1.99E-08 | 1.19325E-10 | 5.76133E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 9.66E-06 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 8.96E-09 | 2.26E-08 | 5.29E-07 | 1.85E-08 | 1.11707E-10 | 5.39348E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 9.11E-06 | 1.16E-08 | 6.96E-09 | 1.16E-08 | 8.42E-09 | 2.12E-08 | 4.96E-07 | 1.73E-08 | 1.05291E-10 | 5.08373E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 8.58E-06 | 1.09E-08 | 6.52E-09 | 1.09E-08 | 7.91E-09 | 1.98E-08 | 4.64E-07 | 1.62E-08 | 9.91796E-11 | 4.78864E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 1.24E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.12E-08 | 2.73E-08 | 6.39E-07 | 2.23E-08 | 1.43765E-10 | 6.94133E-10 | 0 | 0 | 0.0008 | Res | 0.0062 |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 1.32E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.23E-08 | 3.10E-08 | 7.25E-07 | 2.53E-08 | 1.52342E-10 | 7.35545E-10 | 0 | 0 | 0.0009 | Res | 0.0066 |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.28E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.21E-08 | 3.07E-08 | 7.20E-07 | 2.52E-08 | 1.48116E-10 | 7.15142E-10 | 0 | 0 | 0.0009 | Res | 0.0065 |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.20E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.13E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 | 1.38968E-10 | 6.70972E-10 | 0 | 0 | 0.0008 | Res | 0.0061 |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.13E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 1.05E-08 | 2.67E-08 | 6.26E-07 | 2.19E-08 | 1.30072E-10 | 6.28018E-10 | 0 | 0 | 0.0008 | Res | 0.0057 |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.06E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 9.83E-09 | 2.49E-08 | 5.84E-07 | 2.04E-08 | 1.22122E-10 | 5.89637E-10 | 0 | 0 | 0.0007 | Res | 0.0054 |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 9.84E-06 | 1.26E-08 | 7.58E-09 | 1.26E-08 | 9.13E-09 | 2.31E-08 | 5.40E-07 | 1.89E-08 | 1.13783E-10 | 5.49373E-10 | 0 | 0 | 0.0007 | Res | 0.0050 |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 9.22E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 8.52E-09 | 2.15E-08 | 5.03E-07 | 1.76E-08 | 1.06587E-10 | 5.14631E-10 | 0 | 0 | 0.0006 | Res | 0.0047 |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 8.66E-06 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 7.97E-09 | 2.00E-08 | 4.69E-07 | 1.64E-08 | 1.00051E-10 | 4.83071E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 7.45E-09 | 1.86E-08 | 4.37E-07 | 1.53E-08 | 9.37953E-11 | 4.52868E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 7.63E-06 | 9.55E-09 | 5.73E-09 | 9.55E-09 | 6.99E-09 | 1.74E-08 | 4.08E-07 | 1.42E-08 | 8.8211E-11 | 4.25905E-10 | 0 | 0 | 0.0005 | Res | 0.0039 |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 7.11E-06 | 8.83E-09 | 5.30E-09 | 8.83E-09 | 6.49E-09 | 1.61E-08 | 3.77E-07 | 1.32E-08 | 8.22265E-11 | 3.9701E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 1.33E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 1.22E-08 | 3.02E-08 | 7.07E-07 | 2.47E-08 | 1.53798E-10 | 7.42578E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 1.29E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 1.19E-08 | 2.97E-08 | 6.96E-07 | 2.43E-08 | 1.4861E-10 | 7.17529E-10 | 0 | 0 | 0.0009 | Res | 0.0065 |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 1.29E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 1.21E-08 | 3.08E-08 | 7.22E-07 | 2.52E-08 | 1.48686E-10 | 7.17894E-10 | 0 | 0 | 0.0009 | Res | 0.0065 |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 1.22E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 1.14E-08 | 2.92E-08 | 6.84E-07 | 2.39E-08 | 1.40941E-10 | 6.80498E-10 | 0 | 0 | 0.0008 | Res | 0.0062 |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.15E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.07E-08 | 2.73E-08 | 6.40E-07 | 2.24E-08 | 1.32559E-10 | 6.4003E-10 | 0 | 0 | 0.0008 | Res | 0.0058 |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.08E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 1.00E-08 | 2.55E-08 | 5.98E-07 | 2.09E-08 | 1.24363E-10 | 6.00455E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.01E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.36E-09 | 2.38E-08 | 5.57E-07 | 1.95E-08 | 1.16518E-10 | 5.62579E-10 | 0 | 0 | 0.0007 | Res | 0.0051 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 (per million) | Receptor Type | (per million) |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 9.43E-06 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 8.73E-09 | 2.21E-08 | 5.18E-07 | 1.81E-08 | 1.08989E-10 | 5.26227E-10 | 0 | 0 | 0.0006 | Res | 0.0048 |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 8.76E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 8.08E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 1.0126E-10 | 4.88909E-10 | 0 | 0 | 0.0006 | Res | 0.0045 |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 7.45E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 9.37101E-11 | 4.52456E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 7.44E-06 | 9.29E-09 | 5.58E-09 | 9.29E-09 | 6.80E-09 | 1.69E-08 | 3.97E-07 | 1.38E-08 | 8.59667E-11 | 4.15069E-10 | 0 | 0 | 0.0005 | Res | 0.0038 |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 1.30E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 1.18E-08 | 2.91E-08 | 6.80E-07 | 2.37E-08 | 1.49738E-10 | 7.22975E-10 | 0 | 0 | 0.0009 | Res | 0.0065 |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 1.29E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 1.20E-08 | 3.00E-08 | 7.03E-07 | 2.46E-08 | 1.49301E-10 | 7.20866E-10 | 0 | 0 | 0.0009 | Res | 0.0065 |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 1.27E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.19E-08 | 3.02E-08 | 7.08E-07 | 2.47E-08 | 1.46564E-10 | 7.07651E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 1.22E-05 | 1.61E-08 | 9.63E-09 | 1.61E-08 | 1.15E-08 | 2.93E-08 | 6.87E-07 | 2.40E-08 | 1.4122E-10 | 6.81844E-10 | 0 | 0 | 0.0008 | Res | 0.0062 |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 1.08E-08 | 2.77E-08 | 6.50E-07 | 2.27E-08 | 1.33826E-10 | 6.46148E-10 | 0 | 0 | 0.0008 | Res | 0.0059 |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.09E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.01E-08 | 2.59E-08 | 6.06E-07 | 2.12E-08 | 1.25469E-10 | 6.05798E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.01E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 9.41E-09 | 2.40E-08 | 5.61E-07 | 1.96E-08 | 1.16965E-10 | 5.64739E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 9.30E-06 | 1.19E-08 | 7.17E-09 | 1.19E-08 | 8.61E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 1.07482E-10 | 5.18949E-10 | 0 | 0 | 0.0006 | Res | 0.0048 |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 8.56E-06 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 7.90E-09 | 1.99E-08 | 4.66E-07 | 1.63E-08 | 9.89974E-11 | 4.77985E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.57E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.48E-08 | 3.85E-08 | 9.03E-07 | 3.16E-08 | 1.81315E-10 | 8.75434E-10 | 0 | 0 | 0.0011 | Res | 0.0081 |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.67E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.53E-08 | 3.85E-08 | 9.03E-07 | 3.15E-08 | 1.92503E-10 | 9.29453E-10 | 0 | 0 | 0.0011 | Res | 0.0085 |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.48E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.34E-08 | 3.33E-08 | 7.81E-07 | 2.72E-08 | 1.70663E-10 | 8.24006E-10 | 0 | 0 | 0.0010 | Res | 0.0075 |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.41E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.29E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 1.63009E-10 | 7.87047E-10 | 0 | 0 | 0.0010 | Res | 0.0072 |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.37E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.26E-08 | 3.18E-08 | 7.46E-07 | 2.61E-08 | 1.58049E-10 | 7.63101E-10 | 0 | 0 | 0.0009 | Res | 0.0069 |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 1.31E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.23E-08 | 3.11E-08 | 7.28E-07 | 2.54E-08 | 1.51843E-10 | 7.33139E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 1.25E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.17E-08 | 2.98E-08 | 6.98E-07 | 2.44E-08 | 1.4442E-10 | 6.97298E-10 | 0 | 0 | 0.0008 | Res | 0.0063 |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.24E-05 | 1.64E-08 | 9.87E-09 | 1.64E-08 | 1.17E-08 | 3.00E-08 | 7.04E-07 | 2.46E-08 | 1.43474E-10 | 6.92731E-10 | 0 | 0 | 0.0008 | Res | 0.0063 |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 1.16E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.09E-08 | 2.79E-08 | 6.54E-07 | 2.29E-08 | 1.33972E-10 | 6.46852E-10 | 0 | 0 | 0.0008 | Res | 0.0059 |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 1.07E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 9.99E-09 | 2.56E-08 | 6.00E-07 | 2.10E-08 | 1.23782E-10 | 5.97653E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 9.85E-06 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 9.16E-09 | 2.33E-08 | 5.47E-07 | 1.91E-08 | 1.13892E-10 | 5.49901E-10 | 0 | 0 | 0.0007 | Res | 0.0050 |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 9.04E-06 | 1.16E-08 | 6.98E-09 | 1.16E-08 | 8.37E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 | 1.04536E-10 | 5.04726E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 8.29E-06 | 1.06E-08 | 6.33E-09 | 1.06E-08 | 7.64E-09 | 1.93E-08 | 4.51E-07 | 1.58E-08 | 9.58529E-11 | 4.62802E-10 | 0 | 0 | 0.0006 | Res | 0.0042 |
| 581962_4129978.02 | 581962 | 4129978.02 | 1.72E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 1.58E-08 | 4.00E-08 | 9.37E-07 | 3.28E-08 | 1.98449E-10 | 9.5816E-10 | 0 | 0 | 0.0012 | Res | 0.0088 |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 1.64E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.50E-08 | 3.74E-08 | 8.77E-07 | 3.06E-08 | 1.89439E-10 | 9.14661E-10 | 0 | 0 | 0.0011 | Res | 0.0083 |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 1.67E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.54E-08 | 3.90E-08 | 9.14E-07 | 3.19E-08 | 1.92816E-10 | 9.30966E-10 | 0 | 0 | 0.0011 | Res | 0.0085 |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 1.64E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 1.54E-08 | 3.94E-08 | 9.22E-07 | 3.23E-08 | 1.89776E-10 | 9.16287E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 1.62E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 1.54E-08 | 4.00E-08 | 9.38E-07 | 3.28E-08 | 1.87579E-10 | 9.05682E-10 | 0 | 0 | 0.0011 | Res | 0.0083 |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 1.47E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.40E-08 | 3.60E-08 | 8.44E-07 | 2.95E-08 | 1.70403E-10 | 8.2275E-10 | 0 | 0 | 0.0010 | Res | 0.0075 |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 1.44E-05 | 1.94E-08 | 1.16E-08 | 1.94E-08 | 1.36E-08 | 3.55E-08 | 8.32E-07 | 2.91E-08 | 1.66049E-10 | 8.01729E-10 | 0 | 0 | 0.0010 | Res | 0.0074 |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 1.35E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.28E-08 | 3.32E-08 | 7.79E-07 | 2.73E-08 | 1.5612E-10 | 7.53787E-10 | 0 | 0 | 0.0009 | Res | 0.0069 |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 1.25E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.18E-08 | 3.06E-08 | 7.16E-07 | 2.51E-08 | 1.44494E-10 | 6.97653E-10 | 0 | 0 | 0.0008 | Res | 0.0064 |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 1.15E-05 | 1.52E-08 | 9.15E-09 | 1.52E-08 | 1.08E-08 | 2.79E-08 | 6.53E-07 | 2.28E-08 | 1.32769E-10 | 6.41044E-10 | 0 | 0 | 0.0008 | Res | 0.0059 |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 1.05E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 9.82E-09 | 2.53E-08 | 5.92E-07 | 2.07E-08 | 1.21479E-10 | 5.86531E-10 | 0 | 0 | 0.0007 | Res | 0.0054 |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 9.61E-06 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 8.94E-09 | 2.29E-08 | 5.36E-07 | 1.87E-08 | 1.11041E-10 | 5.36136E-10 | 0 | 0 | 0.0006 | Res | 0.0049 |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 8.79E-06 | 1.13E-08 | 6.81E-09 | 1.13E-08 | 8.15E-09 | 2.07E-08 | 4.85E-07 | 1.70E-08 | 1.01664E-10 | 4.90862E-10 | 0 | 0 | 0.0006 | Res | 0.0045 |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 8.05E-06 | 1.03E-08 | 6.16E-09 | 1.03E-08 | 7.42E-09 | 1.87E-08 | 4.39E-07 | 1.53E-08 | 9.30334E-11 | 4.49189E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 7.32E-06 | 9.21E-09 | 5.53E-09 | 9.21E-09 | 6.71E-09 | 1.68E-08 | 3.93E-07 | 1.37E-08 | 8.45787E-11 | 4.08367E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 6.53E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.94E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 7.54586E-11 | 3.64333E-10 | 0 | 0 | 0.0004 | Res | 0.0033 |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.37E-05 | 3.27E-08 | 1.96E-08 | 3.27E-08 | 2.28E-08 | 5.98E-08 | 1.40E-06 | 4.91E-08 | 2.73995E-10 | 1.32292E-09 | 0 | 0 | 0.0016 | Res | 0.0121 |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.23E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.14E-08 | 5.62E-08 | 1.32E-06 | 4.61E-08 | 2.57424E-10 | 1.24291E-09 | 0 | 0 | 0.0015 | Res | 0.0114 |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.92E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 1.80E-08 | 4.68E-08 | 1.10E-06 | 3.84E-08 | 2.21535E-10 | 1.06963E-09 | 0 | 0 | 0.0013 | Res | 0.0098 |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 1.72E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.61E-08 | 4.14E-08 | 9.70E-07 | 3.39E-08 | 1.9885E-10 | 9.60099E-10 | 0 | 0 | 0.0012 | Res | 0.0088 |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 1.67E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.58E-08 | 4.11E-08 | 9.63E-07 | 3.37E-08 | 1.93521E-10 | 9.34369E-10 | 0 | 0 | 0.0011 | Res | 0.0086 |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 1.63E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.55E-08 | 4.07E-08 | 9.53E-07 | 3.34E-08 | 1.87997E-10 | 9.07697E-10 | 0 | 0 | 0.0011 | Res | 0.0083 |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 1.58E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.51E-08 | 3.98E-08 | 9.32E-07 | 3.26E-08 | 1.82247E-10 | 8.79935E-10 | 0 | 0 | 0.0011 | Res | 0.0081 |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 1.46E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.39E-08 | 3.66E-08 | 8.59E-07 | 3.01E-08 | 1.68982E-10 | 8.15886E-10 | 0 | 0 | 0.0010 | Res | 0.0075 |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 1.36E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.29E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 | 1.5664E-10 | 7.56297E-10 | 0 | 0 | 0.0009 | Res | 0.0070 |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 1.25E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.18E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 1.43918E-10 | 6.94871E-10 | 0 | 0 | 0.0008 | Res | 0.0064 |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 1.13E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.07E-08 | 2.78E-08 | 6.52E-07 | 2.28E-08 | 1.31127E-10 | 6.33116E-10 | 0 | 0 | 0.0008 | Res | 0.0059 |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 1.03E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 9.66E-09 | 2.50E-08 | 5.85E-07 | 2.05E-08 | 1.19042E-10 | 5.74763E-10 | 0 | 0 | 0.0007 | Res | 0.0053 |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 9.36E-06 | 1.23E-08 | 7.38E-09 | 1.23E-08 | 8.74E-09 | 2.25E-08 | 5.26E-07 | 1.84E-08 | 1.08245E-10 | 5.22636E-10 | 0 | 0 | 0.0006 | Res | 0.0048 |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 8.50E-06 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 7.89E-09 | 2.01E-08 | 4.72E-07 | 1.65E-08 | 9.82424E-11 | 4.74339E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 7.74E-06 | 9.92E-09 | 5.95E-09 | 9.92E-09 | 7.15E-09 | 1.81E-08 | 4.24E-07 | 1.48E-08 | 8.95131E-11 | 4.32192E-10 | 0 | 0 | 0.0005 | Res | 0.0040 |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 7.08E-06 | 8.96E-09 | 5.38E-09 | 8.96E-09 | 6.50E-09 | 1.63E-08 | 3.83E-07 | 1.34E-08 | 8.18414E-11 | 3.95151E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 6.47E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.91E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 7.48342E-11 | 3.61319E-10 | 0 | 0 | 0.0004 | Res | 0.0033 |
| 581962_4130145.84 | 581962 | 4130145.84 | 2.52E-05 | 3.64E-08 | 2.18E-08 | 3.64E-08 | 2.48E-08 | 6.67E-08 | 1.56E-06 | 5.49E-08 | 2.9122E-10 | 1.40609E-09 | 0 | 0 | 0.0017 | Res | 0.0130 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 (per million) | Receptor Type | (per million) |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.33E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.28E-08 | 6.14E-08 | 1.44E-06 | 5.05E-08 | 2.69324E-10 | 1.30036E-09 | 0 | 0 | 0.0016 | Res | 0.0120 |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.00E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 1.93E-08 | 5.15E-08 | 1.21E-06 | 4.23E-08 | 2.31123E-10 | 1.11592E-09 | 0 | 0 | 0.0013 | Res | 0.0103 |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 1.85E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 1.79E-08 | 4.77E-08 | 1.12E-06 | 3.92E-08 | 2.14207E-10 | 1.03425E-09 | 0 | 0 | 0.0012 | Res | 0.0096 |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.77E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 1.71E-08 | 4.58E-08 | 1.07E-06 | 3.76E-08 | 2.05146E-10 | 9.90496E-10 | 0 | 0 | 0.0012 | Res | 0.0092 |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 1.62E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.56E-08 | 4.15E-08 | 9.73E-07 | 3.41E-08 | 1.87282E-10 | 9.04245E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 1.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.41E-08 | 3.75E-08 | 8.78E-07 | 3.08E-08 | 1.70374E-10 | 8.22608E-10 | 0 | 0 | 0.0010 | Res | 0.0076 |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 1.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.28E-08 | 3.39E-08 | 7.96E-07 | 2.79E-08 | 1.55584E-10 | 7.51201E-10 | 0 | 0 | 0.0009 | Res | 0.0070 |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 1.23E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.16E-08 | 3.07E-08 | 7.19E-07 | 2.52E-08 | 1.41723E-10 | 6.84273E-10 | 0 | 0 | 0.0008 | Res | 0.0064 |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 1.11E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.05E-08 | 2.75E-08 | 6.44E-07 | 2.25E-08 | 1.2824E-10 | 6.19174E-10 | 0 | 0 | 0.0007 | Res | 0.0057 |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 9.97E-06 | 1.33E-08 | 8.01E-09 | 1.33E-08 | 9.38E-09 | 2.44E-08 | 5.72E-07 | 2.00E-08 | 1.15268E-10 | 5.56542E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 8.96E-06 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.38E-09 | 2.16E-08 | 5.07E-07 | 1.77E-08 | 1.03515E-10 | 4.99796E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 8.08E-06 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 7.51E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 9.33443E-11 | 4.5069E-10 | 0 | 0 | 0.0005 | Res | 0.0042 |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 7.33E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.78E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 8.46838E-11 | 4.08875E-10 | 0 | 0 | 0.0005 | Res | 0.0038 |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 6.70E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 6.16E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 7.74356E-11 | 3.73879E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 6.17E-06 | 7.75E-09 | 4.65E-09 | 7.75E-09 | 5.64E-09 | 1.41E-08 | 3.31E-07 | 1.16E-08 | 7.12874E-11 | 3.44194E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 5.49E-06 | 6.77E-09 | 4.06E-09 | 6.77E-09 | 4.99E-09 | 1.23E-08 | 2.89E-07 | 1.01E-08 | 6.35131E-11 | 3.06657E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.54E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 2.49E-08 | 6.72E-08 | 1.58E-06 | 5.53E-08 | 2.93726E-10 | 1.41818E-09 | 0 | 0 | 0.0017 | Res | 0.0132 |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 2.42E-05 | 3.50E-08 | 2.10E-08 | 3.50E-08 | 2.37E-08 | 6.42E-08 | 1.51E-06 | 5.28E-08 | 2.79217E-10 | 1.34813E-09 | 0 | 0 | 0.0016 | Res | 0.0125 |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 2.24E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 2.18E-08 | 5.92E-08 | 1.39E-06 | 4.87E-08 | 2.58677E-10 | 1.24896E-09 | 0 | 0 | 0.0015 | Res | 0.0116 |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 2.02E-05 | 2.89E-08 | 1.73E-08 | 2.89E-08 | 1.96E-08 | 5.29E-08 | 1.24E-06 | 4.36E-08 | 2.33065E-10 | 1.1253E-09 | 0 | 0 | 0.0014 | Res | 0.0105 |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 1.80E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 1.75E-08 | 4.70E-08 | 1.10E-06 | 3.86E-08 | 2.08453E-10 | 1.00647E-09 | 0 | 0 | 0.0012 | Res | 0.0094 |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 1.62E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.56E-08 | 4.18E-08 | 9.80E-07 | 3.44E-08 | 1.87049E-10 | 9.03118E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 1.46E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 1.40E-08 | 3.74E-08 | 8.78E-07 | 3.08E-08 | 1.68863E-10 | 8.15314E-10 | 0 | 0 | 0.0010 | Res | 0.0076 |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 1.32E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.26E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 1.52874E-10 | 7.38112E-10 | 0 | 0 | 0.0009 | Res | 0.0069 |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 1.19E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.13E-08 | 2.99E-08 | 7.00E-07 | 2.45E-08 | 1.37186E-10 | 6.6237E-10 | 0 | 0 | 0.0008 | Res | 0.0062 |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 1.06E-05 | 1.43E-08 | 8.61E-09 | 1.43E-08 | 9.99E-09 | 2.62E-08 | 6.15E-07 | 2.15E-08 | 1.2203E-10 | 5.89192E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 9.40E-06 | 1.26E-08 | 7.57E-09 | 1.26E-08 | 8.85E-09 | 2.31E-08 | 5.41E-07 | 1.89E-08 | 1.08642E-10 | 5.24551E-10 | 0 | 0 | 0.0006 | Res | 0.0049 |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 8.41E-06 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.87E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 9.72114E-11 | 4.69362E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 7.58E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 7.05E-09 | 1.81E-08 | 4.24E-07 | 1.48E-08 | 8.75946E-11 | 4.22929E-10 | 0 | 0 | 0.0005 | Res | 0.0039 |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 6.91E-06 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.40E-09 | 1.63E-08 | 3.82E-07 | 1.33E-08 | 7.98519E-11 | 3.85545E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 6.33E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.83E-09 | 1.48E-08 | 3.46E-07 | 1.21E-08 | 7.31784E-11 | 3.53324E-10 | 0 | 0 | 0.0004 | Res | 0.0033 |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 5.86E-06 | 7.40E-09 | 4.44E-09 | 7.40E-09 | 5.37E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 | 6.76814E-11 | 3.26783E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 5.45E-06 | 6.83E-09 | 4.10E-09 | 6.83E-09 | 4.98E-09 | 1.24E-08 | 2.92E-07 | 1.02E-08 | 6.30432E-11 | 3.04388E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 2.57E-05 | 3.74E-08 | 2.25E-08 | 3.74E-08 | 2.52E-08 | 6.87E-08 | 1.61E-06 | 5.65E-08 | 2.96981E-10 | 1.4339E-09 | 0 | 0 | 0.0017 | Res | 0.0134 |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.37E-05 | 3.44E-08 | 2.06E-08 | 3.44E-08 | 2.31E-08 | 6.30E-08 | 1.48E-06 | 5.19E-08 | 2.74009E-10 | 1.32299E-09 | 0 | 0 | 0.0016 | Res | 0.0124 |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.08E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 2.02E-08 | 5.49E-08 | 1.29E-06 | 4.52E-08 | 2.40791E-10 | 1.1626E-09 | 0 | 0 | 0.0014 | Res | 0.0109 |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 1.83E-05 | 2.61E-08 | 1.57E-08 | 2.61E-08 | 1.77E-08 | 4.78E-08 | 1.12E-06 | 3.93E-08 | 2.11536E-10 | 1.02135E-09 | 0 | 0 | 0.0012 | Res | 0.0096 |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 1.62E-05 | 2.29E-08 | 1.38E-08 | 2.29E-08 | 1.56E-08 | 4.20E-08 | 9.86E-07 | 3.46E-08 | 1.8755E-10 | 9.05542E-10 | 0 | 0 | 0.0011 | Res | 0.0085 |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 1.45E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.39E-08 | 3.72E-08 | 8.71E-07 | 3.05E-08 | 1.67277E-10 | 8.07657E-10 | 0 | 0 | 0.0010 | Res | 0.0075 |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 1.28E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.22E-08 | 3.25E-08 | 7.62E-07 | 2.67E-08 | 1.47934E-10 | 7.14264E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 1.12E-05 | 1.54E-08 | 9.25E-09 | 1.54E-08 | 1.07E-08 | 2.82E-08 | 6.61E-07 | 2.32E-08 | 1.29958E-10 | 6.27472E-10 | 0 | 0 | 0.0008 | Res | 0.0058 |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 9.90E-06 | 1.34E-08 | 8.05E-09 | 1.34E-08 | 9.35E-09 | 2.45E-08 | 5.75E-07 | 2.01E-08 | 1.14489E-10 | 5.52784E-10 | 0 | 0 | 0.0007 | Res | 0.0051 |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 8.80E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 8.27E-09 | 2.15E-08 | 5.04E-07 | 1.77E-08 | 1.01752E-10 | 4.91286E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 7.89E-06 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.37E-09 | 1.90E-08 | 4.46E-07 | 1.56E-08 | 9.11766E-11 | 4.40224E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 7.15E-06 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 6.65E-09 | 1.70E-08 | 3.99E-07 | 1.40E-08 | 8.26262E-11 | 3.98941E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 6.53E-06 | 8.43E-09 | 5.06E-09 | 8.43E-09 | 6.04E-09 | 1.54E-08 | 3.61E-07 | 1.26E-08 | 7.54522E-11 | 3.64302E-10 | 0 | 0 | 0.0004 | Res | 0.0034 |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 6.00E-06 | 7.67E-09 | 4.60E-09 | 7.67E-09 | 5.53E-09 | 1.40E-08 | 3.28E-07 | 1.15E-08 | 6.93463E-11 | 3.34822E-10 | 0 | 0 | 0.0004 | Res | 0.0031 |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 5.53E-06 | 7.00E-09 | 4.20E-09 | 7.00E-09 | 5.08E-09 | 1.28E-08 | 2.99E-07 | 1.04E-08 | 6.39359E-11 | 3.08699E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 5.12E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 4.68E-09 | 1.17E-08 | 2.74E-07 | 9.57E-09 | 5.92003E-11 | 2.85834E-10 | 0 | 0 | 0.0003 | Res | 0.0026 |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 3.49E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 3.44E-08 | 9.45E-08 | 2.22E-06 | 7.78E-08 | 4.02979E-10 | 1.94568E-09 | 0 | 0 | 0.0023 | Res | 0.0182 |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 3.37E-05 | 4.99E-08 | 2.99E-08 | 4.99E-08 | 3.32E-08 | 9.16E-08 | 2.15E-06 | 7.54E-08 | 3.89462E-10 | 1.88042E-09 | 0 | 0 | 0.0023 | Res | 0.0176 |
| 581962_4130397.57 | 581962 | 4130397.57 | 3.17E-05 | 4.68E-08 | 2.81E-08 | 4.68E-08 | 3.12E-08 | 8.59E-08 | 2.02E-06 | 7.08E-08 | 3.66734E-10 | 1.77069E-09 | 0 | 0 | 0.0021 | Res | 0.0166 |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 2.85E-05 | 4.17E-08 | 2.50E-08 | 4.17E-08 | 2.78E-08 | 7.65E-08 | 1.79E-06 | 6.30E-08 | 3.28894E-10 | 1.58798E-09 | 0 | 0 | 0.0019 | Res | 0.0149 |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 2.50E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.43E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 2.88826E-10 | 1.39453E-09 | 0 | 0 | 0.0017 | Res | 0.0131 |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 2.15E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 2.08E-08 | 5.68E-08 | 1.33E-06 | 4.67E-08 | 2.48444E-10 | 1.19955E-09 | 0 | 0 | 0.0014 | Res | 0.0113 |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 1.87E-05 | 2.68E-08 | 1.61E-08 | 2.68E-08 | 1.81E-08 | 4.91E-08 | 1.15E-06 | 4.04E-08 | 2.16732E-10 | 1.04644E-09 | 0 | 0 | 0.0013 | Res | 0.0098 |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 1.63E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.56E-08 | 4.21E-08 | 9.88E-07 | 3.46E-08 | 1.88041E-10 | 9.0791E-10 | 0 | 0 | 0.0011 | Res | 0.0085 |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 1.41E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.35E-08 | 3.61E-08 | 8.46E-07 | 2.97E-08 | 1.63042E-10 | 7.87207E-10 | 0 | 0 | 0.0010 | Res | 0.0074 |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 1.22E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.16E-08 | 3.07E-08 | 7.20E-07 | 2.52E-08 | 1.40658E-10 | 6.79133E-10 | 0 | 0 | 0.0008 | Res | 0.0063 |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 1.06E-05 | 1.44E-08 | 8.66E-09 | 1.44E-08 | 1.00E-08 | 2.64E-08 | 6.19E-07 | 2.17E-08 | 1.2262E-10 | 5.92041E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 9.36E-06 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 8.81E-09 | 2.30E-08 | 5.39E-07 | 1.89E-08 | 1.08209E-10 | 5.22463E-10 | 0 | 0 | 0.0006 | Res | 0.0049 |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 8.34E-06 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.81E-09 | 2.02E-08 | 4.74E-07 | 1.66E-08 | 9.64297E-11 | 4.65587E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 (per million) | Receptor Type | (per million) |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 7.50E-06 | 9.84E-09 | 5.91E-09 | 9.84E-09 | 6.99E-09 | 1.80E-08 | 4.21E-07 | 1.47E-08 | 8.66957E-11 | 4.18589E-10 | 0 | 0 | 0.0005 | Res | 0.0039 |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 6.80E-06 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 6.31E-09 | 1.61E-08 | 3.78E-07 | 1.32E-08 | 7.85757E-11 | 3.79383E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 6.17E-06 | 7.92E-09 | 4.75E-09 | 7.92E-09 | 5.70E-09 | 1.45E-08 | 3.39E-07 | 1.18E-08 | 7.13426E-11 | 3.4446E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 5.65E-06 | 7.17E-09 | 4.30E-09 | 7.17E-09 | 5.19E-09 | 1.31E-08 | 3.06E-07 | 1.07E-08 | 6.52697E-11 | 3.15139E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 5.19E-06 | 6.53E-09 | 3.92E-09 | 6.53E-09 | 4.76E-09 | 1.19E-08 | 2.79E-07 | 9.73E-09 | 6.00352E-11 | 2.89865E-10 | 0 | 0 | 0.0003 | Res | 0.0027 |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 4.80E-06 | 5.97E-09 | 3.58E-09 | 5.97E-09 | 4.38E-09 | 1.09E-08 | 2.55E-07 | 8.89E-09 | 5.54431E-11 | 2.67694E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 4.39E-05 | 6.62E-08 | 3.97E-08 | 6.62E-08 | 4.35E-08 | 1.22E-07 | 2.85E-06 | 1.00E-07 | 5.07259E-10 | 2.44918E-09 | 0 | 0 | 0.0030 | Res | 0.0232 |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 4.06E-05 | 6.08E-08 | 3.65E-08 | 6.08E-08 | 4.01E-08 | 1.12E-07 | 2.62E-06 | 9.21E-08 | 4.69506E-10 | 2.2669E-09 | 0 | 0 | 0.0027 | Res | 0.0215 |
| 581962_4130481.48 | 581962 | 4130481.48 | 3.48E-05 | 5.17E-08 | 3.10E-08 | 5.17E-08 | 3.42E-08 | 9.49E-08 | 2.23E-06 | 7.82E-08 | 4.01924E-10 | 1.94059E-09 | 0 | 0 | 0.0023 | Res | 0.0184 |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 3.07E-05 | 4.52E-08 | 2.71E-08 | 4.52E-08 | 3.00E-08 | 8.30E-08 | 1.95E-06 | 6.84E-08 | 3.54375E-10 | 1.71101E-09 | 0 | 0 | 0.0021 | Res | 0.0162 |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 2.60E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.54E-08 | 6.98E-08 | 1.64E-06 | 5.75E-08 | 3.00934E-10 | 1.45299E-09 | 0 | 0 | 0.0018 | Res | 0.0137 |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 2.22E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.15E-08 | 5.89E-08 | 1.38E-06 | 4.85E-08 | 2.5669E-10 | 1.23937E-09 | 0 | 0 | 0.0015 | Res | 0.0117 |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.89E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 1.82E-08 | 4.95E-08 | 1.16E-06 | 4.08E-08 | 2.18273E-10 | 1.05388E-09 | 0 | 0 | 0.0013 | Res | 0.0099 |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 1.59E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.52E-08 | 4.10E-08 | 9.62E-07 | 3.37E-08 | 1.83375E-10 | 8.85381E-10 | 0 | 0 | 0.0011 | Res | 0.0083 |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 1.34E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.28E-08 | 3.42E-08 | 8.02E-07 | 2.81E-08 | 1.55075E-10 | 7.48742E-10 | 0 | 0 | 0.0009 | Res | 0.0070 |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 1.15E-05 | 1.58E-08 | 9.48E-09 | 1.58E-08 | 1.09E-08 | 2.89E-08 | 6.78E-07 | 2.37E-08 | 1.33186E-10 | 6.43056E-10 | 0 | 0 | 0.0008 | Res | 0.0060 |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 1.01E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.50E-09 | 2.49E-08 | 5.84E-07 | 2.05E-08 | 1.16444E-10 | 5.62222E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 8.90E-06 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 8.35E-09 | 2.17E-08 | 5.09E-07 | 1.78E-08 | 1.02912E-10 | 4.96886E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 7.92E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 7.39E-09 | 1.91E-08 | 4.47E-07 | 1.56E-08 | 9.15271E-11 | 4.41916E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 7.11E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 6.60E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 8.21312E-11 | 3.9655E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 6.40E-06 | 8.22E-09 | 4.93E-09 | 8.22E-09 | 5.92E-09 | 1.50E-08 | 3.52E-07 | 1.23E-08 | 7.4006E-11 | 3.5732E-10 | 0 | 0 | 0.0004 | Res | 0.0033 |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 5.81E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 5.35E-09 | 1.34E-08 | 3.15E-07 | 1.10E-08 | 6.71642E-11 | 3.24286E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 5.32E-06 | 6.68E-09 | 4.01E-09 | 6.68E-09 | 4.88E-09 | 1.22E-08 | 2.85E-07 | 9.95E-09 | 6.15117E-11 | 2.96994E-10 | 0 | 0 | 0.0004 | Res | 0.0027 |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 4.90E-06 | 6.09E-09 | 3.65E-09 | 6.09E-09 | 4.48E-09 | 1.11E-08 | 2.60E-07 | 9.07E-09 | 5.66903E-11 | 2.73715E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 4.54E-06 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 4.13E-09 | 1.02E-08 | 2.38E-07 | 8.31E-09 | 5.25091E-11 | 2.53527E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 5.30E-05 | 8.13E-08 | 4.88E-08 | 8.13E-08 | 5.31E-08 | 1.49E-07 | 3.51E-06 | 1.23E-07 | 6.12184E-10 | 2.95578E-09 | 0 | 0 | 0.0036 | Res | 0.0280 |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 5.19E-05 | 7.93E-08 | 4.76E-08 | 7.93E-08 | 5.18E-08 | 1.46E-07 | 3.42E-06 | 1.20E-07 | 6.00295E-10 | 2.89838E-09 | 0 | 0 | 0.0035 | Res | 0.0275 |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 4.93E-05 | 7.49E-08 | 4.49E-08 | 7.49E-08 | 4.89E-08 | 1.38E-07 | 3.23E-06 | 1.13E-07 | 5.69768E-10 | 2.75099E-09 | 0 | 0 | 0.0033 | Res | 0.0262 |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 4.70E-05 | 7.10E-08 | 4.26E-08 | 7.10E-08 | 4.64E-08 | 1.30E-07 | 3.06E-06 | 1.08E-07 | 5.42758E-10 | 2.62057E-09 | 0 | 0 | 0.0032 | Res | 0.0250 |
| 581962_4130565.39 | 581962 | 4130565.39 | 4.06E-05 | 6.10E-08 | 3.66E-08 | 6.10E-08 | 4.00E-08 | 1.12E-07 | 2.63E-06 | 9.24E-08 | 4.69281E-10 | 2.26581E-09 | 0 | 0 | 0.0027 | Res | 0.0216 |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.30E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 3.24E-08 | 9.03E-08 | 2.12E-06 | 7.45E-08 | 3.81754E-10 | 1.8432E-09 | 0 | 0 | 0.0022 | Res | 0.0175 |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 2.70E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 2.64E-08 | 7.31E-08 | 1.71E-06 | 6.02E-08 | 3.11981E-10 | 1.50632E-09 | 0 | 0 | 0.0018 | Res | 0.0143 |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 2.23E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 2.17E-08 | 5.97E-08 | 1.40E-06 | 4.91E-08 | 2.57689E-10 | 1.24419E-09 | 0 | 0 | 0.0015 | Res | 0.0118 |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 1.81E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.75E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 2.09184E-10 | 1.00999E-09 | 0 | 0 | 0.0012 | Res | 0.0095 |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 1.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.43E-08 | 3.86E-08 | 9.05E-07 | 3.17E-08 | 1.71888E-10 | 8.2992E-10 | 0 | 0 | 0.0010 | Res | 0.0078 |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 1.26E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.21E-08 | 3.23E-08 | 7.57E-07 | 2.65E-08 | 1.46152E-10 | 7.05661E-10 | 0 | 0 | 0.0009 | Res | 0.0066 |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 1.08E-05 | 1.49E-08 | 8.91E-09 | 1.49E-08 | 1.03E-08 | 2.72E-08 | 6.37E-07 | 2.23E-08 | 1.25129E-10 | 6.04152E-10 | 0 | 0 | 0.0007 | Res | 0.0056 |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 9.41E-06 | 1.27E-08 | 7.62E-09 | 1.27E-08 | 8.88E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 1.08736E-10 | 5.25003E-10 | 0 | 0 | 0.0006 | Res | 0.0049 |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 8.28E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.77E-09 | 2.01E-08 | 4.71E-07 | 1.65E-08 | 9.57169E-11 | 4.62146E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 7.36E-06 | 9.64E-09 | 5.78E-09 | 9.64E-09 | 6.87E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 | 8.51316E-11 | 4.11037E-10 | 0 | 0 | 0.0005 | Res | 0.0038 |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 6.63E-06 | 8.55E-09 | 5.13E-09 | 8.55E-09 | 6.15E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 7.66192E-11 | 3.69937E-10 | 0 | 0 | 0.0004 | Res | 0.0034 |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 5.98E-06 | 7.60E-09 | 4.56E-09 | 7.60E-09 | 5.51E-09 | 1.39E-08 | 3.25E-07 | 1.13E-08 | 6.91294E-11 | 3.33774E-10 | 0 | 0 | 0.0004 | Res | 0.0031 |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 5.46E-06 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 5.01E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 6.31427E-11 | 3.04869E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 5.03E-06 | 6.23E-09 | 3.74E-09 | 6.23E-09 | 4.59E-09 | 1.14E-08 | 2.66E-07 | 9.28E-09 | 5.81201E-11 | 2.80619E-10 | 0 | 0 | 0.0003 | Res | 0.0026 |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 4.67E-06 | 5.72E-09 | 3.43E-09 | 5.72E-09 | 4.24E-09 | 1.04E-08 | 2.44E-07 | 8.52E-09 | 5.39354E-11 | 2.60414E-10 | 0 | 0 | 0.0003 | Res | 0.0024 |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 4.36E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 3.95E-09 | 9.64E-09 | 2.26E-07 | 7.87E-09 | 5.03578E-11 | 2.4314E-10 | 0 | 0 | 0.0003 | Res | 0.0022 |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 5.67E-05 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 5.65E-08 | 1.59E-07 | 3.74E-06 | 1.32E-07 | 6.55301E-10 | 3.16396E-09 | 0 | 0 | 0.0038 | Res | 0.0302 |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 5.48E-05 | 8.36E-08 | 5.02E-08 | 8.36E-08 | 5.44E-08 | 1.54E-07 | 3.61E-06 | 1.27E-07 | 6.32936E-10 | 3.05598E-09 | 0 | 0 | 0.0037 | Res | 0.0292 |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 5.45E-05 | 8.29E-08 | 4.98E-08 | 8.29E-08 | 5.39E-08 | 1.52E-07 | 3.58E-06 | 1.26E-07 | 6.29618E-10 | 3.03996E-09 | 0 | 0 | 0.0037 | Res | 0.0291 |
| 581962_4130649.3 | 581962 | 4130649.3 | 4.53E-05 | 6.86E-08 | 4.12E-08 | 6.86E-08 | 4.47E-08 | 1.26E-07 | 2.96E-06 | 1.04E-07 | 5.23807E-10 | 2.52907E-09 | 0 | 0 | 0.0031 | Res | 0.0242 |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 3.46E-05 | 5.20E-08 | 3.12E-08 | 5.20E-08 | 3.41E-08 | 9.56E-08 | 2.24E-06 | 7.89E-08 | 4.0016E-10 | 1.93208E-09 | 0 | 0 | 0.0023 | Res | 0.0185 |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 2.71E-05 | 4.03E-08 | 2.42E-08 | 4.03E-08 | 2.65E-08 | 7.40E-08 | 1.74E-06 | 6.10E-08 | 3.12833E-10 | 1.51044E-09 | 0 | 0 | 0.0018 | Res | 0.0144 |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 2.12E-05 | 3.12E-08 | 1.87E-08 | 3.12E-08 | 2.07E-08 | 5.73E-08 | 1.34E-06 | 4.72E-08 | 2.45179E-10 | 1.18378E-09 | 0 | 0 | 0.0014 | Res | 0.0112 |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 1.69E-05 | 2.45E-08 | 1.47E-08 | 2.45E-08 | 1.64E-08 | 4.49E-08 | 1.05E-06 | 3.70E-08 | 1.94901E-10 | 9.41032E-10 | 0 | 0 | 0.0011 | Res | 0.0089 |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 1.37E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.33E-08 | 3.59E-08 | 8.42E-07 | 2.95E-08 | 1.58565E-10 | 7.65591E-10 | 0 | 0 | 0.0009 | Res | 0.0072 |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 1.15E-05 | 1.61E-08 | 9.65E-09 | 1.61E-08 | 1.10E-08 | 2.95E-08 | 6.91E-07 | 2.42E-08 | 1.32486E-10 | 6.39677E-10 | 0 | 0 | 0.0008 | Res | 0.0060 |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 9.81E-06 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 9.36E-09 | 2.48E-08 | 5.81E-07 | 2.03E-08 | 1.13412E-10 | 5.47581E-10 | 0 | 0 | 0.0007 | Res | 0.0051 |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 8.57E-06 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.12E-09 | 2.12E-08 | 4.98E-07 | 1.74E-08 | 9.90679E-11 | 4.78325E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 7.56E-06 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.11E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 8.73772E-11 | 4.21879E-10 | 0 | 0 | 0.0005 | Res | 0.0039 |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 6.76E-06 | 8.85E-09 | 5.31E-09 | 8.85E-09 | 6.31E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 7.81499E-11 | 3.77327E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 6.13E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 5.69E-09 | 1.44E-08 | 3.37E-07 | 1.18E-08 | 7.08108E-11 | 3.41892E-10 | 0 | 0 | 0.0004 | Res | 0.0031 |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 5.61E-06 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 5.18E-09 | 1.30E-08 | 3.04E-07 | 1.06E-08 | 6.48884E-11 | 3.13298E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 5.19E-06 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 4.76E-09 | 1.18E-08 | 2.77E-07 | 9.68E-09 | 5.99633E-11 | 2.89518E-10 | 0 | 0 | 0.0003 | Res | 0.0026 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 (per million) | Receptor Type | (per million) |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 4.84E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 4.42E-09 | 1.09E-08 | 2.56E-07 | 8.92E-09 | 5.59409E-11 | 2.70097E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 4.55E-06 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 4.14E-09 | 1.02E-08 | 2.38E-07 | 8.30E-09 | 5.25911E-11 | 2.53923E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 4.29E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 3.89E-09 | 9.49E-09 | 2.22E-07 | 7.75E-09 | 4.9579E-11 | 2.3938E-10 | 0 | 0 | 0.0003 | Res | 0.0022 |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 8.03E-05 | 1.23E-07 | 7.39E-08 | 1.23E-07 | 7.96E-08 | 2.27E-07 | 5.32E-06 | 1.87E-07 | 9.28429E-10 | 4.48269E-09 | 0 | 0 | 0.0054 | Res | 0.0431 |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 6.86E-05 | 1.05E-07 | 6.30E-08 | 1.05E-07 | 6.79E-08 | 1.93E-07 | 4.53E-06 | 1.59E-07 | 7.92803E-10 | 3.82786E-09 | 0 | 0 | 0.0046 | Res | 0.0368 |
| 581962_4130733.21 | 581962 | 4130733.21 | 5.06E-05 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 5.00E-08 | 1.42E-07 | 3.33E-06 | 1.17E-07 | 5.84871E-10 | 2.82391E-09 | 0 | 0 | 0.0034 | Res | 0.0271 |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 3.57E-05 | 5.41E-08 | 3.24E-08 | 5.41E-08 | 3.52E-08 | 9.94E-08 | 2.33E-06 | 8.20E-08 | 4.12759E-10 | 1.9929E-09 | 0 | 0 | 0.0024 | Res | 0.0191 |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 2.54E-05 | 3.82E-08 | 2.29E-08 | 3.82E-08 | 2.51E-08 | 7.01E-08 | 1.65E-06 | 5.78E-08 | 2.94127E-10 | 1.42012E-09 | 0 | 0 | 0.0017 | Res | 0.0135 |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.88E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 1.84E-08 | 5.11E-08 | 1.20E-06 | 4.21E-08 | 2.17194E-10 | 1.04867E-09 | 0 | 0 | 0.0013 | Res | 0.0099 |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 1.47E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.44E-08 | 3.94E-08 | 9.25E-07 | 3.25E-08 | 1.69989E-10 | 8.20751E-10 | 0 | 0 | 0.0010 | Res | 0.0077 |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 1.19E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.16E-08 | 3.15E-08 | 7.39E-07 | 2.59E-08 | 1.38066E-10 | 6.66618E-10 | 0 | 0 | 0.0008 | Res | 0.0063 |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 1.00E-05 | 1.42E-08 | 8.52E-09 | 1.42E-08 | 9.69E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 1.15972E-10 | 5.59942E-10 | 0 | 0 | 0.0007 | Res | 0.0052 |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 8.66E-06 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 8.30E-09 | 2.20E-08 | 5.17E-07 | 1.81E-08 | 1.00056E-10 | 4.83095E-10 | 0 | 0 | 0.0006 | Res | 0.0045 |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 7.63E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 7.27E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 8.82174E-11 | 4.25936E-10 | 0 | 0 | 0.0005 | Res | 0.0040 |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 6.86E-06 | 9.23E-09 | 5.54E-09 | 9.23E-09 | 6.49E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 7.93152E-11 | 3.82954E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 6.26E-06 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 5.89E-09 | 1.51E-08 | 3.55E-07 | 1.24E-08 | 7.23864E-11 | 3.495E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 5.79E-06 | 7.55E-09 | 4.53E-09 | 7.55E-09 | 5.40E-09 | 1.38E-08 | 3.23E-07 | 1.13E-08 | 6.68793E-11 | 3.2291E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 5.39E-06 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 5.01E-09 | 1.27E-08 | 2.97E-07 | 1.04E-08 | 6.2343E-11 | 3.01008E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 5.06E-06 | 6.43E-09 | 3.86E-09 | 6.43E-09 | 4.67E-09 | 1.17E-08 | 2.75E-07 | 9.60E-09 | 5.8504E-11 | 2.82472E-10 | 0 | 0 | 0.0003 | Res | 0.0026 |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 4.77E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 4.38E-09 | 1.09E-08 | 2.56E-07 | 8.94E-09 | 5.51364E-11 | 2.66213E-10 | 0 | 0 | 0.0003 | Res | 0.0024 |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 4.53E-06 | 5.63E-09 | 3.38E-09 | 5.63E-09 | 4.14E-09 | 1.03E-08 | 2.40E-07 | 8.39E-09 | 5.2327E-11 | 2.52648E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 4.30E-06 | 5.29E-09 | 3.17E-09 | 5.29E-09 | 3.91E-09 | 9.64E-09 | 2.26E-07 | 7.87E-09 | 4.96477E-11 | 2.39712E-10 | 0 | 0 | 0.0003 | Res | 0.0022 |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 1.18E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 1.17E-07 | 3.34E-07 | 7.83E-06 | 2.76E-07 | 1.36141E-09 | 6.57323E-09 | 0 | 0 | 0.0079 | Res | 0.0633 |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 1.32E-04 | 2.04E-07 | 1.22E-07 | 2.04E-07 | 1.31E-07 | 3.75E-07 | 8.80E-06 | 3.10E-07 | 1.53114E-09 | 7.39272E-09 | 0 | 0 | 0.0089 | Res | 0.0713 |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 1.19E-04 | 1.83E-07 | 1.10E-07 | 1.83E-07 | 1.18E-07 | 3.36E-07 | 7.89E-06 | 2.77E-07 | 1.37331E-09 | 6.6307E-09 | 0 | 0 | 0.0080 | Res | 0.0640 |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 9.00E-05 | 1.38E-07 | 8.28E-08 | 1.38E-07 | 8.90E-08 | 2.54E-07 | 5.96E-06 | 2.10E-07 | 1.0401E-09 | 5.02185E-09 | 0 | 0 | 0.0061 | Res | 0.0484 |
| 581962_4130817.12 | 581962 | 4130817.12 | 5.49E-05 | 8.39E-08 | 5.03E-08 | 8.39E-08 | 5.43E-08 | 1.54E-07 | 3.62E-06 | 1.27E-07 | 6.34283E-10 | 3.06248E-09 | 0 | 0 | 0.0037 | Res | 0.0295 |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 3.32E-05 | 5.03E-08 | 3.02E-08 | 5.03E-08 | 3.28E-08 | 9.25E-08 | 2.17E-06 | 7.63E-08 | 3.83257E-10 | 1.85046E-09 | 0 | 0 | 0.0022 | Res | 0.0177 |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 2.17E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 2.14E-08 | 5.99E-08 | 1.41E-06 | 4.94E-08 | 2.50885E-10 | 1.21134E-09 | 0 | 0 | 0.0015 | Res | 0.0115 |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 1.58E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.56E-08 | 4.31E-08 | 1.01E-06 | 3.55E-08 | 1.82731E-10 | 8.82274E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 1.24E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.22E-08 | 3.34E-08 | 7.83E-07 | 2.75E-08 | 1.43369E-10 | 6.92222E-10 | 0 | 0 | 0.0008 | Res | 0.0065 |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 1.03E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 1.00E-08 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 1.18543E-10 | 5.72357E-10 | 0 | 0 | 0.0007 | Res | 0.0054 |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 8.83E-06 | 1.26E-08 | 7.56E-09 | 1.26E-08 | 8.58E-09 | 2.31E-08 | 5.42E-07 | 1.90E-08 | 1.02075E-10 | 4.92846E-10 | 0 | 0 | 0.0006 | Res | 0.0046 |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 7.82E-06 | 1.10E-08 | 6.61E-09 | 1.10E-08 | 7.55E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 9.04123E-11 | 4.36534E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 7.06E-06 | 9.81E-09 | 5.88E-09 | 9.81E-09 | 6.78E-09 | 1.79E-08 | 4.21E-07 | 1.47E-08 | 8.15813E-11 | 3.93895E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 6.47E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 6.18E-09 | 1.62E-08 | 3.81E-07 | 1.33E-08 | 7.48359E-11 | 3.61327E-10 | 0 | 0 | 0.0004 | Res | 0.0034 |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 5.98E-06 | 8.09E-09 | 4.86E-09 | 8.09E-09 | 5.68E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 | 6.91453E-11 | 3.33851E-10 | 0 | 0 | 0.0004 | Res | 0.0031 |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 5.58E-06 | 7.45E-09 | 4.47E-09 | 7.45E-09 | 5.26E-09 | 1.36E-08 | 3.19E-07 | 1.12E-08 | 6.4505E-11 | 3.11447E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 5.24E-06 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 4.91E-09 | 1.26E-08 | 2.95E-07 | 1.03E-08 | 6.05348E-11 | 2.92278E-10 | 0 | 0 | 0.0004 | Res | 0.0027 |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 4.93E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 4.60E-09 | 1.17E-08 | 2.75E-07 | 9.61E-09 | 5.70443E-11 | 2.75424E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 4.66E-06 | 5.98E-09 | 3.59E-09 | 5.98E-09 | 4.32E-09 | 1.09E-08 | 2.56E-07 | 8.94E-09 | 5.38211E-11 | 2.59862E-10 | 0 | 0 | 0.0003 | Res | 0.0024 |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 4.41E-06 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.07E-09 | 1.02E-08 | 2.39E-07 | 8.36E-09 | 5.10053E-11 | 2.46266E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 4.20E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 3.85E-09 | 9.60E-09 | 2.25E-07 | 7.85E-09 | 4.84931E-11 | 2.34137E-10 | 0 | 0 | 0.0003 | Res | 0.0021 |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 2.32E-04 | 3.58E-07 | 2.15E-07 | 3.58E-07 | 2.30E-07 | 6.59E-07 | 1.55E-05 | 5.44E-07 | 2.68634E-09 | 1.29703E-08 | 0 | 0 | 0.0157 | Res | 0.1255 |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 2.48E-04 | 3.82E-07 | 2.29E-07 | 3.82E-07 | 2.45E-07 | 7.02E-07 | 1.65E-05 | 5.80E-07 | 2.86553E-09 | 1.38355E-08 | 0 | 0 | 0.0167 | Res | 0.1339 |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 2.21E-04 | 3.40E-07 | 2.04E-07 | 3.40E-07 | 2.18E-07 | 6.26E-07 | 1.47E-05 | 5.17E-07 | 2.55385E-09 | 1.23307E-08 | 0 | 0 | 0.0149 | Res | 0.1194 |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 1.16E-04 | 1.79E-07 | 1.07E-07 | 1.79E-07 | 1.15E-07 | 3.29E-07 | 7.72E-06 | 2.72E-07 | 1.34542E-09 | 6.49604E-09 | 0 | 0 | 0.0078 | Res | 0.0628 |
| 581962_4130901.03 | 581962 | 4130901.03 | 4.77E-05 | 7.28E-08 | 4.37E-08 | 7.28E-08 | 4.71E-08 | 1.34E-07 | 3.14E-06 | 1.10E-07 | 5.51434E-10 | 2.66246E-09 | 0 | 0 | 0.0032 | Res | 0.0256 |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 2.59E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.56E-08 | 7.19E-08 | 1.69E-06 | 5.93E-08 | 2.99498E-10 | 1.44605E-09 | 0 | 0 | 0.0017 | Res | 0.0138 |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 1.76E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.73E-08 | 4.83E-08 | 1.13E-06 | 3.98E-08 | 2.03203E-10 | 9.81118E-10 | 0 | 0 | 0.0012 | Res | 0.0093 |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 1.36E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.34E-08 | 3.69E-08 | 8.66E-07 | 3.04E-08 | 1.56886E-10 | 7.57485E-10 | 0 | 0 | 0.0009 | Res | 0.0072 |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 1.12E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 1.10E-08 | 3.01E-08 | 7.07E-07 | 2.48E-08 | 1.29437E-10 | 6.24957E-10 | 0 | 0 | 0.0008 | Res | 0.0059 |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 9.58E-06 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 9.37E-09 | 2.55E-08 | 5.99E-07 | 2.10E-08 | 1.10725E-10 | 5.34606E-10 | 0 | 0 | 0.0006 | Res | 0.0050 |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 8.38E-06 | 1.21E-08 | 7.24E-09 | 1.21E-08 | 8.16E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 9.68557E-11 | 4.67644E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 7.46E-06 | 1.06E-08 | 6.38E-09 | 1.06E-08 | 7.24E-09 | 1.95E-08 | 4.57E-07 | 1.60E-08 | 8.62783E-11 | 4.16574E-10 | 0 | 0 | 0.0005 | Res | 0.0039 |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 6.73E-06 | 9.48E-09 | 5.69E-09 | 9.48E-09 | 6.50E-09 | 1.74E-08 | 4.07E-07 | 1.43E-08 | 7.77884E-11 | 3.75582E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 6.14E-06 | 8.56E-09 | 5.14E-09 | 8.56E-09 | 5.90E-09 | 1.57E-08 | 3.67E-07 | 1.29E-08 | 7.10079E-11 | 3.42844E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 5.65E-06 | 7.79E-09 | 4.67E-09 | 7.79E-09 | 5.41E-09 | 1.42E-08 | 3.34E-07 | 1.17E-08 | 6.5349E-11 | 3.15522E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 5.26E-06 | 7.15E-09 | 4.29E-09 | 7.15E-09 | 5.00E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 6.07622E-11 | 2.93375E-10 | 0 | 0 | 0.0004 | Res | 0.0027 |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 4.92E-06 | 6.62E-09 | 3.97E-09 | 6.62E-09 | 4.66E-09 | 1.21E-08 | 2.84E-07 | 9.92E-09 | 5.69161E-11 | 2.74805E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 4.64E-06 | 6.16E-09 | 3.69E-09 | 6.16E-09 | 4.36E-09 | 1.12E-08 | 2.64E-07 | 9.22E-09 | 5.35942E-11 | 2.58766E-10 | 0 | 0 | 0.0003 | Res | 0.0024 |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 4.38E-06 | 5.75E-09 | 3.45E-09 | 5.75E-09 | 4.10E-09 | 1.05E-08 | 2.46E-07 | 8.60E-09 | 5.06811E-11 | 2.44701E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 4.16E-06 | 5.38E-09 | 3.23E-09 | 5.38E-09 | 3.87E-09 | 9.82E-09 | 2.30E-07 | 8.04E-09 | 4.80341E-11 | 2.31921E-10 | 0 | 0 | 0.0003 | Res | 0.0021 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 3.96E-06 | 5.06E-09 | 3.04E-09 | 5.06E-09 | 3.66E-09 | 9.23E-09 | 2.16E-07 | 7.56E-09 | 4.57516E-11 | 2.209E-10 | 0 | 0 | 0.0003 | Res | 0.0020 |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 6.17E-04 | 9.51E-07 | 5.71E-07 | 9.51E-07 | 6.09E-07 | 1.75E-06 | 4.11E-05 | 1.45E-06 | 7.13195E-09 | 3.44349E-08 | 0 | 0 | 0.0416 | Res | 0.3339 |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 8.09E-04 | 1.25E-06 | 7.49E-07 | 1.25E-06 | 7.99E-07 | 2.30E-06 | 5.39E-05 | 1.90E-06 | 9.35711E-09 | 4.51785E-08 | 0 | 0 | 0.0545 | Res | 0.4383 |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 9.41E-04 | 1.45E-06 | 8.71E-07 | 1.45E-06 | 9.30E-07 | 2.67E-06 | 6.27E-05 | 2.21E-06 | 1.08825E-08 | 5.25435E-08 | 0 | 0 | 0.0634 | Res | 0.5098 |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 7.57E-05 | 1.16E-07 | 6.96E-08 | 1.16E-07 | 7.48E-08 | 2.13E-07 | 5.01E-06 | 1.76E-07 | 8.75486E-10 | 4.22707E-09 | 0 | 0 | 0.0051 | Res | 0.0408 |
| 581962_4130984.94 | 581962 | 4130984.94 | 3.29E-05 | 4.99E-08 | 3.00E-08 | 4.99E-08 | 3.25E-08 | 9.18E-08 | 2.15E-06 | 7.57E-08 | 3.80594E-10 | 1.8376E-09 | 0 | 0 | 0.0022 | Res | 0.0176 |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 2.14E-05 | 3.22E-08 | 1.93E-08 | 3.22E-08 | 2.11E-08 | 5.91E-08 | 1.39E-06 | 4.87E-08 | 2.47455E-10 | 1.19478E-09 | 0 | 0 | 0.0014 | Res | 0.0114 |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 1.59E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.56E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 1.83827E-10 | 8.87562E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 1.27E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.24E-08 | 3.42E-08 | 8.03E-07 | 2.82E-08 | 1.4625E-10 | 7.06132E-10 | 0 | 0 | 0.0009 | Res | 0.0067 |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 1.05E-05 | 1.53E-08 | 9.19E-09 | 1.53E-08 | 1.03E-08 | 2.81E-08 | 6.59E-07 | 2.31E-08 | 1.21119E-10 | 5.84794E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 8.93E-06 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 8.71E-09 | 2.37E-08 | 5.57E-07 | 1.95E-08 | 1.03201E-10 | 4.98281E-10 | 0 | 0 | 0.0006 | Res | 0.0047 |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 7.78E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 7.56E-09 | 2.05E-08 | 4.80E-07 | 1.69E-08 | 8.98774E-11 | 4.33951E-10 | 0 | 0 | 0.0005 | Res | 0.0041 |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 6.89E-06 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 6.68E-09 | 1.80E-08 | 4.22E-07 | 1.48E-08 | 7.96769E-11 | 3.847E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 6.19E-06 | 8.75E-09 | 5.25E-09 | 8.75E-09 | 5.98E-09 | 1.60E-08 | 3.76E-07 | 1.32E-08 | 7.16072E-11 | 3.45738E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 5.63E-06 | 7.88E-09 | 4.73E-09 | 7.88E-09 | 5.42E-09 | 1.44E-08 | 3.38E-07 | 1.19E-08 | 6.50924E-11 | 3.14283E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 5.17E-06 | 7.16E-09 | 4.30E-09 | 7.16E-09 | 4.95E-09 | 1.31E-08 | 3.07E-07 | 1.08E-08 | 5.97298E-11 | 2.8839E-10 | 0 | 0 | 0.0003 | Res | 0.0027 |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 4.80E-06 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.58E-09 | 1.20E-08 | 2.82E-07 | 9.88E-09 | 5.54354E-11 | 2.67656E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 4.50E-06 | 6.11E-09 | 3.66E-09 | 6.11E-09 | 4.27E-09 | 1.12E-08 | 2.62E-07 | 9.17E-09 | 5.19744E-11 | 2.50946E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 4.23E-06 | 5.68E-09 | 3.41E-09 | 5.68E-09 | 4.00E-09 | 1.04E-08 | 2.43E-07 | 8.52E-09 | 4.88629E-11 | 2.35923E-10 | 0 | 0 | 0.0003 | Res | 0.0022 |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 4.01E-06 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.77E-09 | 9.74E-09 | 2.28E-07 | 7.98E-09 | 4.63433E-11 | 2.23757E-10 | 0 | 0 | 0.0003 | Res | 0.0021 |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 3.81E-06 | 5.01E-09 | 3.01E-09 | 5.01E-09 | 3.57E-09 | 9.15E-09 | 2.14E-07 | 7.50E-09 | 4.40541E-11 | 2.12704E-10 | 0 | 0 | 0.0003 | Res | 0.0020 |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 3.63E-06 | 4.72E-09 | 2.83E-09 | 4.72E-09 | 3.39E-09 | 8.62E-09 | 2.02E-07 | 7.06E-09 | 4.2016E-11 | 2.02864E-10 | 0 | 0 | 0.0002 | Res | 0.0019 |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 1.02E-04 | 1.56E-07 | 9.36E-08 | 1.56E-07 | 1.00E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 1.17517E-09 | 5.67403E-09 | 0 | 0 | 0.0068 | Res | 0.0548 |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 8.12E-05 | 1.24E-07 | 7.47E-08 | 1.24E-07 | 8.02E-08 | 2.29E-07 | 5.37E-06 | 1.89E-07 | 9.3871E-10 | 4.53233E-09 | 0 | 0 | 0.0055 | Res | 0.0437 |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 4.41E-05 | 6.71E-08 | 4.03E-08 | 6.71E-08 | 4.35E-08 | 1.23E-07 | 2.90E-06 | 1.02E-07 | 5.09412E-10 | 2.45957E-09 | 0 | 0 | 0.0030 | Res | 0.0236 |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 2.83E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.79E-08 | 7.86E-08 | 1.84E-06 | 6.48E-08 | 3.27255E-10 | 1.58007E-09 | 0 | 0 | 0.0019 | Res | 0.0151 |
| 581962_4131068.85 | 581962 | 4131068.85 | 2.07E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 2.03E-08 | 5.69E-08 | 1.33E-06 | 4.69E-08 | 2.38832E-10 | 1.15314E-09 | 0 | 0 | 0.0014 | Res | 0.0110 |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 1.58E-05 | 2.34E-08 | 1.41E-08 | 2.34E-08 | 1.55E-08 | 4.30E-08 | 1.01E-06 | 3.55E-08 | 1.82356E-10 | 8.80462E-10 | 0 | 0 | 0.0011 | Res | 0.0084 |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 1.26E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.23E-08 | 3.40E-08 | 7.98E-07 | 2.80E-08 | 1.45582E-10 | 7.02909E-10 | 0 | 0 | 0.0008 | Res | 0.0067 |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 1.04E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 1.02E-08 | 2.79E-08 | 6.55E-07 | 2.30E-08 | 1.20642E-10 | 5.82489E-10 | 0 | 0 | 0.0007 | Res | 0.0055 |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 8.86E-06 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 8.63E-09 | 2.35E-08 | 5.50E-07 | 1.93E-08 | 1.02386E-10 | 4.94345E-10 | 0 | 0 | 0.0006 | Res | 0.0047 |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 7.68E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.46E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 8.88274E-11 | 4.28881E-10 | 0 | 0 | 0.0005 | Res | 0.0040 |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 6.77E-06 | 9.62E-09 | 5.77E-09 | 9.62E-09 | 6.56E-09 | 1.76E-08 | 4.13E-07 | 1.45E-08 | 7.82847E-11 | 3.77979E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 6.05E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 5.84E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 6.98935E-11 | 3.37463E-10 | 0 | 0 | 0.0004 | Res | 0.0032 |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 5.47E-06 | 7.65E-09 | 4.59E-09 | 7.65E-09 | 5.26E-09 | 1.40E-08 | 3.28E-07 | 1.15E-08 | 6.31926E-11 | 3.0511E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 4.99E-06 | 6.93E-09 | 4.16E-09 | 6.93E-09 | 4.79E-09 | 1.27E-08 | 2.97E-07 | 1.04E-08 | 5.76708E-11 | 2.78449E-10 | 0 | 0 | 0.0003 | Res | 0.0026 |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 4.59E-06 | 6.33E-09 | 3.80E-09 | 6.33E-09 | 4.39E-09 | 1.16E-08 | 2.71E-07 | 9.51E-09 | 5.30586E-11 | 2.5618E-10 | 0 | 0 | 0.0003 | Res | 0.0024 |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 4.25E-06 | 5.81E-09 | 3.48E-09 | 5.81E-09 | 4.05E-09 | 1.06E-08 | 2.49E-07 | 8.72E-09 | 4.90934E-11 | 2.37036E-10 | 0 | 0 | 0.0003 | Res | 0.0022 |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 4.00E-06 | 5.43E-09 | 3.26E-09 | 5.43E-09 | 3.80E-09 | 9.92E-09 | 2.33E-07 | 8.14E-09 | 4.62018E-11 | 2.23074E-10 | 0 | 0 | 0.0003 | Res | 0.0021 |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 3.77E-06 | 5.08E-09 | 3.05E-09 | 5.08E-09 | 3.57E-09 | 9.28E-09 | 2.18E-07 | 7.62E-09 | 4.35921E-11 | 2.10474E-10 | 0 | 0 | 0.0003 | Res | 0.0020 |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 3.59E-06 | 4.80E-09 | 2.88E-09 | 4.80E-09 | 3.39E-09 | 8.77E-09 | 2.05E-07 | 7.19E-09 | 4.1513E-11 | 2.00435E-10 | 0 | 0 | 0.0002 | Res | 0.0019 |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 3.43E-06 | 4.55E-09 | 2.73E-09 | 4.55E-09 | 3.22E-09 | 8.30E-09 | 1.95E-07 | 6.81E-09 | 3.96844E-11 | 1.91606E-10 | 0 | 0 | 0.0002 | Res | 0.0018 |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 3.27E-06 | 4.28E-09 | 2.57E-09 | 4.28E-09 | 3.05E-09 | 7.82E-09 | 1.83E-07 | 6.41E-09 | 3.7763E-11 | 1.82329E-10 | 0 | 0 | 0.0002 | Res | 0.0017 |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 1.07E-05 | 1.56E-08 | 9.36E-09 | 1.56E-08 | 1.05E-08 | 2.86E-08 | 6.72E-07 | 2.36E-08 | 1.23896E-10 | 5.98199E-10 | 0 | 0 | 0.0007 | Res | 0.0056 |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 6.54E-06 | 9.24E-09 | 5.55E-09 | 9.24E-09 | 6.32E-09 | 1.69E-08 | 3.97E-07 | 1.39E-08 | 7.56455E-11 | 3.65236E-10 | 0 | 0 | 0.0004 | Res | 0.0034 |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 5.90E-06 | 8.28E-09 | 4.97E-09 | 8.28E-09 | 5.69E-09 | 1.52E-08 | 3.55E-07 | 1.25E-08 | 6.82262E-11 | 3.29414E-10 | 0 | 0 | 0.0004 | Res | 0.0031 |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 5.34E-06 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 5.13E-09 | 1.36E-08 | 3.19E-07 | 1.12E-08 | 6.16919E-11 | 2.97864E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 4.87E-06 | 6.73E-09 | 4.04E-09 | 6.73E-09 | 4.66E-09 | 1.23E-08 | 2.89E-07 | 1.01E-08 | 5.62536E-11 | 2.71607E-10 | 0 | 0 | 0.0003 | Res | 0.0025 |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 4.42E-06 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 4.22E-09 | 1.11E-08 | 2.60E-07 | 9.11E-09 | 5.11275E-11 | 2.46857E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 4.07E-06 | 5.54E-09 | 3.33E-09 | 5.54E-09 | 3.88E-09 | 1.01E-08 | 2.38E-07 | 8.32E-09 | 4.70316E-11 | 2.27081E-10 | 0 | 0 | 0.0003 | Res | 0.0021 |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 3.76E-06 | 5.09E-09 | 3.06E-09 | 5.09E-09 | 3.58E-09 | 9.32E-09 | 2.18E-07 | 7.64E-09 | 4.35164E-11 | 2.10108E-10 | 0 | 0 | 0.0003 | Res | 0.0020 |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 3.52E-06 | 4.73E-09 | 2.84E-09 | 4.73E-09 | 3.33E-09 | 8.65E-09 | 2.03E-07 | 7.10E-09 | 4.06922E-11 | 1.96472E-10 | 0 | 0 | 0.0002 | Res | 0.0018 |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 3.31E-06 | 4.43E-09 | 2.66E-09 | 4.43E-09 | 3.13E-09 | 8.09E-09 | 1.90E-07 | 6.63E-09 | 3.82949E-11 | 1.84898E-10 | 0 | 0 | 0.0002 | Res | 0.0017 |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 3.16E-06 | 4.20E-09 | 2.52E-09 | 4.20E-09 | 2.98E-09 | 7.67E-09 | 1.80E-07 | 6.29E-09 | 3.65249E-11 | 1.76352E-10 | 0 | 0 | 0.0002 | Res | 0.0016 |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 3.02E-06 | 3.99E-09 | 2.39E-09 | 3.99E-09 | 2.84E-09 | 7.28E-09 | 1.71E-07 | 5.97E-09 | 3.4909E-11 | 1.6855E-10 | 0 | 0 | 0.0002 | Res | 0.0016 |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 2.87E-06 | 3.76E-09 | 2.26E-09 | 3.76E-09 | 2.69E-09 | 6.87E-09 | 1.61E-07 | 5.63E-09 | 3.31928E-11 | 1.60263E-10 | 0 | 0 | 0.0002 | Res | 0.0015 |

# HRA Permanente Creek Restoration Project

Construction Year 2025

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2025_PAVED | 1.711E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2025 | 0 | 1 | 0 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.068 | 0.000 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 7.44E-05 | 0.00E+00 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 8.12E-04 | 0.00E+00 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 5.68E-04 | 0.00E+00 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 1.01E-03 | 0.00E+00 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 1.83E-03 | 0.00E+00 | 0.00E+00 |
| | Lead | 0.00E+00 | 2.71E-06 | 0.00E+00 | 0.00E+00 |
| | Nickel | 0.00E+00 | 6.16E-05 | 0.00E+00 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 3.45E-02 | 0.00E+00 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 2.00E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 6.54E-08 | 1.85E-07 | 4.35E-06 | 1.53E-07 | 0 | 1.48789E-08 | 0 | 0 | 0.0149 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.37E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 4.46E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 1.02128E-08 | 0 | 0 | 0.0102 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.25E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 3.78E-09 | 6.52E-09 | 1.51E-07 | 5.15E-09 | 0 | 9.29858E-10 | 0 | 0 | 0.0009 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.58E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 5.01E-09 | 1.19E-08 | 2.78E-07 | 9.68E-09 | 0 | 1.17799E-09 | 0 | 0 | 0.0012 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.34E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 2.08E-07 | 5.94E-07 | 1.39E-05 | 4.91E-07 | 0 | 4.71967E-08 | 0 | 0 | 0.0472 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.28E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 4.20E-07 | 1.20E-06 | 2.83E-05 | 9.95E-07 | 0 | 9.54273E-08 | 0 | 0 | 0.0954 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.84E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 1.91E-07 | 5.47E-07 | 1.28E-05 | 4.52E-07 | 0 | 4.34614E-08 | 0 | 0 | 0.0435 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.55E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 5.09E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 1.1547E-07 | 0 | 0 | 0.1155 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.07E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 3.45E-08 | 9.23E-08 | 2.16E-06 | 7.59E-08 | 0 | 7.94375E-09 | 0 | 0 | 0.0079 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.09E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 1.01E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 0 | 2.30296E-08 | 0 | 0 | 0.0230 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.29E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 2.37E-08 | 6.59E-08 | 1.55E-06 | 5.43E-08 | 0 | 5.42198E-09 | 0 | 0 | 0.0054 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.79E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 2.82332E-09 | 0 | 0 | 0.0028 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.55E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 1.12E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 2.64365E-09 | 0 | 0 | 0.0026 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.33E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.05E-08 | 2.45E-08 | 5.74E-07 | 2.00E-08 | 0 | 2.48114E-09 | 0 | 0 | 0.0025 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.14E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 9.88E-09 | 2.30E-08 | 5.38E-07 | 1.87E-08 | 0 | 2.33339E-09 | 0 | 0 | 0.0023 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.96E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.34E-09 | 2.17E-08 | 5.08E-07 | 1.76E-08 | 0 | 2.20611E-09 | 0 | 0 | 0.0022 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.79E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 8.79E-09 | 2.04E-08 | 4.77E-07 | 1.66E-08 | 0 | 2.07706E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.61E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 8.22E-09 | 1.90E-08 | 4.43E-07 | 1.54E-08 | 0 | 1.94264E-09 | 0 | 0 | 0.0019 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.95E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 1.24E-08 | 2.84E-08 | 6.64E-07 | 2.31E-08 | 0 | 2.93807E-09 | 0 | 0 | 0.0029 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.84E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.21E-08 | 2.82E-08 | 6.60E-07 | 2.30E-08 | 0 | 2.86028E-09 | 0 | 0 | 0.0029 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.63E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.26E-07 | 2.18E-08 | 0 | 2.6992E-09 | 0 | 0 | 0.0027 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.41E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.07E-08 | 2.51E-08 | 5.87E-07 | 2.04E-08 | 0 | 2.5348E-09 | 0 | 0 | 0.0025 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.19E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.00E-08 | 2.35E-08 | 5.49E-07 | 1.91E-08 | 0 | 2.37056E-09 | 0 | 0 | 0.0024 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.99E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 9.42E-09 | 2.19E-08 | 5.13E-07 | 1.78E-08 | 0 | 2.22305E-09 | 0 | 0 | 0.0022 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.80E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 8.82E-09 | 2.05E-08 | 4.78E-07 | 1.66E-08 | 0 | 2.08406E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.64E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 8.32E-09 | 1.92E-08 | 4.50E-07 | 1.56E-08 | 0 | 1.96669E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.49E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 7.84E-09 | 1.80E-08 | 4.22E-07 | 1.47E-08 | 0 | 1.8544E-09 | 0 | 0 | 0.0019 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.62E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 1.13E-08 | 2.48E-08 | 5.79E-07 | 2.01E-08 | 0 | 2.69272E-09 | 0 | 0 | 0.0027 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.80E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 1.19E-08 | 2.75E-08 | 6.42E-07 | 2.23E-08 | 0 | 2.82556E-09 | 0 | 0 | 0.0028 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.68E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.16E-08 | 2.72E-08 | 6.37E-07 | 2.22E-08 | 0 | 2.74167E-09 | 0 | 0 | 0.0027 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.47E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.09E-08 | 2.57E-08 | 6.01E-07 | 2.09E-08 | 0 | 2.58142E-09 | 0 | 0 | 0.0026 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.26E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.03E-08 | 2.41E-08 | 5.64E-07 | 1.96E-08 | 0 | 2.42263E-09 | 0 | 0 | 0.0024 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.06E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 9.66E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 2.2787E-09 | 0 | 0 | 0.0023 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.86E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 9.01E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 | 0 | 2.12597E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.68E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 8.44E-09 | 1.96E-08 | 4.58E-07 | 1.59E-08 | 0 | 1.99358E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.52E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 7.92E-09 | 1.83E-08 | 4.28E-07 | 1.49E-08 | 0 | 1.87289E-09 | 0 | 0 | 0.0019 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.36E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 7.43E-09 | 1.71E-08 | 3.99E-07 | 1.39E-08 | 0 | 1.7569E-09 | 0 | 0 | 0.0018 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.22E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 6.98E-09 | 1.60E-08 | 3.73E-07 | 1.30E-08 | 0 | 1.65299E-09 | 0 | 0 | 0.0017 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.07E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 6.50E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 0 | 1.54131E-09 | 0 | 0 | 0.0015 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.86E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.21E-08 | 2.74E-08 | 6.40E-07 | 2.22E-08 | 0 | 2.87551E-09 | 0 | 0 | 0.0029 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.72E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.17E-08 | 2.67E-08 | 6.25E-07 | 2.17E-08 | 0 | 2.77026E-09 | 0 | 0 | 0.0028 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.70E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.17E-08 | 2.74E-08 | 6.42E-07 | 2.23E-08 | 0 | 2.75658E-09 | 0 | 0 | 0.0028 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.52E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 1.11E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 2.62041E-09 | 0 | 0 | 0.0026 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.32E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 1.05E-08 | 2.47E-08 | 5.78E-07 | 2.01E-08 | 0 | 2.47053E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.12E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.86E-09 | 2.32E-08 | 5.44E-07 | 1.89E-08 | 0 | 2.32293E-09 | 0 | 0 | 0.0023 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.93E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.24E-09 | 2.17E-08 | 5.08E-07 | 1.77E-08 | 0 | 2.17936E-09 | 0 | 0 | 0.0022 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.74E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 8.65E-09 | 2.02E-08 | 4.73E-07 | 1.65E-08 | 0 | 2.04035E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.55E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 8.03E-09 | 1.87E-08 | 4.37E-07 | 1.52E-08 | 0 | 1.89687E-09 | 0 | 0 | 0.0019 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.36E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 7.43E-09 | 1.71E-08 | 4.00E-07 | 1.39E-08 | 0 | 1.75617E-09 | 0 | 0 | 0.0018 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.17E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 6.80E-09 | 1.55E-08 | 3.63E-07 | 1.26E-08 | 0 | 1.61154E-09 | 0 | 0 | 0.0016 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.78E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 1.18E-08 | 2.66E-08 | 6.22E-07 | 2.16E-08 | 0 | 2.80921E-09 | 0 | 0 | 0.0028 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.74E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.18E-08 | 2.71E-08 | 6.35E-07 | 2.21E-08 | 0 | 2.78569E-09 | 0 | 0 | 0.0028 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.66E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.15E-08 | 2.71E-08 | 6.33E-07 | 2.20E-08 | 0 | 2.72388E-09 | 0 | 0 | 0.0027 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.53E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 1.12E-08 | 2.64E-08 | 6.18E-07 | 2.15E-08 | 0 | 2.6285E-09 | 0 | 0 | 0.0026 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.36E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 1.06E-08 | 2.52E-08 | 5.91E-07 | 2.06E-08 | 0 | 2.49852E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.15E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.97E-09 | 2.36E-08 | 5.53E-07 | 1.92E-08 | 0 | 2.34592E-09 | 0 | 0 | 0.0023 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.94E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 9.30E-09 | 2.20E-08 | 5.14E-07 | 1.79E-08 | 0 | 2.18962E-09 | 0 | 0 | 0.0022 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.71E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 8.54E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 2.01356E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.49E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.86E-09 | 1.83E-08 | 4.27E-07 | 1.49E-08 | 0 | 1.8553E-09 | 0 | 0 | 0.0019 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.55E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.44E-08 | 3.51E-08 | 8.21E-07 | 2.86E-08 | 0 | 3.38319E-09 | 0 | 0 | 0.0034 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.85E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.53E-08 | 3.53E-08 | 8.25E-07 | 2.87E-08 | 0 | 3.60763E-09 | 0 | 0 | 0.0036 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.31E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.35E-08 | 3.07E-08 | 7.17E-07 | 2.49E-08 | 0 | 3.20552E-09 | 0 | 0 | 0.0032 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.11E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.29E-08 | 2.95E-08 | 6.91E-07 | 2.40E-08 | 0 | 3.05917E-09 | 0 | 0 | 0.0031 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.97E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.25E-08 | 2.90E-08 | 6.79E-07 | 2.36E-08 | 0 | 2.95628E-09 | 0 | 0 | 0.0030 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.80E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.28E-08 | 0 | 2.83037E-09 | 0 | 0 | 0.0028 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.61E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.27E-07 | 2.18E-08 | 0 | 2.68798E-09 | 0 | 0 | 0.0027 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.14E-08 | 2.74E-08 | 6.40E-07 | 2.23E-08 | 0 | 2.67786E-09 | 0 | 0 | 0.0027 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.37E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 1.07E-08 | 2.56E-08 | 5.99E-07 | 2.09E-08 | 0 | 2.50672E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.12E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 9.86E-09 | 2.35E-08 | 5.51E-07 | 1.92E-08 | 0 | 2.31807E-09 | 0 | 0 | 0.0023 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.87E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 9.06E-09 | 2.15E-08 | 5.02E-07 | 1.75E-08 | 0 | 2.13385E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.63E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 8.31E-09 | 1.95E-08 | 4.56E-07 | 1.59E-08 | 0 | 1.95917E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.41E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 7.61E-09 | 1.77E-08 | 4.14E-07 | 1.44E-08 | 0 | 1.79683E-09 | 0 | 0 | 0.0018 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 5.00E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.58E-08 | 3.69E-08 | 8.62E-07 | 3.00E-08 | 0 | 3.72446E-09 | 0 | 0 | 0.0037 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.79E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.51E-08 | 3.46E-08 | 8.10E-07 | 2.82E-08 | 0 | 3.5625E-09 | 0 | 0 | 0.0036 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.86E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.53E-08 | 3.59E-08 | 8.40E-07 | 2.92E-08 | 0 | 3.61726E-09 | 0 | 0 | 0.0036 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.77E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.51E-08 | 3.60E-08 | 8.42E-07 | 2.93E-08 | 0 | 3.5491E-09 | 0 | 0 | 0.0035 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.69E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.49E-08 | 3.61E-08 | 8.44E-07 | 2.94E-08 | 0 | 3.4874E-09 | 0 | 0 | 0.0035 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.26E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.35E-08 | 3.25E-08 | 7.61E-07 | 2.65E-08 | 0 | 3.17148E-09 | 0 | 0 | 0.0032 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.16E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.32E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 0 | 3.09272E-09 | 0 | 0 | 0.0031 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.92E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.25E-08 | 3.04E-08 | 7.12E-07 | 2.48E-08 | 0 | 2.91691E-09 | 0 | 0 | 0.0029 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.63E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.15E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 2.70371E-09 | 0 | 0 | 0.0027 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.34E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.06E-08 | 2.56E-08 | 6.00E-07 | 2.09E-08 | 0 | 2.48654E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.06E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.69E-09 | 2.33E-08 | 5.44E-07 | 1.90E-08 | 0 | 2.27609E-09 | 0 | 0 | 0.0023 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.80E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 8.85E-09 | 2.10E-08 | 4.92E-07 | 1.71E-08 | 0 | 2.08116E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.56E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 8.09E-09 | 1.90E-08 | 4.46E-07 | 1.55E-08 | 0 | 1.90583E-09 | 0 | 0 | 0.0019 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.34E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 7.39E-09 | 1.72E-08 | 4.03E-07 | 1.40E-08 | 0 | 1.74437E-09 | 0 | 0 | 0.0017 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.13E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.71E-09 | 1.54E-08 | 3.61E-07 | 1.25E-08 | 0 | 1.58621E-09 | 0 | 0 | 0.0016 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.90E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 5.97E-09 | 1.35E-08 | 3.15E-07 | 1.09E-08 | 0 | 1.41547E-09 | 0 | 0 | 0.0014 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.85E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.18E-08 | 5.40E-08 | 1.27E-06 | 4.42E-08 | 0 | 5.09459E-09 | 0 | 0 | 0.0051 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.44E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 2.05E-08 | 5.09E-08 | 1.19E-06 | 4.16E-08 | 0 | 4.79212E-09 | 0 | 0 | 0.0048 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.58E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.77E-08 | 4.31E-08 | 1.01E-06 | 3.52E-08 | 0 | 4.14945E-09 | 0 | 0 | 0.0041 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 5.01E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.59E-08 | 3.83E-08 | 8.96E-07 | 3.12E-08 | 0 | 3.73145E-09 | 0 | 0 | 0.0037 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.86E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.54E-08 | 3.77E-08 | 8.82E-07 | 3.07E-08 | 0 | 3.61852E-09 | 0 | 0 | 0.0036 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.70E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.50E-08 | 3.69E-08 | 8.63E-07 | 3.01E-08 | 0 | 3.49992E-09 | 0 | 0 | 0.0035 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.56E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.45E-08 | 3.62E-08 | 8.47E-07 | 2.96E-08 | 0 | 3.39528E-09 | 0 | 0 | 0.0034 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.24E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.35E-08 | 3.36E-08 | 7.86E-07 | 2.74E-08 | 0 | 3.15499E-09 | 0 | 0 | 0.0032 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.94E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.25E-08 | 3.11E-08 | 7.27E-07 | 2.54E-08 | 0 | 2.92983E-09 | 0 | 0 | 0.0029 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.62E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 1.15E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 2.69469E-09 | 0 | 0 | 0.0027 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.30E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.05E-08 | 2.57E-08 | 6.01E-07 | 2.10E-08 | 0 | 2.45687E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 3.00E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 9.51E-09 | 2.30E-08 | 5.40E-07 | 1.88E-08 | 0 | 2.23112E-09 | 0 | 0 | 0.0022 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.73E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 8.64E-09 | 2.07E-08 | 4.85E-07 | 1.69E-08 | 0 | 2.02929E-09 | 0 | 0 | 0.0020 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.48E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.83E-09 | 1.86E-08 | 4.34E-07 | 1.51E-08 | 0 | 1.84223E-09 | 0 | 0 | 0.0018 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.26E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 7.12E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 1.67898E-09 | 0 | 0 | 0.0017 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.06E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.50E-09 | 1.50E-08 | 3.52E-07 | 1.22E-08 | 0 | 1.53557E-09 | 0 | 0 | 0.0015 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.89E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 5.93E-09 | 1.36E-08 | 3.17E-07 | 1.10E-08 | 0 | 1.40465E-09 | 0 | 0 | 0.0014 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.24E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.32E-08 | 5.99E-08 | 1.40E-06 | 4.91E-08 | 0 | 5.38991E-09 | 0 | 0 | 0.0054 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.71E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.15E-08 | 5.54E-08 | 1.30E-06 | 4.54E-08 | 0 | 4.99435E-09 | 0 | 0 | 0.0050 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.78E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.85E-08 | 4.69E-08 | 1.10E-06 | 3.84E-08 | 0 | 4.30377E-09 | 0 | 0 | 0.0043 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.36E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.71E-08 | 4.34E-08 | 1.02E-06 | 3.55E-08 | 0 | 3.98676E-09 | 0 | 0 | 0.0040 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.14E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.65E-08 | 4.20E-08 | 9.84E-07 | 3.44E-08 | 0 | 3.82708E-09 | 0 | 0 | 0.0038 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.70E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.50E-08 | 3.82E-08 | 8.95E-07 | 3.13E-08 | 0 | 3.50004E-09 | 0 | 0 | 0.0035 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.28E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.37E-08 | 3.46E-08 | 8.10E-07 | 2.83E-08 | 0 | 3.18697E-09 | 0 | 0 | 0.0032 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.91E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.25E-08 | 3.14E-08 | 7.35E-07 | 2.57E-08 | 0 | 2.91298E-09 | 0 | 0 | 0.0029 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.57E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.14E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 2.65528E-09 | 0 | 0 | 0.0027 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.23E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 1.03E-08 | 2.54E-08 | 5.95E-07 | 2.08E-08 | 0 | 2.4038E-09 | 0 | 0 | 0.0024 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.90E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 9.23E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 2.16122E-09 | 0 | 0 | 0.0022 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.61E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 8.27E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 1.9413E-09 | 0 | 0 | 0.0019 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.35E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 7.45E-09 | 1.78E-08 | 4.16E-07 | 1.45E-08 | 0 | 1.75105E-09 | 0 | 0 | 0.0018 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.14E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 6.74E-09 | 1.59E-08 | 3.72E-07 | 1.29E-08 | 0 | 1.58905E-09 | 0 | 0 | 0.0016 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.95E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 6.16E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 1.45353E-09 | 0 | 0 | 0.0015 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.80E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 5.66E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 1.33863E-09 | 0 | 0 | 0.0013 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.60E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 5.03E-09 | 1.14E-08 | 2.66E-07 | 9.24E-09 | 0 | 1.1932E-09 | 0 | 0 | 0.0012 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.35E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.36E-08 | 6.13E-08 | 1.44E-06 | 5.03E-08 | 0 | 5.46737E-09 | 0 | 0 | 0.0055 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.98E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.24E-08 | 5.85E-08 | 1.37E-06 | 4.80E-08 | 0 | 5.19312E-09 | 0 | 0 | 0.0052 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.48E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.08E-08 | 5.43E-08 | 1.27E-06 | 4.46E-08 | 0 | 4.82365E-09 | 0 | 0 | 0.0048 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.85E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 1.88E-08 | 4.88E-08 | 1.14E-06 | 4.00E-08 | 0 | 4.35351E-09 | 0 | 0 | 0.0044 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.24E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.68E-08 | 4.34E-08 | 1.02E-06 | 3.56E-08 | 0 | 3.89771E-09 | 0 | 0 | 0.0039 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.70E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.51E-08 | 3.87E-08 | 9.06E-07 | 3.17E-08 | 0 | 3.50047E-09 | 0 | 0 | 0.0035 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.25E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.36E-08 | 3.47E-08 | 8.13E-07 | 2.84E-08 | 0 | 3.16256E-09 | 0 | 0 | 0.0032 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.85E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.23E-08 | 3.12E-08 | 7.31E-07 | 2.55E-08 | 0 | 2.86512E-09 | 0 | 0 | 0.0029 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.46E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.10E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 0 | 2.57226E-09 | 0 | 0 | 0.0026 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.08E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 9.80E-09 | 2.43E-08 | 5.70E-07 | 1.99E-08 | 0 | 2.28855E-09 | 0 | 0 | 0.0023 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.74E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 8.71E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 2.03781E-09 | 0 | 0 | 0.0020 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.45E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 7.78E-09 | 1.89E-08 | 4.41E-07 | 1.54E-08 | 0 | 1.82374E-09 | 0 | 0 | 0.0018 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.21E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 6.99E-09 | 1.68E-08 | 3.92E-07 | 1.37E-08 | 0 | 1.64366E-09 | 0 | 0 | 0.0016 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 2.01E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.37E-09 | 1.51E-08 | 3.53E-07 | 1.23E-08 | 0 | 1.49871E-09 | 0 | 0 | 0.0015 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.85E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 5.83E-09 | 1.36E-08 | 3.19E-07 | 1.11E-08 | 0 | 1.37389E-09 | 0 | 0 | 0.0014 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.71E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 5.38E-09 | 1.25E-08 | 2.92E-07 | 1.01E-08 | 0 | 1.27108E-09 | 0 | 0 | 0.0013 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 (per million) | Receptor Type |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.59E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 5.01E-09 | 1.15E-08 | 2.69E-07 | 9.35E-09 | 0 | 1.18432E-09 | 0 | 0 | 0.0012 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.40E-08 | 6.33E-08 | 1.48E-06 | 5.19E-08 | 0 | 5.54265E-09 | 0 | 0 | 0.0055 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.89E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.22E-08 | 5.85E-08 | 1.37E-06 | 4.81E-08 | 0 | 5.12975E-09 | 0 | 0 | 0.0051 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 6.06E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 1.95E-08 | 5.11E-08 | 1.20E-06 | 4.19E-08 | 0 | 4.51109E-09 | 0 | 0 | 0.0045 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.33E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.71E-08 | 4.45E-08 | 1.04E-06 | 3.65E-08 | 0 | 3.96461E-09 | 0 | 0 | 0.0040 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.73E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.52E-08 | 3.91E-08 | 9.17E-07 | 3.21E-08 | 0 | 3.51668E-09 | 0 | 0 | 0.0035 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.22E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.35E-08 | 3.46E-08 | 8.11E-07 | 2.84E-08 | 0 | 3.13814E-09 | 0 | 0 | 0.0031 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.73E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.10E-07 | 2.48E-08 | 0 | 2.77601E-09 | 0 | 0 | 0.0028 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.28E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.05E-08 | 2.63E-08 | 6.15E-07 | 2.15E-08 | 0 | 2.43882E-09 | 0 | 0 | 0.0024 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.89E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 9.20E-09 | 2.28E-08 | 5.34E-07 | 1.86E-08 | 0 | 2.14849E-09 | 0 | 0 | 0.0021 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.57E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 8.16E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 1.90946E-09 | 0 | 0 | 0.0019 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.30E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 7.29E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 | 0 | 1.71105E-09 | 0 | 0 | 0.0017 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.08E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 6.60E-09 | 1.58E-08 | 3.70E-07 | 1.29E-08 | 0 | 1.55071E-09 | 0 | 0 | 0.0016 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.90E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 6.02E-09 | 1.42E-08 | 3.33E-07 | 1.16E-08 | 0 | 1.41621E-09 | 0 | 0 | 0.0014 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.75E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 5.52E-09 | 1.29E-08 | 3.03E-07 | 1.05E-08 | 0 | 1.30169E-09 | 0 | 0 | 0.0013 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.61E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 5.08E-09 | 1.18E-08 | 2.76E-07 | 9.59E-09 | 0 | 1.20016E-09 | 0 | 0 | 0.0012 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.49E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 4.70E-09 | 1.08E-08 | 2.52E-07 | 8.77E-09 | 0 | 1.11123E-09 | 0 | 0 | 0.0011 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 1.01E-04 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 3.27E-08 | 8.73E-08 | 2.05E-06 | 7.17E-08 | 0 | 7.52382E-09 | 0 | 0 | 0.0075 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.77E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 3.16E-08 | 8.46E-08 | 1.98E-06 | 6.96E-08 | 0 | 7.27293E-09 | 0 | 0 | 0.0073 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.23E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 2.98E-08 | 8.00E-08 | 1.88E-06 | 6.58E-08 | 0 | 6.86652E-09 | 0 | 0 | 0.0069 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.29E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.68E-08 | 7.16E-08 | 1.68E-06 | 5.88E-08 | 0 | 6.17021E-09 | 0 | 0 | 0.0062 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.29E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 2.35E-08 | 6.25E-08 | 1.47E-06 | 5.14E-08 | 0 | 5.42484E-09 | 0 | 0 | 0.0054 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.27E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.02E-08 | 5.32E-08 | 1.25E-06 | 4.37E-08 | 0 | 4.66721E-09 | 0 | 0 | 0.0047 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.47E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.76E-08 | 4.60E-08 | 1.08E-06 | 3.78E-08 | 0 | 4.0727E-09 | 0 | 0 | 0.0041 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.75E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.52E-08 | 3.95E-08 | 9.25E-07 | 3.24E-08 | 0 | 3.53344E-09 | 0 | 0 | 0.0035 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.12E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.32E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 | 0 | 3.06345E-09 | 0 | 0 | 0.0031 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.55E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.14E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 | 0 | 2.64209E-09 | 0 | 0 | 0.0026 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.09E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 9.87E-09 | 2.46E-08 | 5.77E-07 | 2.01E-08 | 0 | 2.30274E-09 | 0 | 0 | 0.0023 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.73E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 8.69E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 2.03164E-09 | 0 | 0 | 0.0020 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.43E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 7.72E-09 | 1.88E-08 | 4.40E-07 | 1.53E-08 | 0 | 1.81006E-09 | 0 | 0 | 0.0018 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.19E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.93E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 1.62706E-09 | 0 | 0 | 0.0016 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.98E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 6.27E-09 | 1.49E-08 | 3.49E-07 | 1.21E-08 | 0 | 1.47436E-09 | 0 | 0 | 0.0015 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.80E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 5.68E-09 | 1.33E-08 | 3.12E-07 | 1.09E-08 | 0 | 1.33833E-09 | 0 | 0 | 0.0013 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.64E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 5.18E-09 | 1.21E-08 | 2.82E-07 | 9.80E-09 | 0 | 1.22407E-09 | 0 | 0 | 0.0012 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.51E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.76E-09 | 1.09E-08 | 2.56E-07 | 8.89E-09 | 0 | 1.1256E-09 | 0 | 0 | 0.0011 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.40E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 4.39E-09 | 9.98E-09 | 2.33E-07 | 8.10E-09 | 0 | 1.03921E-09 | 0 | 0 | 0.0010 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.28E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.15E-08 | 1.14E-07 | 2.67E-06 | 9.36E-08 | 0 | 9.508E-09 | 0 | 0 | 0.0095 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.19E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 3.85E-08 | 1.05E-07 | 2.47E-06 | 8.67E-08 | 0 | 8.82329E-09 | 0 | 0 | 0.0088 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.02E-04 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 3.29E-08 | 8.94E-08 | 2.10E-06 | 7.36E-08 | 0 | 7.55465E-09 | 0 | 0 | 0.0076 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.96E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.90E-08 | 7.85E-08 | 1.84E-06 | 6.46E-08 | 0 | 6.67067E-09 | 0 | 0 | 0.0067 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.61E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 2.46E-08 | 6.60E-08 | 1.55E-06 | 5.43E-08 | 0 | 5.66619E-09 | 0 | 0 | 0.0057 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.50E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.10E-08 | 5.57E-08 | 1.31E-06 | 4.58E-08 | 0 | 4.83349E-09 | 0 | 0 | 0.0048 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.52E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.78E-08 | 4.67E-08 | 1.10E-06 | 3.84E-08 | 0 | 4.10903E-09 | 0 | 0 | 0.0041 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.64E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.49E-08 | 3.86E-08 | 9.04E-07 | 3.16E-08 | 0 | 3.44977E-09 | 0 | 0 | 0.0034 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.92E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.25E-08 | 3.20E-08 | 7.51E-07 | 2.62E-08 | 0 | 2.91544E-09 | 0 | 0 | 0.0029 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.36E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 1.07E-08 | 2.70E-08 | 6.33E-07 | 2.21E-08 | 0 | 2.50234E-09 | 0 | 0 | 0.0025 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.94E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 9.36E-09 | 2.32E-08 | 5.44E-07 | 1.90E-08 | 0 | 2.18678E-09 | 0 | 0 | 0.0022 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.60E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 8.25E-09 | 2.02E-08 | 4.72E-07 | 1.65E-08 | 0 | 1.93157E-09 | 0 | 0 | 0.0019 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.31E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 7.32E-09 | 1.77E-08 | 4.13E-07 | 1.44E-08 | 0 | 1.71712E-09 | 0 | 0 | 0.0017 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.07E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 6.55E-09 | 1.56E-08 | 3.65E-07 | 1.27E-08 | 0 | 1.54009E-09 | 0 | 0 | 0.0015 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.86E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.88E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 1.38713E-09 | 0 | 0 | 0.0014 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.69E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 5.33E-09 | 1.23E-08 | 2.89E-07 | 1.00E-08 | 0 | 1.25836E-09 | 0 | 0 | 0.0013 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.55E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 4.87E-09 | 1.11E-08 | 2.61E-07 | 9.05E-09 | 0 | 1.152E-09 | 0 | 0 | 0.0012 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.43E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.48E-09 | 1.01E-08 | 2.37E-07 | 8.22E-09 | 0 | 1.06129E-09 | 0 | 0 | 0.0011 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.32E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.14E-09 | 9.27E-09 | 2.17E-07 | 7.52E-09 | 0 | 9.82679E-10 | 0 | 0 | 0.0010 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.54E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 5.00E-08 | 1.39E-07 | 3.26E-06 | 1.14E-07 | 0 | 1.14382E-08 | 0 | 0 | 0.0114 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.51E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 4.93E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 1.12613E-08 | 0 | 0 | 0.0113 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.44E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 4.69E-08 | 1.30E-07 | 3.05E-06 | 1.07E-07 | 0 | 1.07185E-08 | 0 | 0 | 0.0107 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.38E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.48E-08 | 1.24E-07 | 2.92E-06 | 1.02E-07 | 0 | 1.02394E-08 | 0 | 0 | 0.0102 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.19E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 3.87E-08 | 1.07E-07 | 2.51E-06 | 8.81E-08 | 0 | 8.8596E-09 | 0 | 0 | 0.0089 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.68E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.14E-08 | 8.61E-08 | 2.02E-06 | 7.09E-08 | 0 | 7.20365E-09 | 0 | 0 | 0.0072 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.91E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 2.56E-08 | 6.95E-08 | 1.63E-06 | 5.71E-08 | 0 | 5.88377E-09 | 0 | 0 | 0.0059 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.53E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.11E-08 | 5.66E-08 | 1.33E-06 | 4.65E-08 | 0 | 4.85693E-09 | 0 | 0 | 0.0049 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.29E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.71E-08 | 4.50E-08 | 1.06E-06 | 3.70E-08 | 0 | 3.93794E-09 | 0 | 0 | 0.0039 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.34E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.40E-08 | 3.62E-08 | 8.49E-07 | 2.97E-08 | 0 | 3.23189E-09 | 0 | 0 | 0.0032 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.69E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.18E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 2.7459E-09 | 0 | 0 | 0.0027 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.16E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 1.01E-08 | 2.53E-08 | 5.93E-07 | 2.07E-08 | 0 | 2.3488E-09 | 0 | 0 | 0.0023 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.74E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.73E-09 | 2.16E-08 | 5.05E-07 | 1.76E-08 | 0 | 2.03944E-09 | 0 | 0 | 0.0020 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.41E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.65E-09 | 1.86E-08 | 4.35E-07 | 1.52E-08 | 0 | 1.79401E-09 | 0 | 0 | 0.0018 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.14E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.78E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 0 | 1.59468E-09 | 0 | 0 | 0.0016 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.93E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 6.09E-09 | 1.43E-08 | 3.35E-07 | 1.17E-08 | 0 | 1.43444E-09 | 0 | 0 | 0.0014 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.74E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 5.47E-09 | 1.27E-08 | 2.97E-07 | 1.03E-08 | 0 | 1.29369E-09 | 0 | 0 | 0.0013 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.59E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 4.99E-09 | 1.14E-08 | 2.66E-07 | 9.25E-09 | 0 | 1.18121E-09 | 0 | 0 | 0.0012 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.46E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 4.58E-09 | 1.03E-08 | 2.41E-07 | 8.38E-09 | 0 | 1.08693E-09 | 0 | 0 | 0.0011 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.36E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 4.24E-09 | 9.46E-09 | 2.21E-07 | 7.67E-09 | 0 | 1.00844E-09 | 0 | 0 | 0.0010 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.27E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 3.95E-09 | 8.73E-09 | 2.04E-07 | 7.07E-09 | 0 | 9.41409E-10 | 0 | 0 | 0.0009 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.66E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 5.40E-08 | 1.51E-07 | 3.54E-06 | 1.24E-07 | 0 | 1.23275E-08 | 0 | 0 | 0.0123 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.60E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 5.23E-08 | 1.46E-07 | 3.43E-06 | 1.20E-07 | 0 | 1.19278E-08 | 0 | 0 | 0.0119 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.60E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 5.22E-08 | 1.46E-07 | 3.43E-06 | 1.21E-07 | 0 | 1.19083E-08 | 0 | 0 | 0.0119 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.33E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 4.34E-08 | 1.21E-07 | 2.84E-06 | 9.98E-08 | 0 | 9.9075E-09 | 0 | 0 | 0.0099 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.02E-04 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 3.30E-08 | 9.14E-08 | 2.15E-06 | 7.53E-08 | 0 | 7.55875E-09 | 0 | 0 | 0.0076 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.93E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.57E-08 | 7.05E-08 | 1.65E-06 | 5.80E-08 | 0 | 5.90163E-09 | 0 | 0 | 0.0059 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.21E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 2.01E-08 | 5.43E-08 | 1.27E-06 | 4.47E-08 | 0 | 4.61813E-09 | 0 | 0 | 0.0046 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.93E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.59E-08 | 4.23E-08 | 9.91E-07 | 3.47E-08 | 0 | 3.6651E-09 | 0 | 0 | 0.0037 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 4.00E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.29E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 0 | 2.97696E-09 | 0 | 0 | 0.0030 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.34E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.07E-08 | 2.74E-08 | 6.43E-07 | 2.25E-08 | 0 | 2.48417E-09 | 0 | 0 | 0.0025 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.85E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 9.12E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 2.1242E-09 | 0 | 0 | 0.0021 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.49E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 7.93E-09 | 1.96E-08 | 4.59E-07 | 1.60E-08 | 0 | 1.85389E-09 | 0 | 0 | 0.0019 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.20E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 6.97E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 0 | 1.63415E-09 | 0 | 0 | 0.0016 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.96E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 6.21E-09 | 1.48E-08 | 3.46E-07 | 1.20E-08 | 0 | 1.46089E-09 | 0 | 0 | 0.0015 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.78E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 5.61E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 0 | 1.32328E-09 | 0 | 0 | 0.0013 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.63E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 5.13E-09 | 1.18E-08 | 2.76E-07 | 9.60E-09 | 0 | 1.21243E-09 | 0 | 0 | 0.0012 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.51E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 4.73E-09 | 1.07E-08 | 2.51E-07 | 8.72E-09 | 0 | 1.12042E-09 | 0 | 0 | 0.0011 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.40E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 4.40E-09 | 9.90E-09 | 2.31E-07 | 8.02E-09 | 0 | 1.04535E-09 | 0 | 0 | 0.0010 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.32E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 4.13E-09 | 9.20E-09 | 2.15E-07 | 7.45E-09 | 0 | 9.82885E-10 | 0 | 0 | 0.0010 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.25E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 3.89E-09 | 8.59E-09 | 2.01E-07 | 6.95E-09 | 0 | 9.2679E-10 | 0 | 0 | 0.0009 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.37E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 7.73E-08 | 2.19E-07 | 5.14E-06 | 1.81E-07 | 0 | 1.76E-08 | 0 | 0 | 0.0176 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 2.02E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 6.60E-08 | 1.87E-07 | 4.38E-06 | 1.54E-07 | 0 | 1.50322E-08 | 0 | 0 | 0.0150 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.49E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 4.86E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 1.10765E-08 | 0 | 0 | 0.0111 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.05E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 3.42E-08 | 9.52E-08 | 2.23E-06 | 7.84E-08 | 0 | 7.80065E-09 | 0 | 0 | 0.0078 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.45E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.42E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 0 | 5.54436E-09 | 0 | 0 | 0.0055 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.49E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.78E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 4.08321E-09 | 0 | 0 | 0.0041 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.28E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.38E-08 | 3.69E-08 | 8.65E-07 | 3.03E-08 | 0 | 3.18863E-09 | 0 | 0 | 0.0032 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.47E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 1.12E-08 | 2.93E-08 | 6.86E-07 | 2.40E-08 | 0 | 2.58502E-09 | 0 | 0 | 0.0026 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.91E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 9.34E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 2.16824E-09 | 0 | 0 | 0.0022 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.51E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 8.03E-09 | 2.03E-08 | 4.75E-07 | 1.66E-08 | 0 | 1.86873E-09 | 0 | 0 | 0.0019 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.21E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 7.05E-09 | 1.75E-08 | 4.09E-07 | 1.43E-08 | 0 | 1.64666E-09 | 0 | 0 | 0.0016 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.99E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 6.32E-09 | 1.54E-08 | 3.60E-07 | 1.26E-08 | 0 | 1.48011E-09 | 0 | 0 | 0.0015 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.82E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 5.75E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 1.35087E-09 | 0 | 0 | 0.0014 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.68E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 5.30E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 0 | 1.24839E-09 | 0 | 0 | 0.0012 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.56E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 4.93E-09 | 1.15E-08 | 2.69E-07 | 9.37E-09 | 0 | 1.16411E-09 | 0 | 0 | 0.0012 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.47E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.62E-09 | 1.07E-08 | 2.49E-07 | 8.66E-09 | 0 | 1.09283E-09 | 0 | 0 | 0.0011 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.38E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.35E-09 | 9.92E-09 | 2.32E-07 | 8.06E-09 | 0 | 1.03034E-09 | 0 | 0 | 0.0010 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.31E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 4.12E-09 | 9.32E-09 | 2.18E-07 | 7.56E-09 | 0 | 9.78163E-10 | 0 | 0 | 0.0010 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.25E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 3.91E-09 | 8.75E-09 | 2.04E-07 | 7.09E-09 | 0 | 9.2841E-10 | 0 | 0 | 0.0009 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.47E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 1.13E-07 | 3.23E-07 | 7.58E-06 | 2.66E-07 | 0 | 2.58168E-08 | 0 | 0 | 0.0258 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.91E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 1.28E-07 | 3.65E-07 | 8.56E-06 | 3.01E-07 | 0 | 2.90985E-08 | 0 | 0 | 0.0291 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.51E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 1.15E-07 | 3.27E-07 | 7.68E-06 | 2.70E-07 | 0 | 2.61071E-08 | 0 | 0 | 0.0261 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.66E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 8.69E-08 | 2.47E-07 | 5.79E-06 | 2.04E-07 | 0 | 1.9762E-08 | 0 | 0 | 0.0198 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.62E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.28E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 | 0 | 1.20245E-08 | 0 | 0 | 0.0120 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.73E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 3.17E-08 | 8.85E-08 | 2.08E-06 | 7.29E-08 | 0 | 7.24072E-09 | 0 | 0 | 0.0072 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.34E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.06E-08 | 5.67E-08 | 1.33E-06 | 4.67E-08 | 0 | 4.72123E-09 | 0 | 0 | 0.0047 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.61E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.49E-08 | 4.04E-08 | 9.47E-07 | 3.32E-08 | 0 | 3.42718E-09 | 0 | 0 | 0.0034 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.60E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.16E-08 | 3.10E-08 | 7.27E-07 | 2.55E-08 | 0 | 2.68199E-09 | 0 | 0 | 0.0027 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.97E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.58E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 | 0 | 2.21364E-09 | 0 | 0 | 0.0022 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.56E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.21E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 | 0 | 1.90409E-09 | 0 | 0 | 0.0019 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.27E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 7.25E-09 | 1.85E-08 | 4.33E-07 | 1.51E-08 | 0 | 1.6857E-09 | 0 | 0 | 0.0017 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.04E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 6.53E-09 | 1.64E-08 | 3.84E-07 | 1.34E-08 | 0 | 1.52093E-09 | 0 | 0 | 0.0015 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.88E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 5.97E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 | 0 | 1.39537E-09 | 0 | 0 | 0.0014 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.73E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 5.51E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 | 0 | 1.28968E-09 | 0 | 0 | 0.0013 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.62E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 5.13E-09 | 1.24E-08 | 2.90E-07 | 1.01E-08 | 0 | 1.2036E-09 | 0 | 0 | 0.0012 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.52E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 4.81E-09 | 1.15E-08 | 2.69E-07 | 9.36E-09 | 0 | 1.12999E-09 | 0 | 0 | 0.0011 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.43E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.52E-09 | 1.07E-08 | 2.50E-07 | 8.69E-09 | 0 | 1.06531E-09 | 0 | 0 | 0.0011 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.35E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.26E-09 | 9.94E-09 | 2.33E-07 | 8.09E-09 | 0 | 1.0056E-09 | 0 | 0 | 0.0010 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.28E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.03E-09 | 9.30E-09 | 2.17E-07 | 7.56E-09 | 0 | 9.53398E-10 | 0 | 0 | 0.0010 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.22E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 3.83E-09 | 8.73E-09 | 2.04E-07 | 7.09E-09 | 0 | 9.06805E-10 | 0 | 0 | 0.0009 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.87E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 2.25E-07 | 6.44E-07 | 1.51E-05 | 5.32E-07 | 0 | 5.11547E-08 | 0 | 0 | 0.0512 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.34E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 2.40E-07 | 6.88E-07 | 1.62E-05 | 5.68E-07 | 0 | 5.4605E-08 | 0 | 0 | 0.0546 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.54E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 2.14E-07 | 6.13E-07 | 1.44E-05 | 5.06E-07 | 0 | 4.86713E-08 | 0 | 0 | 0.0487 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.44E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.13E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 | 0 | 2.56053E-08 | 0 | 0 | 0.0256 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.40E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 4.59E-08 | 1.29E-07 | 3.03E-06 | 1.07E-07 | 0 | 1.04514E-08 | 0 | 0 | 0.0105 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.59E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 2.47E-08 | 6.85E-08 | 1.61E-06 | 5.65E-08 | 0 | 5.64914E-09 | 0 | 0 | 0.0056 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.13E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.66E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 3.81734E-09 | 0 | 0 | 0.0038 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.95E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.28E-08 | 3.44E-08 | 8.08E-07 | 2.83E-08 | 0 | 2.93936E-09 | 0 | 0 | 0.0029 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.25E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.05E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 | 0 | 2.42075E-09 | 0 | 0 | 0.0024 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.78E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 8.95E-09 | 2.36E-08 | 5.53E-07 | 1.94E-08 | 0 | 2.0683E-09 | 0 | 0 | 0.0021 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.43E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.81E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 0 | 1.8078E-09 | 0 | 0 | 0.0018 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.16E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 6.94E-09 | 1.79E-08 | 4.19E-07 | 1.47E-08 | 0 | 1.60955E-09 | 0 | 0 | 0.0016 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.95E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 6.24E-09 | 1.59E-08 | 3.73E-07 | 1.30E-08 | 0 | 1.45077E-09 | 0 | 0 | 0.0015 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.78E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.69E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 1.3242E-09 | 0 | 0 | 0.0013 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.64E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 5.22E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 1.21877E-09 | 0 | 0 | 0.0012 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.52E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 4.85E-09 | 1.19E-08 | 2.80E-07 | 9.76E-09 | 0 | 1.13345E-09 | 0 | 0 | 0.0011 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.43E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 4.53E-09 | 1.10E-08 | 2.58E-07 | 9.01E-09 | 0 | 1.06201E-09 | 0 | 0 | 0.0011 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.34E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 4.26E-09 | 1.03E-08 | 2.40E-07 | 8.36E-09 | 0 | 1.00037E-09 | 0 | 0 | 0.0010 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.27E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 4.02E-09 | 9.57E-09 | 2.24E-07 | 7.79E-09 | 0 | 9.46374E-10 | 0 | 0 | 0.0009 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.21E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 3.81E-09 | 8.94E-09 | 2.09E-07 | 7.28E-09 | 0 | 8.97345E-10 | 0 | 0 | 0.0009 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.15E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 3.62E-09 | 8.41E-09 | 1.97E-07 | 6.84E-09 | 0 | 8.55065E-10 | 0 | 0 | 0.0009 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.83E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 5.99E-07 | 1.72E-06 | 4.04E-05 | 1.42E-06 | 0 | 1.36096E-07 | 0 | 0 | 0.1361 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.40E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 7.87E-07 | 2.26E-06 | 5.30E-05 | 1.87E-06 | 0 | 1.78618E-07 | 0 | 0 | 0.1786 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.79E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 9.15E-07 | 2.63E-06 | 6.17E-05 | 2.17E-06 | 0 | 2.07769E-07 | 0 | 0 | 0.2078 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.24E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 7.31E-08 | 2.08E-07 | 4.87E-06 | 1.71E-07 | 0 | 1.66425E-08 | 0 | 0 | 0.0166 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.68E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.15E-08 | 8.81E-08 | 2.07E-06 | 7.26E-08 | 0 | 7.1998E-09 | 0 | 0 | 0.0072 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.27E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.04E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 | 0 | 4.66494E-09 | 0 | 0 | 0.0047 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.64E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.51E-08 | 4.10E-08 | 9.61E-07 | 3.37E-08 | 0 | 3.45613E-09 | 0 | 0 | 0.0035 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.69E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.19E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 | 0 | 2.74383E-09 | 0 | 0 | 0.0027 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.05E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 9.84E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 | 0 | 2.26853E-09 | 0 | 0 | 0.0023 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.59E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.36E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 | 0 | 1.93037E-09 | 0 | 0 | 0.0019 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.26E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 7.26E-09 | 1.89E-08 | 4.44E-07 | 1.55E-08 | 0 | 1.67943E-09 | 0 | 0 | 0.0017 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 2.00E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 6.42E-09 | 1.66E-08 | 3.88E-07 | 1.36E-08 | 0 | 1.4877E-09 | 0 | 0 | 0.0015 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.80E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 5.75E-09 | 1.47E-08 | 3.45E-07 | 1.21E-08 | 0 | 1.33633E-09 | 0 | 0 | 0.0013 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.63E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 5.22E-09 | 1.32E-08 | 3.10E-07 | 1.08E-08 | 0 | 1.21436E-09 | 0 | 0 | 0.0012 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.50E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.78E-09 | 1.20E-08 | 2.81E-07 | 9.82E-09 | 0 | 1.11416E-09 | 0 | 0 | 0.0011 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.39E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.43E-09 | 1.10E-08 | 2.58E-07 | 9.00E-09 | 0 | 1.03408E-09 | 0 | 0 | 0.0010 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.30E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.15E-09 | 1.02E-08 | 2.39E-07 | 8.34E-09 | 0 | 9.6965E-10 | 0 | 0 | 0.0010 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.23E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 3.89E-09 | 9.48E-09 | 2.22E-07 | 7.74E-09 | 0 | 9.11839E-10 | 0 | 0 | 0.0009 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.16E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 3.69E-09 | 8.88E-09 | 2.08E-07 | 7.25E-09 | 0 | 8.65101E-10 | 0 | 0 | 0.0009 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.11E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 3.50E-09 | 8.34E-09 | 1.95E-07 | 6.80E-09 | 0 | 8.22693E-10 | 0 | 0 | 0.0008 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.05E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 3.33E-09 | 7.86E-09 | 1.84E-07 | 6.40E-09 | 0 | 7.84994E-10 | 0 | 0 | 0.0008 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 3.00E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 9.82E-08 | 2.79E-07 | 6.56E-06 | 2.31E-07 | 0 | 2.2347E-08 | 0 | 0 | 0.0223 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.40E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 7.84E-08 | 2.23E-07 | 5.22E-06 | 1.84E-07 | 0 | 1.78432E-08 | 0 | 0 | 0.0178 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.30E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 4.23E-08 | 1.19E-07 | 2.79E-06 | 9.81E-08 | 0 | 9.65378E-09 | 0 | 0 | 0.0097 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.31E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 2.71E-08 | 7.52E-08 | 1.76E-06 | 6.20E-08 | 0 | 6.18355E-09 | 0 | 0 | 0.0062 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 6.05E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 1.97E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 4.50177E-09 | 0 | 0 | 0.0045 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.61E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.49E-08 | 4.06E-08 | 9.52E-07 | 3.34E-08 | 0 | 3.42947E-09 | 0 | 0 | 0.0034 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.67E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.19E-08 | 3.19E-08 | 7.48E-07 | 2.62E-08 | 0 | 2.73259E-09 | 0 | 0 | 0.0027 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 3.04E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.80E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 0 | 2.26085E-09 | 0 | 0 | 0.0023 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.57E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 8.29E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 0 | 1.9162E-09 | 0 | 0 | 0.0019 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.23E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 7.17E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 0 | 1.66069E-09 | 0 | 0 | 0.0017 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.97E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 6.31E-09 | 1.63E-08 | 3.81E-07 | 1.33E-08 | 0 | 1.46236E-09 | 0 | 0 | 0.0015 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.62E-09 | 1.44E-08 | 3.36E-07 | 1.18E-08 | 0 | 1.30476E-09 | 0 | 0 | 0.0013 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.58E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 5.07E-09 | 1.29E-08 | 3.01E-07 | 1.05E-08 | 0 | 1.17913E-09 | 0 | 0 | 0.0012 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.45E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 4.62E-09 | 1.16E-08 | 2.72E-07 | 9.51E-09 | 0 | 1.07578E-09 | 0 | 0 | 0.0011 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.33E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 4.24E-09 | 1.06E-08 | 2.48E-07 | 8.66E-09 | 0 | 9.89605E-10 | 0 | 0 | 0.0010 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.23E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.92E-09 | 9.71E-09 | 2.27E-07 | 7.93E-09 | 0 | 9.15651E-10 | 0 | 0 | 0.0009 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.16E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 3.68E-09 | 9.06E-09 | 2.12E-07 | 7.40E-09 | 0 | 8.61808E-10 | 0 | 0 | 0.0009 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.09E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 3.47E-09 | 8.48E-09 | 1.98E-07 | 6.92E-09 | 0 | 8.13307E-10 | 0 | 0 | 0.0008 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.04E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 3.30E-09 | 8.00E-09 | 1.87E-07 | 6.53E-09 | 0 | 7.74731E-10 | 0 | 0 | 0.0008 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.96E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 3.15E-09 | 7.58E-09 | 1.77E-07 | 6.18E-09 | 0 | 7.40861E-10 | 0 | 0 | 0.0007 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.48E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 3.00E-09 | 7.14E-09 | 1.67E-07 | 5.82E-09 | 0 | 7.05337E-10 | 0 | 0 | 0.0007 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.12E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 1.01E-08 | 2.66E-08 | 6.24E-07 | 2.19E-08 | 0 | 2.32009E-09 | 0 | 0 | 0.0023 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.90E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.08E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 0 | 1.41188E-09 | 0 | 0 | 0.0014 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.71E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.47E-09 | 1.39E-08 | 3.25E-07 | 1.14E-08 | 0 | 1.27276E-09 | 0 | 0 | 0.0013 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.55E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 4.94E-09 | 1.24E-08 | 2.91E-07 | 1.02E-08 | 0 | 1.15032E-09 | 0 | 0 | 0.0012 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.41E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 4.50E-09 | 1.12E-08 | 2.63E-07 | 9.19E-09 | 0 | 1.0485E-09 | 0 | 0 | 0.0010 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.28E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 4.08E-09 | 1.01E-08 | 2.37E-07 | 8.27E-09 | 0 | 9.52667E-10 | 0 | 0 | 0.0010 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.18E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 3.75E-09 | 9.23E-09 | 2.16E-07 | 7.54E-09 | 0 | 8.76185E-10 | 0 | 0 | 0.0009 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.09E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 3.46E-09 | 8.47E-09 | 1.98E-07 | 6.92E-09 | 0 | 8.1065E-10 | 0 | 0 | 0.0008 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.02E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 3.23E-09 | 7.86E-09 | 1.84E-07 | 6.42E-09 | 0 | 7.58096E-10 | 0 | 0 | 0.0008 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.59E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 3.04E-09 | 7.35E-09 | 1.72E-07 | 6.00E-09 | 0 | 7.13558E-10 | 0 | 0 | 0.0007 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.15E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 2.90E-09 | 6.97E-09 | 1.63E-07 | 5.69E-09 | 0 | 6.80728E-10 | 0 | 0 | 0.0007 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.75E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 2.77E-09 | 6.62E-09 | 1.55E-07 | 5.40E-09 | 0 | 6.50819E-10 | 0 | 0 | 0.0007 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.32E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 2.63E-09 | 6.25E-09 | 1.46E-07 | 5.09E-09 | 0 | 6.19128E-10 | 0 | 0 | 0.0006 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2026

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2026_PAVED | 1.681E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2026 | 0 | 0.25 | 0.75 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.017 | 0.013 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 1.86E-05 | 1.42E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 2.03E-04 | 1.55E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 1.42E-04 | 1.08E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 2.54E-04 | 1.94E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 4.57E-04 | 3.49E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 6.77E-07 | 5.16E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 1.54E-05 | 1.17E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 8.63E-03 | 6.58E-03 | 0.00E+00 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.96E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 6.54E-08 | 1.85E-07 | 4.35E-06 | 1.53E-07 | 0 | 3.65525E-09 | 2.78978E-09 | 0 | 0.0064 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.35E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 4.46E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 2.51053E-09 | 1.91609E-09 | 0 | 0.0044 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.24E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 3.78E-09 | 6.52E-09 | 1.51E-07 | 5.15E-09 | 0 | 2.30304E-10 | 1.75773E-10 | 0 | 0.0004 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.56E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 5.01E-09 | 1.19E-08 | 2.78E-07 | 9.68E-09 | 0 | 2.90424E-10 | 2.21659E-10 | 0 | 0.0005 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.23E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 2.08E-07 | 5.94E-07 | 1.39E-05 | 4.91E-07 | 0 | 1.15924E-08 | 8.84757E-09 | 0 | 0.0204 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.26E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 4.20E-07 | 1.20E-06 | 2.83E-05 | 9.95E-07 | 0 | 2.34373E-08 | 1.78879E-08 | 0 | 0.0413 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.74E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 1.91E-07 | 5.47E-07 | 1.28E-05 | 4.52E-07 | 0 | 1.06748E-08 | 8.1473E-09 | 0 | 0.0188 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.52E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 5.09E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 2.83593E-08 | 2.16445E-08 | 0 | 0.0500 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.05E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 3.45E-08 | 9.23E-08 | 2.16E-06 | 7.59E-08 | 0 | 1.95397E-09 | 1.49131E-09 | 0 | 0.0034 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.04E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 1.01E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 0 | 5.65747E-09 | 4.31792E-09 | 0 | 0.0100 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.16E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 2.37E-08 | 6.59E-08 | 1.55E-06 | 5.43E-08 | 0 | 1.33261E-09 | 1.01708E-09 | 0 | 0.0023 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.74E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 6.96203E-10 | 5.31359E-10 | 0 | 0.0012 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.50E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 1.12E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 6.51928E-10 | 4.97567E-10 | 0 | 0.0011 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.29E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.05E-08 | 2.45E-08 | 5.74E-07 | 2.00E-08 | 0 | 6.11883E-10 | 4.67004E-10 | 0 | 0.0011 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.09E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 9.88E-09 | 2.30E-08 | 5.38E-07 | 1.87E-08 | 0 | 5.7547E-10 | 4.39213E-10 | 0 | 0.0010 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.92E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.34E-09 | 2.17E-08 | 5.08E-07 | 1.76E-08 | 0 | 5.44102E-10 | 4.15271E-10 | 0 | 0.0010 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.75E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 8.79E-09 | 2.04E-08 | 4.77E-07 | 1.66E-08 | 0 | 5.12293E-10 | 3.90995E-10 | 0 | 0.0009 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.58E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 8.22E-09 | 1.90E-08 | 4.43E-07 | 1.54E-08 | 0 | 4.79177E-10 | 3.6572E-10 | 0 | 0.0008 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.90E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 1.24E-08 | 2.84E-08 | 6.64E-07 | 2.31E-08 | 0 | 7.24808E-10 | 5.53191E-10 | 0 | 0.0013 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.21E-08 | 2.82E-08 | 6.60E-07 | 2.30E-08 | 0 | 7.05407E-10 | 5.38384E-10 | 0 | 0.0012 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.58E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.26E-07 | 2.18E-08 | 0 | 6.65627E-10 | 5.08023E-10 | 0 | 0.0012 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.36E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.07E-08 | 2.51E-08 | 5.87E-07 | 2.04E-08 | 0 | 6.25105E-10 | 4.77096E-10 | 0 | 0.0011 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.14E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.00E-08 | 2.35E-08 | 5.49E-07 | 1.91E-08 | 0 | 5.84607E-10 | 4.46186E-10 | 0 | 0.0010 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.95E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 9.42E-09 | 2.19E-08 | 5.13E-07 | 1.78E-08 | 0 | 5.48261E-10 | 4.18446E-10 | 0 | 0.0010 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.76E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 8.82E-09 | 2.05E-08 | 4.78E-07 | 1.66E-08 | 0 | 5.14015E-10 | 3.92309E-10 | 0 | 0.0009 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.61E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 8.32E-09 | 1.92E-08 | 4.50E-07 | 1.56E-08 | 0 | 4.85095E-10 | 3.70236E-10 | 0 | 0.0009 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.46E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 7.84E-09 | 1.80E-08 | 4.22E-07 | 1.47E-08 | 0 | 4.57428E-10 | 3.4912E-10 | 0 | 0.0008 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.57E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 1.13E-08 | 2.48E-08 | 5.79E-07 | 2.01E-08 | 0 | 6.64741E-10 | 5.07346E-10 | 0 | 0.0012 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.75E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 1.19E-08 | 2.75E-08 | 6.42E-07 | 2.23E-08 | 0 | 6.96996E-10 | 5.31964E-10 | 0 | 0.0012 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.63E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.16E-08 | 2.72E-08 | 6.37E-07 | 2.22E-08 |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.42E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.09E-08 | 2.57E-08 | 6.01E-07 | 2.09E-08 |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.21E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.03E-08 | 2.41E-08 | 5.64E-07 | 1.96E-08 |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.02E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 9.66E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.82E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 9.01E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.64E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 8.44E-09 | 1.96E-08 | 4.58E-07 | 1.59E-08 |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.48E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 7.92E-09 | 1.83E-08 | 4.28E-07 | 1.49E-08 |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.33E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 7.43E-09 | 1.71E-08 | 3.99E-07 | 1.39E-08 |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.19E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 6.98E-09 | 1.60E-08 | 3.73E-07 | 1.30E-08 |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.04E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 6.50E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.81E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.21E-08 | 2.74E-08 | 6.40E-07 | 2.22E-08 |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.67E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.17E-08 | 2.67E-08 | 6.25E-07 | 2.17E-08 |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.65E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.17E-08 | 2.74E-08 | 6.42E-07 | 2.23E-08 |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.47E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 1.11E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.27E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 1.05E-08 | 2.47E-08 | 5.78E-07 | 2.01E-08 |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.08E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.86E-09 | 2.32E-08 | 5.44E-07 | 1.89E-08 |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.89E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.24E-09 | 2.17E-08 | 5.08E-07 | 1.77E-08 |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.70E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 8.65E-09 | 2.02E-08 | 4.73E-07 | 1.65E-08 |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.51E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 8.03E-09 | 1.87E-08 | 4.37E-07 | 1.52E-08 |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.33E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 7.43E-09 | 1.71E-08 | 4.00E-07 | 1.39E-08 |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.14E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 6.80E-09 | 1.55E-08 | 3.63E-07 | 1.26E-08 |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.73E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 1.18E-08 | 2.66E-08 | 6.22E-07 | 2.16E-08 |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.69E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.18E-08 | 2.71E-08 | 6.35E-07 | 2.21E-08 |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.61E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.15E-08 | 2.71E-08 | 6.33E-07 | 2.20E-08 |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.48E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 1.12E-08 | 2.64E-08 | 6.18E-07 | 2.15E-08 |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.31E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 1.06E-08 | 2.52E-08 | 5.91E-07 | 2.06E-08 |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.11E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.97E-09 | 2.36E-08 | 5.53E-07 | 1.92E-08 |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.90E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 9.30E-09 | 2.20E-08 | 5.14E-07 | 1.79E-08 |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.67E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 8.54E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.46E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.86E-09 | 1.83E-08 | 4.27E-07 | 1.49E-08 |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.48E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.44E-08 | 3.51E-08 | 8.21E-07 | 2.86E-08 |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.78E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.53E-08 | 3.53E-08 | 8.25E-07 | 2.87E-08 |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.25E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.35E-08 | 3.07E-08 | 7.17E-07 | 2.49E-08 |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.06E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.29E-08 | 2.95E-08 | 6.91E-07 | 2.40E-08 |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.92E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.25E-08 | 2.90E-08 | 6.79E-07 | 2.36E-08 |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.75E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.28E-08 |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.56E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.27E-07 | 2.18E-08 |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.55E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.14E-08 | 2.74E-08 | 6.40E-07 | 2.23E-08 |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.32E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 1.07E-08 | 2.56E-08 | 5.99E-07 | 2.09E-08 |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.07E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 9.86E-09 | 2.35E-08 | 5.51E-07 | 1.92E-08 |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.83E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 9.06E-09 | 2.15E-08 | 5.02E-07 | 1.75E-08 |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.60E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 8.31E-09 | 1.95E-08 | 4.56E-07 | 1.59E-08 |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.38E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 7.61E-09 | 1.77E-08 | 4.14E-07 | 1.44E-08 |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.94E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.58E-08 | 3.69E-08 | 8.62E-07 | 3.00E-08 |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.72E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.51E-08 | 3.46E-08 | 8.10E-07 | 2.82E-08 |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.79E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.53E-08 | 3.59E-08 | 8.40E-07 | 2.92E-08 |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.70E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.51E-08 | 3.60E-08 | 8.42E-07 | 2.93E-08 |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.62E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.49E-08 | 3.61E-08 | 8.44E-07 | 2.94E-08 |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.20E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.35E-08 | 3.25E-08 | 7.61E-07 | 2.65E-08 |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.10E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.32E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.86E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.25E-08 | 3.04E-08 | 7.12E-07 | 2.48E-08 |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.58E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.15E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.29E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.06E-08 | 2.56E-08 | 6.00E-07 | 2.09E-08 |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.02E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.69E-09 | 2.33E-08 | 5.44E-07 | 1.90E-08 |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.76E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 8.85E-09 | 2.10E-08 | 4.92E-07 | 1.71E-08 |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.53E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 8.09E-09 | 1.90E-08 | 4.46E-07 | 1.55E-08 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|
| | | | | (per million) | |
| 0 | 6.76091E-10 | 5.16009E-10 | 0 | 0.0012 | Res |
| 0 | 6.36548E-10 | 4.85829E-10 | 0 | 0.0011 | Res |
| 0 | 5.97402E-10 | 4.55951E-10 | 0 | 0.0011 | Res |
| 0 | 5.61928E-10 | 4.28877E-10 | 0 | 0.0010 | Res |
| 0 | 5.24301E-10 | 4.0016E-10 | 0 | 0.0009 | Res |
| 0 | 4.91687E-10 | 3.75267E-10 | 0 | 0.0009 | Res |
| 0 | 4.61956E-10 | 3.52576E-10 | 0 | 0.0008 | Res |
| 0 | 4.33387E-10 | 3.30771E-10 | 0 | 0.0008 | Res |
| 0 | 4.07794E-10 | 3.11239E-10 | 0 | 0.0007 | Res |
| 0 | 3.80294E-10 | 2.9025E-10 | 0 | 0.0007 | Res |
| 0 | 7.09532E-10 | 5.41532E-10 | 0 | 0.0013 | Res |
| 0 | 6.83433E-10 | 5.21613E-10 | 0 | 0.0012 | Res |
| 0 | 6.79748E-10 | 5.188E-10 | 0 | 0.0012 | Res |
| 0 | 6.46114E-10 | 4.9313E-10 | 0 | 0.0011 | Res |
| 0 | 6.09158E-10 | 4.64924E-10 | 0 | 0.0011 | Res |
| 0 | 5.7277E-10 | 4.37152E-10 | 0 | 0.0010 | Res |
| 0 | 5.37396E-10 | 4.10154E-10 | 0 | 0.0009 | Res |
| 0 | 5.03156E-10 | 3.84021E-10 | 0 | 0.0009 | Res |
| 0 | 4.67826E-10 | 3.57056E-10 | 0 | 0.0008 | Res |
| 0 | 4.33187E-10 | 3.30619E-10 | 0 | 0.0008 | Res |
| 0 | 3.97578E-10 | 3.03441E-10 | 0 | 0.0007 | Res |
| 0 | 6.93223E-10 | 5.29085E-10 | 0 | 0.0012 | Res |
| 0 | 6.87141E-10 | 5.24442E-10 | 0 | 0.0012 | Res |
| 0 | 6.71701E-10 | 5.12659E-10 | 0 | 0.0012 | Res |
| 0 | 6.48062E-10 | 4.94617E-10 | 0 | 0.0011 | Res |
| 0 | 6.15973E-10 | 4.70126E-10 | 0 | 0.0011 | Res |
| 0 | 5.78376E-10 | 4.41431E-10 | 0 | 0.0010 | Res |
| 0 | 5.39875E-10 | 4.12046E-10 | 0 | 0.0010 | Res |
| 0 | 4.96531E-10 | 3.78964E-10 | 0 | 0.0009 | Res |
| 0 | 4.57573E-10 | 3.49231E-10 | 0 | 0.0008 | Res |
| 0 | 8.33744E-10 | 6.36334E-10 | 0 | 0.0015 | Res |
| 0 | 8.89831E-10 | 6.79141E-10 | 0 | 0.0016 | Res |
| 0 | 7.90906E-10 | 6.03639E-10 | 0 | 0.0014 | Res |
| 0 | 7.54694E-10 | 5.76001E-10 | 0 | 0.0013 | Res |
| 0 | 7.29139E-10 | 5.56496E-10 | 0 | 0.0013 | Res |
| 0 | 6.9798E-10 | 5.32715E-10 | 0 | 0.0012 | Res |
| 0 | 6.62807E-10 | 5.0587E-10 | 0 | 0.0012 | Res |
| 0 | 6.60071E-10 | 5.03782E-10 | 0 | 0.0012 | Res |
| 0 | 6.1789E-10 | 4.71588E-10 | 0 | 0.0011 | Res |
| 0 | 5.71445E-10 | 4.36141E-10 | 0 | 0.0010 | Res |
| 0 | 5.26102E-10 | 4.01534E-10 | 0 | 0.0009 | Res |
| 0 | 4.8311E-10 | 3.68721E-10 | 0 | 0.0009 | Res |
| 0 | 4.43154E-10 | 3.38226E-10 | 0 | 0.0008 | Res |
| 0 | 9.18493E-10 | 7.01016E-10 | 0 | 0.0016 | Res |
| 0 | 8.78776E-10 | 6.70703E-10 | 0 | 0.0015 | Res |
| 0 | 8.9201E-10 | 6.80804E-10 | 0 | 0.0016 | Res |
| 0 | 8.74929E-10 | 6.67767E-10 | 0 | 0.0015 | Res |
| 0 | 8.59455E-10 | 6.55957E-10 | 0 | 0.0015 | Res |
| 0 | 7.81711E-10 | 5.96621E-10 | 0 | 0.0014 | Res |
| 0 | 7.62117E-10 | 5.81666E-10 | 0 | 0.0013 | Res |
| 0 | 7.18766E-10 | 5.4858E-10 | 0 | 0.0013 | Res |
| 0 | 6.66275E-10 | 5.08518E-10 | 0 | 0.0012 | Res |
| 0 | 6.12824E-10 | 4.67722E-10 | 0 | 0.0011 | Res |
| 0 | 5.61038E-10 | 4.28198E-10 | 0 | 0.0010 | Res |
| 0 | 5.13073E-10 | 3.9159E-10 | 0 | 0.0009 | Res |
| 0 | 4.69928E-10 | 3.58661E-10 | 0 | 0.0008 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.31E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 7.39E-09 | 1.72E-08 | 4.03E-07 | 1.40E-08 | 0 | 4.30196E-10 | 3.28336E-10 | 0 | 0.0008 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.10E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.71E-09 | 1.54E-08 | 3.61E-07 | 1.25E-08 | 0 | 3.91277E-10 | 2.98632E-10 | 0 | 0.0007 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.88E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 5.97E-09 | 1.35E-08 | 3.15E-07 | 1.09E-08 | 0 | 3.49259E-10 | 2.66563E-10 | 0 | 0.0006 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.75E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.18E-08 | 5.40E-08 | 1.27E-06 | 4.42E-08 | 0 | 1.25505E-09 | 9.57884E-10 | 0 | 0.0022 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.35E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 2.05E-08 | 5.09E-08 | 1.19E-06 | 4.16E-08 | 0 | 1.18049E-09 | 9.00981E-10 | 0 | 0.0021 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.50E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.77E-08 | 4.31E-08 | 1.01E-06 | 3.52E-08 | 0 | 1.02256E-09 | 7.80443E-10 | 0 | 0.0018 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.94E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.59E-08 | 3.83E-08 | 8.96E-07 | 3.12E-08 | 0 | 9.19717E-10 | 7.0195E-10 | 0 | 0.0016 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.79E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.54E-08 | 3.77E-08 | 8.82E-07 | 3.07E-08 | 0 | 8.91683E-10 | 6.80554E-10 | 0 | 0.0016 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.64E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.50E-08 | 3.69E-08 | 8.63E-07 | 3.01E-08 | 0 | 8.62295E-10 | 6.58125E-10 | 0 | 0.0015 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.50E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.45E-08 | 3.62E-08 | 8.47E-07 | 2.96E-08 | 0 | 8.3636E-10 | 6.3833E-10 | 0 | 0.0015 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.18E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.35E-08 | 3.36E-08 | 7.86E-07 | 2.74E-08 | 0 | 7.77197E-10 | 5.93175E-10 | 0 | 0.0014 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.88E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.25E-08 | 3.11E-08 | 7.27E-07 | 2.54E-08 | 0 | 7.21765E-10 | 5.50869E-10 | 0 | 0.0013 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.57E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 1.15E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 6.63905E-10 | 5.06709E-10 | 0 | 0.0012 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.25E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.05E-08 | 2.57E-08 | 6.01E-07 | 2.10E-08 | 0 | 6.05394E-10 | 4.62051E-10 | 0 | 0.0011 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.96E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 9.51E-09 | 2.30E-08 | 5.40E-07 | 1.88E-08 | 0 | 5.49861E-10 | 4.19667E-10 | 0 | 0.0010 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.69E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 8.64E-09 | 2.07E-08 | 4.85E-07 | 1.69E-08 | 0 | 5.00212E-10 | 3.81774E-10 | 0 | 0.0009 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.44E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.83E-09 | 1.86E-08 | 4.34E-07 | 1.51E-08 | 0 | 4.54194E-10 | 3.46652E-10 | 0 | 0.0008 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.23E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 7.12E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 4.14029E-10 | 3.15997E-10 | 0 | 0.0007 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.04E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.50E-09 | 1.50E-08 | 3.52E-07 | 1.22E-08 | 0 | 3.78745E-10 | 2.89067E-10 | 0 | 0.0007 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.86E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 5.93E-09 | 1.36E-08 | 3.17E-07 | 1.10E-08 | 0 | 3.46526E-10 | 2.64477E-10 | 0 | 0.0006 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.13E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.32E-08 | 5.99E-08 | 1.40E-06 | 4.91E-08 | 0 | 1.32679E-09 | 1.01264E-09 | 0 | 0.0023 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.61E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.15E-08 | 5.54E-08 | 1.30E-06 | 4.54E-08 | 0 | 1.22944E-09 | 9.38341E-10 | 0 | 0.0022 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.70E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.85E-08 | 4.69E-08 | 1.10E-06 | 3.84E-08 | 0 | 1.05976E-09 | 8.08836E-10 | 0 | 0.0019 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.28E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.71E-08 | 4.34E-08 | 1.02E-06 | 3.55E-08 | 0 | 9.81718E-10 | 7.49271E-10 | 0 | 0.0017 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.06E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.65E-08 | 4.20E-08 | 9.84E-07 | 3.44E-08 | 0 | 9.42282E-10 | 7.19173E-10 | 0 | 0.0017 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.63E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.50E-08 | 3.82E-08 | 8.95E-07 | 3.13E-08 | 0 | 8.61828E-10 | 6.57768E-10 | 0 | 0.0015 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.22E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.37E-08 | 3.46E-08 | 8.10E-07 | 2.83E-08 | 0 | 7.84829E-10 | 5.99E-10 | 0 | 0.0014 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.86E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.25E-08 | 3.14E-08 | 7.35E-07 | 2.57E-08 | 0 | 7.17434E-10 | 5.47563E-10 | 0 | 0.0013 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.52E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.14E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 6.54048E-10 | 4.99185E-10 | 0 | 0.0012 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.18E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 1.03E-08 | 2.54E-08 | 5.95E-07 | 2.08E-08 | 0 | 5.92199E-10 | 4.5198E-10 | 0 | 0.0010 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.86E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 9.23E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 5.32543E-10 | 4.0645E-10 | 0 | 0.0009 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.57E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 8.27E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 4.78457E-10 | 3.6517E-10 | 0 | 0.0008 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.32E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 7.45E-09 | 1.78E-08 | 4.16E-07 | 1.45E-08 | 0 | 4.31662E-10 | 3.29455E-10 | 0 | 0.0008 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.11E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 6.74E-09 | 1.59E-08 | 3.72E-07 | 1.29E-08 | 0 | 3.91812E-10 | 2.99041E-10 | 0 | 0.0007 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.93E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 6.16E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 3.58472E-10 | 2.73594E-10 | 0 | 0.0006 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.77E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 5.66E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 3.30199E-10 | 2.52016E-10 | 0 | 0.0006 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.58E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 5.03E-09 | 1.14E-08 | 2.66E-07 | 9.24E-09 | 0 | 2.94412E-10 | 2.24703E-10 | 0 | 0.0005 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.23E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.36E-08 | 6.13E-08 | 1.44E-06 | 5.03E-08 | 0 | 1.34565E-09 | 1.02703E-09 | 0 | 0.0024 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.87E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.24E-08 | 5.85E-08 | 1.37E-06 | 4.80E-08 | 0 | 1.27806E-09 | 9.75443E-10 | 0 | 0.0023 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.38E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.08E-08 | 5.43E-08 | 1.27E-06 | 4.46E-08 | 0 | 1.18712E-09 | 9.06042E-10 | 0 | 0.0021 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.76E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 1.88E-08 | 4.88E-08 | 1.14E-06 | 4.00E-08 | 0 | 1.07151E-09 | 8.17801E-10 | 0 | 0.0019 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.16E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.68E-08 | 4.34E-08 | 1.02E-06 | 3.56E-08 | 0 | 9.5944E-10 | 7.32268E-10 | 0 | 0.0017 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.63E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.51E-08 | 3.87E-08 | 9.06E-07 | 3.17E-08 | 0 | 8.61764E-10 | 6.57719E-10 | 0 | 0.0015 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.19E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.36E-08 | 3.47E-08 | 8.13E-07 | 2.84E-08 | 0 | 7.78669E-10 | 5.94299E-10 | 0 | 0.0014 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.79E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.23E-08 | 3.12E-08 | 7.31E-07 | 2.55E-08 | 0 | 7.05525E-10 | 5.38473E-10 | 0 | 0.0012 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.41E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.10E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 0 | 6.33511E-10 | 4.83511E-10 | 0 | 0.0011 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.03E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 9.80E-09 | 2.43E-08 | 5.70E-07 | 1.99E-08 | 0 | 5.63753E-10 | 4.3027E-10 | 0 | 0.0010 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.70E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 8.71E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 5.02099E-10 | 3.83214E-10 | 0 | 0.0009 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.42E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 7.78E-09 | 1.89E-08 | 4.41E-07 | 1.54E-08 | 0 | 4.49455E-10 | 3.43035E-10 | 0 | 0.0008 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.18E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 6.99E-09 | 1.68E-08 | 3.92E-07 | 1.37E-08 | 0 | 4.05165E-10 | 3.09232E-10 | 0 | 0.0007 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.99E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.37E-09 | 1.51E-08 | 3.53E-07 | 1.23E-08 | 0 | 3.6951E-10 | 2.82019E-10 | 0 | 0.0007 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.82E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 5.83E-09 | 1.36E-08 | 3.19E-07 | 1.11E-08 | 0 | 3.38798E-10 | 2.58579E-10 | 0 | 0.0006 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.69E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 5.38E-09 | 1.25E-08 | 2.92E-07 | 1.01E-08 | 0 | 3.13499E-10 | 2.3927E-10 | 0 | 0.0006 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.57E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 5.01E-09 | 1.15E-08 | 2.69E-07 | 9.35E-09 | 0 | 2.92143E-10 | 2.22971E-10 | 0 | 0.0005 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.33E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.40E-08 | 6.33E-08 | 1.48E-06 | 5.19E-08 | 0 | 1.36377E-09 | 1.04087E-09 | 0 | 0.0024 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.78E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.22E-08 | 5.85E-08 | 1.37E-06 | 4.81E-08 | 0 | 1.26218E-09 | 9.63326E-10 | 0 | 0.0022 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.97E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 1.95E-08 | 5.11E-08 | 1.20E-06 | 4.19E-08 |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.24E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.71E-08 | 4.45E-08 | 1.04E-06 | 3.65E-08 |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.65E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.52E-08 | 3.91E-08 | 9.17E-07 | 3.21E-08 |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.15E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.35E-08 | 3.46E-08 | 8.11E-07 | 2.84E-08 |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.67E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.10E-07 | 2.48E-08 |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.23E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.05E-08 | 2.63E-08 | 6.15E-07 | 2.15E-08 |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.84E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 9.20E-09 | 2.28E-08 | 5.34E-07 | 1.86E-08 |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.53E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 8.16E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.27E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 7.29E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.05E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 6.60E-09 | 1.58E-08 | 3.70E-07 | 1.29E-08 |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.88E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 6.02E-09 | 1.42E-08 | 3.33E-07 | 1.16E-08 |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.73E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 5.52E-09 | 1.29E-08 | 3.03E-07 | 1.05E-08 |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.59E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 5.08E-09 | 1.18E-08 | 2.76E-07 | 9.59E-09 |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.47E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 4.70E-09 | 1.08E-08 | 2.52E-07 | 8.77E-09 |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 9.95E-05 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 3.27E-08 | 8.73E-08 | 2.05E-06 | 7.17E-08 |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.62E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 3.16E-08 | 8.46E-08 | 1.98E-06 | 6.96E-08 |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.08E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 2.98E-08 | 8.00E-08 | 1.88E-06 | 6.58E-08 |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.16E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.68E-08 | 7.16E-08 | 1.68E-06 | 5.88E-08 |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.17E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 2.35E-08 | 6.25E-08 | 1.47E-06 | 5.14E-08 |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.17E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.02E-08 | 5.32E-08 | 1.25E-06 | 4.37E-08 |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.39E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.76E-08 | 4.60E-08 | 1.08E-06 | 3.78E-08 |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.67E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.52E-08 | 3.95E-08 | 9.25E-07 | 3.24E-08 |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.05E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.32E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.50E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.14E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.05E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 9.87E-09 | 2.46E-08 | 5.77E-07 | 2.01E-08 |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.69E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 8.69E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.40E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 7.72E-09 | 1.88E-08 | 4.40E-07 | 1.53E-08 |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.16E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.93E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.95E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 6.27E-09 | 1.49E-08 | 3.49E-07 | 1.21E-08 |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.77E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 5.68E-09 | 1.33E-08 | 3.12E-07 | 1.09E-08 |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.62E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 5.18E-09 | 1.21E-08 | 2.82E-07 | 9.80E-09 |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.49E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.76E-09 | 1.09E-08 | 2.56E-07 | 8.89E-09 |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.38E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 4.39E-09 | 9.98E-09 | 2.33E-07 | 8.10E-09 |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.26E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.15E-08 | 1.14E-07 | 2.67E-06 | 9.36E-08 |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.17E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 3.85E-08 | 1.05E-07 | 2.47E-06 | 8.67E-08 |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.99E-05 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 3.29E-08 | 8.94E-08 | 2.10E-06 | 7.36E-08 |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.82E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.90E-08 | 7.85E-08 | 1.84E-06 | 6.46E-08 |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.49E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 2.46E-08 | 6.60E-08 | 1.55E-06 | 5.43E-08 |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.39E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.10E-08 | 5.57E-08 | 1.31E-06 | 4.58E-08 |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.43E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.78E-08 | 4.67E-08 | 1.10E-06 | 3.84E-08 |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.56E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.49E-08 | 3.86E-08 | 9.04E-07 | 3.16E-08 |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.86E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.25E-08 | 3.20E-08 | 7.51E-07 | 2.62E-08 |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.31E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 1.07E-08 | 2.70E-08 | 6.33E-07 | 2.21E-08 |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.90E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 9.36E-09 | 2.32E-08 | 5.44E-07 | 1.90E-08 |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.56E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 8.25E-09 | 2.02E-08 | 4.72E-07 | 1.65E-08 |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.27E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 7.32E-09 | 1.77E-08 | 4.13E-07 | 1.44E-08 |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.04E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 6.55E-09 | 1.56E-08 | 3.65E-07 | 1.27E-08 |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.84E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.88E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.67E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 5.33E-09 | 1.23E-08 | 2.89E-07 | 1.00E-08 |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.53E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 4.87E-09 | 1.11E-08 | 2.61E-07 | 9.05E-09 |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.41E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.48E-09 | 1.01E-08 | 2.37E-07 | 8.22E-09 |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.30E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.14E-09 | 9.27E-09 | 2.17E-07 | 7.52E-09 |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.51E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 5.00E-08 | 1.39E-07 | 3.26E-06 | 1.14E-07 |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.49E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 4.93E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.42E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 4.69E-08 | 1.30E-07 | 3.05E-06 | 1.07E-07 |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.35E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.48E-08 | 1.24E-07 | 2.92E-06 | 1.02E-07 |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.17E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 3.87E-08 | 1.07E-07 | 2.51E-06 | 8.81E-08 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|
| | | | | (per million) | |
| 0 | 1.11011E-09 | 8.4726E-10 | 0 | 0.0020 | Res |
| 0 | 9.75774E-10 | 7.44734E-10 | 0 | 0.0017 | Res |
| 0 | 8.65654E-10 | 6.60688E-10 | 0 | 0.0015 | Res |
| 0 | 7.72584E-10 | 5.89655E-10 | 0 | 0.0014 | Res |
| 0 | 6.83553E-10 | 5.21704E-10 | 0 | 0.0012 | Res |
| 0 | 6.00656E-10 | 4.58436E-10 | 0 | 0.0011 | Res |
| 0 | 5.29273E-10 | 4.03954E-10 | 0 | 0.0009 | Res |
| 0 | 4.70497E-10 | 3.59094E-10 | 0 | 0.0008 | Res |
| 0 | 4.217E-10 | 3.21852E-10 | 0 | 0.0007 | Res |
| 0 | 3.82258E-10 | 2.91749E-10 | 0 | 0.0007 | Res |
| 0 | 3.49167E-10 | 2.66493E-10 | 0 | 0.0006 | Res |
| 0 | 3.2099E-10 | 2.44987E-10 | 0 | 0.0006 | Res |
| 0 | 2.96004E-10 | 2.25917E-10 | 0 | 0.0005 | Res |
| 0 | 2.74117E-10 | 2.09213E-10 | 0 | 0.0005 | Res |
| 0 | 1.85073E-09 | 1.41252E-09 | 0 | 0.0033 | Res |
| 0 | 1.78891E-09 | 1.36534E-09 | 0 | 0.0032 | Res |
| 0 | 1.68891E-09 | 1.28902E-09 | 0 | 0.0030 | Res |
| 0 | 1.51776E-09 | 1.15839E-09 | 0 | 0.0027 | Res |
| 0 | 1.33456E-09 | 1.01857E-09 | 0 | 0.0024 | Res |
| 0 | 1.14838E-09 | 8.76472E-10 | 0 | 0.0020 | Res |
| 0 | 1.00226E-09 | 7.64953E-10 | 0 | 0.0018 | Res |
| 0 | 8.69727E-10 | 6.63797E-10 | 0 | 0.0015 | Res |
| 0 | 7.54205E-10 | 5.75628E-10 | 0 | 0.0013 | Res |
| 0 | 6.50634E-10 | 4.96579E-10 | 0 | 0.0011 | Res |
| 0 | 5.67206E-10 | 4.32905E-10 | 0 | 0.0010 | Res |
| 0 | 5.00545E-10 | 3.82028E-10 | 0 | 0.0009 | Res |
| 0 | 4.46054E-10 | 3.40439E-10 | 0 | 0.0008 | Res |
| 0 | 4.01041E-10 | 3.06084E-10 | 0 | 0.0007 | Res |
| 0 | 3.63476E-10 | 2.77414E-10 | 0 | 0.0006 | Res |
| 0 | 3.30009E-10 | 2.51871E-10 | 0 | 0.0006 | Res |
| 0 | 3.01893E-10 | 2.30412E-10 | 0 | 0.0005 | Res |
| 0 | 2.77658E-10 | 2.11915E-10 | 0 | 0.0005 | Res |
| 0 | 2.56395E-10 | 1.95687E-10 | 0 | 0.0005 | Res |
| 0 | 2.33753E-09 | 1.78406E-09 | 0 | 0.0041 | Res |
| 0 | 2.16928E-09 | 1.65565E-09 | 0 | 0.0038 | Res |
| 0 | 1.85766E-09 | 1.41781E-09 | 0 | 0.0033 | Res |
| 0 | 1.64046E-09 | 1.25204E-09 | 0 | 0.0029 | Res |
| 0 | 1.39368E-09 | 1.06369E-09 | 0 | 0.0025 | Res |
| 0 | 1.18909E-09 | 9.07545E-10 | 0 | 0.0021 | Res |
| 0 | 1.01109E-09 | 7.71691E-10 | 0 | 0.0018 | Res |
| 0 | 8.49108E-10 | 6.4806E-10 | 0 | 0.0015 | Res |
| 0 | 7.17803E-10 | 5.47844E-10 | 0 | 0.0013 | Res |
| 0 | 6.16272E-10 | 4.70354E-10 | 0 | 0.0011 | Res |
| 0 | 5.38699E-10 | 4.11148E-10 | 0 | 0.0009 | Res |
| 0 | 4.75954E-10 | 3.6326E-10 | 0 | 0.0008 | Res |
| 0 | 4.23217E-10 | 3.2301E-10 | 0 | 0.0007 | Res |
| 0 | 3.79677E-10 | 2.89779E-10 | 0 | 0.0007 | Res |
| 0 | 3.42049E-10 | 2.6106E-10 | 0 | 0.0006 | Res |
| 0 | 3.10366E-10 | 2.36879E-10 | 0 | 0.0005 | Res |
| 0 | 2.8419E-10 | 2.16901E-10 | 0 | 0.0005 | Res |
| 0 | 2.61862E-10 | 1.9986E-10 | 0 | 0.0005 | Res |
| 0 | 2.42507E-10 | 1.85087E-10 | 0 | 0.0004 | Res |
| 0 | 2.81128E-09 | 2.14564E-09 | 0 | 0.0050 | Res |
| 0 | 2.76777E-09 | 2.11243E-09 | 0 | 0.0049 | Res |
| 0 | 2.63442E-09 | 2.01065E-09 | 0 | 0.0046 | Res |
| 0 | 2.51669E-09 | 1.9208E-09 | 0 | 0.0044 | Res |
| 0 | 2.17777E-09 | 1.66212E-09 | 0 | 0.0038 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.52E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.14E-08 | 8.61E-08 | 2.02E-06 | 7.09E-08 | 0 | 1.77105E-09 | 1.3517E-09 | 0 | 0.0031 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.78E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 2.56E-08 | 6.95E-08 | 1.63E-06 | 5.71E-08 | 0 | 1.44686E-09 | 1.10428E-09 | 0 | 0.0026 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.42E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.11E-08 | 5.66E-08 | 1.33E-06 | 4.65E-08 | 0 | 1.19463E-09 | 9.11772E-10 | 0 | 0.0021 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.21E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.71E-08 | 4.50E-08 | 1.06E-06 | 3.70E-08 | 0 | 9.68897E-10 | 7.39485E-10 | 0 | 0.0017 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.28E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.40E-08 | 3.62E-08 | 8.49E-07 | 2.97E-08 | 0 | 7.95451E-10 | 6.07108E-10 | 0 | 0.0014 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.63E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.18E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 6.76045E-10 | 5.15974E-10 | 0 | 0.0012 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.11E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 1.01E-08 | 2.53E-08 | 5.93E-07 | 2.07E-08 | 0 | 5.7847E-10 | 4.41502E-10 | 0 | 0.0010 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.70E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.73E-09 | 2.16E-08 | 5.05E-07 | 1.76E-08 | 0 | 5.02442E-10 | 3.83476E-10 | 0 | 0.0009 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.38E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.65E-09 | 1.86E-08 | 4.35E-07 | 1.52E-08 | 0 | 4.42114E-10 | 3.37432E-10 | 0 | 0.0008 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.11E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.78E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 0 | 3.93108E-10 | 3.00029E-10 | 0 | 0.0007 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.90E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 6.09E-09 | 1.43E-08 | 3.35E-07 | 1.17E-08 | 0 | 3.53704E-10 | 2.69955E-10 | 0 | 0.0006 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.72E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 5.47E-09 | 1.27E-08 | 2.97E-07 | 1.03E-08 | 0 | 3.19084E-10 | 2.43532E-10 | 0 | 0.0006 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.57E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 4.99E-09 | 1.14E-08 | 2.66E-07 | 9.25E-09 | 0 | 2.91409E-10 | 2.2241E-10 | 0 | 0.0005 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.44E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 4.58E-09 | 1.03E-08 | 2.41E-07 | 8.38E-09 | 0 | 2.68207E-10 | 2.04702E-10 | 0 | 0.0005 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.34E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 4.24E-09 | 9.46E-09 | 2.21E-07 | 7.67E-09 | 0 | 2.48884E-10 | 1.89954E-10 | 0 | 0.0004 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.25E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 3.95E-09 | 8.73E-09 | 2.04E-07 | 7.07E-09 | 0 | 2.32377E-10 | 1.77356E-10 | 0 | 0.0004 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.63E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 5.40E-08 | 1.51E-07 | 3.54E-06 | 1.24E-07 | 0 | 3.02943E-09 | 2.31214E-09 | 0 | 0.0053 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.58E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 5.23E-08 | 1.46E-07 | 3.43E-06 | 1.20E-07 | 0 | 2.93118E-09 | 2.23715E-09 | 0 | 0.0052 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.57E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 5.22E-08 | 1.46E-07 | 3.43E-06 | 1.21E-07 | 0 | 2.9262E-09 | 2.23334E-09 | 0 | 0.0052 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.31E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 4.34E-08 | 1.21E-07 | 2.84E-06 | 9.98E-08 | 0 | 2.43478E-09 | 1.85828E-09 | 0 | 0.0043 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.99E-05 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 3.30E-08 | 9.14E-08 | 2.15E-06 | 7.53E-08 | 0 | 1.85794E-09 | 1.41802E-09 | 0 | 0.0033 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.80E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.57E-08 | 7.05E-08 | 1.65E-06 | 5.80E-08 | 0 | 1.45094E-09 | 1.1074E-09 | 0 | 0.0026 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.10E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 2.01E-08 | 5.43E-08 | 1.27E-06 | 4.47E-08 | 0 | 1.13571E-09 | 8.66804E-10 | 0 | 0.0020 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.85E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.59E-08 | 4.23E-08 | 9.91E-07 | 3.47E-08 | 0 | 9.0164E-10 | 6.88154E-10 | 0 | 0.0016 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.94E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.29E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 0 | 7.3262E-10 | 5.59153E-10 | 0 | 0.0013 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.29E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.07E-08 | 2.74E-08 | 6.43E-07 | 2.25E-08 | 0 | 6.11573E-10 | 4.66767E-10 | 0 | 0.0011 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.81E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 9.12E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 5.23145E-10 | 3.99277E-10 | 0 | 0.0009 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.46E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 7.93E-09 | 1.96E-08 | 4.59E-07 | 1.60E-08 | 0 | 4.56733E-10 | 3.4859E-10 | 0 | 0.0008 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.16E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 6.97E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 0 | 4.02735E-10 | 3.07377E-10 | 0 | 0.0007 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.94E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 6.21E-09 | 1.48E-08 | 3.46E-07 | 1.20E-08 | 0 | 3.60152E-10 | 2.74877E-10 | 0 | 0.0006 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.75E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 5.61E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 0 | 3.26325E-10 | 2.49059E-10 | 0 | 0.0006 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.61E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 5.13E-09 | 1.18E-08 | 2.76E-07 | 9.60E-09 | 0 | 2.99065E-10 | 2.28254E-10 | 0 | 0.0005 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.49E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 4.73E-09 | 1.07E-08 | 2.51E-07 | 8.72E-09 | 0 | 2.76433E-10 | 2.10981E-10 | 0 | 0.0005 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.39E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 4.40E-09 | 9.90E-09 | 2.31E-07 | 8.02E-09 | 0 | 2.57961E-10 | 1.96882E-10 | 0 | 0.0005 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.30E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 4.13E-09 | 9.20E-09 | 2.15E-07 | 7.45E-09 | 0 | 2.42585E-10 | 1.85147E-10 | 0 | 0.0004 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.23E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 3.89E-09 | 8.59E-09 | 2.01E-07 | 6.95E-09 | 0 | 2.28772E-10 | 1.74604E-10 | 0 | 0.0004 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.32E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 7.73E-08 | 2.19E-07 | 5.14E-06 | 1.81E-07 | 0 | 4.32384E-09 | 3.30006E-09 | 0 | 0.0076 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.99E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 6.60E-08 | 1.87E-07 | 4.38E-06 | 1.54E-07 | 0 | 3.69314E-09 | 2.8187E-09 | 0 | 0.0065 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.46E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 4.86E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 2.72163E-09 | 2.07721E-09 | 0 | 0.0048 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.03E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 3.42E-08 | 9.52E-08 | 2.23E-06 | 7.84E-08 | 0 | 1.91709E-09 | 1.46317E-09 | 0 | 0.0034 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.33E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.42E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 0 | 1.36295E-09 | 1.04024E-09 | 0 | 0.0024 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.40E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.78E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 1.00409E-09 | 7.66348E-10 | 0 | 0.0018 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.22E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.38E-08 | 3.69E-08 | 8.65E-07 | 3.03E-08 | 0 | 7.84379E-10 | 5.98657E-10 | 0 | 0.0014 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.42E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 1.12E-08 | 2.93E-08 | 6.86E-07 | 2.40E-08 | 0 | 6.36129E-10 | 4.85509E-10 | 0 | 0.0011 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.87E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 9.34E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 5.33761E-10 | 4.07379E-10 | 0 | 0.0009 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.47E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 8.03E-09 | 2.03E-08 | 4.75E-07 | 1.66E-08 | 0 | 4.60197E-10 | 3.51234E-10 | 0 | 0.0008 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.18E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 7.05E-09 | 1.75E-08 | 4.09E-07 | 1.43E-08 | 0 | 4.05648E-10 | 3.09601E-10 | 0 | 0.0007 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.96E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 6.32E-09 | 1.54E-08 | 3.60E-07 | 1.26E-08 | 0 | 3.64734E-10 | 2.78374E-10 | 0 | 0.0006 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.79E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 5.75E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 3.32983E-10 | 2.54141E-10 | 0 | 0.0006 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.65E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 5.30E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 0 | 3.07798E-10 | 2.34919E-10 | 0 | 0.0005 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.54E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 4.93E-09 | 1.15E-08 | 2.69E-07 | 9.37E-09 | 0 | 2.87085E-10 | 2.1911E-10 | 0 | 0.0005 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.45E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.62E-09 | 1.07E-08 | 2.49E-07 | 8.66E-09 | 0 | 2.69561E-10 | 2.05735E-10 | 0 | 0.0005 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.37E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.35E-09 | 9.92E-09 | 2.32E-07 | 8.06E-09 | 0 | 2.54194E-10 | 1.94007E-10 | 0 | 0.0004 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.30E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 4.12E-09 | 9.32E-09 | 2.18E-07 | 7.56E-09 | 0 | 2.4136E-10 | 1.84212E-10 | 0 | 0.0004 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.23E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 3.91E-09 | 8.75E-09 | 2.04E-07 | 7.09E-09 | 0 | 2.29119E-10 | 1.74869E-10 | 0 | 0.0004 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.41E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 1.13E-07 | 3.23E-07 | 7.58E-06 | 2.66E-07 | 0 | 6.34187E-09 | 4.84027E-09 | 0 | 0.0112 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.84E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 1.28E-07 | 3.65E-07 | 8.56E-06 | 3.01E-07 | 0 | 7.14769E-09 | 5.45529E-09 | 0 | 0.0126 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.45E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 1.15E-07 | 3.27E-07 | 7.68E-06 | 2.70E-07 |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.61E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 8.69E-08 | 2.47E-07 | 5.79E-06 | 2.04E-07 |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.59E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.28E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.56E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 3.17E-08 | 8.85E-08 | 2.08E-06 | 7.29E-08 |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.24E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.06E-08 | 5.67E-08 | 1.33E-06 | 4.67E-08 |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.53E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.49E-08 | 4.04E-08 | 9.47E-07 | 3.32E-08 |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.55E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.16E-08 | 3.10E-08 | 7.27E-07 | 2.55E-08 |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.93E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.58E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.52E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.21E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.23E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 7.25E-09 | 1.85E-08 | 4.33E-07 | 1.51E-08 |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.01E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 6.53E-09 | 1.64E-08 | 3.84E-07 | 1.34E-08 |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.85E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 5.97E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.71E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 5.51E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.59E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 5.13E-09 | 1.24E-08 | 2.90E-07 | 1.01E-08 |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.50E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 4.81E-09 | 1.15E-08 | 2.69E-07 | 9.36E-09 |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.41E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.52E-09 | 1.07E-08 | 2.50E-07 | 8.69E-09 |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.33E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.26E-09 | 9.94E-09 | 2.33E-07 | 8.09E-09 |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.26E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.03E-09 | 9.30E-09 | 2.17E-07 | 7.56E-09 |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.20E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 3.83E-09 | 8.73E-09 | 2.04E-07 | 7.09E-09 |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.75E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 2.25E-07 | 6.44E-07 | 1.51E-05 | 5.32E-07 |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.21E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 2.40E-07 | 6.88E-07 | 1.62E-05 | 5.68E-07 |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.43E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 2.14E-07 | 6.13E-07 | 1.44E-05 | 5.06E-07 |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.38E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.13E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.38E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 4.59E-08 | 1.29E-07 | 3.03E-06 | 1.07E-07 |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.46E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 2.47E-08 | 6.85E-08 | 1.61E-06 | 5.65E-08 |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.05E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.66E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.89E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.28E-08 | 3.44E-08 | 8.08E-07 | 2.83E-08 |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.20E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.05E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.74E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 8.95E-09 | 2.36E-08 | 5.53E-07 | 1.94E-08 |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.39E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.81E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.13E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 6.94E-09 | 1.79E-08 | 4.19E-07 | 1.47E-08 |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.92E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 6.24E-09 | 1.59E-08 | 3.73E-07 | 1.30E-08 |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.69E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.61E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 5.22E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.50E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 4.85E-09 | 1.19E-08 | 2.80E-07 | 9.76E-09 |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.41E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 4.53E-09 | 1.10E-08 | 2.58E-07 | 9.01E-09 |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.33E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 4.26E-09 | 1.03E-08 | 2.40E-07 | 8.36E-09 |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.25E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 4.02E-09 | 9.57E-09 | 2.24E-07 | 7.79E-09 |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.19E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 3.81E-09 | 8.94E-09 | 2.09E-07 | 7.28E-09 |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.13E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 3.62E-09 | 8.41E-09 | 1.97E-07 | 6.84E-09 |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.80E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 5.99E-07 | 1.72E-06 | 4.04E-05 | 1.42E-06 |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.36E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 7.87E-07 | 2.26E-06 | 5.30E-05 | 1.87E-06 |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.74E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 9.15E-07 | 2.63E-06 | 6.17E-05 | 2.17E-06 |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.20E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 7.31E-08 | 2.08E-07 | 4.87E-06 | 1.71E-07 |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.51E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.15E-08 | 8.81E-08 | 2.07E-06 | 7.26E-08 |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.16E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.04E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.57E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.51E-08 | 4.10E-08 | 9.61E-07 | 3.37E-08 |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.63E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.19E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.00E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 9.84E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.55E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.36E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.22E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 7.26E-09 | 1.89E-08 | 4.44E-07 | 1.55E-08 |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.97E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 6.42E-09 | 1.66E-08 | 3.88E-07 | 1.36E-08 |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.77E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 5.75E-09 | 1.47E-08 | 3.45E-07 | 1.21E-08 |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.61E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 5.22E-09 | 1.32E-08 | 3.10E-07 | 1.08E-08 |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.47E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.78E-09 | 1.20E-08 | 2.81E-07 | 9.82E-09 |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.37E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.43E-09 | 1.10E-08 | 2.58E-07 | 9.00E-09 |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.28E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.15E-09 | 1.02E-08 | 2.39E-07 | 8.34E-09 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
|---|---|---|---|---|---|
| 0 | 6.41297E-09 | 4.89453E-09 | 0 | 0.0113 | Res |
| 0 | 4.85462E-09 | 3.70516E-09 | 0 | 0.0086 | Res |
| 0 | 2.95433E-09 | 2.25482E-09 | 0 | 0.0052 | Res |
| 0 | 1.77943E-09 | 1.3581E-09 | 0 | 0.0031 | Res |
| 0 | 1.16064E-09 | 8.85825E-10 | 0 | 0.0020 | Res |
| 0 | 8.42803E-10 | 6.43247E-10 | 0 | 0.0015 | Res |
| 0 | 6.59769E-10 | 5.03551E-10 | 0 | 0.0012 | Res |
| 0 | 5.44729E-10 | 4.15751E-10 | 0 | 0.0010 | Res |
| 0 | 4.68693E-10 | 3.57718E-10 | 0 | 0.0008 | Res |
| 0 | 4.15052E-10 | 3.16777E-10 | 0 | 0.0007 | Res |
| 0 | 3.74579E-10 | 2.85887E-10 | 0 | 0.0007 | Res |
| 0 | 3.4374E-10 | 2.6235E-10 | 0 | 0.0006 | Res |
| 0 | 3.17779E-10 | 2.42537E-10 | 0 | 0.0006 | Res |
| 0 | 2.96636E-10 | 2.264E-10 | 0 | 0.0005 | Res |
| 0 | 2.78557E-10 | 2.12602E-10 | 0 | 0.0005 | Res |
| 0 | 2.62667E-10 | 2.00474E-10 | 0 | 0.0005 | Res |
| 0 | 2.47996E-10 | 1.89276E-10 | 0 | 0.0004 | Res |
| 0 | 2.35168E-10 | 1.79486E-10 | 0 | 0.0004 | Res |
| 0 | 2.23717E-10 | 1.70746E-10 | 0 | 0.0004 | Res |
| 0 | 1.25644E-08 | 9.58948E-09 | 0 | 0.0222 | Res |
| 0 | 1.34117E-08 | 1.02361E-08 | 0 | 0.0236 | Res |
| 0 | 1.19544E-08 | 9.12388E-09 | 0 | 0.0211 | Res |
| 0 | 6.2896E-09 | 4.80038E-09 | 0 | 0.0111 | Res |
| 0 | 2.56792E-09 | 1.9599E-09 | 0 | 0.0045 | Res |
| 0 | 1.38849E-09 | 1.05973E-09 | 0 | 0.0024 | Res |
| 0 | 9.38569E-10 | 7.16339E-10 | 0 | 0.0017 | Res |
| 0 | 7.22904E-10 | 5.51737E-10 | 0 | 0.0013 | Res |
| 0 | 5.955E-10 | 4.545E-10 | 0 | 0.0010 | Res |
| 0 | 5.08914E-10 | 3.88415E-10 | 0 | 0.0009 | Res |
| 0 | 4.44912E-10 | 3.39567E-10 | 0 | 0.0008 | Res |
| 0 | 3.96206E-10 | 3.02394E-10 | 0 | 0.0007 | Res |
| 0 | 3.57199E-10 | 2.72623E-10 | 0 | 0.0006 | Res |
| 0 | 3.26107E-10 | 2.48893E-10 | 0 | 0.0006 | Res |
| 0 | 3.00209E-10 | 2.29127E-10 | 0 | 0.0005 | Res |
| 0 | 2.79254E-10 | 2.13133E-10 | 0 | 0.0005 | Res |
| 0 | 2.61709E-10 | 1.99742E-10 | 0 | 0.0005 | Res |
| 0 | 2.46572E-10 | 1.8819E-10 | 0 | 0.0004 | Res |
| 0 | 2.33312E-10 | 1.78069E-10 | 0 | 0.0004 | Res |
| 0 | 2.21271E-10 | 1.6888E-10 | 0 | 0.0004 | Res |
| 0 | 2.10888E-10 | 1.60955E-10 | 0 | 0.0004 | Res |
| 0 | 3.3425E-08 | 2.55107E-08 | 0 | 0.0589 | Res |
| 0 | 4.38677E-08 | 3.34809E-08 | 0 | 0.0773 | Res |
| 0 | 5.10268E-08 | 3.89449E-08 | 0 | 0.0900 | Res |
| 0 | 4.08839E-09 | 3.12036E-09 | 0 | 0.0072 | Res |
| 0 | 1.76933E-09 | 1.3504E-09 | 0 | 0.0031 | Res |
| 0 | 1.14674E-09 | 8.75221E-10 | 0 | 0.0020 | Res |
| 0 | 8.4982E-10 | 6.48603E-10 | 0 | 0.0015 | Res |
| 0 | 6.74841E-10 | 5.15055E-10 | 0 | 0.0012 | Res |
| 0 | 5.58066E-10 | 4.2593E-10 | 0 | 0.0010 | Res |
| 0 | 4.74978E-10 | 3.62515E-10 | 0 | 0.0008 | Res |
| 0 | 4.13315E-10 | 3.15452E-10 | 0 | 0.0007 | Res |
| 0 | 3.66199E-10 | 2.79492E-10 | 0 | 0.0006 | Res |
| 0 | 3.28999E-10 | 2.511E-10 | 0 | 0.0006 | Res |
| 0 | 2.99027E-10 | 2.28225E-10 | 0 | 0.0005 | Res |
| 0 | 2.74406E-10 | 2.09434E-10 | 0 | 0.0005 | Res |
| 0 | 2.54729E-10 | 1.94416E-10 | 0 | 0.0004 | Res |
| 0 | 2.38902E-10 | 1.82335E-10 | 0 | 0.0004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.21E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 3.89E-09 | 9.48E-09 | 2.22E-07 | 7.74E-09 | 0 | 2.24702E-10 | 1.71498E-10 | 0 | 0.0004 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.15E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 3.69E-09 | 8.88E-09 | 2.08E-07 | 7.25E-09 | 0 | 2.13224E-10 | 1.62738E-10 | 0 | 0.0004 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.09E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 3.50E-09 | 8.34E-09 | 1.95E-07 | 6.80E-09 | 0 | 2.0281E-10 | 1.5479E-10 | 0 | 0.0004 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.04E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 3.33E-09 | 7.86E-09 | 1.84E-07 | 6.40E-09 | 0 | 1.93554E-10 | 1.47725E-10 | 0 | 0.0003 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.95E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 9.82E-08 | 2.79E-07 | 6.56E-06 | 2.31E-07 | 0 | 5.48949E-09 | 4.18971E-09 | 0 | 0.0097 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.36E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 7.84E-08 | 2.23E-07 | 5.22E-06 | 1.84E-07 | 0 | 4.38336E-09 | 3.34548E-09 | 0 | 0.0077 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.28E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 4.23E-08 | 1.19E-07 | 2.79E-06 | 9.81E-08 | 0 | 2.37207E-09 | 1.81042E-09 | 0 | 0.0042 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.17E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 2.71E-08 | 7.52E-08 | 1.76E-06 | 6.20E-08 | 0 | 1.51977E-09 | 1.15992E-09 | 0 | 0.0027 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.95E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 1.97E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 1.10669E-09 | 8.44652E-10 | 0 | 0.0020 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.53E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.49E-08 | 4.06E-08 | 9.52E-07 | 3.34E-08 | 0 | 8.43296E-10 | 6.43624E-10 | 0 | 0.0015 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.61E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.19E-08 | 3.19E-08 | 7.48E-07 | 2.62E-08 | 0 | 6.72101E-10 | 5.12964E-10 | 0 | 0.0012 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.99E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.80E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 0 | 5.56202E-10 | 4.24507E-10 | 0 | 0.0010 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.53E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 8.29E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 0 | 4.71516E-10 | 3.59872E-10 | 0 | 0.0008 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.20E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 7.17E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 0 | 4.08724E-10 | 3.11948E-10 | 0 | 0.0007 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.93E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 6.31E-09 | 1.63E-08 | 3.81E-07 | 1.33E-08 | 0 | 3.59975E-10 | 2.74742E-10 | 0 | 0.0006 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.73E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.62E-09 | 1.44E-08 | 3.36E-07 | 1.18E-08 | 0 | 3.21237E-10 | 2.45176E-10 | 0 | 0.0006 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.56E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 5.07E-09 | 1.29E-08 | 3.01E-07 | 1.05E-08 | 0 | 2.9035E-10 | 2.21602E-10 | 0 | 0.0005 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.42E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 4.62E-09 | 1.16E-08 | 2.72E-07 | 9.51E-09 | 0 | 2.64939E-10 | 2.02208E-10 | 0 | 0.0005 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.31E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 4.24E-09 | 1.06E-08 | 2.48E-07 | 8.66E-09 | 0 | 2.43753E-10 | 1.86038E-10 | 0 | 0.0004 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.21E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.92E-09 | 9.71E-09 | 2.27E-07 | 7.93E-09 | 0 | 2.25571E-10 | 1.72161E-10 | 0 | 0.0004 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.14E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 3.68E-09 | 9.06E-09 | 2.12E-07 | 7.40E-09 | 0 | 2.12334E-10 | 1.62058E-10 | 0 | 0.0004 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.08E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 3.47E-09 | 8.48E-09 | 1.98E-07 | 6.92E-09 | 0 | 2.00413E-10 | 1.5296E-10 | 0 | 0.0004 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.03E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 3.30E-09 | 8.00E-09 | 1.87E-07 | 6.53E-09 | 0 | 1.90933E-10 | 1.45725E-10 | 0 | 0.0003 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.82E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 3.15E-09 | 7.58E-09 | 1.77E-07 | 6.18E-09 | 0 | 1.82613E-10 | 1.39374E-10 | 0 | 0.0003 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.35E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 3.00E-09 | 7.14E-09 | 1.67E-07 | 5.82E-09 | 0 | 1.73885E-10 | 1.32713E-10 | 0 | 0.0003 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.07E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 1.01E-08 | 2.66E-08 | 6.24E-07 | 2.19E-08 | 0 | 5.7081E-10 | 4.35656E-10 | 0 | 0.0010 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.87E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.08E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 0 | 3.47604E-10 | 2.653E-10 | 0 | 0.0006 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.68E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.47E-09 | 1.39E-08 | 3.25E-07 | 1.14E-08 | 0 | 3.134E-10 | 2.39194E-10 | 0 | 0.0006 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.52E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 4.94E-09 | 1.24E-08 | 2.91E-07 | 1.02E-08 | 0 | 2.83293E-10 | 2.16216E-10 | 0 | 0.0005 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.39E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 4.50E-09 | 1.12E-08 | 2.63E-07 | 9.19E-09 | 0 | 2.58254E-10 | 1.97106E-10 | 0 | 0.0005 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.26E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 4.08E-09 | 1.01E-08 | 2.37E-07 | 8.27E-09 | 0 | 2.34685E-10 | 1.79117E-10 | 0 | 0.0004 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.16E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 3.75E-09 | 9.23E-09 | 2.16E-07 | 7.54E-09 | 0 | 2.15872E-10 | 1.64759E-10 | 0 | 0.0004 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.07E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 3.46E-09 | 8.47E-09 | 1.98E-07 | 6.92E-09 | 0 | 1.9975E-10 | 1.52454E-10 | 0 | 0.0004 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.00E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 3.23E-09 | 7.86E-09 | 1.84E-07 | 6.42E-09 | 0 | 1.86821E-10 | 1.42586E-10 | 0 | 0.0003 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.45E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 3.04E-09 | 7.35E-09 | 1.72E-07 | 6.00E-09 | 0 | 1.75864E-10 | 1.34224E-10 | 0 | 0.0003 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.02E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 2.90E-09 | 6.97E-09 | 1.63E-07 | 5.69E-09 | 0 | 1.67788E-10 | 1.2806E-10 | 0 | 0.0003 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.62E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 2.77E-09 | 6.62E-09 | 1.55E-07 | 5.40E-09 | 0 | 1.60432E-10 | 1.22446E-10 | 0 | 0.0003 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.20E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 2.63E-09 | 6.25E-09 | 1.46E-07 | 5.09E-09 | 0 | 1.52639E-10 | 1.16498E-10 | 0 | 0.0003 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2027

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 5.566E-05 | 3.53E-08 | 2.12E-08 | 3.53E-08 | 1.81E-07 | 3.95E-07 | 3.53E-08 | 5.65E-09 | 6.49E-07 | 7.06E-08 | 2.82E-09 | 1.05E-04 |
| Paved road | 2027_PAVED | 1.614E-04 | 8.60E-08 | 5.16E-08 | 8.60E-08 | 5.50E-08 | 1.72E-06 | 1.58E-07 | 9.63E-09 | 3.71E-06 | 1.72E-07 | 1.31E-07 | 4.88E-04 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2027 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.89E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.07E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.45E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.58E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.65E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.88E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.57E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.78E-03 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 9.94E-08 | 5.96E-08 | 9.94E-08 | 6.70E-08 | 1.82E-07 | 4.28E-06 | 1.50E-07 | 0 | 0 | 3.5285E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 6.68E-08 | 4.01E-08 | 6.68E-08 | 4.96E-08 | 1.22E-07 | 2.85E-06 | 9.93E-08 | 0 | 0 | 2.36552E-09 | 0 | 0.0024 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 8.15E-06 | 4.54E-09 | 2.72E-09 | 4.54E-09 | 8.41E-09 | 7.31E-09 | 1.65E-07 | 5.12E-09 | 0 | 0 | 1.54206E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.28E-05 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 7.63E-09 | 1.22E-08 | 2.82E-07 | 9.53E-09 | 0 | 0 | 2.42768E-10 | 0 | 0.0002 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.96E-04 | 3.17E-07 | 1.90E-07 | 3.17E-07 | 2.07E-07 | 5.83E-07 | 1.37E-05 | 4.81E-07 | 0 | 0 | 1.12741E-08 | 0 | 0.0113 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.21E-03 | 6.43E-07 | 3.86E-07 | 6.43E-07 | 4.16E-07 | 1.18E-06 | 2.77E-05 | 9.76E-07 | 0 | 0 | 2.28423E-08 | 0 | 0.0228 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.48E-04 | 2.92E-07 | 1.75E-07 | 2.92E-07 | 1.91E-07 | 5.37E-07 | 1.26E-05 | 4.43E-07 | 0 | 0 | 1.03839E-08 | 0 | 0.0104 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.46E-03 | 7.78E-07 | 4.67E-07 | 7.78E-07 | 5.02E-07 | 1.43E-06 | 3.36E-05 | 1.18E-06 | 0 | 0 | 2.76567E-08 | 0 | 0.0277 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.49E-05 | 5.09E-08 | 3.05E-08 | 5.09E-08 | 4.13E-08 | 9.20E-08 | 2.15E-06 | 7.45E-08 | 0 | 0 | 1.79688E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.89E-04 | 1.54E-07 | 9.24E-08 | 1.54E-07 | 1.03E-07 | 2.82E-07 | 6.62E-06 | 2.32E-07 | 0 | 0 | 5.46631E-09 | 0 | 0.0055 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.68E-05 | 3.57E-08 | 2.14E-08 | 3.57E-08 | 2.58E-08 | 6.51E-08 | 1.52E-06 | 5.33E-08 | 0 | 0 | 1.26416E-09 | 0 | 0.0013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.05E-05 | 1.65E-08 | 9.91E-09 | 1.65E-08 | 1.86E-08 | 2.89E-08 | 6.69E-07 | 2.25E-08 | 0 | 0 | 5.77066E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.85E-05 | 1.54E-08 | 9.27E-09 | 1.54E-08 | 1.75E-08 | 2.70E-08 | 6.25E-07 | 2.10E-08 | 0 | 0 | 5.39253E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.67E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 1.65E-08 | 2.53E-08 | 5.85E-07 | 1.97E-08 | 0 | 0 | 5.05025E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.50E-05 | 1.36E-08 | 8.15E-09 | 1.36E-08 | 1.56E-08 | 2.37E-08 | 5.49E-07 | 1.84E-08 | 0 | 0 | 4.74082E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.36E-05 | 1.28E-08 | 7.69E-09 | 1.28E-08 | 1.48E-08 | 2.24E-08 | 5.18E-07 | 1.74E-08 | 0 | 0 | 4.47497E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 1.39E-08 | 2.10E-08 | 4.86E-07 | 1.63E-08 | 0 | 0 | 4.20585E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.12E-08 | 6.75E-09 | 1.12E-08 | 1.31E-08 | 1.96E-08 | 4.53E-07 | 1.52E-08 | 0 | 0 | 3.9205E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.11E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 2.01E-08 | 2.94E-08 | 6.80E-07 | 2.27E-08 | 0 | 0 | 5.89486E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.07E-05 | 1.67E-08 | 9.99E-09 | 1.67E-08 | 1.91E-08 | 2.91E-08 | 6.73E-07 | 2.26E-08 | 0 | 0 | 5.81384E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.91E-05 | 1.58E-08 | 9.46E-09 | 1.58E-08 | 1.79E-08 | 2.76E-08 | 6.38E-07 | 2.15E-08 | 0 | 0 | 5.50545E-10 | 0 | 0.0006 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.73E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 1.68E-08 | 2.58E-08 | 5.98E-07 | 2.01E-08 | 0 | 0 | 5.16359E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.55E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.57E-08 | 2.42E-08 | 5.59E-07 | 1.88E-08 | 0 | 0 | 4.82744E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.39E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.48E-08 | 2.26E-08 | 5.23E-07 | 1.76E-08 | 0 | 0 | 4.51602E-10 | 0 | 0.0005 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.23E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 1.40E-08 | 2.11E-08 | 4.88E-07 | 1.64E-08 | 0 | 0 | 4.22146E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.10E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 1.32E-08 | 1.98E-08 | 4.59E-07 | 1.54E-08 | 0 | 0 | 3.97385E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.07E-08 | 6.43E-09 | 1.07E-08 | 1.26E-08 | 1.86E-08 | 4.31E-07 | 1.45E-08 | 0 | 0 | 3.73665E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.77E-05 | 1.51E-08 | 9.05E-09 | 1.51E-08 | 1.94E-08 | 2.59E-08 | 5.98E-07 | 1.98E-08 | 0 | 0 | 5.23965E-10 | 0 | 0.0005 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.01E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.92E-08 | 2.84E-08 | 6.57E-07 | 2.20E-08 | 0 | 0 | 5.68979E-10 | 0 | 0.0006 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.96E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 1.81E-08 | 2.80E-08 | 6.49E-07 | 2.18E-08 | 0 | 0 | 5.5961E-10 | 0 | 0.0006 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.79E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.70E-08 | 2.64E-08 | 6.12E-07 | 2.06E-08 | 0 | 0 | 5.27804E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.61E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.60E-08 | 2.48E-08 | 5.74E-07 | 1.93E-08 | 0 | 0 | 4.95002E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.46E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 1.51E-08 | 2.33E-08 | 5.39E-07 | 1.81E-08 | 0 | 0 | 4.64935E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 1.41E-08 | 2.16E-08 | 5.01E-07 | 1.68E-08 | 0 | 0 | 4.3242E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 1.33E-08 | 2.02E-08 | 4.68E-07 | 1.57E-08 | 0 | 0 | 4.04273E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.26E-08 | 1.89E-08 | 4.37E-07 | 1.47E-08 | 0 | 0 | 3.78557E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 1.19E-08 | 1.76E-08 | 4.08E-07 | 1.37E-08 | 0 | 0 | 3.53651E-10 | 0 | 0.0004 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 9.51E-09 | 5.70E-09 | 9.51E-09 | 1.13E-08 | 1.65E-08 | 3.82E-07 | 1.28E-08 | 0 | 0 | 3.31308E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.62E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 1.07E-08 | 1.53E-08 | 3.53E-07 | 1.18E-08 | 0 | 0 | 3.07101E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.02E-05 | 1.64E-08 | 9.85E-09 | 1.64E-08 | 2.00E-08 | 2.84E-08 | 6.57E-07 | 2.19E-08 | 0 | 0 | 5.7145E-10 | 0 | 0.0006 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.93E-05 | 1.59E-08 | 9.56E-09 | 1.59E-08 | 1.90E-08 | 2.77E-08 | 6.40E-07 | 2.14E-08 | 0 | 0 | 5.55076E-10 | 0 | 0.0006 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.98E-05 | 1.61E-08 | 9.68E-09 | 1.61E-08 | 1.82E-08 | 2.82E-08 | 6.53E-07 | 2.20E-08 | 0 | 0 | 5.63286E-10 | 0 | 0.0006 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.84E-05 | 1.54E-08 | 9.23E-09 | 1.54E-08 | 1.71E-08 | 2.69E-08 | 6.24E-07 | 2.10E-08 | 0 | 0 | 5.37415E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.68E-05 | 1.45E-08 | 8.70E-09 | 1.45E-08 | 1.62E-08 | 2.54E-08 | 5.88E-07 | 1.98E-08 | 0 | 0 | 5.06712E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.52E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 1.52E-08 | 2.39E-08 | 5.53E-07 | 1.86E-08 | 0 | 0 | 4.7622E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 1.43E-08 | 2.23E-08 | 5.17E-07 | 1.74E-08 | 0 | 0 | 4.45844E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.19E-08 | 7.15E-09 | 1.19E-08 | 1.35E-08 | 2.08E-08 | 4.82E-07 | 1.62E-08 | 0 | 0 | 4.16068E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 1.27E-08 | 1.92E-08 | 4.45E-07 | 1.50E-08 | 0 | 0 | 3.84942E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.19E-08 | 1.77E-08 | 4.09E-07 | 1.37E-08 | 0 | 0 | 3.54268E-10 | 0 | 0.0004 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.70E-05 | 9.26E-09 | 5.56E-09 | 9.26E-09 | 1.10E-08 | 1.61E-08 | 3.72E-07 | 1.24E-08 | 0 | 0 | 3.22647E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.94E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 1.96E-08 | 2.77E-08 | 6.39E-07 | 2.13E-08 | 0 | 0 | 5.5645E-10 | 0 | 0.0006 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.97E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 1.88E-08 | 2.80E-08 | 6.49E-07 | 2.17E-08 | 0 | 0 | 5.61626E-10 | 0 | 0.0006 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.94E-05 | 1.59E-08 | 9.55E-09 | 1.59E-08 | 1.80E-08 | 2.78E-08 | 6.45E-07 | 2.17E-08 | 0 | 0 | 5.56033E-10 | 0 | 0.0006 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.86E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.71E-08 | 2.71E-08 | 6.29E-07 | 2.12E-08 | 0 | 0 | 5.40761E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 1.62E-08 | 2.59E-08 | 6.00E-07 | 2.03E-08 | 0 | 0 | 5.15547E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 1.52E-08 | 2.42E-08 | 5.62E-07 | 1.90E-08 | 0 | 0 | 4.83182E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 1.43E-08 | 2.25E-08 | 5.22E-07 | 1.76E-08 | 0 | 0 | 4.4975E-10 | 0 | 0.0004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.17E-05 | 1.18E-08 | 7.07E-09 | 1.18E-08 | 1.33E-08 | 2.06E-08 | 4.77E-07 | 1.61E-08 | 0 | 0 | 4.11282E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.99E-05 | 1.08E-08 | 6.47E-09 | 1.08E-08 | 1.24E-08 | 1.88E-08 | 4.36E-07 | 1.46E-08 | 0 | 0 | 3.76591E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.75E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 2.11E-08 | 3.57E-08 | 8.30E-07 | 2.82E-08 | 0 | 0 | 7.09768E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.85E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 2.43E-08 | 3.64E-08 | 8.43E-07 | 2.83E-08 | 0 | 0 | 7.29322E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.37E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 2.22E-08 | 3.18E-08 | 7.35E-07 | 2.45E-08 | 0 | 0 | 6.38946E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.24E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 2.09E-08 | 3.06E-08 | 7.07E-07 | 2.37E-08 | 0 | 0 | 6.13422E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.16E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.98E-08 | 2.99E-08 | 6.93E-07 | 2.33E-08 | 0 | 0 | 5.9888E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.05E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 1.87E-08 | 2.89E-08 | 6.69E-07 | 2.25E-08 | 0 | 0 | 5.77156E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.91E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 1.77E-08 | 2.76E-08 | 6.38E-07 | 2.15E-08 | 0 | 0 | 5.50188E-10 | 0 | 0.0006 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 1.59E-08 | 9.54E-09 | 1.59E-08 | 1.71E-08 | 2.80E-08 | 6.49E-07 | 2.20E-08 | 0 | 0 | 5.56581E-10 | 0 | 0.0006 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 1.60E-08 | 2.62E-08 | 6.07E-07 | 2.06E-08 | 0 | 0 | 5.20936E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.53E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 1.49E-08 | 2.41E-08 | 5.59E-07 | 1.89E-08 | 0 | 0 | 4.79702E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.32E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 1.39E-08 | 2.20E-08 | 5.10E-07 | 1.72E-08 | 0 | 0 | 4.39078E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.12E-05 | 1.15E-08 | 6.88E-09 | 1.15E-08 | 1.29E-08 | 2.01E-08 | 4.65E-07 | 1.56E-08 | 0 | 0 | 4.00486E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.93E-05 | 1.04E-08 | 6.27E-09 | 1.04E-08 | 1.20E-08 | 1.82E-08 | 4.22E-07 | 1.42E-08 | 0 | 0 | 3.64617E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.01E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 2.47E-08 | 3.79E-08 | 8.79E-07 | 2.95E-08 | 0 | 0 | 7.58445E-10 | 0 | 0.0008 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.79E-05 | 2.06E-08 | 1.23E-08 | 2.06E-08 | 2.41E-08 | 3.58E-08 | 8.28E-07 | 2.78E-08 | 0 | 0 | 7.17504E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.90E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 2.39E-08 | 3.70E-08 | 8.56E-07 | 2.88E-08 | 0 | 0 | 7.3822E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.88E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 2.28E-08 | 3.69E-08 | 8.55E-07 | 2.89E-08 | 0 | 0 | 7.34012E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.86E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 2.18E-08 | 3.68E-08 | 8.54E-07 | 2.90E-08 | 0 | 0 | 7.30621E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.49E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 2.01E-08 | 3.32E-08 | 7.71E-07 | 2.61E-08 | 0 | 0 | 6.60432E-10 | 0 | 0.0007 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.44E-05 | 1.86E-08 | 1.11E-08 | 1.86E-08 | 1.92E-08 | 3.28E-08 | 7.61E-07 | 2.59E-08 | 0 | 0 | 6.50434E-10 | 0 | 0.0007 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.81E-08 | 3.10E-08 | 7.20E-07 | 2.45E-08 | 0 | 0 | 6.14439E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 1.68E-08 | 2.86E-08 | 6.65E-07 | 2.26E-08 | 0 | 0 | 5.67969E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 1.48E-08 | 8.91E-09 | 1.48E-08 | 1.56E-08 | 2.62E-08 | 6.08E-07 | 2.06E-08 | 0 | 0 | 5.19991E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.50E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.45E-08 | 2.38E-08 | 5.52E-07 | 1.87E-08 | 0 | 0 | 4.73111E-10 | 0 | 0.0005 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.27E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.34E-08 | 2.16E-08 | 5.00E-07 | 1.69E-08 | 0 | 0 | 4.2964E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.06E-05 | 1.12E-08 | 6.71E-09 | 1.12E-08 | 1.25E-08 | 1.96E-08 | 4.53E-07 | 1.53E-08 | 0 | 0 | 3.90574E-10 | 0 | 0.0004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.16E-08 | 1.77E-08 | 4.11E-07 | 1.38E-08 | 0 | 0 | 3.54659E-10 | 0 | 0.0004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.69E-05 | 9.16E-09 | 5.50E-09 | 9.16E-09 | 1.08E-08 | 1.59E-08 | 3.69E-07 | 1.24E-08 | 0 | 0 | 3.19499E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.49E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 9.82E-09 | 1.40E-08 | 3.24E-07 | 1.08E-08 | 0 | 0 | 2.81513E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.73E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 3.08E-08 | 5.48E-08 | 1.27E-06 | 4.34E-08 | 0 | 0 | 1.08473E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.40E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.89E-08 | 5.17E-08 | 1.20E-06 | 4.10E-08 | 0 | 0 | 1.02186E-09 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.60E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 2.59E-08 | 4.39E-08 | 1.02E-06 | 3.46E-08 | 0 | 0 | 8.71247E-10 | 0 | 0.0009 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.11E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 2.36E-08 | 3.91E-08 | 9.08E-07 | 3.07E-08 | 0 | 0 | 7.77631E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.02E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 2.25E-08 | 3.84E-08 | 8.91E-07 | 3.03E-08 | 0 | 0 | 7.61155E-10 | 0 | 0.0008 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.92E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 2.14E-08 | 3.75E-08 | 8.70E-07 | 2.96E-08 | 0 | 0 | 7.41913E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 2.04E-08 | 3.67E-08 | 8.53E-07 | 2.91E-08 | 0 | 0 | 7.25252E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.55E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 1.90E-08 | 3.40E-08 | 7.91E-07 | 2.70E-08 | 0 | 0 | 6.72973E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.29E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.77E-08 | 3.15E-08 | 7.33E-07 | 2.50E-08 | 0 | 0 | 6.23671E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.02E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 1.64E-08 | 2.88E-08 | 6.70E-07 | 2.28E-08 | 0 | 0 | 5.71304E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 1.52E-08 | 2.61E-08 | 6.07E-07 | 2.06E-08 | 0 | 0 | 5.17955E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.47E-05 | 1.33E-08 | 8.00E-09 | 1.33E-08 | 1.40E-08 | 2.35E-08 | 5.46E-07 | 1.85E-08 | 0 | 0 | 4.67028E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.23E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 1.29E-08 | 2.12E-08 | 4.91E-07 | 1.66E-08 | 0 | 0 | 4.21547E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.20E-08 | 1.90E-08 | 4.41E-07 | 1.49E-08 | 0 | 0 | 3.79449E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.81E-05 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 1.11E-08 | 1.72E-08 | 3.97E-07 | 1.34E-08 | 0 | 0 | 3.42806E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.64E-05 | 8.91E-09 | 5.34E-09 | 8.91E-09 | 1.03E-08 | 1.55E-08 | 3.59E-07 | 1.21E-08 | 0 | 0 | 3.1075E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.49E-05 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 9.60E-09 | 1.40E-08 | 3.25E-07 | 1.09E-08 | 0 | 0 | 2.81648E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.25E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 3.03E-08 | 6.02E-08 | 1.40E-06 | 4.83E-08 | 0 | 0 | 1.18342E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.81E-08 | 5.57E-08 | 1.30E-06 | 4.47E-08 | 0 | 0 | 1.09573E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 2.65E-08 | 1.59E-08 | 2.65E-08 | 2.50E-08 | 4.73E-08 | 1.10E-06 | 3.78E-08 | 0 | 0 | 9.33004E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 2.46E-08 | 1.47E-08 | 2.46E-08 | 2.32E-08 | 4.38E-08 | 1.02E-06 | 3.50E-08 | 0 | 0 | 8.637E-10 | 0 | 0.0009 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.40E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 2.20E-08 | 4.23E-08 | 9.85E-07 | 3.38E-08 | 0 | 0 | 8.33157E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.01E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 2.02E-08 | 3.85E-08 | 8.98E-07 | 3.08E-08 | 0 | 0 | 7.59588E-10 | 0 | 0.0008 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.64E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.86E-08 | 3.49E-08 | 8.12E-07 | 2.78E-08 | 0 | 0 | 6.885E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.31E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.72E-08 | 3.17E-08 | 7.38E-07 | 2.52E-08 | 0 | 0 | 6.26533E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.00E-05 | 1.62E-08 | 9.71E-09 | 1.62E-08 | 1.59E-08 | 2.87E-08 | 6.69E-07 | 2.28E-08 | 0 | 0 | 5.68156E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.70E-05 | 1.46E-08 | 8.74E-09 | 1.46E-08 | 1.46E-08 | 2.58E-08 | 6.00E-07 | 2.04E-08 | 0 | 0 | 5.10977E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.41E-05 | 1.30E-08 | 7.80E-09 | 1.30E-08 | 1.34E-08 | 2.30E-08 | 5.34E-07 | 1.81E-08 | 0 | 0 | 4.55677E-10 | 0 | 0.0005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 1.22E-08 | 2.04E-08 | 4.74E-07 | 1.61E-08 | 0 | 0 | 4.05595E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.91E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 1.12E-08 | 1.82E-08 | 4.22E-07 | 1.43E-08 | 0 | 0 | 3.62454E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.72E-05 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 1.04E-08 | 1.63E-08 | 3.78E-07 | 1.28E-08 | 0 | 0 | 3.25876E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.56E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 9.68E-09 | 1.48E-08 | 3.42E-07 | 1.15E-08 | 0 | 0 | 2.95454E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.43E-05 | 7.74E-09 | 4.64E-09 | 7.74E-09 | 9.06E-09 | 1.35E-08 | 3.12E-07 | 1.04E-08 | 0 | 0 | 2.69862E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.25E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 8.27E-09 | 1.18E-08 | 2.73E-07 | 9.11E-09 | 0 | 0 | 2.37477E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 3.03E-08 | 6.15E-08 | 1.43E-06 | 4.94E-08 | 0 | 0 | 1.20785E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.08E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 2.85E-08 | 5.86E-08 | 1.37E-06 | 4.72E-08 | 0 | 0 | 1.15064E-09 | 0 | 0.0012 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.65E-08 | 5.45E-08 | 1.27E-06 | 4.38E-08 | 0 | 0 | 1.06893E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.08E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 2.41E-08 | 4.90E-08 | 1.14E-06 | 3.93E-08 | 0 | 0 | 9.61556E-10 | 0 | 0.0010 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.53E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 2.18E-08 | 4.36E-08 | 1.02E-06 | 3.50E-08 | 0 | 0 | 8.56833E-10 | 0 | 0.0009 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.04E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.99E-08 | 3.89E-08 | 9.07E-07 | 3.12E-08 | 0 | 0 | 7.65725E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.64E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 1.82E-08 | 3.50E-08 | 8.14E-07 | 2.79E-08 | 0 | 0 | 6.88458E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.28E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.66E-08 | 3.15E-08 | 7.33E-07 | 2.51E-08 | 0 | 0 | 6.20588E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.92E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 1.52E-08 | 2.80E-08 | 6.52E-07 | 2.23E-08 | 0 | 0 | 5.53497E-10 | 0 | 0.0006 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.58E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 1.38E-08 | 2.47E-08 | 5.74E-07 | 1.96E-08 | 0 | 0 | 4.88326E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.25E-08 | 2.17E-08 | 5.05E-07 | 1.72E-08 | 0 | 0 | 4.3085E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.02E-05 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 1.14E-08 | 1.92E-08 | 4.46E-07 | 1.51E-08 | 0 | 0 | 3.81974E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.80E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 1.05E-08 | 1.71E-08 | 3.98E-07 | 1.34E-08 | 0 | 0 | 3.41077E-10 | 0 | 0.0003 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.63E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 9.74E-09 | 1.55E-08 | 3.58E-07 | 1.21E-08 | 0 | 0 | 3.08354E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.48E-05 | 8.03E-09 | 4.82E-09 | 8.03E-09 | 9.08E-09 | 1.40E-08 | 3.25E-07 | 1.09E-08 | 0 | 0 | 2.80398E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.36E-05 | 7.38E-09 | 4.43E-09 | 7.38E-09 | 8.52E-09 | 1.29E-08 | 2.98E-07 | 1.00E-08 | 0 | 0 | 2.57569E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.26E-05 | 6.84E-09 | 4.10E-09 | 6.84E-09 | 8.04E-09 | 1.19E-08 | 2.75E-07 | 9.22E-09 | 0 | 0 | 2.38411E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 2.98E-08 | 6.32E-08 | 1.48E-06 | 5.10E-08 | 0 | 0 | 1.23879E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 2.75E-08 | 5.85E-08 | 1.37E-06 | 4.72E-08 | 0 | 0 | 1.1466E-09 | 0 | 0.0011 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.30E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 2.46E-08 | 5.12E-08 | 1.19E-06 | 4.12E-08 | 0 | 0 | 1.00303E-09 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.63E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 2.19E-08 | 4.46E-08 | 1.04E-06 | 3.59E-08 | 0 | 0 | 8.76289E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.08E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 1.97E-08 | 3.93E-08 | 9.17E-07 | 3.15E-08 | 0 | 0 | 7.72819E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.62E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.79E-08 | 3.48E-08 | 8.12E-07 | 2.79E-08 | 0 | 0 | 6.85704E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.18E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.61E-08 | 3.06E-08 | 7.12E-07 | 2.44E-08 | 0 | 0 | 6.0223E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.77E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 1.44E-08 | 2.66E-08 | 6.18E-07 | 2.11E-08 | 0 | 0 | 5.24445E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 1.30E-08 | 2.31E-08 | 5.38E-07 | 1.83E-08 | 0 | 0 | 4.57665E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.13E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 1.18E-08 | 2.03E-08 | 4.72E-07 | 1.61E-08 | 0 | 0 | 4.0298E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.89E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 1.08E-08 | 1.80E-08 | 4.18E-07 | 1.42E-08 | 0 | 0 | 3.57823E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.70E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 9.92E-09 | 1.62E-08 | 3.75E-07 | 1.27E-08 | 0 | 0 | 3.21602E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.54E-05 | 8.34E-09 | 5.00E-09 | 8.34E-09 | 9.20E-09 | 1.46E-08 | 3.39E-07 | 1.14E-08 | 0 | 0 | 2.91445E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.40E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 8.59E-09 | 1.33E-08 | 3.08E-07 | 1.04E-08 | 0 | 0 | 2.65884E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.29E-05 | 6.97E-09 | 4.18E-09 | 6.97E-09 | 8.03E-09 | 1.22E-08 | 2.81E-07 | 9.45E-09 | 0 | 0 | 2.43301E-10 | 0 | 0.0002 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.18E-05 | 6.41E-09 | 3.85E-09 | 6.41E-09 | 7.55E-09 | 1.12E-08 | 2.58E-07 | 8.64E-09 | 0 | 0 | 2.23603E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.98E-05 | 4.81E-08 | 2.89E-08 | 4.81E-08 | 3.92E-08 | 8.70E-08 | 2.03E-06 | 7.04E-08 | 0 | 0 | 1.69975E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 4.66E-08 | 2.80E-08 | 4.66E-08 | 3.77E-08 | 8.43E-08 | 1.97E-06 | 6.83E-08 | 0 | 0 | 1.64687E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.22E-05 | 4.40E-08 | 2.64E-08 | 4.40E-08 | 3.55E-08 | 7.97E-08 | 1.86E-06 | 6.46E-08 | 0 | 0 | 1.55607E-09 | 0 | 0.0016 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.37E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 3.22E-08 | 7.13E-08 | 1.67E-06 | 5.78E-08 | 0 | 0 | 1.39438E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.86E-08 | 6.24E-08 | 1.46E-06 | 5.05E-08 | 0 | 0 | 1.22045E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.51E-05 | 2.96E-08 | 1.77E-08 | 2.96E-08 | 2.51E-08 | 5.32E-08 | 1.24E-06 | 4.30E-08 | 0 | 0 | 1.04285E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.78E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 2.23E-08 | 4.61E-08 | 1.08E-06 | 3.71E-08 | 0 | 0 | 9.04144E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.11E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.97E-08 | 3.96E-08 | 9.24E-07 | 3.18E-08 | 0 | 0 | 7.78384E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.53E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.74E-08 | 3.40E-08 | 7.92E-07 | 2.72E-08 | 0 | 0 | 6.69087E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.02E-05 | 1.63E-08 | 9.75E-09 | 1.63E-08 | 1.54E-08 | 2.90E-08 | 6.74E-07 | 2.31E-08 | 0 | 0 | 5.71244E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.60E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 1.38E-08 | 2.49E-08 | 5.80E-07 | 1.98E-08 | 0 | 0 | 4.9294E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.24E-08 | 2.17E-08 | 5.05E-07 | 1.72E-08 | 0 | 0 | 4.30714E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.01E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.13E-08 | 1.92E-08 | 4.45E-07 | 1.51E-08 | 0 | 0 | 3.80195E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.79E-05 | 9.68E-09 | 5.81E-09 | 9.68E-09 | 1.03E-08 | 1.70E-08 | 3.95E-07 | 1.34E-08 | 0 | 0 | 3.38776E-10 | 0 | 0.0003 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.61E-05 | 8.70E-09 | 5.22E-09 | 8.70E-09 | 9.52E-09 | 1.53E-08 | 3.54E-07 | 1.20E-08 | 0 | 0 | 3.04389E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.45E-05 | 7.84E-09 | 4.70E-09 | 7.84E-09 | 8.79E-09 | 1.37E-08 | 3.18E-07 | 1.07E-08 | 0 | 0 | 2.73904E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.31E-05 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 8.18E-09 | 1.24E-08 | 2.88E-07 | 9.66E-09 | 0 | 0 | 2.48445E-10 | 0 | 0.0002 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.20E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 7.64E-09 | 1.13E-08 | 2.62E-07 | 8.76E-09 | 0 | 0 | 2.26615E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.10E-05 | 5.96E-09 | 3.58E-09 | 5.96E-09 | 7.15E-09 | 1.03E-08 | 2.39E-07 | 7.99E-09 | 0 | 0 | 2.07588E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.67E-08 | 1.13E-07 | 2.64E-06 | 9.19E-08 | 0 | 0 | 2.19338E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 5.74E-08 | 3.45E-08 | 5.74E-08 | 4.35E-08 | 1.04E-07 | 2.44E-06 | 8.51E-08 | 0 | 0 | 2.03222E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.14E-05 | 4.89E-08 | 2.93E-08 | 4.89E-08 | 3.79E-08 | 8.88E-08 | 2.08E-06 | 7.22E-08 | 0 | 0 | 1.73013E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.04E-05 | 4.30E-08 | 2.58E-08 | 4.30E-08 | 3.39E-08 | 7.80E-08 | 1.82E-06 | 6.34E-08 | 0 | 0 | 1.52175E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.78E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.93E-08 | 6.57E-08 | 1.54E-06 | 5.33E-08 | 0 | 0 | 1.28388E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.74E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.55E-08 | 5.56E-08 | 1.30E-06 | 4.49E-08 | 0 | 0 | 1.08714E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.84E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 2.22E-08 | 4.68E-08 | 1.09E-06 | 3.77E-08 | 0 | 0 | 9.16206E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.02E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.92E-08 | 3.87E-08 | 9.03E-07 | 3.11E-08 | 0 | 0 | 7.60819E-10 | 0 | 0.0008 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.36E-05 | 1.81E-08 | 1.08E-08 | 1.81E-08 | 1.67E-08 | 3.23E-08 | 7.52E-07 | 2.58E-08 | 0 | 0 | 6.35451E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.85E-05 | 1.53E-08 | 9.21E-09 | 1.53E-08 | 1.47E-08 | 2.73E-08 | 6.36E-07 | 2.17E-08 | 0 | 0 | 5.39073E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.46E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.32E-08 | 2.36E-08 | 5.48E-07 | 1.87E-08 | 0 | 0 | 4.66042E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.15E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 1.19E-08 | 2.05E-08 | 4.77E-07 | 1.62E-08 | 0 | 0 | 4.07296E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.89E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 1.08E-08 | 1.80E-08 | 4.18E-07 | 1.42E-08 | 0 | 0 | 3.58289E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.68E-05 | 9.10E-09 | 5.46E-09 | 9.10E-09 | 9.93E-09 | 1.60E-08 | 3.70E-07 | 1.25E-08 | 0 | 0 | 3.18125E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.50E-05 | 8.12E-09 | 4.87E-09 | 8.12E-09 | 9.13E-09 | 1.42E-08 | 3.29E-07 | 1.11E-08 | 0 | 0 | 2.83656E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.35E-05 | 7.30E-09 | 4.38E-09 | 7.30E-09 | 8.44E-09 | 1.27E-08 | 2.95E-07 | 9.89E-09 | 0 | 0 | 2.54854E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.22E-05 | 6.64E-09 | 3.98E-09 | 6.64E-09 | 7.86E-09 | 1.15E-08 | 2.67E-07 | 8.92E-09 | 0 | 0 | 2.3125E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.12E-05 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 7.35E-09 | 1.05E-08 | 2.43E-07 | 8.11E-09 | 0 | 0 | 2.11304E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.03E-05 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 6.90E-09 | 9.65E-09 | 2.23E-07 | 7.41E-09 | 0 | 0 | 1.94161E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 7.52E-08 | 4.51E-08 | 7.52E-08 | 5.44E-08 | 1.37E-07 | 3.22E-06 | 1.12E-07 | 0 | 0 | 2.66623E-09 | 0 | 0.0027 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 7.41E-08 | 4.45E-08 | 7.41E-08 | 5.35E-08 | 1.35E-07 | 3.17E-06 | 1.11E-07 | 0 | 0 | 2.62626E-09 | 0 | 0.0026 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 7.05E-08 | 4.23E-08 | 7.05E-08 | 5.10E-08 | 1.29E-07 | 3.01E-06 | 1.05E-07 | 0 | 0 | 2.49805E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 6.73E-08 | 4.04E-08 | 6.73E-08 | 4.88E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 0 | 2.38577E-09 | 0 | 0.0024 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 5.81E-08 | 3.48E-08 | 5.81E-08 | 4.27E-08 | 1.06E-07 | 2.48E-06 | 8.65E-08 | 0 | 0 | 2.05644E-09 | 0 | 0.0021 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.77E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.55E-08 | 8.53E-08 | 2.00E-06 | 6.96E-08 | 0 | 0 | 1.66047E-09 | 0 | 0.0017 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.11E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.97E-08 | 6.90E-08 | 1.61E-06 | 5.61E-08 | 0 | 0 | 1.34528E-09 | 0 | 0.0013 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.81E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.51E-08 | 5.63E-08 | 1.32E-06 | 4.57E-08 | 0 | 0 | 1.1005E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.66E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 2.11E-08 | 4.50E-08 | 1.05E-06 | 3.63E-08 | 0 | 0 | 8.81542E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.77E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.79E-08 | 3.64E-08 | 8.48E-07 | 2.92E-08 | 0 | 0 | 7.13799E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.16E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.57E-08 | 3.04E-08 | 7.09E-07 | 2.43E-08 | 0 | 0 | 5.99061E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.67E-05 | 1.44E-08 | 8.63E-09 | 1.44E-08 | 1.38E-08 | 2.56E-08 | 5.96E-07 | 2.04E-08 | 0 | 0 | 5.05613E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.29E-05 | 1.24E-08 | 7.41E-09 | 1.24E-08 | 1.24E-08 | 2.19E-08 | 5.09E-07 | 1.73E-08 | 0 | 0 | 4.33279E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 1.99E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 1.12E-08 | 1.90E-08 | 4.40E-07 | 1.49E-08 | 0 | 0 | 3.76285E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.75E-05 | 9.44E-09 | 5.67E-09 | 9.44E-09 | 1.02E-08 | 1.66E-08 | 3.85E-07 | 1.30E-08 | 0 | 0 | 3.30373E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.55E-05 | 8.41E-09 | 5.05E-09 | 8.41E-09 | 9.42E-09 | 1.47E-08 | 3.41E-07 | 1.15E-08 | 0 | 0 | 2.93743E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.38E-05 | 7.51E-09 | 4.50E-09 | 7.51E-09 | 8.69E-09 | 1.31E-08 | 3.03E-07 | 1.02E-08 | 0 | 0 | 2.61868E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.25E-05 | 6.79E-09 | 4.08E-09 | 6.79E-09 | 8.09E-09 | 1.18E-08 | 2.73E-07 | 9.12E-09 | 0 | 0 | 2.36656E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.14E-05 | 6.20E-09 | 3.72E-09 | 6.20E-09 | 7.57E-09 | 1.07E-08 | 2.48E-07 | 8.26E-09 | 0 | 0 | 2.15755E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.05E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 7.13E-09 | 9.86E-09 | 2.27E-07 | 7.56E-09 | 0 | 0 | 1.98562E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 9.72E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 6.73E-09 | 9.12E-09 | 2.10E-07 | 6.98E-09 | 0 | 0 | 1.8408E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 8.15E-08 | 4.89E-08 | 8.15E-08 | 5.77E-08 | 1.49E-07 | 3.49E-06 | 1.22E-07 | 0 | 0 | 2.88922E-09 | 0 | 0.0029 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 5.57E-08 | 1.44E-07 | 3.38E-06 | 1.18E-07 | 0 | 0 | 2.79621E-09 | 0 | 0.0028 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 5.52E-08 | 1.44E-07 | 3.38E-06 | 1.18E-07 | 0 | 0 | 2.79827E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 6.54E-08 | 3.93E-08 | 6.54E-08 | 4.65E-08 | 1.20E-07 | 2.80E-06 | 9.80E-08 | 0 | 0 | 2.3197E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.28E-05 | 4.96E-08 | 2.98E-08 | 4.96E-08 | 3.63E-08 | 9.04E-08 | 2.12E-06 | 7.39E-08 | 0 | 0 | 1.75695E-09 | 0 | 0.0018 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.18E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.91E-08 | 6.99E-08 | 1.64E-06 | 5.70E-08 | 0 | 0 | 1.36014E-09 | 0 | 0.0014 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.56E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 2.35E-08 | 5.40E-08 | 1.26E-06 | 4.38E-08 | 0 | 0 | 1.05289E-09 | 0 | 0.0011 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.36E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.93E-08 | 4.22E-08 | 9.85E-07 | 3.41E-08 | 0 | 0 | 8.24954E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.49E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.63E-08 | 3.37E-08 | 7.86E-07 | 2.71E-08 | 0 | 0 | 6.60539E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.87E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.41E-08 | 2.76E-08 | 6.43E-07 | 2.21E-08 | 0 | 0 | 5.4316E-10 | 0 | 0.0005 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 1.25E-08 | 2.32E-08 | 5.40E-07 | 1.85E-08 | 0 | 0 | 4.57674E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.08E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 1.13E-08 | 1.99E-08 | 4.62E-07 | 1.57E-08 | 0 | 0 | 3.9374E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.81E-05 | 9.77E-09 | 5.86E-09 | 9.77E-09 | 1.02E-08 | 1.72E-08 | 4.00E-07 | 1.36E-08 | 0 | 0 | 3.42138E-10 | 0 | 0.0003 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.59E-05 | 8.63E-09 | 5.18E-09 | 8.63E-09 | 9.43E-09 | 1.51E-08 | 3.51E-07 | 1.19E-08 | 0 | 0 | 3.0171E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.43E-05 | 7.73E-09 | 4.64E-09 | 7.73E-09 | 8.76E-09 | 1.35E-08 | 3.13E-07 | 1.05E-08 | 0 | 0 | 2.69878E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.29E-05 | 7.01E-09 | 4.21E-09 | 7.01E-09 | 8.20E-09 | 1.22E-08 | 2.82E-07 | 9.46E-09 | 0 | 0 | 2.44503E-10 | 0 | 0.0002 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.18E-05 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 7.72E-09 | 1.11E-08 | 2.57E-07 | 8.60E-09 | 0 | 0 | 2.23711E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.09E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 7.31E-09 | 1.03E-08 | 2.38E-07 | 7.92E-09 | 0 | 0 | 2.06983E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.02E-05 | 5.56E-09 | 3.34E-09 | 5.56E-09 | 6.96E-09 | 9.59E-09 | 2.21E-07 | 7.35E-09 | 0 | 0 | 1.93241E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 9.57E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 6.64E-09 | 8.97E-09 | 2.07E-07 | 6.86E-09 | 0 | 0 | 1.81086E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.17E-07 | 7.05E-08 | 1.17E-07 | 7.95E-08 | 2.15E-07 | 5.05E-06 | 1.77E-07 | 0 | 0 | 4.16983E-09 | 0 | 0.0042 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.00E-07 | 6.01E-08 | 1.00E-07 | 6.82E-08 | 1.84E-07 | 4.31E-06 | 1.51E-07 | 0 | 0 | 3.55617E-09 | 0 | 0.0036 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 7.35E-08 | 4.41E-08 | 7.35E-08 | 5.10E-08 | 1.35E-07 | 3.15E-06 | 1.11E-07 | 0 | 0 | 2.60873E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.63E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 3.68E-08 | 9.40E-08 | 2.20E-06 | 7.70E-08 | 0 | 0 | 1.82388E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.78E-05 | 3.62E-08 | 2.17E-08 | 3.62E-08 | 2.70E-08 | 6.60E-08 | 1.54E-06 | 5.39E-08 | 0 | 0 | 1.28337E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.93E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 2.06E-08 | 4.79E-08 | 1.12E-06 | 3.89E-08 | 0 | 0 | 9.33453E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.80E-05 | 2.04E-08 | 1.22E-08 | 2.04E-08 | 1.67E-08 | 3.68E-08 | 8.60E-07 | 2.98E-08 | 0 | 0 | 7.19303E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.04E-05 | 1.63E-08 | 9.78E-09 | 1.63E-08 | 1.41E-08 | 2.93E-08 | 6.84E-07 | 2.36E-08 | 0 | 0 | 5.74899E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.51E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 1.22E-08 | 2.42E-08 | 5.63E-07 | 1.94E-08 | 0 | 0 | 4.75243E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.13E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 1.09E-08 | 2.05E-08 | 4.76E-07 | 1.63E-08 | 0 | 0 | 4.03711E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.85E-05 | 1.00E-08 | 6.00E-09 | 1.00E-08 | 9.94E-09 | 1.77E-08 | 4.12E-07 | 1.41E-08 | 0 | 0 | 3.50778E-10 | 0 | 0.0004 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.64E-05 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 9.20E-09 | 1.57E-08 | 3.64E-07 | 1.24E-08 | 0 | 0 | 3.11228E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.48E-05 | 8.02E-09 | 4.81E-09 | 8.02E-09 | 8.61E-09 | 1.41E-08 | 3.27E-07 | 1.11E-08 | 0 | 0 | 2.80692E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.36E-05 | 7.34E-09 | 4.41E-09 | 7.34E-09 | 8.13E-09 | 1.29E-08 | 2.98E-07 | 1.01E-08 | 0 | 0 | 2.56634E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.25E-05 | 6.79E-09 | 4.07E-09 | 6.79E-09 | 7.73E-09 | 1.19E-08 | 2.75E-07 | 9.23E-09 | 0 | 0 | 2.36985E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.16E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 7.38E-09 | 1.10E-08 | 2.55E-07 | 8.54E-09 | 0 | 0 | 2.20533E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.09E-05 | 5.92E-09 | 3.55E-09 | 5.92E-09 | 7.07E-09 | 1.03E-08 | 2.38E-07 | 7.95E-09 | 0 | 0 | 2.0625E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 6.79E-09 | 9.67E-09 | 2.23E-07 | 7.46E-09 | 0 | 0 | 1.94442E-10 | 0 | 0.0002 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 9.68E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 6.53E-09 | 9.10E-09 | 2.10E-07 | 7.00E-09 | 0 | 0 | 1.83295E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.24E-04 | 1.73E-07 | 1.04E-07 | 1.73E-07 | 1.15E-07 | 3.17E-07 | 7.44E-06 | 2.61E-07 | 0 | 0 | 6.13842E-09 | 0 | 0.0061 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.66E-04 | 1.95E-07 | 1.17E-07 | 1.95E-07 | 1.29E-07 | 3.58E-07 | 8.41E-06 | 2.95E-07 | 0 | 0 | 6.9301E-09 | 0 | 0.0069 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.28E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.16E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 | 0 | 0 | 6.21524E-09 | 0 | 0.0062 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.32E-07 | 7.93E-08 | 1.32E-07 | 8.84E-08 | 2.43E-07 | 5.69E-06 | 2.00E-07 | 0 | 0 | 4.69548E-09 | 0 | 0.0047 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.01E-08 | 4.80E-08 | 8.01E-08 | 5.48E-08 | 1.47E-07 | 3.44E-06 | 1.21E-07 | 0 | 0 | 2.84096E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.95E-05 | 4.78E-08 | 2.87E-08 | 4.78E-08 | 3.40E-08 | 8.73E-08 | 2.05E-06 | 7.16E-08 | 0 | 0 | 1.69484E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.77E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.30E-08 | 5.61E-08 | 1.31E-06 | 4.58E-08 | 0 | 0 | 1.09167E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.13E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.74E-08 | 4.01E-08 | 9.38E-07 | 3.26E-08 | 0 | 0 | 7.82303E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.19E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.41E-08 | 3.09E-08 | 7.22E-07 | 2.50E-08 | 0 | 0 | 6.04359E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.60E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 1.20E-08 | 2.51E-08 | 5.86E-07 | 2.02E-08 | 0 | 0 | 4.92647E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.21E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 1.07E-08 | 2.13E-08 | 4.97E-07 | 1.71E-08 | 0 | 0 | 4.18821E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 1.94E-05 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 9.69E-09 | 1.86E-08 | 4.34E-07 | 1.49E-08 | 0 | 0 | 3.66734E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.73E-05 | 9.32E-09 | 5.59E-09 | 9.32E-09 | 8.97E-09 | 1.66E-08 | 3.86E-07 | 1.32E-08 | 0 | 0 | 3.27413E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.57E-05 | 8.47E-09 | 5.08E-09 | 8.47E-09 | 8.42E-09 | 1.50E-08 | 3.50E-07 | 1.19E-08 | 0 | 0 | 2.97403E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.44E-05 | 7.76E-09 | 4.66E-09 | 7.76E-09 | 7.95E-09 | 1.37E-08 | 3.19E-07 | 1.08E-08 | 0 | 0 | 2.7218E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.33E-05 | 7.19E-09 | 4.31E-09 | 7.19E-09 | 7.57E-09 | 1.27E-08 | 2.94E-07 | 9.97E-09 | 0 | 0 | 2.51622E-10 | 0 | 0.0003 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.24E-05 | 6.69E-09 | 4.01E-09 | 6.69E-09 | 7.25E-09 | 1.18E-08 | 2.73E-07 | 9.22E-09 | 0 | 0 | 2.3408E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.16E-05 | 6.26E-09 | 3.76E-09 | 6.26E-09 | 6.96E-09 | 1.10E-08 | 2.54E-07 | 8.57E-09 | 0 | 0 | 2.18717E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.08E-05 | 5.86E-09 | 3.52E-09 | 5.86E-09 | 6.68E-09 | 1.02E-08 | 2.37E-07 | 7.97E-09 | 0 | 0 | 2.04625E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.02E-05 | 5.52E-09 | 3.31E-09 | 5.52E-09 | 6.44E-09 | 9.60E-09 | 2.22E-07 | 7.45E-09 | 0 | 0 | 1.92377E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 9.59E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 6.22E-09 | 9.05E-09 | 2.09E-07 | 6.99E-09 | 0 | 0 | 1.81513E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.46E-04 | 3.44E-07 | 2.06E-07 | 3.44E-07 | 2.24E-07 | 6.32E-07 | 1.48E-05 | 5.22E-07 | 0 | 0 | 1.2222E-08 | 0 | 0.0122 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.89E-04 | 3.67E-07 | 2.20E-07 | 3.67E-07 | 2.39E-07 | 6.75E-07 | 1.58E-05 | 5.57E-07 | 0 | 0 | 1.30531E-08 | 0 | 0.0131 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.14E-04 | 3.27E-07 | 1.96E-07 | 3.27E-07 | 2.13E-07 | 6.02E-07 | 1.41E-05 | 4.96E-07 | 0 | 0 | 1.16321E-08 | 0 | 0.0116 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.22E-04 | 1.72E-07 | 1.03E-07 | 1.72E-07 | 1.13E-07 | 3.15E-07 | 7.40E-06 | 2.60E-07 | 0 | 0 | 6.09979E-09 | 0 | 0.0061 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 6.95E-08 | 4.17E-08 | 6.95E-08 | 4.78E-08 | 1.27E-07 | 2.98E-06 | 1.05E-07 | 0 | 0 | 2.46575E-09 | 0 | 0.0025 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.95E-05 | 3.71E-08 | 2.23E-08 | 3.71E-08 | 2.70E-08 | 6.77E-08 | 1.59E-06 | 5.54E-08 | 0 | 0 | 1.31552E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.64E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.89E-08 | 4.51E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 8.77724E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.53E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.50E-08 | 3.43E-08 | 8.01E-07 | 2.78E-08 | 0 | 0 | 6.68669E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.88E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 1.27E-08 | 2.79E-08 | 6.52E-07 | 2.26E-08 | 0 | 0 | 5.45567E-10 | 0 | 0.0005 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.44E-05 | 1.31E-08 | 7.86E-09 | 1.31E-08 | 1.11E-08 | 2.36E-08 | 5.51E-07 | 1.90E-08 | 0 | 0 | 4.62104E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.12E-05 | 1.14E-08 | 6.82E-09 | 1.14E-08 | 9.94E-09 | 2.04E-08 | 4.76E-07 | 1.64E-08 | 0 | 0 | 4.00463E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.87E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 9.04E-09 | 1.80E-08 | 4.19E-07 | 1.44E-08 | 0 | 0 | 3.53545E-10 | 0 | 0.0004 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.67E-05 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 8.32E-09 | 1.60E-08 | 3.74E-07 | 1.28E-08 | 0 | 0 | 3.1592E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.51E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 7.76E-09 | 1.45E-08 | 3.37E-07 | 1.15E-08 | 0 | 0 | 2.85845E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.38E-05 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 7.29E-09 | 1.32E-08 | 3.07E-07 | 1.05E-08 | 0 | 0 | 2.60724E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.27E-05 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 6.92E-09 | 1.21E-08 | 2.82E-07 | 9.60E-09 | 0 | 0 | 2.4031E-10 | 0 | 0.0002 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.18E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 6.61E-09 | 1.12E-08 | 2.61E-07 | 8.87E-09 | 0 | 0 | 2.23167E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.10E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 6.34E-09 | 1.05E-08 | 2.43E-07 | 8.23E-09 | 0 | 0 | 2.08357E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 6.11E-09 | 9.80E-09 | 2.27E-07 | 7.68E-09 | 0 | 0 | 1.9536E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 9.70E-06 | 5.26E-09 | 3.15E-09 | 5.26E-09 | 5.90E-09 | 9.19E-09 | 2.13E-07 | 7.17E-09 | 0 | 0 | 1.83575E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.16E-06 | 4.97E-09 | 2.98E-09 | 4.97E-09 | 5.72E-09 | 8.67E-09 | 2.01E-07 | 6.74E-09 | 0 | 0 | 1.7343E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.72E-03 | 9.18E-07 | 5.51E-07 | 9.18E-07 | 5.91E-07 | 1.69E-06 | 3.96E-05 | 1.39E-06 | 0 | 0 | 3.2607E-08 | 0 | 0.0326 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.26E-03 | 1.20E-06 | 7.23E-07 | 1.20E-06 | 7.75E-07 | 2.22E-06 | 5.20E-05 | 1.83E-06 | 0 | 0 | 4.28132E-08 | 0 | 0.0428 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.63E-03 | 1.40E-06 | 8.41E-07 | 1.40E-06 | 9.01E-07 | 2.58E-06 | 6.05E-05 | 2.13E-06 | 0 | 0 | 4.98108E-08 | 0 | 0.0498 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.09E-04 | 1.11E-07 | 6.68E-08 | 1.11E-07 | 7.46E-08 | 2.04E-07 | 4.79E-06 | 1.68E-07 | 0 | 0 | 3.9505E-09 | 0 | 0.0040 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.91E-05 | 4.76E-08 | 2.85E-08 | 4.76E-08 | 3.37E-08 | 8.69E-08 | 2.04E-06 | 7.13E-08 | 0 | 0 | 1.68684E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.71E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.26E-08 | 5.56E-08 | 1.30E-06 | 4.54E-08 | 0 | 0 | 1.08066E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.19E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.73E-08 | 4.07E-08 | 9.51E-07 | 3.31E-08 | 0 | 0 | 7.92473E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.29E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.41E-08 | 3.19E-08 | 7.46E-07 | 2.59E-08 | 0 | 0 | 6.23293E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.70E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 1.19E-08 | 2.61E-08 | 6.10E-07 | 2.11E-08 | 0 | 0 | 5.10862E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.28E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 1.04E-08 | 2.20E-08 | 5.14E-07 | 1.78E-08 | 0 | 0 | 4.31141E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 1.97E-05 | 1.06E-08 | 6.34E-09 | 1.06E-08 | 9.22E-09 | 1.90E-08 | 4.43E-07 | 1.53E-08 | 0 | 0 | 3.72193E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.73E-05 | 9.29E-09 | 5.57E-09 | 9.29E-09 | 8.32E-09 | 1.67E-08 | 3.88E-07 | 1.34E-08 | 0 | 0 | 3.27234E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.54E-05 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 7.62E-09 | 1.48E-08 | 3.45E-07 | 1.19E-08 | 0 | 0 | 2.91761E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.39E-05 | 7.48E-09 | 4.49E-09 | 7.48E-09 | 7.05E-09 | 1.33E-08 | 3.11E-07 | 1.07E-08 | 0 | 0 | 2.63167E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.27E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 6.58E-09 | 1.21E-08 | 2.82E-07 | 9.65E-09 | 0 | 0 | 2.39619E-10 | 0 | 0.0002 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.17E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 6.22E-09 | 1.12E-08 | 2.60E-07 | 8.85E-09 | 0 | 0 | 2.20718E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.09E-05 | 5.86E-09 | 3.51E-09 | 5.86E-09 | 5.93E-09 | 1.04E-08 | 2.41E-07 | 8.20E-09 | 0 | 0 | 2.05436E-10 | 0 | 0.0002 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.01E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 5.67E-09 | 9.66E-09 | 2.24E-07 | 7.62E-09 | 0 | 0 | 1.91642E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 9.53E-06 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 5.47E-09 | 9.07E-09 | 2.11E-07 | 7.13E-09 | 0 | 0 | 1.80408E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 8.99E-06 | 4.87E-09 | 2.92E-09 | 4.87E-09 | 5.29E-09 | 8.55E-09 | 1.98E-07 | 6.70E-09 | 0 | 0 | 1.70192E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 8.51E-06 | 4.61E-09 | 2.77E-09 | 4.61E-09 | 5.13E-09 | 8.07E-09 | 1.87E-07 | 6.31E-09 | 0 | 0 | 1.61067E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.81E-04 | 1.50E-07 | 8.98E-08 | 1.50E-07 | 9.96E-08 | 2.75E-07 | 6.44E-06 | 2.26E-07 | 0 | 0 | 5.31448E-09 | 0 | 0.0053 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.24E-04 | 1.19E-07 | 7.16E-08 | 1.19E-07 | 8.00E-08 | 2.19E-07 | 5.13E-06 | 1.80E-07 | 0 | 0 | 4.23612E-09 | 0 | 0.0042 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 6.41E-08 | 3.84E-08 | 6.41E-08 | 4.45E-08 | 1.17E-07 | 2.75E-06 | 9.63E-08 | 0 | 0 | 2.27312E-09 | 0 | 0.0023 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.62E-05 | 4.07E-08 | 2.44E-08 | 4.07E-08 | 2.93E-08 | 7.43E-08 | 1.74E-06 | 6.08E-08 | 0 | 0 | 1.44251E-09 | 0 | 0.0014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.50E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 2.20E-08 | 5.35E-08 | 1.25E-06 | 4.37E-08 | 0 | 0 | 1.04079E-09 | 0 | 0.0010 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.15E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.72E-08 | 4.03E-08 | 9.42E-07 | 3.28E-08 | 0 | 0 | 7.85285E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.27E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.41E-08 | 3.17E-08 | 7.42E-07 | 2.57E-08 | 0 | 0 | 6.19803E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.68E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.20E-08 | 2.60E-08 | 6.07E-07 | 2.10E-08 | 0 | 0 | 5.08248E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.26E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 1.04E-08 | 2.18E-08 | 5.09E-07 | 1.76E-08 | 0 | 0 | 4.27149E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 1.94E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 9.16E-09 | 1.87E-08 | 4.36E-07 | 1.50E-08 | 0 | 0 | 3.6732E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.70E-05 | 9.12E-09 | 5.47E-09 | 9.12E-09 | 8.22E-09 | 1.63E-08 | 3.81E-07 | 1.31E-08 | 0 | 0 | 3.21133E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.50E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 7.45E-09 | 1.45E-08 | 3.37E-07 | 1.16E-08 | 0 | 0 | 2.84603E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.35E-05 | 7.27E-09 | 4.36E-09 | 7.27E-09 | 6.84E-09 | 1.30E-08 | 3.02E-07 | 1.03E-08 | 0 | 0 | 2.55604E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.22E-05 | 6.60E-09 | 3.96E-09 | 6.60E-09 | 6.33E-09 | 1.17E-08 | 2.73E-07 | 9.35E-09 | 0 | 0 | 2.31812E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.12E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 5.90E-09 | 1.07E-08 | 2.50E-07 | 8.52E-09 | 0 | 0 | 2.11985E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.03E-05 | 5.56E-09 | 3.33E-09 | 5.56E-09 | 5.54E-09 | 9.85E-09 | 2.29E-07 | 7.81E-09 | 0 | 0 | 1.94931E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 9.64E-06 | 5.20E-09 | 3.12E-09 | 5.20E-09 | 5.27E-09 | 9.21E-09 | 2.14E-07 | 7.29E-09 | 0 | 0 | 1.82506E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.04E-06 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 5.04E-09 | 8.63E-09 | 2.00E-07 | 6.81E-09 | 0 | 0 | 1.71223E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 8.57E-06 | 4.63E-09 | 2.78E-09 | 4.63E-09 | 4.86E-09 | 8.16E-09 | 1.90E-07 | 6.43E-09 | 0 | 0 | 1.62165E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.14E-06 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 4.71E-09 | 7.75E-09 | 1.80E-07 | 6.09E-09 | 0 | 0 | 1.54136E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 7.70E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 4.55E-09 | 7.31E-09 | 1.70E-07 | 5.73E-09 | 0 | 0 | 1.45711E-10 | 0 | 0.0001 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.75E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 1.23E-08 | 2.66E-08 | 6.21E-07 | 2.15E-08 | 0 | 0 | 5.20345E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.63E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 8.05E-09 | 1.57E-08 | 3.65E-07 | 1.25E-08 | 0 | 0 | 3.08171E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.46E-05 | 7.85E-09 | 4.71E-09 | 7.85E-09 | 7.37E-09 | 1.40E-08 | 3.26E-07 | 1.12E-08 | 0 | 0 | 2.76112E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.31E-05 | 7.06E-09 | 4.23E-09 | 7.06E-09 | 6.76E-09 | 1.26E-08 | 2.93E-07 | 1.00E-08 | 0 | 0 | 2.48017E-10 | 0 | 0.0002 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.19E-05 | 6.40E-09 | 3.84E-09 | 6.40E-09 | 6.24E-09 | 1.14E-08 | 2.65E-07 | 9.04E-09 | 0 | 0 | 2.24792E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.07E-05 | 5.78E-09 | 3.47E-09 | 5.78E-09 | 5.75E-09 | 1.03E-08 | 2.39E-07 | 8.13E-09 | 0 | 0 | 2.02983E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 9.81E-06 | 5.29E-09 | 3.18E-09 | 5.29E-09 | 5.35E-09 | 9.37E-09 | 2.18E-07 | 7.42E-09 | 0 | 0 | 1.85698E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.03E-06 | 4.88E-09 | 2.93E-09 | 4.88E-09 | 5.01E-09 | 8.62E-09 | 2.00E-07 | 6.81E-09 | 0 | 0 | 1.70942E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 8.40E-06 | 4.54E-09 | 2.73E-09 | 4.54E-09 | 4.73E-09 | 8.02E-09 | 1.86E-07 | 6.32E-09 | 0 | 0 | 1.59123E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 7.88E-06 | 4.26E-09 | 2.55E-09 | 4.26E-09 | 4.49E-09 | 7.50E-09 | 1.74E-07 | 5.90E-09 | 0 | 0 | 1.49108E-10 | 0 | 0.0001 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 7.49E-06 | 4.05E-09 | 2.43E-09 | 4.05E-09 | 4.32E-09 | 7.13E-09 | 1.65E-07 | 5.60E-09 | 0 | 0 | 1.41724E-10 | 0 | 0.0001 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.13E-06 | 3.86E-09 | 2.31E-09 | 3.86E-09 | 4.17E-09 | 6.78E-09 | 1.57E-07 | 5.32E-09 | 0 | 0 | 1.34904E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 6.74E-06 | 3.65E-09 | 2.19E-09 | 3.65E-09 | 4.01E-09 | 6.40E-09 | 1.48E-07 | 5.01E-09 | 0 | 0 | 1.27655E-10 | 0 | 0.0001 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2028

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 3.324E-05 | 9.075E-09 | 5.445E-09 | 9.075E-09 | 4.647E-08 | 1.016E-07 | 9.075E-09 | 1.452E-09 | 1.670E-07 | 1.815E-08 | 7.260E-10 | 2.696E-05 |
| Paved road | 2028_PAVED | 1.603E-04 | 8.608E-08 | 5.165E-08 | 8.608E-08 | 5.509E-08 | 1.722E-06 | 1.584E-07 | 9.641E-09 | 3.719E-06 | 1.722E-07 | 1.308E-07 | 4.889E-04 |
| Unpaved road | 2028_UNPAVED | 9.795E-05 | 4.259E-07 | 2.555E-07 | 4.259E-07 | 2.726E-07 | 8.517E-06 | 7.836E-07 | 4.770E-08 | 1.840E-05 | 8.517E-07 | 6.473E-07 | 2.419E-03 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2028 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.89E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.07E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.45E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.58E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.65E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.88E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.57E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.78E-03 | 0.00E+00 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.87E-04 | 1.10E-07 | 6.58E-08 | 1.10E-07 | 7.08E-08 | 2.02E-07 | 4.73E-06 | 1.66E-07 | 0 | 0 | 3.53956E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.92E-08 | 4.75E-08 | 7.92E-08 | 5.13E-08 | 1.46E-07 | 3.42E-06 | 1.20E-07 | 0 | 0 | 2.37473E-09 | 0 | 0.0024 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.14E-08 | 1.29E-08 | 2.14E-08 | 1.47E-08 | 3.92E-08 | 9.20E-07 | 3.22E-08 | 0 | 0 | 2.10303E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.53E-07 | 2.64E-08 | 0 | 0 | 2.771E-10 | 0 | 0.0003 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.93E-04 | 3.26E-07 | 1.96E-07 | 3.26E-07 | 2.09E-07 | 6.00E-07 | 1.41E-05 | 4.96E-07 | 0 | 0 | 1.12208E-08 | 0 | 0.0112 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.53E-07 | 3.92E-07 | 6.53E-07 | 4.18E-07 | 1.20E-06 | 2.82E-05 | 9.92E-07 | 0 | 0 | 2.2713E-08 | 0 | 0.0227 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.46E-04 | 3.00E-07 | 1.80E-07 | 3.00E-07 | 1.93E-07 | 5.53E-07 | 1.30E-05 | 4.56E-07 | 0 | 0 | 1.03356E-08 | 0 | 0.0103 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.88E-07 | 4.73E-07 | 7.88E-07 | 5.05E-07 | 1.45E-06 | 3.40E-05 | 1.20E-06 | 0 | 0 | 2.74954E-08 | 0 | 0.0275 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.48E-05 | 6.23E-08 | 3.74E-08 | 6.23E-08 | 4.06E-08 | 1.15E-07 | 2.69E-06 | 9.45E-08 | 0 | 0 | 1.79514E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.88E-04 | 1.64E-07 | 9.85E-08 | 1.64E-07 | 1.06E-07 | 3.02E-07 | 7.09E-06 | 2.49E-07 | 0 | 0 | 5.45481E-09 | 0 | 0.0055 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.79E-05 | 4.44E-08 | 2.67E-08 | 4.44E-08 | 2.90E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.28579E-09 | 0 | 0.0013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.64E-08 | 4.55E-08 | 1.07E-06 | 3.75E-08 | 0 | 0 | 5.72076E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.83E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.55E-08 | 4.29E-08 | 1.01E-06 | 3.53E-08 | 0 | 0 | 5.35213E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.65E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 1.47E-08 | 4.05E-08 | 9.50E-07 | 3.34E-08 | 0 | 0 | 5.01813E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.49E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.39E-08 | 3.83E-08 | 8.99E-07 | 3.16E-08 | 0 | 0 | 4.71652E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.32E-08 | 3.64E-08 | 8.55E-07 | 3.00E-08 | 0 | 0 | 4.45726E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.26E-08 | 3.45E-08 | 8.10E-07 | 2.85E-08 | 0 | 0 | 4.19533E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.19E-08 | 3.26E-08 | 7.65E-07 | 2.69E-08 | 0 | 0 | 3.91691E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.05E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.67E-08 | 4.62E-08 | 1.08E-06 | 3.80E-08 | 0 | 0 | 5.77921E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.03E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.63E-08 | 4.51E-08 | 1.06E-06 | 3.72E-08 | 0 | 0 | 5.73084E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.88E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.55E-08 | 4.30E-08 | 1.01E-06 | 3.54E-08 | 0 | 0 | 5.44458E-10 | 0 | 0.0005 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.70E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.47E-08 | 4.07E-08 | 9.54E-07 | 3.35E-08 | 0 | 0 | 5.11517E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.53E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.39E-08 | 3.84E-08 | 9.01E-07 | 3.16E-08 | 0 | 0 | 4.79388E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.37E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.53E-07 | 2.99E-08 | 0 | 0 | 4.49201E-10 | 0 | 0.0004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.20601E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.69E-07 | 2.70E-08 | 0 | 0 | 3.96571E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.14E-08 | 3.12E-08 | 7.32E-07 | 2.57E-08 | 0 | 0 | 3.73555E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.69E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.54E-08 | 4.24E-08 | 9.94E-07 | 3.49E-08 | 0 | 0 | 5.08971E-10 | 0 | 0.0005 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.95E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.42E-08 | 1.04E-06 | 3.64E-08 | 0 | 0 | 5.58297E-10 | 0 | 0.0006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.92E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 1.56E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.52585E-10 | 0 | 0.0006 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.76E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.49E-08 | 4.11E-08 | 9.65E-07 | 3.39E-08 | 0 | 0 | 5.22764E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.60E-05 | 2.13E-08 | 1.28E-08 | 2.13E-08 | 1.41E-08 | 3.90E-08 | 9.15E-07 | 3.21E-08 | 0 | 0 | 4.91447E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.35E-08 | 3.71E-08 | 8.70E-07 | 3.05E-08 | 0 | 0 | 4.62562E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.27E-08 | 3.50E-08 | 8.22E-07 | 2.88E-08 | 0 | 0 | 4.31146E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.32E-08 | 7.80E-07 | 2.74E-08 | 0 | 0 | 4.03954E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.42E-07 | 2.60E-08 | 0 | 0 | 3.79051E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.64E-08 | 9.83E-09 | 1.64E-08 | 1.10E-08 | 3.00E-08 | 7.05E-07 | 2.47E-08 | 0 | 0 | 3.54861E-10 | 0 | 0.0004 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.76E-05 | 1.56E-08 | 9.37E-09 | 1.56E-08 | 1.05E-08 | 2.86E-08 | 6.72E-07 | 2.36E-08 | 0 | 0 | 3.33118E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.64E-05 | 1.48E-08 | 8.88E-09 | 1.48E-08 | 9.94E-09 | 2.71E-08 | 6.37E-07 | 2.23E-08 | 0 | 0 | 3.09561E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.95E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 1.62E-08 | 4.48E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 5.57743E-10 | 0 | 0.0006 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.88E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.35E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.44343E-10 | 0 | 0.0005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.35E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.56623E-10 | 0 | 0.0006 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.18E-08 | 9.81E-07 | 3.44E-08 | 0 | 0 | 5.32918E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.66E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.44E-08 | 3.98E-08 | 9.35E-07 | 3.28E-08 | 0 | 0 | 5.03771E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.38E-08 | 3.79E-08 | 8.89E-07 | 3.12E-08 | 0 | 0 | 4.74728E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.45E-07 | 2.97E-08 | 0 | 0 | 4.45475E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.42E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 4.16667E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.04E-05 | 1.76E-08 | 1.05E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.57E-07 | 2.66E-08 | 0 | 0 | 3.86416E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 1.11E-08 | 3.04E-08 | 7.13E-07 | 2.50E-08 | 0 | 0 | 3.56548E-10 | 0 | 0.0004 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.72E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.68E-07 | 2.34E-08 | 0 | 0 | 3.2572E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.87E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.61E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.43936E-10 | 0 | 0.0005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.92E-05 | 2.41E-08 | 1.44E-08 | 2.41E-08 | 1.60E-08 | 4.42E-08 | 1.04E-06 | 3.64E-08 | 0 | 0 | 5.52882E-10 | 0 | 0.0006 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.57E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 0 | 0 | 5.50479E-10 | 0 | 0.0006 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.84E-05 | 2.31E-08 | 1.38E-08 | 2.31E-08 | 1.53E-08 | 4.23E-08 | 9.93E-07 | 3.49E-08 | 0 | 0 | 5.37684E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.47E-08 | 4.06E-08 | 9.54E-07 | 3.35E-08 | 0 | 0 | 5.14284E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.40E-08 | 3.86E-08 | 9.06E-07 | 3.18E-08 | 0 | 0 | 4.83081E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.33E-08 | 3.65E-08 | 8.57E-07 | 3.01E-08 | 0 | 0 | 4.50749E-10 | 0 | 0.0005 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.42E-08 | 8.03E-07 | 2.82E-08 | 0 | 0 | 4.13324E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.53E-07 | 2.64E-08 | 0 | 0 | 3.79471E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.80E-05 | 3.17E-08 | 1.90E-08 | 3.17E-08 | 2.10E-08 | 5.82E-08 | 1.37E-06 | 4.80E-08 | 0 | 0 | 7.19291E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.79E-05 | 3.11E-08 | 1.86E-08 | 3.11E-08 | 2.06E-08 | 5.70E-08 | 1.34E-06 | 4.70E-08 | 0 | 0 | 7.17221E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.29E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 1.80E-08 | 4.99E-08 | 1.17E-06 | 4.11E-08 | 0 | 0 | 6.23667E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.18E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.74E-08 | 4.81E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 6.01343E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.12E-05 | 2.56E-08 | 1.53E-08 | 2.56E-08 | 1.70E-08 | 4.69E-08 | 1.10E-06 | 3.87E-08 | 0 | 0 | 5.90296E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.02E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 1.64E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 0 | 5.71427E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.89E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.46761E-10 | 0 | 0.0005 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.57E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 0 | 0 | 5.55934E-10 | 0 | 0.0006 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.49E-08 | 4.12E-08 | 9.67E-07 | 3.40E-08 | 0 | 0 | 5.21805E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.87E-08 | 9.08E-07 | 3.19E-08 | 0 | 0 | 4.81621E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.62E-08 | 8.50E-07 | 2.98E-08 | 0 | 0 | 4.4187E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.23E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 4.04069E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.95E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 1.15E-08 | 3.17E-08 | 7.43E-07 | 2.61E-08 | 0 | 0 | 3.68873E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.95E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.12E-08 | 5.89E-08 | 1.38E-06 | 4.86E-08 | 0 | 0 | 7.47461E-10 | 0 | 0.0007 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.71E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.01E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 7.032E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.83E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.02E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 | 0 | 0 | 7.25001E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.83E-05 | 3.01E-08 | 1.81E-08 | 3.01E-08 | 1.99E-08 | 5.53E-08 | 1.30E-06 | 4.56E-08 | 0 | 0 | 7.24899E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.83E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 1.97E-08 | 5.47E-08 | 1.28E-06 | 4.51E-08 | 0 | 0 | 7.25365E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.47E-05 | 2.75E-08 | 1.65E-08 | 2.75E-08 | 1.82E-08 | 5.05E-08 | 1.19E-06 | 4.16E-08 | 0 | 0 | 6.56826E-10 | 0 | 0.0007 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.43E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 1.78E-08 | 4.95E-08 | 1.16E-06 | 4.08E-08 | 0 | 0 | 6.49584E-10 | 0 | 0.0006 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.70E-08 | 4.72E-08 | 1.11E-06 | 3.89E-08 | 0 | 0 | 6.15293E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.01E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.69999E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.50E-08 | 4.14E-08 | 9.71E-07 | 3.41E-08 | 0 | 0 | 5.23018E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.52E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.39E-08 | 3.85E-08 | 9.04E-07 | 3.17E-08 | 0 | 0 | 4.76932E-10 | 0 | 0.0005 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.30E-08 | 3.59E-08 | 8.42E-07 | 2.95E-08 | 0 | 0 | 4.34143E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.09E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.22E-08 | 3.35E-08 | 7.85E-07 | 2.76E-08 | 0 | 0 | 3.95631E-10 | 0 | 0.0004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.14E-08 | 3.12E-08 | 7.33E-07 | 2.57E-08 | 0 | 0 | 3.60241E-10 | 0 | 0.0004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.72E-05 | 1.58E-08 | 9.50E-09 | 1.58E-08 | 1.06E-08 | 2.90E-08 | 6.81E-07 | 2.39E-08 | 0 | 0 | 3.25554E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 9.77E-09 | 2.67E-08 | 6.26E-07 | 2.20E-08 | 0 | 0 | 2.88141E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.66E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 2.73E-08 | 7.64E-08 | 1.79E-06 | 6.30E-08 | 0 | 0 | 1.07181E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.35E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 2.59E-08 | 7.25E-08 | 1.70E-06 | 5.98E-08 | 0 | 0 | 1.01194E-09 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.55E-05 | 3.49E-08 | 2.09E-08 | 3.49E-08 | 2.30E-08 | 6.40E-08 | 1.50E-06 | 5.28E-08 | 0 | 0 | 8.62176E-10 | 0 | 0.0009 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.07E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 2.10E-08 | 5.86E-08 | 1.37E-06 | 4.83E-08 | 0 | 0 | 7.70552E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.00E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.05E-08 | 5.71E-08 | 1.34E-06 | 4.71E-08 | 0 | 0 | 7.57402E-10 | 0 | 0.0008 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.91E-05 | 3.02E-08 | 1.81E-08 | 3.02E-08 | 1.99E-08 | 5.55E-08 | 1.30E-06 | 4.58E-08 | 0 | 0 | 7.40916E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.84E-05 | 2.95E-08 | 1.77E-08 | 2.95E-08 | 1.94E-08 | 5.41E-08 | 1.27E-06 | 4.46E-08 | 0 | 0 | 7.2666E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.57E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 1.83E-08 | 5.08E-08 | 1.19E-06 | 4.19E-08 | 0 | 0 | 6.75683E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.78E-08 | 1.12E-06 | 3.94E-08 | 0 | 0 | 6.27453E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.04E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.45E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 5.75916E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.49E-08 | 4.13E-08 | 9.69E-07 | 3.40E-08 | 0 | 0 | 5.23325E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.38E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 4.72976E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.26E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.29E-08 | 3.54E-08 | 8.31E-07 | 2.92E-08 | 0 | 0 | 4.27971E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.70E-07 | 2.70E-08 | 0 | 0 | 3.86295E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.85E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.49969E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.55E-08 | 9.32E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.69E-07 | 2.35E-08 | 0 | 0 | 3.18173E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.53E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 9.75E-09 | 2.66E-08 | 6.25E-07 | 2.19E-08 | 0 | 0 | 2.89316E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.24E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 2.89E-08 | 8.11E-08 | 1.90E-06 | 6.69E-08 | 0 | 0 | 1.18124E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 4.13E-08 | 2.48E-08 | 4.13E-08 | 2.71E-08 | 7.59E-08 | 1.78E-06 | 6.26E-08 | 0 | 0 | 1.09549E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.39E-08 | 6.68E-08 | 1.57E-06 | 5.50E-08 | 0 | 0 | 9.33407E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.57E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 2.24E-08 | 6.25E-08 | 1.47E-06 | 5.15E-08 | 0 | 0 | 8.65885E-10 | 0 | 0.0009 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.42E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.16E-08 | 6.03E-08 | 1.41E-06 | 4.97E-08 | 0 | 0 | 8.3729E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.04E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.00E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 7.64813E-10 | 0 | 0.0008 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.67E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 1.85E-08 | 5.16E-08 | 1.21E-06 | 4.25E-08 | 0 | 0 | 6.94513E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.34E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 1.72E-08 | 4.78E-08 | 1.12E-06 | 3.94E-08 | 0 | 0 | 6.33212E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.04E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.75416E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.74E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.09E-08 | 9.59E-07 | 3.37E-08 | 0 | 0 | 5.18739E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.45E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 1.36E-08 | 3.75E-08 | 8.80E-07 | 3.09E-08 | 0 | 0 | 4.63848E-10 | 0 | 0.0005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.09E-07 | 2.84E-08 | 0 | 0 | 4.14132E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.96E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 1.16E-08 | 3.18E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.71253E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.77E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 1.08E-08 | 2.95E-08 | 6.93E-07 | 2.43E-08 | 0 | 0 | 3.34866E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.61E-05 | 1.50E-08 | 9.02E-09 | 1.50E-08 | 1.01E-08 | 2.76E-08 | 6.47E-07 | 2.27E-08 | 0 | 0 | 3.04577E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.41E-08 | 8.47E-09 | 1.41E-08 | 9.48E-09 | 2.59E-08 | 6.07E-07 | 2.13E-08 | 0 | 0 | 2.79066E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.30E-08 | 7.79E-09 | 1.30E-08 | 8.74E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.46954E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.93E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.20785E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.09E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.80E-08 | 7.86E-08 | 1.84E-06 | 6.48E-08 | 0 | 0 | 1.15292E-09 | 0 | 0.0012 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.67E-05 | 4.01E-08 | 2.40E-08 | 4.01E-08 | 2.62E-08 | 7.36E-08 | 1.73E-06 | 6.07E-08 | 0 | 0 | 1.07297E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.11E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 2.41E-08 | 6.74E-08 | 1.58E-06 | 5.55E-08 | 0 | 0 | 9.66953E-10 | 0 | 0.0010 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.56E-05 | 3.34E-08 | 2.00E-08 | 3.34E-08 | 2.19E-08 | 6.13E-08 | 1.44E-06 | 5.05E-08 | 0 | 0 | 8.63341E-10 | 0 | 0.0009 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.08E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.61E-08 | 0 | 0 | 7.73149E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.68E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 1.85E-08 | 5.14E-08 | 1.21E-06 | 4.24E-08 | 0 | 0 | 6.96613E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.32E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.70E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 6.29327E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.97E-05 | 2.36E-08 | 1.42E-08 | 2.36E-08 | 1.56E-08 | 4.34E-08 | 1.02E-06 | 3.57E-08 | 0 | 0 | 5.62752E-10 | 0 | 0.0006 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.63E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.43E-08 | 3.95E-08 | 9.26E-07 | 3.25E-08 | 0 | 0 | 4.98025E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.40901E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.31E-08 | 7.76E-07 | 2.72E-08 | 0 | 0 | 3.92302E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.86E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.51598E-10 | 0 | 0.0004 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.68E-07 | 2.34E-08 | 0 | 0 | 3.18958E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.54E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 9.74E-09 | 2.66E-08 | 6.25E-07 | 2.19E-08 | 0 | 0 | 2.91061E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.42E-05 | 1.37E-08 | 8.21E-09 | 1.37E-08 | 9.20E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 | 0 | 0 | 2.6824E-10 | 0 | 0.0003 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.32E-05 | 1.30E-08 | 7.77E-09 | 1.30E-08 | 8.72E-09 | 2.38E-08 | 5.57E-07 | 1.95E-08 | 0 | 0 | 2.49033E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.56E-05 | 4.50E-08 | 2.70E-08 | 4.50E-08 | 2.94E-08 | 8.28E-08 | 1.94E-06 | 6.83E-08 | 0 | 0 | 1.24147E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.08E-05 | 4.20E-08 | 2.52E-08 | 4.20E-08 | 2.75E-08 | 7.72E-08 | 1.81E-06 | 6.37E-08 | 0 | 0 | 1.15107E-09 | 0 | 0.0012 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.33E-05 | 3.76E-08 | 2.26E-08 | 3.76E-08 | 2.47E-08 | 6.92E-08 | 1.62E-06 | 5.70E-08 | 0 | 0 | 1.00893E-09 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.67E-05 | 3.37E-08 | 2.02E-08 | 3.37E-08 | 2.22E-08 | 6.20E-08 | 1.45E-06 | 5.11E-08 | 0 | 0 | 8.83398E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.12E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.62E-08 | 0 | 0 | 7.80876E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.67E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 1.83E-08 | 5.10E-08 | 1.20E-06 | 4.20E-08 | 0 | 0 | 6.94567E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.23E-05 | 2.51E-08 | 1.51E-08 | 2.51E-08 | 1.66E-08 | 4.61E-08 | 1.08E-06 | 3.80E-08 | 0 | 0 | 6.118E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.82E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.50E-08 | 4.16E-08 | 9.76E-07 | 3.43E-08 | 0 | 0 | 5.34632E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.36E-08 | 3.77E-08 | 8.84E-07 | 3.10E-08 | 0 | 0 | 4.68333E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.19E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.14033E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.42E-07 | 2.61E-08 | 0 | 0 | 3.69151E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.76E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.89E-07 | 2.42E-08 | 0 | 0 | 3.33105E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.49E-08 | 8.97E-09 | 1.49E-08 | 1.00E-08 | 2.74E-08 | 6.43E-07 | 2.26E-08 | 0 | 0 | 3.03063E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.47E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 9.43E-09 | 2.57E-08 | 6.04E-07 | 2.12E-08 | 0 | 0 | 2.77565E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.35E-05 | 1.32E-08 | 7.92E-09 | 1.32E-08 | 8.89E-09 | 2.42E-08 | 5.68E-07 | 1.99E-08 | 0 | 0 | 2.55001E-10 | 0 | 0.0003 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 8.41E-09 | 2.29E-08 | 5.36E-07 | 1.88E-08 | 0 | 0 | 2.35285E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.97E-05 | 5.91E-08 | 3.55E-08 | 5.91E-08 | 3.85E-08 | 1.09E-07 | 2.55E-06 | 8.96E-08 | 0 | 0 | 1.69802E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 5.71E-08 | 3.43E-08 | 5.71E-08 | 3.72E-08 | 1.05E-07 | 2.46E-06 | 8.66E-08 | 0 | 0 | 1.64657E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.23E-05 | 5.41E-08 | 3.25E-08 | 5.41E-08 | 3.53E-08 | 9.95E-08 | 2.34E-06 | 8.21E-08 | 0 | 0 | 1.55729E-09 | 0 | 0.0016 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.38E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 3.21E-08 | 9.04E-08 | 2.12E-06 | 7.46E-08 | 0 | 0 | 1.39715E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.47E-05 | 4.39E-08 | 2.63E-08 | 4.39E-08 | 2.87E-08 | 8.07E-08 | 1.89E-06 | 6.65E-08 | 0 | 0 | 1.22475E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.54E-05 | 3.86E-08 | 2.31E-08 | 3.86E-08 | 2.53E-08 | 7.08E-08 | 1.66E-06 | 5.84E-08 | 0 | 0 | 1.04856E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.81E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 2.25E-08 | 6.31E-08 | 1.48E-06 | 5.20E-08 | 0 | 0 | 9.10983E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.15E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.62E-08 | 0 | 0 | 7.8623E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.58E-05 | 2.71E-08 | 1.63E-08 | 2.71E-08 | 1.79E-08 | 4.98E-08 | 1.17E-06 | 4.10E-08 | 0 | 0 | 6.77841E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.07E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.59E-08 | 4.42E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.80795E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.66E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.44E-08 | 3.97E-08 | 9.32E-07 | 3.27E-08 | 0 | 0 | 5.03148E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.41423E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.30E-08 | 7.74E-07 | 2.72E-08 | 0 | 0 | 3.91313E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.85E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.15E-07 | 2.51E-08 | 0 | 0 | 3.50221E-10 | 0 | 0.0004 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.67E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.03E-08 | 2.83E-08 | 6.64E-07 | 2.33E-08 | 0 | 0 | 3.16058E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.51E-05 | 1.44E-08 | 8.62E-09 | 1.44E-08 | 9.65E-09 | 2.64E-08 | 6.18E-07 | 2.17E-08 | 0 | 0 | 2.85756E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.38E-05 | 1.35E-08 | 8.08E-09 | 1.35E-08 | 9.06E-09 | 2.47E-08 | 5.79E-07 | 2.03E-08 | 0 | 0 | 2.60423E-10 | 0 | 0.0003 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.55E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.38654E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 8.09E-09 | 2.19E-08 | 5.15E-07 | 1.81E-08 | 0 | 0 | 2.19674E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.27E-08 | 4.36E-08 | 7.27E-08 | 4.72E-08 | 1.34E-07 | 3.14E-06 | 1.10E-07 | 0 | 0 | 2.1951E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.40E-08 | 1.25E-07 | 2.92E-06 | 1.03E-07 | 0 | 0 | 2.03419E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.15E-05 | 5.88E-08 | 3.53E-08 | 5.88E-08 | 3.83E-08 | 1.08E-07 | 2.54E-06 | 8.92E-08 | 0 | 0 | 1.73317E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.06E-05 | 5.25E-08 | 3.15E-08 | 5.25E-08 | 3.42E-08 | 9.66E-08 | 2.27E-06 | 7.97E-08 | 0 | 0 | 1.52587E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.81E-05 | 4.55E-08 | 2.73E-08 | 4.55E-08 | 2.97E-08 | 8.36E-08 | 1.96E-06 | 6.89E-08 | 0 | 0 | 1.2892E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.78E-05 | 3.96E-08 | 2.38E-08 | 3.96E-08 | 2.59E-08 | 7.27E-08 | 1.71E-06 | 6.00E-08 | 0 | 0 | 1.09348E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.88E-05 | 3.45E-08 | 2.07E-08 | 3.45E-08 | 2.26E-08 | 6.33E-08 | 1.49E-06 | 5.22E-08 | 0 | 0 | 9.23458E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.06E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 1.96E-08 | 5.47E-08 | 1.28E-06 | 4.51E-08 | 0 | 0 | 7.68933E-10 | 0 | 0.0008 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.40E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.44323E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.90E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.22E-08 | 9.91E-07 | 3.48E-08 | 0 | 0 | 5.48547E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.38E-08 | 3.80E-08 | 8.92E-07 | 3.13E-08 | 0 | 0 | 4.76015E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.21E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.11E-07 | 2.85E-08 | 0 | 0 | 4.17648E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.41E-07 | 2.60E-08 | 0 | 0 | 3.68979E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.74E-05 | 1.59E-08 | 9.53E-09 | 1.59E-08 | 1.06E-08 | 2.91E-08 | 6.84E-07 | 2.40E-08 | 0 | 0 | 3.29108E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.56E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 9.88E-09 | 2.70E-08 | 6.33E-07 | 2.22E-08 | 0 | 0 | 2.94884E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.41E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.23E-09 | 2.52E-08 | 5.90E-07 | 2.07E-08 | 0 | 0 | 2.66284E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 8.68E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.42816E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.18E-05 | 1.21E-08 | 7.29E-09 | 1.21E-08 | 8.20E-09 | 2.23E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.22991E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.09E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 7.78E-09 | 2.11E-08 | 4.95E-07 | 1.73E-08 | 0 | 0 | 2.05924E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 5.62E-08 | 1.60E-07 | 3.74E-06 | 1.32E-07 | 0 | 0 | 2.67259E-09 | 0 | 0.0027 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.51E-08 | 5.11E-08 | 8.51E-08 | 5.51E-08 | 1.57E-07 | 3.67E-06 | 1.29E-07 | 0 | 0 | 2.63155E-09 | 0 | 0.0026 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.25E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 | 0 | 0 | 2.50281E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.74E-08 | 4.64E-08 | 7.74E-08 | 5.01E-08 | 1.42E-07 | 3.34E-06 | 1.17E-07 | 0 | 0 | 2.39018E-09 | 0 | 0.0024 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.39E-08 | 1.24E-07 | 2.92E-06 | 1.03E-07 | 0 | 0 | 2.06177E-09 | 0 | 0.0021 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.81E-05 | 5.62E-08 | 3.37E-08 | 5.62E-08 | 3.65E-08 | 1.03E-07 | 2.42E-06 | 8.52E-08 | 0 | 0 | 1.66718E-09 | 0 | 0.0017 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.15E-05 | 4.69E-08 | 2.82E-08 | 4.69E-08 | 3.06E-08 | 8.63E-08 | 2.02E-06 | 7.12E-08 | 0 | 0 | 1.353E-09 | 0 | 0.0014 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.86E-05 | 3.97E-08 | 2.38E-08 | 3.97E-08 | 2.60E-08 | 7.30E-08 | 1.71E-06 | 6.02E-08 | 0 | 0 | 1.10895E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.70E-05 | 3.32E-08 | 1.99E-08 | 3.32E-08 | 2.18E-08 | 6.11E-08 | 1.43E-06 | 5.04E-08 | 0 | 0 | 8.90655E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.82E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 1.86E-08 | 5.18E-08 | 1.22E-06 | 4.27E-08 | 0 | 0 | 7.23364E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.22E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 1.63E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 0 | 6.08888E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.72E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.45E-08 | 4.01E-08 | 9.41E-07 | 3.30E-08 | 0 | 0 | 5.15641E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.34E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 1.30E-08 | 3.59E-08 | 8.42E-07 | 2.96E-08 | 0 | 0 | 4.43468E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.18E-08 | 3.25E-08 | 7.63E-07 | 2.68E-08 | 0 | 0 | 3.86596E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.80E-05 | 1.62E-08 | 9.74E-09 | 1.62E-08 | 1.09E-08 | 2.98E-08 | 6.99E-07 | 2.45E-08 | 0 | 0 | 3.40819E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.61E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.01E-08 | 2.75E-08 | 6.46E-07 | 2.27E-08 | 0 | 0 | 3.04277E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.44E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 9.35E-09 | 2.55E-08 | 5.99E-07 | 2.10E-08 | 0 | 0 | 2.7252E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.31E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 8.77E-09 | 2.39E-08 | 5.60E-07 | 1.97E-08 | 0 | 0 | 2.47381E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.20E-05 | 1.23E-08 | 7.36E-09 | 1.23E-08 | 8.28E-09 | 2.25E-08 | 5.28E-07 | 1.85E-08 | 0 | 0 | 2.26561E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.11E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 7.86E-09 | 2.13E-08 | 5.00E-07 | 1.75E-08 | 0 | 0 | 2.09421E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.49E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 1.94996E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 9.25E-08 | 5.55E-08 | 9.25E-08 | 5.98E-08 | 1.70E-07 | 3.99E-06 | 1.40E-07 | 0 | 0 | 2.89575E-09 | 0 | 0.0029 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 8.94E-08 | 5.37E-08 | 8.94E-08 | 5.78E-08 | 1.64E-07 | 3.86E-06 | 1.36E-07 | 0 | 0 | 2.80247E-09 | 0 | 0.0028 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.86E-08 | 5.31E-08 | 8.86E-08 | 5.73E-08 | 1.63E-07 | 3.82E-06 | 1.34E-07 | 0 | 0 | 2.80317E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 7.47E-08 | 4.48E-08 | 7.47E-08 | 4.84E-08 | 1.37E-07 | 3.22E-06 | 1.13E-07 | 0 | 0 | 2.32651E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.33E-05 | 5.85E-08 | 3.51E-08 | 5.85E-08 | 3.80E-08 | 1.08E-07 | 2.52E-06 | 8.87E-08 | 0 | 0 | 1.76613E-09 | 0 | 0.0018 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.24E-05 | 4.70E-08 | 2.82E-08 | 4.70E-08 | 3.06E-08 | 8.64E-08 | 2.03E-06 | 7.12E-08 | 0 | 0 | 1.37067E-09 | 0 | 0.0014 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.62E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.48E-08 | 6.99E-08 | 1.64E-06 | 5.76E-08 | 0 | 0 | 1.06423E-09 | 0 | 0.0011 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.42E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.05E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 8.36666E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.55E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 1.74E-08 | 4.85E-08 | 1.14E-06 | 4.00E-08 | 0 | 0 | 6.72291E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.93E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.19E-08 | 9.83E-07 | 3.45E-08 | 0 | 0 | 5.54789E-10 | 0 | 0.0006 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.48E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.34E-08 | 3.70E-08 | 8.69E-07 | 3.05E-08 | 0 | 0 | 4.6906E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.14E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.33E-08 | 7.81E-07 | 2.74E-08 | 0 | 0 | 4.04843E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 1.10E-08 | 3.02E-08 | 7.09E-07 | 2.49E-08 | 0 | 0 | 3.53007E-10 | 0 | 0.0004 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.65E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.01E-08 | 2.77E-08 | 6.51E-07 | 2.28E-08 | 0 | 0 | 3.12355E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 9.42E-09 | 2.58E-08 | 6.04E-07 | 2.12E-08 | 0 | 0 | 2.80332E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.35E-05 | 1.31E-08 | 7.89E-09 | 1.31E-08 | 8.84E-09 | 2.41E-08 | 5.66E-07 | 1.98E-08 | 0 | 0 | 2.54782E-10 | 0 | 0.0003 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.24E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 8.34E-09 | 2.27E-08 | 5.33E-07 | 1.87E-08 | 0 | 0 | 2.3384E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.15E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 7.93E-09 | 2.16E-08 | 5.06E-07 | 1.77E-08 | 0 | 0 | 2.17017E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 7.58E-09 | 2.06E-08 | 4.82E-07 | 1.69E-08 | 0 | 0 | 2.03163E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 7.26E-09 | 1.97E-08 | 4.61E-07 | 1.62E-08 | 0 | 0 | 1.90955E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.27E-07 | 7.62E-08 | 1.27E-07 | 8.18E-08 | 2.34E-07 | 5.48E-06 | 1.93E-07 | 0 | 0 | 4.16699E-09 | 0 | 0.0042 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.09E-07 | 6.56E-08 | 1.09E-07 | 7.05E-08 | 2.01E-07 | 4.72E-06 | 1.66E-07 | 0 | 0 | 3.5567E-09 | 0 | 0.0036 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.23E-08 | 4.94E-08 | 8.23E-08 | 5.32E-08 | 1.51E-07 | 3.55E-06 | 1.25E-07 | 0 | 0 | 2.61461E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.69E-05 | 5.98E-08 | 3.59E-08 | 5.98E-08 | 3.88E-08 | 1.10E-07 | 2.58E-06 | 9.08E-08 | 0 | 0 | 1.83392E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.85E-05 | 4.43E-08 | 2.66E-08 | 4.43E-08 | 2.89E-08 | 8.15E-08 | 1.91E-06 | 6.72E-08 | 0 | 0 | 1.29591E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.00E-05 | 3.42E-08 | 2.05E-08 | 3.42E-08 | 2.24E-08 | 6.28E-08 | 1.47E-06 | 5.18E-08 | 0 | 0 | 9.4718E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.87E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 1.83E-08 | 5.12E-08 | 1.20E-06 | 4.22E-08 | 0 | 0 | 7.33343E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.11E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.55E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.88806E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.58E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.36E-08 | 3.76E-08 | 8.83E-07 | 3.10E-08 | 0 | 0 | 4.88761E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.20E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.21E-08 | 3.35E-08 | 7.86E-07 | 2.76E-08 | 0 | 0 | 4.16732E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.92E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 1.10E-08 | 3.03E-08 | 7.12E-07 | 2.50E-08 | 0 | 0 | 3.63208E-10 | 0 | 0.0004 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.71E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 1.02E-08 | 2.79E-08 | 6.55E-07 | 2.30E-08 | 0 | 0 | 3.23073E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 9.48E-09 | 2.60E-08 | 6.09E-07 | 2.14E-08 | 0 | 0 | 2.9198E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 8.92E-09 | 2.44E-08 | 5.72E-07 | 2.01E-08 | 0 | 0 | 2.6742E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.31E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 8.45E-09 | 2.31E-08 | 5.41E-07 | 1.90E-08 | 0 | 0 | 2.473E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.22E-05 | 1.20E-08 | 7.17E-09 | 1.20E-08 | 8.04E-09 | 2.19E-08 | 5.14E-07 | 1.80E-08 | 0 | 0 | 2.30465E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 7.68E-09 | 2.09E-08 | 4.90E-07 | 1.72E-08 | 0 | 0 | 2.15829E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.08E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 7.37E-09 | 2.00E-08 | 4.70E-07 | 1.65E-08 | 0 | 0 | 2.03701E-10 | 0 | 0.0002 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.02E-05 | 1.05E-08 | 6.28E-09 | 1.05E-08 | 7.08E-09 | 1.92E-08 | 4.50E-07 | 1.58E-08 | 0 | 0 | 1.92308E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.23E-04 | 1.82E-07 | 1.09E-07 | 1.82E-07 | 1.17E-07 | 3.36E-07 | 7.88E-06 | 2.77E-07 | 0 | 0 | 6.12125E-09 | 0 | 0.0061 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.65E-04 | 2.04E-07 | 1.23E-07 | 2.04E-07 | 1.31E-07 | 3.76E-07 | 8.83E-06 | 3.10E-07 | 0 | 0 | 6.90773E-09 | 0 | 0.0069 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.27E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 1.18E-07 | 3.38E-07 | 7.94E-06 | 2.79E-07 | 0 | 0 | 6.19725E-09 | 0 | 0.0062 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.41E-07 | 8.44E-08 | 1.41E-07 | 9.06E-08 | 2.59E-07 | 6.08E-06 | 2.14E-07 | 0 | 0 | 4.68713E-09 | 0 | 0.0047 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.82E-08 | 5.29E-08 | 8.82E-08 | 5.69E-08 | 1.62E-07 | 3.81E-06 | 1.34E-07 | 0 | 0 | 2.84433E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.01E-05 | 5.56E-08 | 3.34E-08 | 5.56E-08 | 3.61E-08 | 1.02E-07 | 2.40E-06 | 8.44E-08 | 0 | 0 | 1.7052E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.84E-05 | 3.84E-08 | 2.30E-08 | 3.84E-08 | 2.50E-08 | 7.05E-08 | 1.66E-06 | 5.82E-08 | 0 | 0 | 1.10532E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.21E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 1.93E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 0 | 7.97245E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.27E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.59E-08 | 4.43E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.1965E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.68E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.81E-08 | 8.94E-07 | 3.14E-08 | 0 | 0 | 5.07827E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.29E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 4.33582E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.54E-08 | 0 | 0 | 3.80921E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.80E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 1.03E-08 | 2.84E-08 | 6.66E-07 | 2.34E-08 | 0 | 0 | 3.40933E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.64E-05 | 1.44E-08 | 8.65E-09 | 1.44E-08 | 9.63E-09 | 2.65E-08 | 6.21E-07 | 2.18E-08 | 0 | 0 | 3.10222E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 9.05E-09 | 2.48E-08 | 5.82E-07 | 2.04E-08 | 0 | 0 | 2.84322E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 8.56E-09 | 2.34E-08 | 5.50E-07 | 1.93E-08 | 0 | 0 | 2.63097E-10 | 0 | 0.0003 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 8.13E-09 | 2.22E-08 | 5.21E-07 | 1.83E-08 | 0 | 0 | 2.44897E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.15E-08 | 6.92E-09 | 1.15E-08 | 7.75E-09 | 2.12E-08 | 4.96E-07 | 1.74E-08 | 0 | 0 | 2.28944E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 7.40E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 2.14315E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.05E-08 | 6.31E-09 | 1.05E-08 | 7.09E-09 | 1.93E-08 | 4.52E-07 | 1.59E-08 | 0 | 0 | 2.01605E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.01E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 6.80E-09 | 1.85E-08 | 4.33E-07 | 1.52E-08 | 0 | 0 | 1.90287E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.42E-04 | 3.53E-07 | 2.12E-07 | 3.53E-07 | 2.27E-07 | 6.50E-07 | 1.53E-05 | 5.37E-07 | 0 | 0 | 1.21631E-08 | 0 | 0.0122 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.86E-04 | 3.76E-07 | 2.26E-07 | 3.76E-07 | 2.41E-07 | 6.92E-07 | 1.63E-05 | 5.72E-07 | 0 | 0 | 1.29886E-08 | 0 | 0.0130 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.11E-04 | 3.36E-07 | 2.02E-07 | 3.36E-07 | 2.15E-07 | 6.18E-07 | 1.45E-05 | 5.10E-07 | 0 | 0 | 1.15766E-08 | 0 | 0.0116 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.21E-04 | 1.80E-07 | 1.08E-07 | 1.80E-07 | 1.16E-07 | 3.31E-07 | 7.76E-06 | 2.73E-07 | 0 | 0 | 6.08044E-09 | 0 | 0.0061 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 4.98E-08 | 1.42E-07 | 3.33E-06 | 1.17E-07 | 0 | 0 | 2.47003E-09 | 0 | 0.0025 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.01E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 2.89E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.32703E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.71E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 2.08E-08 | 5.86E-08 | 1.37E-06 | 4.83E-08 | 0 | 0 | 8.91719E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.61E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.69E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 6.83615E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.96E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 1.45E-08 | 4.05E-08 | 9.51E-07 | 3.34E-08 | 0 | 0 | 5.6084E-10 | 0 | 0.0006 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.52E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.29E-08 | 3.58E-08 | 8.40E-07 | 2.95E-08 | 0 | 0 | 4.77354E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.16E-08 | 3.22E-08 | 7.56E-07 | 2.65E-08 | 0 | 0 | 4.15476E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.90E-07 | 2.42E-08 | 0 | 0 | 3.68196E-10 | 0 | 0.0004 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 9.84E-09 | 2.71E-08 | 6.36E-07 | 2.23E-08 | 0 | 0 | 3.30091E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.37E-08 | 8.25E-09 | 1.37E-08 | 9.18E-09 | 2.52E-08 | 5.92E-07 | 2.08E-08 | 0 | 0 | 2.99443E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.45E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 8.60E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.73707E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 8.13E-09 | 2.22E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.52647E-10 | 0 | 0.0003 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 7.71E-09 | 2.11E-08 | 4.94E-07 | 1.73E-08 | 0 | 0 | 2.34824E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.16E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 7.34E-09 | 2.00E-08 | 4.70E-07 | 1.65E-08 | 0 | 0 | 2.19369E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.09E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.01E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 0 | 0 | 2.05731E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 9.95E-09 | 5.97E-09 | 9.95E-09 | 6.70E-09 | 1.82E-08 | 4.28E-07 | 1.50E-08 | 0 | 0 | 1.93344E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.65E-06 | 9.53E-09 | 5.72E-09 | 9.53E-09 | 6.43E-09 | 1.75E-08 | 4.10E-07 | 1.44E-08 | 0 | 0 | 1.82621E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.27E-07 | 5.56E-07 | 9.27E-07 | 5.94E-07 | 1.71E-06 | 4.00E-05 | 1.41E-06 | 0 | 0 | 3.2413E-08 | 0 | 0.0324 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.25E-03 | 1.21E-06 | 7.28E-07 | 1.21E-06 | 7.78E-07 | 2.23E-06 | 5.24E-05 | 1.85E-06 | 0 | 0 | 4.25519E-08 | 0 | 0.0426 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.41E-06 | 8.47E-07 | 1.41E-06 | 9.03E-07 | 2.60E-06 | 6.10E-05 | 2.14E-06 | 0 | 0 | 4.95031E-08 | 0 | 0.0495 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.19E-07 | 7.13E-08 | 1.19E-07 | 7.65E-08 | 2.19E-07 | 5.13E-06 | 1.81E-07 | 0 | 0 | 3.94425E-09 | 0 | 0.0039 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.95E-05 | 5.49E-08 | 3.29E-08 | 5.49E-08 | 3.56E-08 | 1.01E-07 | 2.37E-06 | 8.33E-08 | 0 | 0 | 1.6952E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.77E-05 | 3.75E-08 | 2.25E-08 | 3.75E-08 | 2.45E-08 | 6.90E-08 | 1.62E-06 | 5.69E-08 | 0 | 0 | 1.09271E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.26E-05 | 2.92E-08 | 1.75E-08 | 2.92E-08 | 1.91E-08 | 5.36E-08 | 1.26E-06 | 4.42E-08 | 0 | 0 | 8.06108E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.37E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.59E-08 | 4.44E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.37736E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.78E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 5.2572E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.36E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.21E-08 | 3.37E-08 | 7.91E-07 | 2.78E-08 | 0 | 0 | 4.46156E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.05E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 1.09E-08 | 3.03E-08 | 7.10E-07 | 2.50E-08 | 0 | 0 | 3.87188E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.81E-05 | 1.50E-08 | 9.03E-09 | 1.50E-08 | 1.00E-08 | 2.76E-08 | 6.48E-07 | 2.27E-08 | 0 | 0 | 3.42076E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.62E-05 | 1.39E-08 | 8.32E-09 | 1.39E-08 | 9.24E-09 | 2.54E-08 | 5.97E-07 | 2.09E-08 | 0 | 0 | 3.06314E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.47E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 8.60E-09 | 2.36E-08 | 5.54E-07 | 1.95E-08 | 0 | 0 | 2.77354E-10 | 0 | 0.0003 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.34E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 8.06E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 0 | 0 | 2.53348E-10 | 0 | 0.0003 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.24E-05 | 1.14E-08 | 6.81E-09 | 1.14E-08 | 7.61E-09 | 2.08E-08 | 4.89E-07 | 1.71E-08 | 0 | 0 | 2.33928E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.08E-08 | 6.46E-09 | 1.08E-08 | 7.23E-09 | 1.98E-08 | 4.64E-07 | 1.63E-08 | 0 | 0 | 2.18072E-10 | 0 | 0.0002 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.08E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 6.89E-09 | 1.88E-08 | 4.40E-07 | 1.55E-08 | 0 | 0 | 2.0368E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 6.59E-09 | 1.79E-08 | 4.21E-07 | 1.48E-08 | 0 | 0 | 1.91809E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.56E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 6.31E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 0 | 0 | 1.8097E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.04E-06 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 6.06E-09 | 1.65E-08 | 3.86E-07 | 1.35E-08 | 0 | 0 | 1.71237E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.80E-04 | 1.58E-07 | 9.47E-08 | 1.58E-07 | 1.02E-07 | 2.90E-07 | 6.82E-06 | 2.40E-07 | 0 | 0 | 5.30003E-09 | 0 | 0.0053 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.27E-07 | 7.63E-08 | 1.27E-07 | 8.19E-08 | 2.34E-07 | 5.49E-06 | 1.93E-07 | 0 | 0 | 4.22843E-09 | 0 | 0.0042 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.17E-08 | 4.30E-08 | 7.17E-08 | 4.63E-08 | 1.32E-07 | 3.09E-06 | 1.09E-07 | 0 | 0 | 2.27802E-09 | 0 | 0.0023 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.67E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.12E-08 | 8.83E-08 | 2.07E-06 | 7.29E-08 | 0 | 0 | 1.45255E-09 | 0 | 0.0015 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.56E-05 | 3.65E-08 | 2.19E-08 | 3.65E-08 | 2.38E-08 | 6.70E-08 | 1.57E-06 | 5.53E-08 | 0 | 0 | 1.05312E-09 | 0 | 0.0011 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.22E-05 | 2.90E-08 | 1.74E-08 | 2.90E-08 | 1.90E-08 | 5.34E-08 | 1.25E-06 | 4.40E-08 | 0 | 0 | 7.98939E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.35E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.59E-08 | 4.44E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.34222E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.76E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 5.23092E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.34E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.21E-08 | 3.36E-08 | 7.89E-07 | 2.77E-08 | 0 | 0 | 4.42222E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.02E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 1.09E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 0 | 3.82463E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.78E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 9.93E-09 | 2.74E-08 | 6.43E-07 | 2.26E-08 | 0 | 0 | 3.36276E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.15E-09 | 2.52E-08 | 5.91E-07 | 2.07E-08 | 0 | 0 | 2.99645E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.43E-05 | 1.27E-08 | 7.64E-09 | 1.27E-08 | 8.51E-09 | 2.34E-08 | 5.48E-07 | 1.92E-08 | 0 | 0 | 2.70501E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 7.96E-09 | 2.18E-08 | 5.12E-07 | 1.80E-08 | 0 | 0 | 2.46464E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.20E-05 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 7.49E-09 | 2.05E-08 | 4.81E-07 | 1.69E-08 | 0 | 0 | 2.26338E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 7.07E-09 | 1.93E-08 | 4.53E-07 | 1.59E-08 | 0 | 0 | 2.08927E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.04E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 6.74E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 0 | 0 | 1.96058E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.73E-06 | 9.56E-09 | 5.74E-09 | 9.56E-09 | 6.44E-09 | 1.75E-08 | 4.11E-07 | 1.44E-08 | 0 | 0 | 1.8427E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.23E-06 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.18E-09 | 1.68E-08 | 3.94E-07 | 1.38E-08 | 0 | 0 | 1.74688E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.77E-06 | 8.81E-09 | 5.29E-09 | 8.81E-09 | 5.95E-09 | 1.62E-08 | 3.79E-07 | 1.33E-08 | 0 | 0 | 1.66102E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.30E-06 | 8.44E-09 | 5.07E-09 | 8.44E-09 | 5.71E-09 | 1.55E-08 | 3.63E-07 | 1.27E-08 | 0 | 0 | 1.57115E-10 | 0 | 0.0002 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.83E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.42E-08 | 3.94E-08 | 9.25E-07 | 3.25E-08 | 0 | 0 | 5.35875E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.71E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 9.80E-09 | 2.70E-08 | 6.34E-07 | 2.22E-08 | 0 | 0 | 3.2373E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.54E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.09E-09 | 2.50E-08 | 5.87E-07 | 2.06E-08 | 0 | 0 | 2.91561E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.47E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.63358E-10 | 0 | 0.0003 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.27E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 7.93E-09 | 2.17E-08 | 5.10E-07 | 1.79E-08 | 0 | 0 | 2.39995E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.42E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 2.18028E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.00E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 0 | 0 | 2.00537E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.80E-06 | 9.84E-09 | 5.90E-09 | 9.84E-09 | 6.63E-09 | 1.80E-08 | 4.23E-07 | 1.49E-08 | 0 | 0 | 1.85529E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.16E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 6.31E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 0 | 0 | 1.73406E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.61E-06 | 8.93E-09 | 5.36E-09 | 8.93E-09 | 6.03E-09 | 1.64E-08 | 3.84E-07 | 1.35E-08 | 0 | 0 | 1.63039E-10 | 0 | 0.0002 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.20E-06 | 8.59E-09 | 5.15E-09 | 8.59E-09 | 5.80E-09 | 1.57E-08 | 3.69E-07 | 1.30E-08 | 0 | 0 | 1.55241E-10 | 0 | 0.0002 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.82E-06 | 8.27E-09 | 4.96E-09 | 8.27E-09 | 5.59E-09 | 1.52E-08 | 3.55E-07 | 1.25E-08 | 0 | 0 | 1.47984E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.41E-06 | 7.93E-09 | 4.76E-09 | 7.93E-09 | 5.37E-09 | 1.45E-08 | 3.41E-07 | 1.20E-08 | 0 | 0 | 1.40284E-10 | 0 | 0.0001 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2029

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 3.324E-05 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2029_PAVED | 1.598E-04 | 8.67E-08 | 5.20E-08 | 8.67E-08 | 5.55E-08 | 1.73E-06 | 1.60E-07 | 9.71E-09 | 3.75E-06 | 1.73E-07 | 1.32E-07 | 4.93E-04 |
| Unpaved road | 2029_UNPAVED | 9.761E-05 | 4.29E-07 | 2.57E-07 | 4.29E-07 | 2.75E-07 | 8.58E-06 | 7.89E-07 | 4.81E-08 | 1.85E-05 | 8.58E-07 | 6.52E-07 | 2.44E-03 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2029 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 581 | 581 | 302 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1.7 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.89E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.07E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.45E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.58E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.65E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.88E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.57E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.78E-03 | 0.00E+00 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 1.10E-07 | 6.63E-08 | 1.10E-07 | 7.13E-08 | 2.03E-07 | 4.77E-06 | 1.68E-07 | 0 | 0 | 3.52755E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.98E-08 | 4.79E-08 | 7.98E-08 | 5.17E-08 | 1.47E-07 | 3.44E-06 | 1.21E-07 | 0 | 0 | 2.36669E-09 | 0 | 0.0024 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 1.48E-08 | 3.95E-08 | 9.27E-07 | 3.25E-08 | 0 | 0 | 2.09641E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.58E-07 | 2.66E-08 | 0 | 0 | 2.76187E-10 | 0 | 0.0003 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.91E-04 | 3.29E-07 | 1.97E-07 | 3.29E-07 | 2.11E-07 | 6.05E-07 | 1.42E-05 | 4.99E-07 | 0 | 0 | 1.11827E-08 | 0 | 0.0112 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.57E-07 | 3.94E-07 | 6.57E-07 | 4.21E-07 | 1.21E-06 | 2.84E-05 | 9.99E-07 | 0 | 0 | 2.26358E-08 | 0 | 0.0226 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.44E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 1.94E-07 | 5.57E-07 | 1.31E-05 | 4.60E-07 | 0 | 0 | 1.03005E-08 | 0 | 0.0103 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.94E-07 | 4.76E-07 | 7.94E-07 | 5.08E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 0 | 2.7402E-08 | 0 | 0.0274 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.45E-05 | 6.28E-08 | 3.77E-08 | 6.28E-08 | 4.09E-08 | 1.15E-07 | 2.71E-06 | 9.52E-08 | 0 | 0 | 1.78907E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.87E-04 | 1.65E-07 | 9.92E-08 | 1.65E-07 | 1.06E-07 | 3.04E-07 | 7.14E-06 | 2.51E-07 | 0 | 0 | 5.43629E-09 | 0 | 0.0054 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.77E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.92E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.28145E-09 | 0 | 0.0013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.01E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 1.65E-08 | 4.58E-08 | 1.08E-06 | 3.78E-08 | 0 | 0 | 5.70161E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.82E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.56E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.33422E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.64E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.48E-08 | 4.08E-08 | 9.57E-07 | 3.36E-08 | 0 | 0 | 5.00136E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.48E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.40E-08 | 3.86E-08 | 9.06E-07 | 3.18E-08 | 0 | 0 | 4.70076E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.33E-08 | 3.67E-08 | 8.61E-07 | 3.02E-08 | 0 | 0 | 4.44238E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.21E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.27E-08 | 3.48E-08 | 8.17E-07 | 2.87E-08 | 0 | 0 | 4.18133E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.06E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.20E-08 | 3.29E-08 | 7.71E-07 | 2.71E-08 | 0 | 0 | 3.90386E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.04E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 1.68E-08 | 4.65E-08 | 1.09E-06 | 3.83E-08 | 0 | 0 | 5.75987E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.64E-08 | 4.55E-08 | 1.07E-06 | 3.75E-08 | 0 | 0 | 5.71166E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.87E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 1.57E-08 | 4.33E-08 | 1.02E-06 | 3.57E-08 | 0 | 0 | 5.42637E-10 | 0 | 0.0005 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.69E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.10E-08 | 9.61E-07 | 3.38E-08 | 0 | 0 | 5.09806E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.52E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.87E-08 | 9.08E-07 | 3.19E-08 | 0 | 0 | 4.77786E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.36E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.33E-08 | 3.66E-08 | 8.59E-07 | 3.02E-08 | 0 | 0 | 4.47702E-10 | 0 | 0.0004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.21E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.13E-07 | 2.86E-08 | 0 | 0 | 4.19199E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.30E-08 | 7.74E-07 | 2.72E-08 | 0 | 0 | 3.95249E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.15E-08 | 3.14E-08 | 7.37E-07 | 2.59E-08 | 0 | 0 | 3.72311E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.68E-05 | 2.33E-08 | 1.40E-08 | 2.33E-08 | 1.55E-08 | 4.27E-08 | 1.00E-06 | 3.52E-08 | 0 | 0 | 5.07272E-10 | 0 | 0.0005 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.94E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.45E-08 | 1.04E-06 | 3.67E-08 | 0 | 0 | 5.5643E-10 | 0 | 0.0006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.50736E-10 | 0 | 0.0006 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.75E-05 | 2.26E-08 | 1.35E-08 | 2.26E-08 | 1.50E-08 | 4.14E-08 | 9.72E-07 | 3.41E-08 | 0 | 0 | 5.21015E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.59E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.42E-08 | 3.93E-08 | 9.22E-07 | 3.24E-08 | 0 | 0 | 4.89805E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.36E-08 | 3.73E-08 | 8.76E-07 | 3.08E-08 | 0 | 0 | 4.61017E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.27E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 1.28E-08 | 3.53E-08 | 8.28E-07 | 2.91E-08 | 0 | 0 | 4.29708E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.22E-08 | 3.35E-08 | 7.86E-07 | 2.76E-08 | 0 | 0 | 4.02607E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.77789E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 1.11E-08 | 3.03E-08 | 7.10E-07 | 2.49E-08 | 0 | 0 | 3.5368E-10 | 0 | 0.0004 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 1.57E-08 | 9.44E-09 | 1.57E-08 | 1.05E-08 | 2.89E-08 | 6.77E-07 | 2.38E-08 | 0 | 0 | 3.32011E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.63E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.00E-08 | 2.73E-08 | 6.41E-07 | 2.25E-08 | 0 | 0 | 3.08533E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.94E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.63E-08 | 4.51E-08 | 1.06E-06 | 3.72E-08 | 0 | 0 | 5.55879E-10 | 0 | 0.0006 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.87E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.42524E-10 | 0 | 0.0005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.39E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.54761E-10 | 0 | 0.0006 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.21E-08 | 9.88E-07 | 3.47E-08 | 0 | 0 | 5.31135E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.65E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 1.45E-08 | 4.01E-08 | 9.42E-07 | 3.31E-08 | 0 | 0 | 5.02087E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.39E-08 | 3.82E-08 | 8.96E-07 | 3.15E-08 | 0 | 0 | 4.73142E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.51E-07 | 2.99E-08 | 0 | 0 | 4.43988E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.15278E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.18E-08 | 3.25E-08 | 7.62E-07 | 2.68E-08 | 0 | 0 | 3.85128E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.12E-08 | 3.06E-08 | 7.18E-07 | 2.52E-08 | 0 | 0 | 3.55361E-10 | 0 | 0.0004 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.71E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 1.05E-08 | 2.87E-08 | 6.73E-07 | 2.36E-08 | 0 | 0 | 3.24637E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.86E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.62E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.42118E-10 | 0 | 0.0005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.91E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.61E-08 | 4.45E-08 | 1.04E-06 | 3.67E-08 | 0 | 0 | 5.51034E-10 | 0 | 0.0006 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.90E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.48638E-10 | 0 | 0.0005 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.83E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 1.54E-08 | 4.26E-08 | 1.00E-06 | 3.51E-08 | 0 | 0 | 5.35885E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.71E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.09E-08 | 9.61E-07 | 3.37E-08 | 0 | 0 | 5.12564E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.41E-08 | 3.89E-08 | 9.13E-07 | 3.21E-08 | 0 | 0 | 4.81466E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.37E-05 | 2.01E-08 | 1.20E-08 | 2.01E-08 | 1.34E-08 | 3.68E-08 | 8.64E-07 | 3.03E-08 | 0 | 0 | 4.49244E-10 | 0 | 0.0004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.09E-07 | 2.84E-08 | 0 | 0 | 4.11946E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.59E-07 | 2.66E-08 | 0 | 0 | 3.78207E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.79E-05 | 3.19E-08 | 1.92E-08 | 3.19E-08 | 2.12E-08 | 5.86E-08 | 1.38E-06 | 4.83E-08 | 0 | 0 | 7.16884E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.78E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.07E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 7.14819E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.28E-05 | 2.74E-08 | 1.64E-08 | 2.74E-08 | 1.82E-08 | 5.03E-08 | 1.18E-06 | 4.15E-08 | 0 | 0 | 6.2158E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.17E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 1.75E-08 | 4.85E-08 | 1.14E-06 | 4.00E-08 | 0 | 0 | 5.99331E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.11E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.71E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 5.88321E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.01E-05 | 2.49E-08 | 1.50E-08 | 2.49E-08 | 1.65E-08 | 4.57E-08 | 1.07E-06 | 3.77E-08 | 0 | 0 | 5.69514E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.88E-05 | 2.39E-08 | 1.44E-08 | 2.39E-08 | 1.59E-08 | 4.39E-08 | 1.03E-06 | 3.62E-08 | 0 | 0 | 5.44932E-10 | 0 | 0.0005 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.58E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.54073E-10 | 0 | 0.0006 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 2.26E-08 | 1.36E-08 | 2.26E-08 | 1.50E-08 | 4.15E-08 | 9.74E-07 | 3.42E-08 | 0 | 0 | 5.20059E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.41E-08 | 3.90E-08 | 9.15E-07 | 3.21E-08 | 0 | 0 | 4.80011E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.32E-08 | 3.65E-08 | 8.56E-07 | 3.01E-08 | 0 | 0 | 4.40394E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.41E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 4.02721E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.49E-07 | 2.63E-08 | 0 | 0 | 3.67644E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.93E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 2.14E-08 | 5.94E-08 | 1.39E-06 | 4.89E-08 | 0 | 0 | 7.44956E-10 | 0 | 0.0007 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.70E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.03E-08 | 5.63E-08 | 1.32E-06 | 4.64E-08 | 0 | 0 | 7.00844E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.82E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.03E-08 | 5.65E-08 | 1.33E-06 | 4.66E-08 | 0 | 0 | 7.2257E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.82E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.01E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 7.22467E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.82E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 1.98E-08 | 5.51E-08 | 1.29E-06 | 4.54E-08 | 0 | 0 | 7.22931E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.46E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 1.83E-08 | 5.09E-08 | 1.19E-06 | 4.20E-08 | 0 | 0 | 6.54623E-10 | 0 | 0.0007 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.42E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 1.80E-08 | 4.99E-08 | 1.17E-06 | 4.11E-08 | 0 | 0 | 6.47406E-10 | 0 | 0.0006 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.24E-05 | 2.59E-08 | 1.55E-08 | 2.59E-08 | 1.71E-08 | 4.75E-08 | 1.11E-06 | 3.92E-08 | 0 | 0 | 6.1323E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.68089E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.51E-08 | 4.17E-08 | 9.78E-07 | 3.43E-08 | 0 | 0 | 5.21268E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.51E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.88E-08 | 9.11E-07 | 3.20E-08 | 0 | 0 | 4.75337E-10 | 0 | 0.0005 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.61E-08 | 8.48E-07 | 2.98E-08 | 0 | 0 | 4.32694E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.08E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.22E-08 | 3.37E-08 | 7.91E-07 | 2.78E-08 | 0 | 0 | 3.94311E-10 | 0 | 0.0004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.15E-08 | 3.15E-08 | 7.38E-07 | 2.59E-08 | 0 | 0 | 3.59041E-10 | 0 | 0.0004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.71E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 1.07E-08 | 2.93E-08 | 6.86E-07 | 2.41E-08 | 0 | 0 | 3.24472E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.47E-08 | 8.80E-09 | 1.47E-08 | 9.84E-09 | 2.69E-08 | 6.31E-07 | 2.21E-08 | 0 | 0 | 2.87185E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.64E-05 | 4.19E-08 | 2.52E-08 | 4.19E-08 | 2.75E-08 | 7.70E-08 | 1.81E-06 | 6.35E-08 | 0 | 0 | 1.0682E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.33E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 2.61E-08 | 7.30E-08 | 1.71E-06 | 6.02E-08 | 0 | 0 | 1.00854E-09 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 2.31E-08 | 6.45E-08 | 1.51E-06 | 5.32E-08 | 0 | 0 | 8.59279E-10 | 0 | 0.0009 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.06E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.12E-08 | 5.90E-08 | 1.38E-06 | 4.86E-08 | 0 | 0 | 7.67966E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 3.99E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.07E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 7.54859E-10 | 0 | 0.0008 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.90E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.59E-08 | 1.31E-06 | 4.61E-08 | 0 | 0 | 7.38428E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 1.96E-08 | 5.45E-08 | 1.28E-06 | 4.49E-08 | 0 | 0 | 7.24219E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.56E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 1.84E-08 | 5.12E-08 | 1.20E-06 | 4.22E-08 | 0 | 0 | 6.73415E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.30E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.81E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 6.25348E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.03E-05 | 2.44E-08 | 1.47E-08 | 2.44E-08 | 1.62E-08 | 4.49E-08 | 1.05E-06 | 3.70E-08 | 0 | 0 | 5.73986E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.50E-08 | 4.16E-08 | 9.77E-07 | 3.43E-08 | 0 | 0 | 5.21573E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.39E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 4.71394E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.25E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.29E-08 | 3.57E-08 | 8.38E-07 | 2.94E-08 | 0 | 0 | 4.26542E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.03E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.31E-08 | 7.76E-07 | 2.73E-08 | 0 | 0 | 3.85007E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.84E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 0 | 0 | 3.48803E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.57E-08 | 9.39E-09 | 1.57E-08 | 1.05E-08 | 2.87E-08 | 6.74E-07 | 2.37E-08 | 0 | 0 | 3.17115E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.52E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 9.81E-09 | 2.68E-08 | 6.30E-07 | 2.21E-08 | 0 | 0 | 2.88356E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.22E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 2.91E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.17726E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.77E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 2.73E-08 | 7.64E-08 | 1.79E-06 | 6.30E-08 | 0 | 0 | 1.0918E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.91E-05 | 3.66E-08 | 2.20E-08 | 3.66E-08 | 2.41E-08 | 6.73E-08 | 1.58E-06 | 5.55E-08 | 0 | 0 | 9.30266E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 2.25E-08 | 6.30E-08 | 1.48E-06 | 5.19E-08 | 0 | 0 | 8.62972E-10 | 0 | 0.0009 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.41E-05 | 3.31E-08 | 1.98E-08 | 3.31E-08 | 2.17E-08 | 6.07E-08 | 1.42E-06 | 5.01E-08 | 0 | 0 | 8.34474E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.03E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.02E-08 | 5.63E-08 | 1.32E-06 | 4.64E-08 | 0 | 0 | 7.62242E-10 | 0 | 0.0008 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.66E-05 | 2.83E-08 | 1.70E-08 | 2.83E-08 | 1.87E-08 | 5.20E-08 | 1.22E-06 | 4.28E-08 | 0 | 0 | 6.9218E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.33E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 6.31087E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.03E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.73487E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.73E-05 | 2.24E-08 | 1.35E-08 | 2.24E-08 | 1.49E-08 | 4.12E-08 | 9.66E-07 | 3.39E-08 | 0 | 0 | 5.17002E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.44E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 1.37E-08 | 3.78E-08 | 8.87E-07 | 3.11E-08 | 0 | 0 | 4.62297E-10 | 0 | 0.0005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.18E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.15E-07 | 2.86E-08 | 0 | 0 | 4.1275E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.95E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 | 0 | 0 | 3.70016E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.76E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 1.08E-08 | 2.97E-08 | 6.98E-07 | 2.45E-08 | 0 | 0 | 3.33752E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.60E-05 | 1.51E-08 | 9.09E-09 | 1.51E-08 | 1.01E-08 | 2.78E-08 | 6.52E-07 | 2.29E-08 | 0 | 0 | 3.03565E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.54E-09 | 2.61E-08 | 6.12E-07 | 2.15E-08 | 0 | 0 | 2.78141E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.31E-08 | 7.85E-09 | 1.31E-08 | 8.80E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 0 | 2.46137E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.36E-05 | 4.51E-08 | 2.71E-08 | 4.51E-08 | 2.95E-08 | 8.29E-08 | 1.95E-06 | 6.84E-08 | 0 | 0 | 1.20377E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.07E-05 | 4.31E-08 | 2.58E-08 | 4.31E-08 | 2.82E-08 | 7.92E-08 | 1.86E-06 | 6.53E-08 | 0 | 0 | 1.14903E-09 | 0 | 0.0011 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 4.04E-08 | 2.42E-08 | 4.04E-08 | 2.64E-08 | 7.42E-08 | 1.74E-06 | 6.12E-08 | 0 | 0 | 1.06935E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.09E-05 | 3.69E-08 | 2.22E-08 | 3.69E-08 | 2.42E-08 | 6.79E-08 | 1.59E-06 | 5.60E-08 | 0 | 0 | 9.63696E-10 | 0 | 0.0010 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.54E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 2.21E-08 | 6.17E-08 | 1.45E-06 | 5.09E-08 | 0 | 0 | 8.60435E-10 | 0 | 0.0009 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.07E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.70549E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.67E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 1.86E-08 | 5.18E-08 | 1.22E-06 | 4.27E-08 | 0 | 0 | 6.94274E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.27215E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.96E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.57E-08 | 4.37E-08 | 1.02E-06 | 3.60E-08 | 0 | 0 | 5.60866E-10 | 0 | 0.0006 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.62E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.44E-08 | 3.98E-08 | 9.33E-07 | 3.28E-08 | 0 | 0 | 4.96358E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.52E-07 | 2.99E-08 | 0 | 0 | 4.39428E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.21E-08 | 3.33E-08 | 7.82E-07 | 2.74E-08 | 0 | 0 | 3.90994E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.85E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 0 | 0 | 3.50427E-10 | 0 | 0.0004 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 1.05E-08 | 2.87E-08 | 6.73E-07 | 2.36E-08 | 0 | 0 | 3.17898E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.53E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 9.81E-09 | 2.68E-08 | 6.29E-07 | 2.21E-08 | 0 | 0 | 2.90095E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.41E-05 | 1.38E-08 | 8.27E-09 | 1.38E-08 | 9.26E-09 | 2.53E-08 | 5.93E-07 | 2.08E-08 | 0 | 0 | 2.67351E-10 | 0 | 0.0003 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.31E-05 | 1.30E-08 | 7.83E-09 | 1.30E-08 | 8.78E-09 | 2.39E-08 | 5.61E-07 | 1.97E-08 | 0 | 0 | 2.48209E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 4.54E-08 | 2.72E-08 | 4.54E-08 | 2.97E-08 | 8.34E-08 | 1.96E-06 | 6.88E-08 | 0 | 0 | 1.23728E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 4.24E-08 | 2.54E-08 | 4.24E-08 | 2.77E-08 | 7.78E-08 | 1.83E-06 | 6.42E-08 | 0 | 0 | 1.14719E-09 | 0 | 0.0011 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.31E-05 | 3.79E-08 | 2.28E-08 | 3.79E-08 | 2.49E-08 | 6.97E-08 | 1.64E-06 | 5.75E-08 | 0 | 0 | 1.00553E-09 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.65E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 2.23E-08 | 6.24E-08 | 1.47E-06 | 5.15E-08 | 0 | 0 | 8.80424E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.11E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.7825E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.66E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 1.84E-08 | 5.14E-08 | 1.21E-06 | 4.23E-08 | 0 | 0 | 6.92234E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.22E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 1.67E-08 | 4.65E-08 | 1.09E-06 | 3.83E-08 | 0 | 0 | 6.09747E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.19E-08 | 9.84E-07 | 3.45E-08 | 0 | 0 | 5.32841E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.37E-08 | 3.80E-08 | 8.91E-07 | 3.13E-08 | 0 | 0 | 4.66767E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.18E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.13E-07 | 2.85E-08 | 0 | 0 | 4.12651E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.48E-07 | 2.63E-08 | 0 | 0 | 3.67921E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.75E-05 | 1.61E-08 | 9.67E-09 | 1.61E-08 | 1.08E-08 | 2.96E-08 | 6.94E-07 | 2.44E-08 | 0 | 0 | 3.31997E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.01E-08 | 2.76E-08 | 6.48E-07 | 2.27E-08 | 0 | 0 | 3.02057E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.46E-05 | 1.41E-08 | 8.48E-09 | 1.41E-08 | 9.49E-09 | 2.59E-08 | 6.08E-07 | 2.13E-08 | 0 | 0 | 2.76645E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.34E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 8.95E-09 | 2.44E-08 | 5.72E-07 | 2.01E-08 | 0 | 0 | 2.54157E-10 | 0 | 0.0003 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 8.47E-09 | 2.30E-08 | 5.40E-07 | 1.90E-08 | 0 | 0 | 2.34507E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.94E-05 | 5.95E-08 | 3.57E-08 | 5.95E-08 | 3.88E-08 | 1.09E-07 | 2.57E-06 | 9.03E-08 | 0 | 0 | 1.69228E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.67E-05 | 5.76E-08 | 3.45E-08 | 5.76E-08 | 3.75E-08 | 1.06E-07 | 2.48E-06 | 8.73E-08 | 0 | 0 | 1.64101E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.20E-05 | 5.45E-08 | 3.27E-08 | 5.45E-08 | 3.55E-08 | 1.00E-07 | 2.35E-06 | 8.27E-08 | 0 | 0 | 1.55202E-09 | 0 | 0.0016 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.35E-05 | 4.95E-08 | 2.97E-08 | 4.95E-08 | 3.23E-08 | 9.11E-08 | 2.14E-06 | 7.51E-08 | 0 | 0 | 1.39244E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 2.89E-08 | 8.13E-08 | 1.91E-06 | 6.70E-08 | 0 | 0 | 1.22062E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.52E-05 | 3.88E-08 | 2.33E-08 | 3.88E-08 | 2.54E-08 | 7.14E-08 | 1.67E-06 | 5.89E-08 | 0 | 0 | 1.04502E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.80E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.27E-08 | 6.35E-08 | 1.49E-06 | 5.24E-08 | 0 | 0 | 9.07915E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.14E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.83586E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.57E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 1.80E-08 | 5.02E-08 | 1.18E-06 | 4.14E-08 | 0 | 0 | 6.75564E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.06E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 5.78848E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.65E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.45E-08 | 4.00E-08 | 9.39E-07 | 3.30E-08 | 0 | 0 | 5.01464E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.52E-07 | 2.99E-08 | 0 | 0 | 4.39948E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.06E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.33E-08 | 7.80E-07 | 2.74E-08 | 0 | 0 | 3.90008E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.84E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.12E-08 | 3.07E-08 | 7.20E-07 | 2.53E-08 | 0 | 0 | 3.49055E-10 | 0 | 0.0003 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.66E-05 | 1.55E-08 | 9.33E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.69E-07 | 2.35E-08 | 0 | 0 | 3.15007E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.50E-05 | 1.45E-08 | 8.69E-09 | 1.45E-08 | 9.72E-09 | 2.66E-08 | 6.23E-07 | 2.19E-08 | 0 | 0 | 2.84809E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.37E-05 | 1.36E-08 | 8.14E-09 | 1.36E-08 | 9.13E-09 | 2.49E-08 | 5.84E-07 | 2.05E-08 | 0 | 0 | 2.59561E-10 | 0 | 0.0003 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 8.61E-09 | 2.34E-08 | 5.49E-07 | 1.93E-08 | 0 | 0 | 2.37866E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 8.14E-09 | 2.21E-08 | 5.19E-07 | 1.82E-08 | 0 | 0 | 2.18949E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.33E-08 | 4.40E-08 | 7.33E-08 | 4.75E-08 | 1.35E-07 | 3.16E-06 | 1.11E-07 | 0 | 0 | 2.18767E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 4.43E-08 | 1.25E-07 | 2.94E-06 | 1.04E-07 | 0 | 0 | 2.0273E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.12E-05 | 5.93E-08 | 3.56E-08 | 5.93E-08 | 3.85E-08 | 1.09E-07 | 2.56E-06 | 8.99E-08 | 0 | 0 | 1.72731E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.03E-05 | 5.29E-08 | 3.18E-08 | 5.29E-08 | 3.45E-08 | 9.73E-08 | 2.28E-06 | 8.03E-08 | 0 | 0 | 1.52071E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.79E-05 | 4.58E-08 | 2.75E-08 | 4.58E-08 | 2.99E-08 | 8.42E-08 | 1.98E-06 | 6.94E-08 | 0 | 0 | 1.28485E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.76E-05 | 3.99E-08 | 2.39E-08 | 3.99E-08 | 2.61E-08 | 7.33E-08 | 1.72E-06 | 6.04E-08 | 0 | 0 | 1.08979E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.86E-05 | 3.47E-08 | 2.08E-08 | 3.47E-08 | 2.28E-08 | 6.38E-08 | 1.50E-06 | 5.26E-08 | 0 | 0 | 9.20347E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.05E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 1.97E-08 | 5.51E-08 | 1.29E-06 | 4.54E-08 | 0 | 0 | 7.66347E-10 | 0 | 0.0008 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.39E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.81E-08 | 1.13E-06 | 3.96E-08 | 0 | 0 | 6.4216E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.89E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 1.53E-08 | 4.26E-08 | 9.99E-07 | 3.51E-08 | 0 | 0 | 5.46709E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.39E-08 | 3.83E-08 | 8.99E-07 | 3.16E-08 | 0 | 0 | 4.74422E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.20E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.26E-08 | 3.48E-08 | 8.17E-07 | 2.87E-08 | 0 | 0 | 4.16254E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.18E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.67749E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.73E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.89E-07 | 2.42E-08 | 0 | 0 | 3.28014E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.55E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 9.95E-09 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 0 | 0 | 2.93906E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.40E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 9.29E-09 | 2.53E-08 | 5.95E-07 | 2.09E-08 | 0 | 0 | 2.65402E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.74E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.42013E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.17E-05 | 1.22E-08 | 7.34E-09 | 1.22E-08 | 8.26E-09 | 2.24E-08 | 5.26E-07 | 1.85E-08 | 0 | 0 | 2.22256E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.08E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 7.84E-09 | 2.12E-08 | 4.98E-07 | 1.75E-08 | 0 | 0 | 2.05246E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.74E-08 | 5.24E-08 | 8.74E-08 | 5.66E-08 | 1.61E-07 | 3.77E-06 | 1.33E-07 | 0 | 0 | 2.66354E-09 | 0 | 0.0027 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.58E-08 | 5.15E-08 | 8.58E-08 | 5.55E-08 | 1.58E-07 | 3.70E-06 | 1.30E-07 | 0 | 0 | 2.62264E-09 | 0 | 0.0026 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.16E-08 | 4.90E-08 | 8.16E-08 | 5.29E-08 | 1.50E-07 | 3.52E-06 | 1.24E-07 | 0 | 0 | 2.49433E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.80E-08 | 4.68E-08 | 7.80E-08 | 5.05E-08 | 1.43E-07 | 3.37E-06 | 1.18E-07 | 0 | 0 | 2.38209E-09 | 0 | 0.0024 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 4.42E-08 | 1.25E-07 | 2.94E-06 | 1.03E-07 | 0 | 0 | 2.05479E-09 | 0 | 0.0021 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.78E-05 | 5.66E-08 | 3.40E-08 | 5.66E-08 | 3.68E-08 | 1.04E-07 | 2.44E-06 | 8.58E-08 | 0 | 0 | 1.66154E-09 | 0 | 0.0017 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.12E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 3.08E-08 | 8.69E-08 | 2.04E-06 | 7.17E-08 | 0 | 0 | 1.34843E-09 | 0 | 0.0013 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.84E-05 | 4.00E-08 | 2.40E-08 | 4.00E-08 | 2.62E-08 | 7.35E-08 | 1.73E-06 | 6.06E-08 | 0 | 0 | 1.10521E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.69E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.20E-08 | 6.15E-08 | 1.44E-06 | 5.07E-08 | 0 | 0 | 8.87655E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.81E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 1.87E-08 | 5.22E-08 | 1.23E-06 | 4.31E-08 | 0 | 0 | 7.20931E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.21E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 1.64E-08 | 4.57E-08 | 1.07E-06 | 3.77E-08 | 0 | 0 | 6.06845E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.71E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.46E-08 | 4.04E-08 | 9.48E-07 | 3.33E-08 | 0 | 0 | 5.13913E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.62E-08 | 8.49E-07 | 2.98E-08 | 0 | 0 | 4.41986E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.69E-07 | 2.70E-08 | 0 | 0 | 3.85307E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.79E-05 | 1.64E-08 | 9.81E-09 | 1.64E-08 | 1.09E-08 | 3.00E-08 | 7.04E-07 | 2.47E-08 | 0 | 0 | 3.39684E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.60E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.01E-08 | 2.77E-08 | 6.50E-07 | 2.28E-08 | 0 | 0 | 3.03266E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.43E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 9.42E-09 | 2.57E-08 | 6.03E-07 | 2.12E-08 | 0 | 0 | 2.71616E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.30E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 8.83E-09 | 2.41E-08 | 5.64E-07 | 1.98E-08 | 0 | 0 | 2.46563E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.19E-05 | 1.24E-08 | 7.42E-09 | 1.24E-08 | 8.34E-09 | 2.27E-08 | 5.32E-07 | 1.86E-08 | 0 | 0 | 2.25813E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.10E-05 | 1.17E-08 | 7.03E-09 | 1.17E-08 | 7.91E-09 | 2.15E-08 | 5.04E-07 | 1.77E-08 | 0 | 0 | 2.08731E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 7.54E-09 | 2.04E-08 | 4.79E-07 | 1.68E-08 | 0 | 0 | 1.94354E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.52E-04 | 9.32E-08 | 5.59E-08 | 9.32E-08 | 6.03E-08 | 1.71E-07 | 4.02E-06 | 1.41E-07 | 0 | 0 | 2.88594E-09 | 0 | 0.0029 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 9.01E-08 | 5.41E-08 | 9.01E-08 | 5.83E-08 | 1.66E-07 | 3.89E-06 | 1.37E-07 | 0 | 0 | 2.79298E-09 | 0 | 0.0028 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.92E-08 | 5.35E-08 | 8.92E-08 | 5.77E-08 | 1.64E-07 | 3.85E-06 | 1.35E-07 | 0 | 0 | 2.79366E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.22E-04 | 7.53E-08 | 4.52E-08 | 7.53E-08 | 4.87E-08 | 1.38E-07 | 3.25E-06 | 1.14E-07 | 0 | 0 | 2.31863E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.30E-05 | 5.89E-08 | 3.54E-08 | 5.89E-08 | 3.83E-08 | 1.08E-07 | 2.54E-06 | 8.94E-08 | 0 | 0 | 1.76016E-09 | 0 | 0.0018 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.22E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 3.08E-08 | 8.70E-08 | 2.04E-06 | 7.18E-08 | 0 | 0 | 1.36604E-09 | 0 | 0.0014 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.60E-05 | 3.83E-08 | 2.30E-08 | 3.83E-08 | 2.50E-08 | 7.04E-08 | 1.65E-06 | 5.81E-08 | 0 | 0 | 1.06064E-09 | 0 | 0.0011 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.40E-05 | 3.15E-08 | 1.89E-08 | 3.15E-08 | 2.07E-08 | 5.79E-08 | 1.36E-06 | 4.78E-08 | 0 | 0 | 8.33848E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.54E-05 | 2.66E-08 | 1.60E-08 | 2.66E-08 | 1.75E-08 | 4.88E-08 | 1.15E-06 | 4.03E-08 | 0 | 0 | 6.70032E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.92E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.22E-08 | 9.91E-07 | 3.48E-08 | 0 | 0 | 5.52928E-10 | 0 | 0.0006 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.47E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.35E-08 | 3.73E-08 | 8.75E-07 | 3.07E-08 | 0 | 0 | 4.6749E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.22E-08 | 3.35E-08 | 7.87E-07 | 2.76E-08 | 0 | 0 | 4.03491E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.66E-08 | 9.95E-09 | 1.66E-08 | 1.11E-08 | 3.04E-08 | 7.14E-07 | 2.51E-08 | 0 | 0 | 3.5183E-10 | 0 | 0.0004 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.64E-05 | 1.52E-08 | 9.14E-09 | 1.52E-08 | 1.02E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 | 0 | 0 | 3.11316E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.41E-08 | 8.49E-09 | 1.41E-08 | 9.49E-09 | 2.59E-08 | 6.09E-07 | 2.14E-08 | 0 | 0 | 2.79402E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.34E-05 | 1.32E-08 | 7.95E-09 | 1.32E-08 | 8.90E-09 | 2.43E-08 | 5.70E-07 | 2.00E-08 | 0 | 0 | 2.53938E-10 | 0 | 0.0003 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.23E-05 | 1.25E-08 | 7.49E-09 | 1.25E-08 | 8.40E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 0 | 2.33067E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.14E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 7.99E-09 | 2.17E-08 | 5.09E-07 | 1.79E-08 | 0 | 0 | 2.163E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.13E-08 | 6.78E-09 | 1.13E-08 | 7.63E-09 | 2.07E-08 | 4.86E-07 | 1.70E-08 | 0 | 0 | 2.02493E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.08E-08 | 6.49E-09 | 1.08E-08 | 7.31E-09 | 1.98E-08 | 4.65E-07 | 1.63E-08 | 0 | 0 | 1.90326E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.19E-04 | 1.28E-07 | 7.68E-08 | 1.28E-07 | 8.24E-08 | 2.35E-07 | 5.52E-06 | 1.94E-07 | 0 | 0 | 4.15285E-09 | 0 | 0.0042 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.87E-04 | 1.10E-07 | 6.61E-08 | 1.10E-07 | 7.10E-08 | 2.03E-07 | 4.75E-06 | 1.67E-07 | 0 | 0 | 3.54463E-09 | 0 | 0.0035 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.29E-08 | 4.97E-08 | 8.29E-08 | 5.36E-08 | 1.52E-07 | 3.58E-06 | 1.26E-07 | 0 | 0 | 2.60575E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.65E-05 | 6.03E-08 | 3.62E-08 | 6.03E-08 | 3.91E-08 | 1.11E-07 | 2.60E-06 | 9.15E-08 | 0 | 0 | 1.82771E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.82E-05 | 4.47E-08 | 2.68E-08 | 4.47E-08 | 2.91E-08 | 8.21E-08 | 1.93E-06 | 6.77E-08 | 0 | 0 | 1.29153E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.99E-05 | 3.44E-08 | 2.07E-08 | 3.44E-08 | 2.25E-08 | 6.33E-08 | 1.48E-06 | 5.22E-08 | 0 | 0 | 9.43985E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.86E-05 | 2.81E-08 | 1.68E-08 | 2.81E-08 | 1.84E-08 | 5.16E-08 | 1.21E-06 | 4.25E-08 | 0 | 0 | 7.30875E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.10E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.56E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.86829E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.57E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 1.37E-08 | 3.79E-08 | 8.89E-07 | 3.12E-08 | 0 | 0 | 4.87124E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.19E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.22E-08 | 3.37E-08 | 7.92E-07 | 2.78E-08 | 0 | 0 | 4.15338E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.91E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.11E-08 | 3.06E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.61996E-10 | 0 | 0.0004 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.70E-05 | 1.53E-08 | 9.20E-09 | 1.53E-08 | 1.02E-08 | 2.81E-08 | 6.60E-07 | 2.32E-08 | 0 | 0 | 3.21997E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.43E-08 | 8.56E-09 | 1.43E-08 | 9.55E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 | 0 | 0 | 2.91009E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.34E-08 | 8.04E-09 | 1.34E-08 | 8.99E-09 | 2.46E-08 | 5.77E-07 | 2.02E-08 | 0 | 0 | 2.66533E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.30E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.51E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.4648E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.21E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.10E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 0 | 0 | 2.29702E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 7.74E-09 | 2.11E-08 | 4.94E-07 | 1.73E-08 | 0 | 0 | 2.15115E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.07E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.42E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 2.03028E-10 | 0 | 0.0002 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.01E-05 | 1.05E-08 | 6.33E-09 | 1.05E-08 | 7.13E-09 | 1.93E-08 | 4.54E-07 | 1.59E-08 | 0 | 0 | 1.91674E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.22E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 1.18E-07 | 3.38E-07 | 7.94E-06 | 2.79E-07 | 0 | 0 | 6.10046E-09 | 0 | 0.0061 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.64E-04 | 2.06E-07 | 1.24E-07 | 2.06E-07 | 1.32E-07 | 3.79E-07 | 8.89E-06 | 3.13E-07 | 0 | 0 | 6.88427E-09 | 0 | 0.0069 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.26E-04 | 1.85E-07 | 1.11E-07 | 1.85E-07 | 1.19E-07 | 3.41E-07 | 8.00E-06 | 2.81E-07 | 0 | 0 | 6.1762E-09 | 0 | 0.0062 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.47E-04 | 1.42E-07 | 8.51E-08 | 1.42E-07 | 9.13E-08 | 2.61E-07 | 6.12E-06 | 2.15E-07 | 0 | 0 | 4.67122E-09 | 0 | 0.0047 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.89E-08 | 5.33E-08 | 8.89E-08 | 5.74E-08 | 1.63E-07 | 3.84E-06 | 1.35E-07 | 0 | 0 | 2.83468E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.98E-05 | 5.61E-08 | 3.36E-08 | 5.61E-08 | 3.64E-08 | 1.03E-07 | 2.42E-06 | 8.50E-08 | 0 | 0 | 1.69942E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.82E-05 | 3.87E-08 | 2.32E-08 | 3.87E-08 | 2.52E-08 | 7.11E-08 | 1.67E-06 | 5.86E-08 | 0 | 0 | 1.10158E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.20E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 1.94E-08 | 5.44E-08 | 1.28E-06 | 4.49E-08 | 0 | 0 | 7.94558E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.26E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.60E-08 | 4.47E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 6.17566E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.67E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.38E-08 | 3.84E-08 | 9.01E-07 | 3.17E-08 | 0 | 0 | 5.06124E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.28E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.23E-08 | 3.41E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 4.3213E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 1.12E-08 | 3.10E-08 | 7.28E-07 | 2.56E-08 | 0 | 0 | 3.79648E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.04E-08 | 2.86E-08 | 6.71E-07 | 2.35E-08 | 0 | 0 | 3.39795E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.63E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 9.70E-09 | 2.67E-08 | 6.25E-07 | 2.20E-08 | 0 | 0 | 3.09189E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.12E-09 | 2.50E-08 | 5.87E-07 | 2.06E-08 | 0 | 0 | 2.83376E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 8.63E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.62223E-10 | 0 | 0.0003 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 8.19E-09 | 2.24E-08 | 5.25E-07 | 1.84E-08 | 0 | 0 | 2.44084E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 7.81E-09 | 2.13E-08 | 5.00E-07 | 1.75E-08 | 0 | 0 | 2.28185E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.45E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 2.13605E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.06E-08 | 6.35E-09 | 1.06E-08 | 7.14E-09 | 1.94E-08 | 4.55E-07 | 1.60E-08 | 0 | 0 | 2.00939E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.00E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 6.85E-09 | 1.86E-08 | 4.36E-07 | 1.53E-08 | 0 | 0 | 1.89658E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.40E-04 | 3.56E-07 | 2.13E-07 | 3.56E-07 | 2.28E-07 | 6.55E-07 | 1.54E-05 | 5.41E-07 | 0 | 0 | 1.21217E-08 | 0 | 0.0121 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.84E-04 | 3.79E-07 | 2.27E-07 | 3.79E-07 | 2.43E-07 | 6.97E-07 | 1.64E-05 | 5.76E-07 | 0 | 0 | 1.29445E-08 | 0 | 0.0129 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.09E-04 | 3.38E-07 | 2.03E-07 | 3.38E-07 | 2.17E-07 | 6.23E-07 | 1.46E-05 | 5.14E-07 | 0 | 0 | 1.15373E-08 | 0 | 0.0115 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.20E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 1.16E-07 | 3.33E-07 | 7.82E-06 | 2.75E-07 | 0 | 0 | 6.05979E-09 | 0 | 0.0061 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.77E-08 | 4.66E-08 | 7.77E-08 | 5.02E-08 | 1.43E-07 | 3.35E-06 | 1.18E-07 | 0 | 0 | 2.46166E-09 | 0 | 0.0025 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.99E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.91E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.32254E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.69E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.10E-08 | 5.90E-08 | 1.39E-06 | 4.87E-08 | 0 | 0 | 8.8871E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.60E-05 | 2.59E-08 | 1.56E-08 | 2.59E-08 | 1.70E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.81313E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.95E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.46E-08 | 4.08E-08 | 9.58E-07 | 3.37E-08 | 0 | 0 | 5.58955E-10 | 0 | 0.0006 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.51E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.30E-08 | 3.61E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.75752E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.17E-08 | 3.25E-08 | 7.62E-07 | 2.67E-08 | 0 | 0 | 4.14085E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.61E-08 | 9.69E-09 | 1.61E-08 | 1.07E-08 | 2.96E-08 | 6.95E-07 | 2.44E-08 | 0 | 0 | 3.66965E-10 | 0 | 0.0004 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 9.91E-09 | 2.73E-08 | 6.41E-07 | 2.25E-08 | 0 | 0 | 3.28989E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.39E-08 | 8.31E-09 | 1.39E-08 | 9.24E-09 | 2.54E-08 | 5.96E-07 | 2.09E-08 | 0 | 0 | 2.98444E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.44E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.67E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.72795E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 8.18E-09 | 2.24E-08 | 5.26E-07 | 1.85E-08 | 0 | 0 | 2.51807E-10 | 0 | 0.0003 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.16E-08 | 6.94E-09 | 1.16E-08 | 7.76E-09 | 2.12E-08 | 4.98E-07 | 1.75E-08 | 0 | 0 | 2.34044E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.15E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.39E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 2.18642E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.08E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 7.06E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 0 | 0 | 2.0505E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 1.00E-08 | 6.01E-09 | 1.00E-08 | 6.75E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 0 | 0 | 1.92704E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.61E-06 | 9.60E-09 | 5.76E-09 | 9.60E-09 | 6.48E-09 | 1.76E-08 | 4.13E-07 | 1.45E-08 | 0 | 0 | 1.82018E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.34E-07 | 5.60E-07 | 9.34E-07 | 5.98E-07 | 1.72E-06 | 4.03E-05 | 1.42E-06 | 0 | 0 | 3.23028E-08 | 0 | 0.0323 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.24E-03 | 1.22E-06 | 7.34E-07 | 1.22E-06 | 7.83E-07 | 2.25E-06 | 5.28E-05 | 1.86E-06 | 0 | 0 | 4.24072E-08 | 0 | 0.0424 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.42E-06 | 8.53E-07 | 1.42E-06 | 9.10E-07 | 2.62E-06 | 6.14E-05 | 2.16E-06 | 0 | 0 | 4.93348E-08 | 0 | 0.0493 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.20E-07 | 7.19E-08 | 1.20E-07 | 7.71E-08 | 2.20E-07 | 5.17E-06 | 1.82E-07 | 0 | 0 | 3.93087E-09 | 0 | 0.0039 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.92E-05 | 5.53E-08 | 3.32E-08 | 5.53E-08 | 3.58E-08 | 1.02E-07 | 2.39E-06 | 8.39E-08 | 0 | 0 | 1.68946E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.75E-05 | 3.78E-08 | 2.27E-08 | 3.78E-08 | 2.46E-08 | 6.95E-08 | 1.63E-06 | 5.73E-08 | 0 | 0 | 1.08902E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.24E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 1.92E-08 | 5.40E-08 | 1.27E-06 | 4.46E-08 | 0 | 0 | 8.03389E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.36E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 1.60E-08 | 4.48E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 6.35589E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.77E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.38E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 5.23953E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.40E-08 | 7.97E-07 | 2.80E-08 | 0 | 0 | 4.4466E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.04E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 1.10E-08 | 3.05E-08 | 7.16E-07 | 2.51E-08 | 0 | 0 | 3.85891E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.80E-05 | 1.52E-08 | 9.09E-09 | 1.52E-08 | 1.01E-08 | 2.78E-08 | 6.53E-07 | 2.29E-08 | 0 | 0 | 3.40932E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.61E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 9.30E-09 | 2.56E-08 | 6.01E-07 | 2.11E-08 | 0 | 0 | 3.05292E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.46E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.66E-09 | 2.38E-08 | 5.59E-07 | 1.96E-08 | 0 | 0 | 2.76429E-10 | 0 | 0.0003 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 8.12E-09 | 2.23E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.52505E-10 | 0 | 0.0003 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.23E-05 | 1.14E-08 | 6.86E-09 | 1.14E-08 | 7.67E-09 | 2.10E-08 | 4.92E-07 | 1.73E-08 | 0 | 0 | 2.3315E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 7.28E-09 | 1.99E-08 | 4.67E-07 | 1.64E-08 | 0 | 0 | 2.17348E-10 | 0 | 0.0002 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.07E-05 | 1.03E-08 | 6.19E-09 | 1.03E-08 | 6.93E-09 | 1.89E-08 | 4.44E-07 | 1.56E-08 | 0 | 0 | 2.03005E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.85E-09 | 5.91E-09 | 9.85E-09 | 6.63E-09 | 1.81E-08 | 4.24E-07 | 1.49E-08 | 0 | 0 | 1.91174E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.53E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.35E-09 | 1.73E-08 | 4.06E-07 | 1.42E-08 | 0 | 0 | 1.80372E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.01E-06 | 9.04E-09 | 5.43E-09 | 9.04E-09 | 6.10E-09 | 1.66E-08 | 3.89E-07 | 1.36E-08 | 0 | 0 | 1.70671E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.79E-04 | 1.59E-07 | 9.54E-08 | 1.59E-07 | 1.02E-07 | 2.93E-07 | 6.87E-06 | 2.42E-07 | 0 | 0 | 5.28204E-09 | 0 | 0.0053 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.28E-07 | 7.69E-08 | 1.28E-07 | 8.25E-08 | 2.36E-07 | 5.54E-06 | 1.95E-07 | 0 | 0 | 4.21408E-09 | 0 | 0.0042 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.22E-08 | 4.33E-08 | 7.22E-08 | 4.67E-08 | 1.33E-07 | 3.12E-06 | 1.10E-07 | 0 | 0 | 2.2703E-09 | 0 | 0.0023 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.65E-05 | 4.84E-08 | 2.90E-08 | 4.84E-08 | 3.14E-08 | 8.90E-08 | 2.09E-06 | 7.34E-08 | 0 | 0 | 1.44764E-09 | 0 | 0.0014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.54E-05 | 3.68E-08 | 2.21E-08 | 3.68E-08 | 2.40E-08 | 6.75E-08 | 1.59E-06 | 5.57E-08 | 0 | 0 | 1.04956E-09 | 0 | 0.0010 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.21E-05 | 2.93E-08 | 1.76E-08 | 2.93E-08 | 1.92E-08 | 5.38E-08 | 1.26E-06 | 4.43E-08 | 0 | 0 | 7.96245E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.34E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.60E-08 | 4.47E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 6.32087E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.75E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.38E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 5.21334E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.33E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 4.40739E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.01E-05 | 1.66E-08 | 9.93E-09 | 1.66E-08 | 1.10E-08 | 3.04E-08 | 7.13E-07 | 2.50E-08 | 0 | 0 | 3.81183E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.77E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.00E-08 | 2.76E-08 | 6.48E-07 | 2.28E-08 | 0 | 0 | 3.35152E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 9.21E-09 | 2.54E-08 | 5.95E-07 | 2.09E-08 | 0 | 0 | 2.98645E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.42E-05 | 1.28E-08 | 7.70E-09 | 1.28E-08 | 8.57E-09 | 2.35E-08 | 5.52E-07 | 1.94E-08 | 0 | 0 | 2.696E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.20E-08 | 7.19E-09 | 1.20E-08 | 8.01E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 | 0 | 0 | 2.45645E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.19E-05 | 1.13E-08 | 6.75E-09 | 1.13E-08 | 7.54E-09 | 2.06E-08 | 4.84E-07 | 1.70E-08 | 0 | 0 | 2.25587E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 7.12E-09 | 1.95E-08 | 4.56E-07 | 1.60E-08 | 0 | 0 | 2.08234E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.03E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 6.79E-09 | 1.85E-08 | 4.35E-07 | 1.53E-08 | 0 | 0 | 1.95409E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.70E-06 | 9.63E-09 | 5.78E-09 | 9.63E-09 | 6.48E-09 | 1.77E-08 | 4.14E-07 | 1.45E-08 | 0 | 0 | 1.83661E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.20E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 6.23E-09 | 1.69E-08 | 3.97E-07 | 1.39E-08 | 0 | 0 | 1.7411E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.74E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 5.99E-09 | 1.63E-08 | 3.82E-07 | 1.34E-08 | 0 | 0 | 1.65553E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.27E-06 | 8.51E-09 | 5.10E-09 | 8.51E-09 | 5.75E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 0 | 0 | 1.56597E-10 | 0 | 0.0002 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.82E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.43E-08 | 3.97E-08 | 9.32E-07 | 3.28E-08 | 0 | 0 | 5.34075E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.70E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 9.87E-09 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 0 | 0 | 3.22649E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.53E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 9.16E-09 | 2.52E-08 | 5.91E-07 | 2.08E-08 | 0 | 0 | 2.90589E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 8.53E-09 | 2.34E-08 | 5.49E-07 | 1.93E-08 | 0 | 0 | 2.62482E-10 | 0 | 0.0003 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.26E-05 | 1.19E-08 | 7.16E-09 | 1.19E-08 | 7.99E-09 | 2.19E-08 | 5.13E-07 | 1.80E-08 | 0 | 0 | 2.39197E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 7.48E-09 | 2.04E-08 | 4.80E-07 | 1.68E-08 | 0 | 0 | 2.17305E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 7.05E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 0 | 0 | 1.99872E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.77E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 6.67E-09 | 1.82E-08 | 4.26E-07 | 1.50E-08 | 0 | 0 | 1.84915E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.13E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.36E-09 | 1.73E-08 | 4.06E-07 | 1.42E-08 | 0 | 0 | 1.72834E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.58E-06 | 9.00E-09 | 5.40E-09 | 9.00E-09 | 6.07E-09 | 1.65E-08 | 3.87E-07 | 1.36E-08 | 0 | 0 | 1.62501E-10 | 0 | 0.0002 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.17E-06 | 8.65E-09 | 5.19E-09 | 8.65E-09 | 5.84E-09 | 1.59E-08 | 3.72E-07 | 1.31E-08 | 0 | 0 | 1.54729E-10 | 0 | 0.0002 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.79E-06 | 8.33E-09 | 5.00E-09 | 8.33E-09 | 5.63E-09 | 1.53E-08 | 3.58E-07 | 1.26E-08 | 0 | 0 | 1.47497E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.39E-06 | 7.99E-09 | 4.79E-09 | 7.99E-09 | 5.41E-09 | 1.46E-08 | 3.44E-07 | 1.20E-08 | 0 | 0 | 1.39823E-10 | 0 | 0.0001 | Res |

# B-2 Cancer Risk Calculations – 2015 OEHHA Guidance

# HRA Permanente Creek Restoration Project

Construction Year 2024

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust | PM10 Dust for speciation | Arsenic | Beryllium | Cadmium | Cobalt | Copper | Lead | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) | (tons/year) |
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Copper | Lead | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) |
| Concrete Channel 2024 | 2024_CONCRTE | 2.877E-07 | 8.36E-14 | 5.02E-14 | 8.36E-14 | 4.28E-13 | 9.37E-13 | 8.36E-14 | 1.34E-14 | 1.54E-12 | 1.67E-13 | 6.69E-15 | 2.48E-10 |
| Paved road | 2024_PAVED | 5.948E-06 | 3.00E-09 | 1.80E-09 | 3.00E-09 | 1.92E-09 | 6.01E-08 | 5.53E-09 | 3.36E-10 | 1.30E-07 | 6.01E-09 | 4.56E-09 | 1.71E-05 |
| Unpaved road | 2024_CCP_UNPV | 1.802E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 4.72E-09 | 1.47E-07 | 1.36E-08 | 8.26E-10 | 3.18E-07 | 1.47E-08 | 1.12E-08 | 4.19E-05 |
| Channel Widening 2024 | 2024_CHAN_RCK | 5.566E-05 | 5.889E-09 | 3.533E-09 | 5.889E-09 | 3.015E-08 | 6.595E-08 | 5.889E-09 | 9.422E-10 | 1.084E-07 | 1.178E-08 | 4.711E-10 | 1.749E-05 |
| Paved road | 2024_PAVED | 5.173E-05 | 8.597E-08 | 5.158E-08 | 8.597E-08 | 5.502E-08 | 1.719E-06 | 1.582E-07 | 9.629E-09 | 3.714E-06 | 1.719E-07 | 1.307E-07 | 4.883E-04 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2024 | 0.25 | 0.75 | 0 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.011 | 0.095 | 0.000 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 1.16E-05 | 1.05E-04 | 0.00E+00 | 0.00E+00 |
| | Arsenic | 1.26E-04 | 1.14E-03 | 0.00E+00 | 0.00E+00 |
| | Beryllium | 8.83E-05 | 8.00E-04 | 0.00E+00 | 0.00E+00 |
| | Cadmium | 1.58E-04 | 1.43E-03 | 0.00E+00 | 0.00E+00 |
| | Cobalt | 2.84E-04 | 2.57E-03 | 0.00E+00 | 0.00E+00 |
| | Lead | 4.20E-07 | 3.81E-06 | 0.00E+00 | 0.00E+00 |
| | Nickel | 9.56E-06 | 8.66E-05 | 0.00E+00 | 0.00E+00 |
| | Chromium VI | 5.36E-03 | 4.85E-02 | 0.00E+00 | 0.00E+00 |

| | Max | |
|---|---|---|
| CT House | 0.055851524 | per million |
| Res | 0.779666769 | per million |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 6.80E-05 | 1.05E-07 | 6.28E-08 | 1.05E-07 | 6.75E-08 | 1.92E-07 | 4.51E-06 | 1.59E-07 | 7.85631E-10 | 7.11638E-09 | 0 | 0 | 0.0079 | CT House | 0.0559 |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 4.73E-05 | 7.23E-08 | 4.34E-08 | 7.23E-08 | 4.74E-08 | 1.33E-07 | 3.12E-06 | 1.09E-07 | 5.47066E-10 | 4.95542E-09 | 0 | 0 | 0.0055 | Res | 0.0383 |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 4.22E-06 | 3.82E-09 | 2.29E-09 | 3.82E-09 | 3.36E-09 | 6.86E-09 | 1.60E-07 | 5.51E-09 | 4.8765E-11 | 4.41721E-10 | 0 | 0 | 0.0005 | Acute | 0.0034 |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 5.66E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 5.58E-09 | 1.44E-08 | 3.38E-07 | 1.18E-08 | 6.53906E-11 | 5.92319E-10 | 0 | 0 | 0.0007 | Acute | 0.0044 |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 2.14E-04 | 3.30E-07 | 1.98E-07 | 3.30E-07 | 2.12E-07 | 6.07E-07 | 1.43E-05 | 5.01E-07 | 2.47759E-09 | 2.24425E-08 | 0 | 0 | 0.0249 | Res | 0.1771 |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 4.33E-04 | 6.68E-07 | 4.01E-07 | 6.68E-07 | 4.28E-07 | 1.23E-06 | 2.88E-05 | 1.01E-06 | 5.00589E-09 | 4.53442E-08 | 0 | 0 | 0.0504 | Res | 0.3581 |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.97E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 1.95E-07 | 5.58E-07 | 1.31E-05 | 4.61E-07 | 2.27999E-09 | 2.06525E-08 | 0 | 0 | 0.0229 | Res | 0.1631 |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 5.24E-04 | 8.07E-07 | 4.84E-07 | 8.07E-07 | 5.17E-07 | 1.49E-06 | 3.49E-05 | 1.23E-06 | 6.05239E-09 | 5.48236E-08 | 0 | 0 | 0.0609 | Res | 0.4333 |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 3.68E-05 | 5.44E-08 | 3.27E-08 | 5.44E-08 | 3.63E-08 | 9.99E-08 | 2.34E-06 | 8.23E-08 | 4.25349E-10 | 3.85289E-09 | 0 | 0 | 0.0043 | Res | 0.0296 |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 1.05E-04 | 1.62E-07 | 9.74E-08 | 1.62E-07 | 1.05E-07 | 2.99E-07 | 7.01E-06 | 2.47E-07 | 1.21711E-09 | 1.10248E-08 | 0 | 0 | 0.0122 | Res | 0.0864 |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 2.49E-05 | 3.77E-08 | 2.26E-08 | 3.77E-08 | 2.46E-08 | 6.93E-08 | 1.63E-06 | 5.72E-08 | 2.87629E-10 | 2.60539E-09 | 0 | 0 | 0.0029 | Acute | 0.0203 |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.32E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.26E-08 | 3.20E-08 | 7.50E-07 | 2.62E-08 | 1.53105E-10 | 1.38685E-09 | 0 | 0 | 0.0015 | Res | 0.0104 |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.24E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.17E-08 | 2.98E-08 | 6.98E-07 | 2.44E-08 | 1.43125E-10 | 1.29645E-09 | 0 | 0 | 0.0014 | Res | 0.0097 |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 1.09E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 1.34068E-10 | 1.21441E-09 | 0 | 0 | 0.0013 | Res | 0.0091 |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.09E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 1.02E-08 | 2.58E-08 | 6.05E-07 | 2.11E-08 | 1.25812E-10 | 1.13963E-09 | 0 | 0 | 0.0013 | Res | 0.0085 |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.03E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 9.59E-09 | 2.42E-08 | 5.68E-07 | 1.98E-08 | 1.18724E-10 | 1.07542E-09 | 0 | 0 | 0.0012 | Res | 0.0081 |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 9.65E-06 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 8.97E-09 | 2.26E-08 | 5.30E-07 | 1.85E-08 | 1.1154E-10 | 1.01035E-09 | 0 | 0 | 0.0011 | Res | 0.0076 |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 9.01E-06 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 8.34E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 | 1.04164E-10 | 9.43533E-10 | 0 | 0 | 0.0010 | Res | 0.0071 |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 1.37E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.28E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 1.58592E-10 | 1.43655E-09 | 0 | 0 | 0.0016 | Res | 0.0107 |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 1.34E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.27E-08 | 3.22E-08 | 7.55E-07 | 2.64E-08 | 1.55086E-10 | 1.4048E-09 | 0 | 0 | 0.0016 | Res | 0.0105 |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.26E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.11E-07 | 2.48E-08 | 1.46018E-10 | 1.32265E-09 | 0 | 0 | 0.0015 | Res | 0.0099 |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.18E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.11E-08 | 2.82E-08 | 6.61E-07 | 2.31E-08 | 1.36781E-10 | 1.23899E-09 | 0 | 0 | 0.0014 | Res | 0.0093 |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.10E-05 | 1.43E-08 | 8.59E-09 | 1.43E-08 | 1.03E-08 | 2.61E-08 | 6.12E-07 | 2.14E-08 | 1.27469E-10 | 1.15463E-09 | 0 | 0 | 0.0013 | Res | 0.0087 |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.03E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 9.61E-09 | 2.43E-08 | 5.69E-07 | 1.99E-08 | 1.19325E-10 | 1.08087E-09 | 0 | 0 | 0.0012 | Res | 0.0081 |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 9.66E-06 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 8.96E-09 | 2.26E-08 | 5.29E-07 | 1.85E-08 | 1.11707E-10 | 1.01186E-09 | 0 | 0 | 0.0011 | Res | 0.0076 |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 9.11E-06 | 1.16E-08 | 6.96E-09 | 1.16E-08 | 8.42E-09 | 2.12E-08 | 4.96E-07 | 1.73E-08 | 1.05291E-10 | 9.53747E-10 | 0 | 0 | 0.0011 | Res | 0.0072 |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 8.58E-06 | 1.09E-08 | 6.52E-09 | 1.09E-08 | 7.91E-09 | 1.98E-08 | 4.64E-07 | 1.62E-08 | 9.91796E-11 | 8.98386E-10 | 0 | 0 | 0.0010 | Res | 0.0068 |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 1.24E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.12E-08 | 2.73E-08 | 6.39E-07 | 2.23E-08 | 1.43765E-10 | 1.30225E-09 | 0 | 0 | 0.0014 | Res | 0.0098 |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 1.32E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.23E-08 | 3.10E-08 | 7.25E-07 | 2.53E-08 | 1.52342E-10 | 1.37994E-09 | 0 | 0 | 0.0015 | Res | 0.0103 |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.28E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.21E-08 | 3.07E-08 | 7.20E-07 | 2.52E-08 | 1.48116E-10 | 1.34166E-09 | 0 | 0 | 0.0015 | Res | 0.0100 |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.20E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.13E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 | 1.38968E-10 | 1.25879E-09 | 0 | 0 | 0.0014 | Res | 0.0095 |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.13E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 1.05E-08 | 2.67E-08 | 6.26E-07 | 2.19E-08 | 1.30072E-10 | 1.17821E-09 | 0 | 0 | 0.0013 | Res | 0.0089 |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.06E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 9.83E-09 | 2.49E-08 | 5.84E-07 | 2.04E-08 | 1.22122E-10 | 1.1062E-09 | 0 | 0 | 0.0012 | Res | 0.0083 |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 9.84E-06 | 1.26E-08 | 7.58E-09 | 1.26E-08 | 9.13E-09 | 2.31E-08 | 5.40E-07 | 1.89E-08 | 1.13783E-10 | 1.03067E-09 | 0 | 0 | 0.0011 | Res | 0.0078 |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 9.22E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 8.52E-09 | 2.15E-08 | 5.03E-07 | 1.76E-08 | 1.06587E-10 | 9.65487E-10 | 0 | 0 | 0.0011 | Res | 0.0073 |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 8.66E-06 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 7.97E-09 | 2.00E-08 | 4.69E-07 | 1.64E-08 | 1.00051E-10 | 9.06278E-10 | 0 | 0 | 0.0010 | Res | 0.0069 |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 7.45E-09 | 1.86E-08 | 4.37E-07 | 1.53E-08 | 9.37953E-11 | 8.49614E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 7.63E-06 | 9.55E-09 | 5.73E-09 | 9.55E-09 | 6.99E-09 | 1.74E-08 | 4.08E-07 | 1.42E-08 | 8.8211E-11 | 7.9903E-10 | 0 | 0 | 0.0009 | Res | 0.0060 |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 7.11E-06 | 8.83E-09 | 5.30E-09 | 8.83E-09 | 6.49E-09 | 1.61E-08 | 3.77E-07 | 1.32E-08 | 8.22265E-11 | 7.44822E-10 | 0 | 0 | 0.0008 | Res | 0.0056 |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 1.33E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 1.22E-08 | 3.02E-08 | 7.07E-07 | 2.47E-08 | 1.53798E-10 | 1.39313E-09 | 0 | 0 | 0.0015 | Res | 0.0105 |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 1.29E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 1.19E-08 | 2.97E-08 | 6.96E-07 | 2.43E-08 | 1.4861E-10 | 1.34614E-09 | 0 | 0 | 0.0015 | Res | 0.0101 |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 1.29E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 1.21E-08 | 3.08E-08 | 7.22E-07 | 2.52E-08 | 1.48686E-10 | 1.34682E-09 | 0 | 0 | 0.0015 | Res | 0.0101 |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 1.22E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 1.14E-08 | 2.92E-08 | 6.84E-07 | 2.39E-08 | 1.40941E-10 | 1.27667E-09 | 0 | 0 | 0.0014 | Res | 0.0096 |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.15E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.07E-08 | 2.73E-08 | 6.40E-07 | 2.24E-08 | 1.32559E-10 | 1.20074E-09 | 0 | 0 | 0.0013 | Res | 0.0091 |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.08E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 1.00E-08 | 2.55E-08 | 5.98E-07 | 2.09E-08 | 1.24363E-10 | 1.1265E-09 | 0 | 0 | 0.0013 | Res | 0.0085 |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.01E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.36E-09 | 2.38E-08 | 5.57E-07 | 1.95E-08 | 1.16518E-10 | 1.05544E-09 | 0 | 0 | 0.0012 | Res | 0.0080 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 9.43E-06 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 8.73E-09 | 2.21E-08 | 5.18E-07 | 1.81E-08 | 1.08989E-10 | 9.87241E-10 | 0 | 0 | 0.0011 | Res | 0.0075 |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 8.76E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 8.08E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 1.0126E-10 | 9.1723E-10 | 0 | 0 | 0.0010 | Res | 0.0069 |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 7.45E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 9.37101E-11 | 8.48842E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 7.44E-06 | 9.29E-09 | 5.58E-09 | 9.29E-09 | 6.80E-09 | 1.69E-08 | 3.97E-07 | 1.38E-08 | 8.59667E-11 | 7.78701E-10 | 0 | 0 | 0.0009 | Res | 0.0059 |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 1.30E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 1.18E-08 | 2.91E-08 | 6.80E-07 | 2.37E-08 | 1.49738E-10 | 1.35636E-09 | 0 | 0 | 0.0015 | Res | 0.0102 |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 1.29E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 1.20E-08 | 3.00E-08 | 7.03E-07 | 2.46E-08 | 1.49301E-10 | 1.3524E-09 | 0 | 0 | 0.0015 | Res | 0.0102 |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 1.27E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.19E-08 | 3.02E-08 | 7.08E-07 | 2.47E-08 | 1.46564E-10 | 1.32761E-09 | 0 | 0 | 0.0015 | Res | 0.0100 |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 1.22E-05 | 1.61E-08 | 9.63E-09 | 1.61E-08 | 1.15E-08 | 2.93E-08 | 6.87E-07 | 2.40E-08 | 1.4122E-10 | 1.27919E-09 | 0 | 0 | 0.0014 | Res | 0.0096 |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 1.08E-08 | 2.77E-08 | 6.50E-07 | 2.27E-08 | 1.33826E-10 | 1.21222E-09 | 0 | 0 | 0.0013 | Res | 0.0092 |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.09E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.01E-08 | 2.59E-08 | 6.06E-07 | 2.12E-08 | 1.25469E-10 | 1.13652E-09 | 0 | 0 | 0.0013 | Res | 0.0086 |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.01E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 9.41E-09 | 2.40E-08 | 5.61E-07 | 1.96E-08 | 1.16965E-10 | 1.05949E-09 | 0 | 0 | 0.0012 | Res | 0.0080 |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 9.30E-06 | 1.19E-08 | 7.17E-09 | 1.19E-08 | 8.61E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 1.07482E-10 | 9.73587E-10 | 0 | 0 | 0.0011 | Res | 0.0074 |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 8.56E-06 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 7.90E-09 | 1.99E-08 | 4.66E-07 | 1.63E-08 | 9.89974E-11 | 8.96736E-10 | 0 | 0 | 0.0010 | Res | 0.0068 |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.57E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.48E-08 | 3.85E-08 | 9.03E-07 | 3.16E-08 | 1.81315E-10 | 1.64238E-09 | 0 | 0 | 0.0018 | Res | 0.0125 |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.67E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.53E-08 | 3.85E-08 | 9.03E-07 | 3.15E-08 | 1.92503E-10 | 1.74372E-09 | 0 | 0 | 0.0019 | Res | 0.0132 |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.48E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.34E-08 | 3.33E-08 | 7.81E-07 | 2.72E-08 | 1.70663E-10 | 1.5459E-09 | 0 | 0 | 0.0017 | Res | 0.0117 |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.41E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.29E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 1.63009E-10 | 1.47656E-09 | 0 | 0 | 0.0016 | Res | 0.0111 |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.37E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.26E-08 | 3.18E-08 | 7.46E-07 | 2.61E-08 | 1.58049E-10 | 1.43164E-09 | 0 | 0 | 0.0016 | Res | 0.0108 |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 1.31E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.23E-08 | 3.11E-08 | 7.28E-07 | 2.54E-08 | 1.51843E-10 | 1.37542E-09 | 0 | 0 | 0.0015 | Res | 0.0104 |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 1.25E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.17E-08 | 2.98E-08 | 6.98E-07 | 2.44E-08 | 1.4442E-10 | 1.30818E-09 | 0 | 0 | 0.0015 | Res | 0.0099 |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.24E-05 | 1.64E-08 | 9.87E-09 | 1.64E-08 | 1.17E-08 | 3.00E-08 | 7.04E-07 | 2.46E-08 | 1.43474E-10 | 1.29962E-09 | 0 | 0 | 0.0014 | Res | 0.0098 |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 1.16E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.09E-08 | 2.79E-08 | 6.54E-07 | 2.29E-08 | 1.33972E-10 | 1.21354E-09 | 0 | 0 | 0.0013 | Res | 0.0092 |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 1.07E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 9.99E-09 | 2.56E-08 | 6.00E-07 | 2.10E-08 | 1.23782E-10 | 1.12124E-09 | 0 | 0 | 0.0012 | Res | 0.0085 |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 9.85E-06 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 9.16E-09 | 2.33E-08 | 5.47E-07 | 1.91E-08 | 1.13892E-10 | 1.03166E-09 | 0 | 0 | 0.0011 | Res | 0.0078 |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 9.04E-06 | 1.16E-08 | 6.98E-09 | 1.16E-08 | 8.37E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 | 1.04536E-10 | 9.46905E-10 | 0 | 0 | 0.0011 | Res | 0.0072 |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 8.29E-06 | 1.06E-08 | 6.33E-09 | 1.06E-08 | 7.64E-09 | 1.93E-08 | 4.51E-07 | 1.58E-08 | 9.58529E-11 | 8.68252E-10 | 0 | 0 | 0.0010 | Res | 0.0066 |
| 581962_4129978.02 | 581962 | 4129978.02 | 1.72E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 1.58E-08 | 4.00E-08 | 9.37E-07 | 3.28E-08 | 1.98449E-10 | 1.79758E-09 | 0 | 0 | 0.0020 | Res | 0.0136 |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 1.64E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.50E-08 | 3.74E-08 | 8.77E-07 | 3.06E-08 | 1.89439E-10 | 1.71597E-09 | 0 | 0 | 0.0019 | Res | 0.0130 |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 1.67E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.54E-08 | 3.90E-08 | 9.14E-07 | 3.19E-08 | 1.92816E-10 | 1.74656E-09 | 0 | 0 | 0.0019 | Res | 0.0132 |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 1.64E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 1.54E-08 | 3.94E-08 | 9.22E-07 | 3.23E-08 | 1.89776E-10 | 1.71902E-09 | 0 | 0 | 0.0019 | Res | 0.0130 |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 1.62E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 1.54E-08 | 4.00E-08 | 9.38E-07 | 3.28E-08 | 1.87579E-10 | 1.69913E-09 | 0 | 0 | 0.0019 | Res | 0.0128 |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 1.47E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.40E-08 | 3.60E-08 | 8.44E-07 | 2.95E-08 | 1.70403E-10 | 1.54354E-09 | 0 | 0 | 0.0017 | Res | 0.0117 |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 1.44E-05 | 1.94E-08 | 1.16E-08 | 1.94E-08 | 1.36E-08 | 3.55E-08 | 8.32E-07 | 2.91E-08 | 1.66049E-10 | 1.5041E-09 | 0 | 0 | 0.0017 | Res | 0.0114 |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 1.35E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.28E-08 | 3.32E-08 | 7.79E-07 | 2.73E-08 | 1.5612E-10 | 1.41416E-09 | 0 | 0 | 0.0016 | Res | 0.0107 |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 1.25E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.18E-08 | 3.06E-08 | 7.16E-07 | 2.51E-08 | 1.44494E-10 | 1.30885E-09 | 0 | 0 | 0.0015 | Res | 0.0100 |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 1.15E-05 | 1.52E-08 | 9.15E-09 | 1.52E-08 | 1.08E-08 | 2.79E-08 | 6.53E-07 | 2.28E-08 | 1.32769E-10 | 1.20265E-09 | 0 | 0 | 0.0013 | Res | 0.0092 |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 1.05E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 9.82E-09 | 2.53E-08 | 5.92E-07 | 2.07E-08 | 1.21479E-10 | 1.10038E-09 | 0 | 0 | 0.0012 | Res | 0.0084 |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 9.61E-06 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 8.94E-09 | 2.29E-08 | 5.36E-07 | 1.87E-08 | 1.11041E-10 | 1.00583E-09 | 0 | 0 | 0.0011 | Res | 0.0076 |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 8.79E-06 | 1.13E-08 | 6.81E-09 | 1.13E-08 | 8.15E-09 | 2.07E-08 | 4.85E-07 | 1.70E-08 | 1.01664E-10 | 9.20894E-10 | 0 | 0 | 0.0010 | Res | 0.0070 |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 8.05E-06 | 1.03E-08 | 6.16E-09 | 1.03E-08 | 7.42E-09 | 1.87E-08 | 4.39E-07 | 1.53E-08 | 9.30334E-11 | 8.42712E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 7.32E-06 | 9.21E-09 | 5.53E-09 | 9.21E-09 | 6.71E-09 | 1.68E-08 | 3.93E-07 | 1.37E-08 | 8.45787E-11 | 7.66128E-10 | 0 | 0 | 0.0009 | Res | 0.0058 |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 6.53E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.94E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 7.54586E-11 | 6.83517E-10 | 0 | 0 | 0.0008 | Res | 0.0052 |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.37E-05 | 3.27E-08 | 1.96E-08 | 3.27E-08 | 2.28E-08 | 5.98E-08 | 1.40E-06 | 4.91E-08 | 2.73995E-10 | 2.48189E-09 | 0 | 0 | 0.0028 | Res | 0.0188 |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.23E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.14E-08 | 5.62E-08 | 1.32E-06 | 4.61E-08 | 2.57424E-10 | 2.33179E-09 | 0 | 0 | 0.0026 | Res | 0.0177 |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.92E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 1.80E-08 | 4.68E-08 | 1.10E-06 | 3.84E-08 | 2.21535E-10 | 2.0067E-09 | 0 | 0 | 0.0022 | Res | 0.0153 |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 1.72E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.61E-08 | 4.14E-08 | 9.70E-07 | 3.39E-08 | 1.9885E-10 | 1.80122E-09 | 0 | 0 | 0.0020 | Res | 0.0137 |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 1.67E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.58E-08 | 4.11E-08 | 9.63E-07 | 3.37E-08 | 1.93521E-10 | 1.75295E-09 | 0 | 0 | 0.0019 | Res | 0.0133 |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 1.63E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.55E-08 | 4.07E-08 | 9.53E-07 | 3.34E-08 | 1.87997E-10 | 1.70291E-09 | 0 | 0 | 0.0019 | Res | 0.0129 |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 1.58E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.51E-08 | 3.98E-08 | 9.32E-07 | 3.26E-08 | 1.82247E-10 | 1.65082E-09 | 0 | 0 | 0.0018 | Res | 0.0125 |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 1.46E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.39E-08 | 3.66E-08 | 8.59E-07 | 3.01E-08 | 1.68982E-10 | 1.53066E-09 | 0 | 0 | 0.0017 | Res | 0.0117 |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 1.36E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.29E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 | 1.5664E-10 | 1.41887E-09 | 0 | 0 | 0.0016 | Res | 0.0108 |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 1.25E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.18E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 1.43918E-10 | 1.30363E-09 | 0 | 0 | 0.0014 | Res | 0.0099 |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 1.13E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.07E-08 | 2.78E-08 | 6.52E-07 | 2.28E-08 | 1.31127E-10 | 1.18777E-09 | 0 | 0 | 0.0013 | Res | 0.0091 |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 1.03E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 9.66E-09 | 2.50E-08 | 5.85E-07 | 2.05E-08 | 1.19042E-10 | 1.0783E-09 | 0 | 0 | 0.0012 | Res | 0.0082 |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 9.36E-06 | 1.23E-08 | 7.38E-09 | 1.23E-08 | 8.74E-09 | 2.25E-08 | 5.26E-07 | 1.84E-08 | 1.08245E-10 | 9.80504E-10 | 0 | 0 | 0.0011 | Res | 0.0075 |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 8.50E-06 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 7.89E-09 | 2.01E-08 | 4.72E-07 | 1.65E-08 | 9.82424E-11 | 8.89896E-10 | 0 | 0 | 0.0010 | Res | 0.0068 |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 7.74E-06 | 9.92E-09 | 5.95E-09 | 9.92E-09 | 7.15E-09 | 1.81E-08 | 4.24E-07 | 1.48E-08 | 8.95131E-11 | 8.10825E-10 | 0 | 0 | 0.0009 | Res | 0.0062 |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 7.08E-06 | 8.96E-09 | 5.38E-09 | 8.96E-09 | 6.50E-09 | 1.63E-08 | 3.83E-07 | 1.34E-08 | 8.18414E-11 | 7.41333E-10 | 0 | 0 | 0.0008 | Res | 0.0056 |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 6.47E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.91E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 7.48342E-11 | 6.77861E-10 | 0 | 0 | 0.0008 | Res | 0.0051 |
| 581962_4130145.84 | 581962 | 4130145.84 | 2.52E-05 | 3.64E-08 | 2.18E-08 | 3.64E-08 | 2.48E-08 | 6.67E-08 | 1.56E-06 | 5.49E-08 | 2.9122E-10 | 2.63792E-09 | 0 | 0 | 0.0029 | Res | 0.0200 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.33E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.28E-08 | 6.14E-08 | 1.44E-06 | 5.05E-08 | 2.69324E-10 | 2.43958E-09 | 0 | 0 | 0.0027 | Res | 0.0185 |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.00E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 1.93E-08 | 5.15E-08 | 1.21E-06 | 4.23E-08 | 2.31123E-10 | 2.09355E-09 | 0 | 0 | 0.0023 | Res | 0.0159 |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 1.85E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 1.79E-08 | 4.77E-08 | 1.12E-06 | 3.92E-08 | 2.14207E-10 | 1.94033E-09 | 0 | 0 | 0.0022 | Res | 0.0148 |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.77E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 1.71E-08 | 4.58E-08 | 1.07E-06 | 3.76E-08 | 2.05146E-10 | 1.85824E-09 | 0 | 0 | 0.0021 | Res | 0.0142 |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 1.62E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.56E-08 | 4.15E-08 | 9.73E-07 | 3.41E-08 | 1.87282E-10 | 1.69643E-09 | 0 | 0 | 0.0019 | Res | 0.0130 |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 1.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.41E-08 | 3.75E-08 | 8.78E-07 | 3.08E-08 | 1.70374E-10 | 1.54327E-09 | 0 | 0 | 0.0017 | Res | 0.0118 |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 1.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.28E-08 | 3.39E-08 | 7.96E-07 | 2.79E-08 | 1.55584E-10 | 1.40931E-09 | 0 | 0 | 0.0016 | Res | 0.0108 |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 1.23E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.16E-08 | 3.07E-08 | 7.19E-07 | 2.52E-08 | 1.41723E-10 | 1.28375E-09 | 0 | 0 | 0.0014 | Res | 0.0098 |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 1.11E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.05E-08 | 2.75E-08 | 6.44E-07 | 2.25E-08 | 1.2824E-10 | 1.16162E-09 | 0 | 0 | 0.0013 | Res | 0.0089 |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 9.97E-06 | 1.33E-08 | 8.01E-09 | 1.33E-08 | 9.38E-09 | 2.44E-08 | 5.72E-07 | 2.00E-08 | 1.15268E-10 | 1.04412E-09 | 0 | 0 | 0.0012 | Res | 0.0080 |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 8.96E-06 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.38E-09 | 2.16E-08 | 5.07E-07 | 1.77E-08 | 1.03515E-10 | 9.37654E-10 | 0 | 0 | 0.0010 | Res | 0.0072 |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 8.08E-06 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 7.51E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 9.33443E-11 | 8.45528E-10 | 0 | 0 | 0.0009 | Res | 0.0064 |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 7.33E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.78E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 8.46838E-11 | 7.6708E-10 | 0 | 0 | 0.0009 | Res | 0.0058 |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 6.70E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 6.16E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 7.74356E-11 | 7.01425E-10 | 0 | 0 | 0.0008 | Res | 0.0053 |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 6.17E-06 | 7.75E-09 | 4.65E-09 | 7.75E-09 | 5.64E-09 | 1.41E-08 | 3.31E-07 | 1.16E-08 | 7.12874E-11 | 6.45733E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 5.49E-06 | 6.77E-09 | 4.06E-09 | 6.77E-09 | 4.99E-09 | 1.23E-08 | 2.89E-07 | 1.01E-08 | 6.35131E-11 | 5.75313E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.54E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 2.49E-08 | 6.72E-08 | 1.58E-06 | 5.53E-08 | 2.93726E-10 | 2.66062E-09 | 0 | 0 | 0.0030 | Res | 0.0203 |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 2.42E-05 | 3.50E-08 | 2.10E-08 | 3.50E-08 | 2.37E-08 | 6.42E-08 | 1.51E-06 | 5.28E-08 | 2.79217E-10 | 2.5292E-09 | 0 | 0 | 0.0028 | Res | 0.0193 |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 2.24E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 2.18E-08 | 5.92E-08 | 1.39E-06 | 4.87E-08 | 2.58677E-10 | 2.34314E-09 | 0 | 0 | 0.0026 | Res | 0.0179 |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 2.02E-05 | 2.89E-08 | 1.73E-08 | 2.89E-08 | 1.96E-08 | 5.29E-08 | 1.24E-06 | 4.36E-08 | 2.33065E-10 | 2.11114E-09 | 0 | 0 | 0.0023 | Res | 0.0162 |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 1.80E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 1.75E-08 | 4.70E-08 | 1.10E-06 | 3.86E-08 | 2.08453E-10 | 1.88821E-09 | 0 | 0 | 0.0021 | Res | 0.0145 |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 1.62E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.56E-08 | 4.18E-08 | 9.80E-07 | 3.44E-08 | 1.87049E-10 | 1.69432E-09 | 0 | 0 | 0.0019 | Res | 0.0130 |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 1.46E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 1.40E-08 | 3.74E-08 | 8.78E-07 | 3.08E-08 | 1.68863E-10 | 1.52959E-09 | 0 | 0 | 0.0017 | Res | 0.0117 |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 1.32E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.26E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 1.52874E-10 | 1.38475E-09 | 0 | 0 | 0.0015 | Res | 0.0106 |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 1.19E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.13E-08 | 2.99E-08 | 7.00E-07 | 2.45E-08 | 1.37186E-10 | 1.24266E-09 | 0 | 0 | 0.0014 | Res | 0.0095 |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 1.06E-05 | 1.43E-08 | 8.61E-09 | 1.43E-08 | 9.99E-09 | 2.62E-08 | 6.15E-07 | 2.15E-08 | 1.2203E-10 | 1.10537E-09 | 0 | 0 | 0.0012 | Res | 0.0085 |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 9.40E-06 | 1.26E-08 | 7.57E-09 | 1.26E-08 | 8.85E-09 | 2.31E-08 | 5.41E-07 | 1.89E-08 | 1.08642E-10 | 9.84098E-10 | 0 | 0 | 0.0011 | Res | 0.0075 |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 8.41E-06 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.87E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 9.72114E-11 | 8.80558E-10 | 0 | 0 | 0.0010 | Res | 0.0067 |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 7.58E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 7.05E-09 | 1.81E-08 | 4.24E-07 | 1.48E-08 | 8.75946E-11 | 7.93447E-10 | 0 | 0 | 0.0009 | Res | 0.0061 |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 6.91E-06 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.40E-09 | 1.63E-08 | 3.82E-07 | 1.33E-08 | 7.98519E-11 | 7.23313E-10 | 0 | 0 | 0.0008 | Res | 0.0055 |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 6.33E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 5.83E-09 | 1.48E-08 | 3.46E-07 | 1.21E-08 | 7.31784E-11 | 6.62862E-10 | 0 | 0 | 0.0007 | Res | 0.0051 |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 5.86E-06 | 7.40E-09 | 4.44E-09 | 7.40E-09 | 5.37E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 | 6.76814E-11 | 6.1307E-10 | 0 | 0 | 0.0007 | Res | 0.0047 |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 5.45E-06 | 6.83E-09 | 4.10E-09 | 6.83E-09 | 4.98E-09 | 1.24E-08 | 2.92E-07 | 1.02E-08 | 6.30432E-11 | 5.71056E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 2.57E-05 | 3.74E-08 | 2.25E-08 | 3.74E-08 | 2.52E-08 | 6.87E-08 | 1.61E-06 | 5.65E-08 | 2.96981E-10 | 2.69011E-09 | 0 | 0 | 0.0030 | Res | 0.0206 |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.37E-05 | 3.44E-08 | 2.06E-08 | 3.44E-08 | 2.31E-08 | 6.30E-08 | 1.48E-06 | 5.19E-08 | 2.74009E-10 | 2.48202E-09 | 0 | 0 | 0.0028 | Res | 0.0191 |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.08E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 2.02E-08 | 5.49E-08 | 1.29E-06 | 4.52E-08 | 2.40791E-10 | 2.18112E-09 | 0 | 0 | 0.0024 | Res | 0.0168 |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 1.83E-05 | 2.61E-08 | 1.57E-08 | 2.61E-08 | 1.77E-08 | 4.78E-08 | 1.12E-06 | 3.93E-08 | 2.11536E-10 | 1.91613E-09 | 0 | 0 | 0.0021 | Res | 0.0147 |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 1.62E-05 | 2.29E-08 | 1.38E-08 | 2.29E-08 | 1.56E-08 | 4.20E-08 | 9.86E-07 | 3.46E-08 | 1.8755E-10 | 1.69886E-09 | 0 | 0 | 0.0019 | Res | 0.0131 |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 1.45E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.39E-08 | 3.72E-08 | 8.71E-07 | 3.05E-08 | 1.67277E-10 | 1.51523E-09 | 0 | 0 | 0.0017 | Res | 0.0116 |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 1.28E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.22E-08 | 3.25E-08 | 7.62E-07 | 2.67E-08 | 1.47934E-10 | 1.34001E-09 | 0 | 0 | 0.0015 | Res | 0.0103 |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 1.12E-05 | 1.54E-08 | 9.25E-09 | 1.54E-08 | 1.07E-08 | 2.82E-08 | 6.61E-07 | 2.32E-08 | 1.29958E-10 | 1.17718E-09 | 0 | 0 | 0.0013 | Res | 0.0090 |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 9.90E-06 | 1.34E-08 | 8.05E-09 | 1.34E-08 | 9.35E-09 | 2.45E-08 | 5.75E-07 | 2.01E-08 | 1.14489E-10 | 1.03706E-09 | 0 | 0 | 0.0012 | Res | 0.0079 |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 8.80E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 8.27E-09 | 2.15E-08 | 5.04E-07 | 1.77E-08 | 1.01752E-10 | 9.21689E-10 | 0 | 0 | 0.0010 | Res | 0.0071 |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 7.89E-06 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.37E-09 | 1.90E-08 | 4.46E-07 | 1.56E-08 | 9.11766E-11 | 8.25893E-10 | 0 | 0 | 0.0009 | Res | 0.0063 |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 7.15E-06 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 6.65E-09 | 1.70E-08 | 3.99E-07 | 1.40E-08 | 8.26262E-11 | 7.48443E-10 | 0 | 0 | 0.0008 | Res | 0.0057 |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 6.53E-06 | 8.43E-09 | 5.06E-09 | 8.43E-09 | 6.04E-09 | 1.54E-08 | 3.61E-07 | 1.26E-08 | 7.54522E-11 | 6.83459E-10 | 0 | 0 | 0.0008 | Res | 0.0052 |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 6.00E-06 | 7.67E-09 | 4.60E-09 | 7.67E-09 | 5.53E-09 | 1.40E-08 | 3.28E-07 | 1.15E-08 | 6.93463E-11 | 6.28151E-10 | 0 | 0 | 0.0007 | Res | 0.0048 |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 5.53E-06 | 7.00E-09 | 4.20E-09 | 7.00E-09 | 5.08E-09 | 1.28E-08 | 2.99E-07 | 1.04E-08 | 6.39359E-11 | 5.79143E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 5.12E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 4.68E-09 | 1.17E-08 | 2.74E-07 | 9.57E-09 | 5.92003E-11 | 5.36247E-10 | 0 | 0 | 0.0006 | Res | 0.0041 |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 3.49E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 3.44E-08 | 9.45E-08 | 2.22E-06 | 7.78E-08 | 4.02979E-10 | 3.65025E-09 | 0 | 0 | 0.0041 | Res | 0.0280 |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 3.37E-05 | 4.99E-08 | 2.99E-08 | 4.99E-08 | 3.32E-08 | 9.16E-08 | 2.15E-06 | 7.54E-08 | 3.89462E-10 | 3.52782E-09 | 0 | 0 | 0.0039 | Res | 0.0271 |
| 581962_4130397.57 | 581962 | 4130397.57 | 3.17E-05 | 4.68E-08 | 2.81E-08 | 4.68E-08 | 3.12E-08 | 8.59E-08 | 2.02E-06 | 7.08E-08 | 3.66734E-10 | 3.32194E-09 | 0 | 0 | 0.0037 | Res | 0.0256 |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 2.85E-05 | 4.17E-08 | 2.50E-08 | 4.17E-08 | 2.78E-08 | 7.65E-08 | 1.79E-06 | 6.30E-08 | 3.28894E-10 | 2.97918E-09 | 0 | 0 | 0.0033 | Res | 0.0230 |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 2.50E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.43E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 2.88826E-10 | 2.61624E-09 | 0 | 0 | 0.0029 | Res | 0.0202 |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 2.15E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 2.08E-08 | 5.68E-08 | 1.33E-06 | 4.67E-08 | 2.48444E-10 | 2.25045E-09 | 0 | 0 | 0.0025 | Res | 0.0174 |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 1.87E-05 | 2.68E-08 | 1.61E-08 | 2.68E-08 | 1.81E-08 | 4.91E-08 | 1.15E-06 | 4.04E-08 | 2.16732E-10 | 1.9632E-09 | 0 | 0 | 0.0022 | Res | 0.0151 |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 1.63E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.56E-08 | 4.21E-08 | 9.88E-07 | 3.46E-08 | 1.88041E-10 | 1.70331E-09 | 0 | 0 | 0.0019 | Res | 0.0131 |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 1.41E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.35E-08 | 3.61E-08 | 8.46E-07 | 2.97E-08 | 1.63042E-10 | 1.47686E-09 | 0 | 0 | 0.0016 | Res | 0.0114 |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 1.22E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.16E-08 | 3.07E-08 | 7.20E-07 | 2.52E-08 | 1.40658E-10 | 1.2741E-09 | 0 | 0 | 0.0014 | Res | 0.0098 |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 1.06E-05 | 1.44E-08 | 8.66E-09 | 1.44E-08 | 1.00E-08 | 2.64E-08 | 6.19E-07 | 2.17E-08 | 1.2262E-10 | 1.11071E-09 | 0 | 0 | 0.0012 | Res | 0.0085 |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 9.36E-06 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 8.81E-09 | 2.30E-08 | 5.39E-07 | 1.89E-08 | 1.08209E-10 | 9.80179E-10 | 0 | 0 | 0.0011 | Res | 0.0075 |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 8.34E-06 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.81E-09 | 2.02E-08 | 4.74E-07 | 1.66E-08 | 9.64297E-11 | 8.73477E-10 | 0 | 0 | 0.0010 | Res | 0.0067 |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 7.50E-06 | 9.84E-09 | 5.91E-09 | 9.84E-09 | 6.99E-09 | 1.80E-08 | 4.21E-07 | 1.47E-08 | 8.66957E-11 | 7.85305E-10 | 0 | 0 | 0.0009 | Res | 0.0060 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 6.80E-06 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 6.31E-09 | 1.61E-08 | 3.78E-07 | 1.32E-08 | 7.85757E-11 | 7.11752E-10 | 0 | 0 | 0.0008 | Res | 0.0054 |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 6.17E-06 | 7.92E-09 | 4.75E-09 | 7.92E-09 | 5.70E-09 | 1.45E-08 | 3.39E-07 | 1.18E-08 | 7.13426E-11 | 6.46234E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 5.65E-06 | 7.17E-09 | 4.30E-09 | 7.17E-09 | 5.19E-09 | 1.31E-08 | 3.06E-07 | 1.07E-08 | 6.52697E-11 | 5.91224E-10 | 0 | 0 | 0.0007 | Res | 0.0045 |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 5.19E-06 | 6.53E-09 | 3.92E-09 | 6.53E-09 | 4.76E-09 | 1.19E-08 | 2.79E-07 | 9.73E-09 | 6.00352E-11 | 5.4381E-10 | 0 | 0 | 0.0006 | Res | 0.0041 |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 4.80E-06 | 5.97E-09 | 3.58E-09 | 5.97E-09 | 4.38E-09 | 1.09E-08 | 2.55E-07 | 8.89E-09 | 5.54431E-11 | 5.02214E-10 | 0 | 0 | 0.0006 | Res | 0.0038 |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 4.39E-05 | 6.62E-08 | 3.97E-08 | 6.62E-08 | 4.35E-08 | 1.22E-07 | 2.85E-06 | 1.00E-07 | 5.07259E-10 | 4.59484E-09 | 0 | 0 | 0.0051 | Res | 0.0356 |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 4.06E-05 | 6.08E-08 | 3.65E-08 | 6.08E-08 | 4.01E-08 | 1.12E-07 | 2.62E-06 | 9.21E-08 | 4.69506E-10 | 4.25287E-09 | 0 | 0 | 0.0047 | Res | 0.0330 |
| 581962_4130481.48 | 581962 | 4130481.48 | 3.48E-05 | 5.17E-08 | 3.10E-08 | 5.17E-08 | 3.42E-08 | 9.49E-08 | 2.23E-06 | 7.82E-08 | 4.01924E-10 | 3.6407E-09 | 0 | 0 | 0.0040 | Res | 0.0282 |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 3.07E-05 | 4.52E-08 | 2.71E-08 | 4.52E-08 | 3.00E-08 | 8.30E-08 | 1.95E-06 | 6.84E-08 | 3.54375E-10 | 3.20999E-09 | 0 | 0 | 0.0036 | Res | 0.0249 |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 2.60E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.54E-08 | 6.98E-08 | 1.64E-06 | 5.75E-08 | 3.00934E-10 | 2.72591E-09 | 0 | 0 | 0.0030 | Res | 0.0211 |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 2.22E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.15E-08 | 5.89E-08 | 1.38E-06 | 4.85E-08 | 2.5669E-10 | 2.32514E-09 | 0 | 0 | 0.0026 | Res | 0.0180 |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.89E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 1.82E-08 | 4.95E-08 | 1.16E-06 | 4.08E-08 | 2.18273E-10 | 1.97715E-09 | 0 | 0 | 0.0022 | Res | 0.0153 |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 1.59E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.52E-08 | 4.10E-08 | 9.62E-07 | 3.37E-08 | 1.83375E-10 | 1.66104E-09 | 0 | 0 | 0.0018 | Res | 0.0128 |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 1.34E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.28E-08 | 3.42E-08 | 8.02E-07 | 2.81E-08 | 1.55075E-10 | 1.4047E-09 | 0 | 0 | 0.0016 | Res | 0.0108 |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 1.15E-05 | 1.58E-08 | 9.48E-09 | 1.58E-08 | 1.09E-08 | 2.89E-08 | 6.78E-07 | 2.37E-08 | 1.33186E-10 | 1.20642E-09 | 0 | 0 | 0.0013 | Res | 0.0093 |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 1.01E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.50E-09 | 2.49E-08 | 5.84E-07 | 2.05E-08 | 1.16444E-10 | 1.05477E-09 | 0 | 0 | 0.0012 | Res | 0.0081 |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 8.90E-06 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 8.35E-09 | 2.17E-08 | 5.09E-07 | 1.78E-08 | 1.02912E-10 | 9.32196E-10 | 0 | 0 | 0.0010 | Res | 0.0071 |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 7.92E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 7.39E-09 | 1.91E-08 | 4.47E-07 | 1.56E-08 | 9.15271E-11 | 8.29068E-10 | 0 | 0 | 0.0009 | Res | 0.0063 |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 7.11E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 6.60E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 8.21312E-11 | 7.43958E-10 | 0 | 0 | 0.0008 | Res | 0.0057 |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 6.40E-06 | 8.22E-09 | 4.93E-09 | 8.22E-09 | 5.92E-09 | 1.50E-08 | 3.52E-07 | 1.23E-08 | 7.4006E-11 | 6.70359E-10 | 0 | 0 | 0.0007 | Res | 0.0051 |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 5.81E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 5.35E-09 | 1.34E-08 | 3.15E-07 | 1.10E-08 | 6.71642E-11 | 6.08384E-10 | 0 | 0 | 0.0007 | Res | 0.0046 |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 5.32E-06 | 6.68E-09 | 4.01E-09 | 6.68E-09 | 4.88E-09 | 1.22E-08 | 2.85E-07 | 9.95E-09 | 6.15117E-11 | 5.57184E-10 | 0 | 0 | 0.0006 | Res | 0.0042 |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 4.90E-06 | 6.09E-09 | 3.65E-09 | 6.09E-09 | 4.48E-09 | 1.11E-08 | 2.60E-07 | 9.07E-09 | 5.66903E-11 | 5.1351E-10 | 0 | 0 | 0.0006 | Res | 0.0039 |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 4.54E-06 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 4.13E-09 | 1.02E-08 | 2.38E-07 | 8.31E-09 | 5.25091E-11 | 4.75636E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 5.30E-05 | 8.13E-08 | 4.88E-08 | 8.13E-08 | 5.31E-08 | 1.49E-07 | 3.51E-06 | 1.23E-07 | 6.12184E-10 | 5.54527E-09 | 0 | 0 | 0.0062 | Res | 0.0429 |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 5.19E-05 | 7.93E-08 | 4.76E-08 | 7.93E-08 | 5.18E-08 | 1.46E-07 | 3.42E-06 | 1.20E-07 | 6.00295E-10 | 5.43757E-09 | 0 | 0 | 0.0060 | Res | 0.0422 |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 4.93E-05 | 7.49E-08 | 4.49E-08 | 7.49E-08 | 4.89E-08 | 1.38E-07 | 3.23E-06 | 1.13E-07 | 5.69768E-10 | 5.16106E-09 | 0 | 0 | 0.0057 | Res | 0.0401 |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 4.70E-05 | 7.10E-08 | 4.26E-08 | 7.10E-08 | 4.64E-08 | 1.30E-07 | 3.06E-06 | 1.08E-07 | 5.42758E-10 | 4.9164E-09 | 0 | 0 | 0.0055 | Res | 0.0383 |
| 581962_4130565.39 | 581962 | 4130565.39 | 4.06E-05 | 6.10E-08 | 3.66E-08 | 6.10E-08 | 4.00E-08 | 1.12E-07 | 2.63E-06 | 9.24E-08 | 4.69281E-10 | 4.25082E-09 | 0 | 0 | 0.0047 | Res | 0.0331 |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.30E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 3.24E-08 | 9.03E-08 | 2.12E-06 | 7.45E-08 | 3.81754E-10 | 3.45799E-09 | 0 | 0 | 0.0038 | Res | 0.0269 |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 2.70E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 2.64E-08 | 7.31E-08 | 1.71E-06 | 6.02E-08 | 3.11981E-10 | 2.82597E-09 | 0 | 0 | 0.0031 | Res | 0.0220 |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 2.23E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 2.17E-08 | 5.97E-08 | 1.40E-06 | 4.91E-08 | 2.57689E-10 | 2.33419E-09 | 0 | 0 | 0.0026 | Res | 0.0181 |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 1.81E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.75E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 2.09184E-10 | 1.89482E-09 | 0 | 0 | 0.0021 | Res | 0.0147 |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 1.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.43E-08 | 3.86E-08 | 9.05E-07 | 3.17E-08 | 1.71888E-10 | 1.55699E-09 | 0 | 0 | 0.0017 | Res | 0.0120 |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 1.26E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.21E-08 | 3.23E-08 | 7.57E-07 | 2.65E-08 | 1.46152E-10 | 1.32387E-09 | 0 | 0 | 0.0015 | Res | 0.0102 |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 1.08E-05 | 1.49E-08 | 8.91E-09 | 1.49E-08 | 1.03E-08 | 2.72E-08 | 6.37E-07 | 2.23E-08 | 1.25129E-10 | 1.13344E-09 | 0 | 0 | 0.0013 | Res | 0.0087 |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 9.41E-06 | 1.27E-08 | 7.62E-09 | 1.27E-08 | 8.88E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 1.08736E-10 | 9.84946E-10 | 0 | 0 | 0.0011 | Res | 0.0075 |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 8.28E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.77E-09 | 2.01E-08 | 4.71E-07 | 1.65E-08 | 9.57169E-11 | 8.6702E-10 | 0 | 0 | 0.0010 | Res | 0.0066 |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 7.36E-06 | 9.64E-09 | 5.78E-09 | 9.64E-09 | 6.87E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 | 8.51316E-11 | 7.71137E-10 | 0 | 0 | 0.0009 | Res | 0.0059 |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 6.63E-06 | 8.55E-09 | 5.13E-09 | 8.55E-09 | 6.15E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 7.66192E-11 | 6.9403E-10 | 0 | 0 | 0.0008 | Res | 0.0053 |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 5.98E-06 | 7.60E-09 | 4.56E-09 | 7.60E-09 | 5.51E-09 | 1.39E-08 | 3.25E-07 | 1.13E-08 | 6.91294E-11 | 6.26186E-10 | 0 | 0 | 0.0007 | Res | 0.0048 |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 5.46E-06 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 5.01E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 6.31427E-11 | 5.71957E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 5.03E-06 | 6.23E-09 | 3.74E-09 | 6.23E-09 | 4.59E-09 | 1.14E-08 | 2.66E-07 | 9.28E-09 | 5.81201E-11 | 5.26462E-10 | 0 | 0 | 0.0006 | Res | 0.0040 |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 4.67E-06 | 5.72E-09 | 3.43E-09 | 5.72E-09 | 4.24E-09 | 1.04E-08 | 2.44E-07 | 8.52E-09 | 5.39354E-11 | 4.88556E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 4.36E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 3.95E-09 | 9.64E-09 | 2.26E-07 | 7.87E-09 | 5.03578E-11 | 4.56149E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 5.67E-05 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 5.65E-08 | 1.59E-07 | 3.74E-06 | 1.32E-07 | 6.55301E-10 | 5.93583E-09 | 0 | 0 | 0.0066 | Res | 0.0462 |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 5.48E-05 | 8.36E-08 | 5.02E-08 | 8.36E-08 | 5.44E-08 | 1.54E-07 | 3.61E-06 | 1.27E-07 | 6.32936E-10 | 5.73324E-09 | 0 | 0 | 0.0064 | Res | 0.0447 |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 5.45E-05 | 8.29E-08 | 4.98E-08 | 8.29E-08 | 5.39E-08 | 1.52E-07 | 3.58E-06 | 1.26E-07 | 6.29618E-10 | 5.70319E-09 | 0 | 0 | 0.0063 | Res | 0.0446 |
| 581962_4130649.3 | 581962 | 4130649.3 | 4.53E-05 | 6.86E-08 | 4.12E-08 | 6.86E-08 | 4.47E-08 | 1.26E-07 | 2.96E-06 | 1.04E-07 | 5.23807E-10 | 4.74474E-09 | 0 | 0 | 0.0053 | Res | 0.0371 |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 3.46E-05 | 5.20E-08 | 3.12E-08 | 5.20E-08 | 3.41E-08 | 9.56E-08 | 2.24E-06 | 7.89E-08 | 4.0016E-10 | 3.62472E-09 | 0 | 0 | 0.0040 | Res | 0.0283 |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 2.71E-05 | 4.03E-08 | 2.42E-08 | 4.03E-08 | 2.65E-08 | 7.40E-08 | 1.74E-06 | 6.10E-08 | 3.12833E-10 | 2.8337E-09 | 0 | 0 | 0.0031 | Res | 0.0221 |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 2.12E-05 | 3.12E-08 | 1.87E-08 | 3.12E-08 | 2.07E-08 | 5.73E-08 | 1.34E-06 | 4.72E-08 | 2.45179E-10 | 2.22087E-09 | 0 | 0 | 0.0025 | Res | 0.0172 |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 1.69E-05 | 2.45E-08 | 1.47E-08 | 2.45E-08 | 1.64E-08 | 4.49E-08 | 1.05E-06 | 3.70E-08 | 1.94901E-10 | 1.76545E-09 | 0 | 0 | 0.0020 | Res | 0.0137 |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 1.37E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.33E-08 | 3.59E-08 | 8.42E-07 | 2.95E-08 | 1.58565E-10 | 1.43631E-09 | 0 | 0 | 0.0016 | Res | 0.0111 |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 1.15E-05 | 1.61E-08 | 9.65E-09 | 1.61E-08 | 1.10E-08 | 2.95E-08 | 6.91E-07 | 2.42E-08 | 1.32486E-10 | 1.20008E-09 | 0 | 0 | 0.0013 | Res | 0.0092 |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 9.81E-06 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 9.36E-09 | 2.48E-08 | 5.81E-07 | 2.03E-08 | 1.13412E-10 | 1.0273E-09 | 0 | 0 | 0.0011 | Res | 0.0079 |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 8.57E-06 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.12E-09 | 2.12E-08 | 4.98E-07 | 1.74E-08 | 9.90679E-11 | 8.97374E-10 | 0 | 0 | 0.0010 | Res | 0.0069 |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 7.56E-06 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.11E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 8.73772E-11 | 7.91478E-10 | 0 | 0 | 0.0009 | Res | 0.0060 |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 6.76E-06 | 8.85E-09 | 5.31E-09 | 8.85E-09 | 6.31E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 7.81499E-11 | 7.07895E-10 | 0 | 0 | 0.0008 | Res | 0.0054 |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 6.13E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 5.69E-09 | 1.44E-08 | 3.37E-07 | 1.18E-08 | 7.08108E-11 | 6.41416E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 5.61E-06 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 5.18E-09 | 1.30E-08 | 3.04E-07 | 1.06E-08 | 6.48884E-11 | 5.8777E-10 | 0 | 0 | 0.0007 | Res | 0.0045 |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 5.19E-06 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 4.76E-09 | 1.18E-08 | 2.77E-07 | 9.68E-09 | 5.99633E-11 | 5.43157E-10 | 0 | 0 | 0.0006 | Res | 0.0041 |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 4.84E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 4.42E-09 | 1.09E-08 | 2.56E-07 | 8.92E-09 | 5.59409E-11 | 5.06722E-10 | 0 | 0 | 0.0006 | Res | 0.0038 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 4.55E-06 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 4.14E-09 | 1.02E-08 | 2.38E-07 | 8.30E-09 | 5.25911E-11 | 4.7638E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 4.29E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 3.89E-09 | 9.49E-09 | 2.22E-07 | 7.75E-09 | 4.9579E-11 | 4.49095E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 8.03E-05 | 1.23E-07 | 7.39E-08 | 1.23E-07 | 7.96E-08 | 2.27E-07 | 5.32E-06 | 1.87E-07 | 9.28429E-10 | 8.40987E-09 | 0 | 0 | 0.0093 | Res | 0.0660 |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 6.86E-05 | 1.05E-07 | 6.30E-08 | 1.05E-07 | 6.79E-08 | 1.93E-07 | 4.53E-06 | 1.59E-07 | 7.92803E-10 | 7.18135E-09 | 0 | 0 | 0.0080 | Res | 0.0564 |
| 581962_4130733.21 | 581962 | 4130733.21 | 5.06E-05 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 5.00E-08 | 1.42E-07 | 3.33E-06 | 1.17E-07 | 5.84871E-10 | 5.29786E-09 | 0 | 0 | 0.0059 | Res | 0.0415 |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 3.57E-05 | 5.41E-08 | 3.24E-08 | 5.41E-08 | 3.52E-08 | 9.94E-08 | 2.33E-06 | 8.20E-08 | 4.12759E-10 | 3.73884E-09 | 0 | 0 | 0.0042 | Res | 0.0292 |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 2.54E-05 | 3.82E-08 | 2.29E-08 | 3.82E-08 | 2.51E-08 | 7.01E-08 | 1.65E-06 | 5.78E-08 | 2.94127E-10 | 2.66425E-09 | 0 | 0 | 0.0030 | Res | 0.0208 |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.88E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 1.84E-08 | 5.11E-08 | 1.20E-06 | 4.21E-08 | 2.17194E-10 | 1.96738E-09 | 0 | 0 | 0.0022 | Res | 0.0153 |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 1.47E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.44E-08 | 3.94E-08 | 9.25E-07 | 3.25E-08 | 1.69989E-10 | 1.53979E-09 | 0 | 0 | 0.0017 | Res | 0.0119 |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 1.19E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.16E-08 | 3.15E-08 | 7.39E-07 | 2.59E-08 | 1.38066E-10 | 1.25063E-09 | 0 | 0 | 0.0014 | Res | 0.0096 |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 1.00E-05 | 1.42E-08 | 8.52E-09 | 1.42E-08 | 9.69E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 1.15972E-10 | 1.05049E-09 | 0 | 0 | 0.0012 | Res | 0.0081 |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 8.66E-06 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 8.30E-09 | 2.20E-08 | 5.17E-07 | 1.81E-08 | 1.00056E-10 | 9.06323E-10 | 0 | 0 | 0.0010 | Res | 0.0069 |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 7.63E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 7.27E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 8.82174E-11 | 7.99088E-10 | 0 | 0 | 0.0009 | Res | 0.0061 |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 6.86E-06 | 9.23E-09 | 5.54E-09 | 9.23E-09 | 6.49E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 7.93152E-11 | 7.18451E-10 | 0 | 0 | 0.0008 | Res | 0.0055 |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 6.26E-06 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 5.89E-09 | 1.51E-08 | 3.55E-07 | 1.24E-08 | 7.23864E-11 | 6.55688E-10 | 0 | 0 | 0.0007 | Res | 0.0050 |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 5.79E-06 | 7.55E-09 | 4.53E-09 | 7.55E-09 | 5.40E-09 | 1.38E-08 | 3.23E-07 | 1.13E-08 | 6.68793E-11 | 6.05804E-10 | 0 | 0 | 0.0007 | Res | 0.0046 |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 5.39E-06 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 5.01E-09 | 1.27E-08 | 2.97E-07 | 1.04E-08 | 6.2343E-11 | 5.64714E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 5.06E-06 | 6.43E-09 | 3.86E-09 | 6.43E-09 | 4.67E-09 | 1.17E-08 | 2.75E-07 | 9.60E-09 | 5.8504E-11 | 5.2994E-10 | 0 | 0 | 0.0006 | Res | 0.0040 |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 4.77E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 4.38E-09 | 1.09E-08 | 2.56E-07 | 8.94E-09 | 5.51364E-11 | 4.99435E-10 | 0 | 0 | 0.0006 | Res | 0.0038 |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 4.53E-06 | 5.63E-09 | 3.38E-09 | 5.63E-09 | 4.14E-09 | 1.03E-08 | 2.40E-07 | 8.39E-09 | 5.2327E-11 | 4.73987E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 4.30E-06 | 5.29E-09 | 3.17E-09 | 5.29E-09 | 3.91E-09 | 9.64E-09 | 2.26E-07 | 7.87E-09 | 4.96477E-11 | 4.49718E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 1.18E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 1.17E-07 | 3.34E-07 | 7.83E-06 | 2.76E-07 | 1.36141E-09 | 1.23319E-08 | 0 | 0 | 0.0137 | Res | 0.0969 |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 1.32E-04 | 2.04E-07 | 1.22E-07 | 2.04E-07 | 1.31E-07 | 3.75E-07 | 8.80E-06 | 3.10E-07 | 1.53114E-09 | 1.38693E-08 | 0 | 0 | 0.0154 | Res | 0.1092 |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 1.19E-04 | 1.83E-07 | 1.10E-07 | 1.83E-07 | 1.18E-07 | 3.36E-07 | 7.89E-06 | 2.77E-07 | 1.37331E-09 | 1.24397E-08 | 0 | 0 | 0.0138 | Res | 0.0979 |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 9.00E-05 | 1.38E-07 | 8.28E-08 | 1.38E-07 | 8.90E-08 | 2.54E-07 | 5.96E-06 | 2.10E-07 | 1.0401E-09 | 9.42136E-09 | 0 | 0 | 0.0105 | Res | 0.0741 |
| 581962_4130817.12 | 581962 | 4130817.12 | 5.49E-05 | 8.39E-08 | 5.03E-08 | 8.39E-08 | 5.43E-08 | 1.54E-07 | 3.62E-06 | 1.27E-07 | 6.34283E-10 | 5.74544E-09 | 0 | 0 | 0.0064 | Res | 0.0451 |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 3.32E-05 | 5.03E-08 | 3.02E-08 | 5.03E-08 | 3.28E-08 | 9.25E-08 | 2.17E-06 | 7.63E-08 | 3.83257E-10 | 3.47161E-09 | 0 | 0 | 0.0039 | Res | 0.0271 |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 2.17E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 2.14E-08 | 5.99E-08 | 1.41E-06 | 4.94E-08 | 2.50885E-10 | 2.27256E-09 | 0 | 0 | 0.0025 | Res | 0.0177 |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 1.58E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.56E-08 | 4.31E-08 | 1.01E-06 | 3.55E-08 | 1.82731E-10 | 1.65521E-09 | 0 | 0 | 0.0018 | Res | 0.0128 |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 1.24E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.22E-08 | 3.34E-08 | 7.83E-07 | 2.75E-08 | 1.43369E-10 | 1.29866E-09 | 0 | 0 | 0.0014 | Res | 0.0100 |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 1.03E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 1.00E-08 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 1.18543E-10 | 1.07378E-09 | 0 | 0 | 0.0012 | Res | 0.0083 |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 8.83E-06 | 1.26E-08 | 7.56E-09 | 1.26E-08 | 8.58E-09 | 2.31E-08 | 5.42E-07 | 1.90E-08 | 1.02075E-10 | 9.24616E-10 | 0 | 0 | 0.0010 | Res | 0.0071 |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 7.82E-06 | 1.10E-08 | 6.61E-09 | 1.10E-08 | 7.55E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 9.04123E-11 | 8.1897E-10 | 0 | 0 | 0.0009 | Res | 0.0063 |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 7.06E-06 | 9.81E-09 | 5.88E-09 | 9.81E-09 | 6.78E-09 | 1.79E-08 | 4.21E-07 | 1.47E-08 | 8.15813E-11 | 7.38977E-10 | 0 | 0 | 0.0008 | Res | 0.0057 |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 6.47E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 6.18E-09 | 1.62E-08 | 3.81E-07 | 1.33E-08 | 7.48359E-11 | 6.77876E-10 | 0 | 0 | 0.0008 | Res | 0.0052 |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 5.98E-06 | 8.09E-09 | 4.86E-09 | 8.09E-09 | 5.68E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 | 6.91453E-11 | 6.2633E-10 | 0 | 0 | 0.0007 | Res | 0.0048 |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 5.58E-06 | 7.45E-09 | 4.47E-09 | 7.45E-09 | 5.26E-09 | 1.36E-08 | 3.19E-07 | 1.12E-08 | 6.4505E-11 | 5.84297E-10 | 0 | 0 | 0.0006 | Res | 0.0045 |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 5.24E-06 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 4.91E-09 | 1.26E-08 | 2.95E-07 | 1.03E-08 | 6.05348E-11 | 5.48335E-10 | 0 | 0 | 0.0006 | Res | 0.0042 |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 4.93E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 4.60E-09 | 1.17E-08 | 2.75E-07 | 9.61E-09 | 5.70443E-11 | 5.16717E-10 | 0 | 0 | 0.0006 | Res | 0.0039 |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 4.66E-06 | 5.98E-09 | 3.59E-09 | 5.98E-09 | 4.32E-09 | 1.09E-08 | 2.56E-07 | 8.94E-09 | 5.38211E-11 | 4.8752E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 4.41E-06 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.07E-09 | 1.02E-08 | 2.39E-07 | 8.36E-09 | 5.10053E-11 | 4.62014E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 4.20E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 3.85E-09 | 9.60E-09 | 2.25E-07 | 7.85E-09 | 4.84931E-11 | 4.39259E-10 | 0 | 0 | 0.0005 | Res | 0.0033 |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 2.32E-04 | 3.58E-07 | 2.15E-07 | 3.58E-07 | 2.30E-07 | 6.59E-07 | 1.55E-05 | 5.44E-07 | 2.68634E-09 | 2.43333E-08 | 0 | 0 | 0.0270 | Res | 0.1919 |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 2.48E-04 | 3.82E-07 | 2.29E-07 | 3.82E-07 | 2.45E-07 | 7.02E-07 | 1.65E-05 | 5.80E-07 | 2.86553E-09 | 2.59565E-08 | 0 | 0 | 0.0288 | Res | 0.2049 |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 2.21E-04 | 3.40E-07 | 2.04E-07 | 3.40E-07 | 2.18E-07 | 6.26E-07 | 1.47E-05 | 5.17E-07 | 2.55385E-09 | 2.31332E-08 | 0 | 0 | 0.0257 | Res | 0.1826 |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 1.16E-04 | 1.79E-07 | 1.07E-07 | 1.79E-07 | 1.15E-07 | 3.29E-07 | 7.72E-06 | 2.72E-07 | 1.34542E-09 | 1.21871E-08 | 0 | 0 | 0.0135 | Res | 0.0961 |
| 581962_4130901.03 | 581962 | 4130901.03 | 4.77E-05 | 7.28E-08 | 4.37E-08 | 7.28E-08 | 4.71E-08 | 1.34E-07 | 3.14E-06 | 1.10E-07 | 5.51434E-10 | 4.99498E-09 | 0 | 0 | 0.0055 | Res | 0.0392 |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 2.59E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.56E-08 | 7.19E-08 | 1.69E-06 | 5.93E-08 | 2.99498E-10 | 2.71291E-09 | 0 | 0 | 0.0030 | Res | 0.0212 |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 1.76E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.73E-08 | 4.83E-08 | 1.13E-06 | 3.98E-08 | 2.03203E-10 | 1.84065E-09 | 0 | 0 | 0.0020 | Res | 0.0143 |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 1.36E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.34E-08 | 3.69E-08 | 8.66E-07 | 3.04E-08 | 1.56886E-10 | 1.4211E-09 | 0 | 0 | 0.0016 | Res | 0.0110 |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 1.12E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 1.10E-08 | 3.01E-08 | 7.07E-07 | 2.48E-08 | 1.29437E-10 | 1.17247E-09 | 0 | 0 | 0.0013 | Res | 0.0090 |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 9.58E-06 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 9.37E-09 | 2.55E-08 | 5.99E-07 | 2.10E-08 | 1.10725E-10 | 1.00296E-09 | 0 | 0 | 0.0011 | Res | 0.0077 |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 8.38E-06 | 1.21E-08 | 7.24E-09 | 1.21E-08 | 8.16E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 9.68557E-11 | 8.77335E-10 | 0 | 0 | 0.0010 | Res | 0.0067 |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 7.46E-06 | 1.06E-08 | 6.38E-09 | 1.06E-08 | 7.24E-09 | 1.95E-08 | 4.57E-07 | 1.60E-08 | 8.62783E-11 | 7.81524E-10 | 0 | 0 | 0.0009 | Res | 0.0060 |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 6.73E-06 | 9.48E-09 | 5.69E-09 | 9.48E-09 | 6.50E-09 | 1.74E-08 | 4.07E-07 | 1.43E-08 | 7.77884E-11 | 7.04621E-10 | 0 | 0 | 0.0008 | Res | 0.0054 |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 6.14E-06 | 8.56E-09 | 5.14E-09 | 8.56E-09 | 5.90E-09 | 1.57E-08 | 3.67E-07 | 1.29E-08 | 7.10079E-11 | 6.43202E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 5.65E-06 | 7.79E-09 | 4.67E-09 | 7.79E-09 | 5.41E-09 | 1.42E-08 | 3.34E-07 | 1.17E-08 | 6.5349E-11 | 5.91942E-10 | 0 | 0 | 0.0007 | Res | 0.0045 |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 5.26E-06 | 7.15E-09 | 4.29E-09 | 7.15E-09 | 5.00E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 6.07622E-11 | 5.50395E-10 | 0 | 0 | 0.0006 | Res | 0.0042 |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 4.92E-06 | 6.62E-09 | 3.97E-09 | 6.62E-09 | 4.66E-09 | 1.21E-08 | 2.84E-07 | 9.92E-09 | 5.69161E-11 | 5.15556E-10 | 0 | 0 | 0.0006 | Res | 0.0039 |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 4.64E-06 | 6.16E-09 | 3.69E-09 | 6.16E-09 | 4.36E-09 | 1.12E-08 | 2.64E-07 | 9.22E-09 | 5.35942E-11 | 4.85465E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 4.38E-06 | 5.75E-09 | 3.45E-09 | 5.75E-09 | 4.10E-09 | 1.05E-08 | 2.46E-07 | 8.60E-09 | 5.06811E-11 | 4.59078E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 4.16E-06 | 5.38E-09 | 3.23E-09 | 5.38E-09 | 3.87E-09 | 9.82E-09 | 2.30E-07 | 8.04E-09 | 4.80341E-11 | 4.35101E-10 | 0 | 0 | 0.0005 | Res | 0.0033 |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 3.96E-06 | 5.06E-09 | 3.04E-09 | 5.06E-09 | 3.66E-09 | 9.23E-09 | 2.16E-07 | 7.56E-09 | 4.57516E-11 | 4.14426E-10 | 0 | 0 | 0.0005 | Res | 0.0031 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2024 | Receptor Type | Cancer Risk Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | | (per million) |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 6.17E-04 | 9.51E-07 | 5.71E-07 | 9.51E-07 | 6.09E-07 | 1.75E-06 | 4.11E-05 | 1.45E-06 | 7.13195E-09 | 6.46025E-08 | 0 | 0 | 0.0717 | Res | 0.5107 |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 8.09E-04 | 1.25E-06 | 7.49E-07 | 1.25E-06 | 7.99E-07 | 2.30E-06 | 5.39E-05 | 1.90E-06 | 9.35711E-09 | 8.47583E-08 | 0 | 0 | 0.0941 | Res | 0.6703 |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 9.41E-04 | 1.45E-06 | 8.71E-07 | 1.45E-06 | 9.30E-07 | 2.67E-06 | 6.27E-05 | 2.21E-06 | 1.08825E-08 | 9.85757E-08 | 0 | 0 | 0.1095 | Res | 0.7797 |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 7.57E-05 | 1.16E-07 | 6.96E-08 | 1.16E-07 | 7.48E-08 | 2.13E-07 | 5.01E-06 | 1.76E-07 | 8.75486E-10 | 7.9303E-09 | 0 | 0 | 0.0088 | Res | 0.0624 |
| 581962_4130984.94 | 581962 | 4130984.94 | 3.29E-05 | 4.99E-08 | 3.00E-08 | 4.99E-08 | 3.25E-08 | 9.18E-08 | 2.15E-06 | 7.57E-08 | 3.80594E-10 | 3.44748E-09 | 0 | 0 | 0.0038 | Res | 0.0270 |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 2.14E-05 | 3.22E-08 | 1.93E-08 | 3.22E-08 | 2.11E-08 | 5.91E-08 | 1.39E-06 | 4.87E-08 | 2.47455E-10 | 2.24149E-09 | 0 | 0 | 0.0025 | Res | 0.0175 |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 1.59E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.56E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 1.83827E-10 | 1.66513E-09 | 0 | 0 | 0.0018 | Res | 0.0129 |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 1.27E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.24E-08 | 3.42E-08 | 8.03E-07 | 2.82E-08 | 1.4625E-10 | 1.32476E-09 | 0 | 0 | 0.0015 | Res | 0.0103 |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 1.05E-05 | 1.53E-08 | 9.19E-09 | 1.53E-08 | 1.03E-08 | 2.81E-08 | 6.59E-07 | 2.31E-08 | 1.21119E-10 | 1.09712E-09 | 0 | 0 | 0.0012 | Res | 0.0085 |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 8.93E-06 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 8.71E-09 | 2.37E-08 | 5.57E-07 | 1.95E-08 | 1.03201E-10 | 9.34812E-10 | 0 | 0 | 0.0010 | Res | 0.0072 |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 7.78E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 7.56E-09 | 2.05E-08 | 4.80E-07 | 1.69E-08 | 8.98774E-11 | 8.14125E-10 | 0 | 0 | 0.0009 | Res | 0.0063 |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 6.89E-06 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 6.68E-09 | 1.80E-08 | 4.22E-07 | 1.48E-08 | 7.96769E-11 | 7.21727E-10 | 0 | 0 | 0.0008 | Res | 0.0055 |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 6.19E-06 | 8.75E-09 | 5.25E-09 | 8.75E-09 | 5.98E-09 | 1.60E-08 | 3.76E-07 | 1.32E-08 | 7.16072E-11 | 6.48631E-10 | 0 | 0 | 0.0007 | Res | 0.0050 |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 5.63E-06 | 7.88E-09 | 4.73E-09 | 7.88E-09 | 5.42E-09 | 1.44E-08 | 3.38E-07 | 1.19E-08 | 6.50924E-11 | 5.89618E-10 | 0 | 0 | 0.0007 | Res | 0.0045 |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 5.17E-06 | 7.16E-09 | 4.30E-09 | 7.16E-09 | 4.95E-09 | 1.31E-08 | 3.07E-07 | 1.08E-08 | 5.97298E-11 | 5.41042E-10 | 0 | 0 | 0.0006 | Res | 0.0041 |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 4.80E-06 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.58E-09 | 1.20E-08 | 2.82E-07 | 9.88E-09 | 5.54354E-11 | 5.02143E-10 | 0 | 0 | 0.0006 | Res | 0.0038 |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 4.50E-06 | 6.11E-09 | 3.66E-09 | 6.11E-09 | 4.27E-09 | 1.12E-08 | 2.62E-07 | 9.17E-09 | 5.19744E-11 | 4.70793E-10 | 0 | 0 | 0.0005 | Res | 0.0036 |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 4.23E-06 | 5.68E-09 | 3.41E-09 | 5.68E-09 | 4.00E-09 | 1.04E-08 | 2.43E-07 | 8.52E-09 | 4.88629E-11 | 4.42609E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 4.01E-06 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.77E-09 | 9.74E-09 | 2.28E-07 | 7.98E-09 | 4.63433E-11 | 4.19786E-10 | 0 | 0 | 0.0005 | Res | 0.0032 |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 3.81E-06 | 5.01E-09 | 3.01E-09 | 5.01E-09 | 3.57E-09 | 9.15E-09 | 2.14E-07 | 7.50E-09 | 4.40541E-11 | 3.99049E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 3.63E-06 | 4.72E-09 | 2.83E-09 | 4.72E-09 | 3.39E-09 | 8.62E-09 | 2.02E-07 | 7.06E-09 | 4.2016E-11 | 3.80588E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 1.02E-04 | 1.56E-07 | 9.36E-08 | 1.56E-07 | 1.00E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 1.17517E-09 | 1.06449E-08 | 0 | 0 | 0.0118 | Res | 0.0838 |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 8.12E-05 | 1.24E-07 | 7.47E-08 | 1.24E-07 | 8.02E-08 | 2.29E-07 | 5.37E-06 | 1.89E-07 | 9.3871E-10 | 8.50299E-09 | 0 | 0 | 0.0094 | Res | 0.0669 |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 4.41E-05 | 6.71E-08 | 4.03E-08 | 6.71E-08 | 4.35E-08 | 1.23E-07 | 2.90E-06 | 1.02E-07 | 5.09412E-10 | 4.61434E-09 | 0 | 0 | 0.0051 | Res | 0.0362 |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 2.83E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.79E-08 | 7.86E-08 | 1.84E-06 | 6.48E-08 | 3.27255E-10 | 2.96434E-09 | 0 | 0 | 0.0033 | Res | 0.0232 |
| 581962_4131068.85 | 581962 | 4131068.85 | 2.07E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 2.03E-08 | 5.69E-08 | 1.33E-06 | 4.69E-08 | 2.38832E-10 | 2.16338E-09 | 0 | 0 | 0.0024 | Res | 0.0169 |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 1.58E-05 | 2.34E-08 | 1.41E-08 | 2.34E-08 | 1.55E-08 | 4.30E-08 | 1.01E-06 | 3.55E-08 | 1.82356E-10 | 1.65181E-09 | 0 | 0 | 0.0018 | Res | 0.0128 |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 1.26E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.23E-08 | 3.40E-08 | 7.98E-07 | 2.80E-08 | 1.45582E-10 | 1.31871E-09 | 0 | 0 | 0.0015 | Res | 0.0102 |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 1.04E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 1.02E-08 | 2.79E-08 | 6.55E-07 | 2.30E-08 | 1.20642E-10 | 1.09279E-09 | 0 | 0 | 0.0012 | Res | 0.0084 |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 8.86E-06 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 8.63E-09 | 2.35E-08 | 5.50E-07 | 1.93E-08 | 1.02386E-10 | 9.27429E-10 | 0 | 0 | 0.0010 | Res | 0.0072 |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 7.68E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.46E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 8.88274E-11 | 8.04614E-10 | 0 | 0 | 0.0009 | Res | 0.0062 |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 6.77E-06 | 9.62E-09 | 5.77E-09 | 9.62E-09 | 6.56E-09 | 1.76E-08 | 4.13E-07 | 1.45E-08 | 7.82847E-11 | 7.09117E-10 | 0 | 0 | 0.0008 | Res | 0.0055 |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 6.05E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 5.84E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 6.98935E-11 | 6.33107E-10 | 0 | 0 | 0.0007 | Res | 0.0049 |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 5.47E-06 | 7.65E-09 | 4.59E-09 | 7.65E-09 | 5.26E-09 | 1.40E-08 | 3.28E-07 | 1.15E-08 | 6.31926E-11 | 5.72409E-10 | 0 | 0 | 0.0006 | Res | 0.0044 |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 4.99E-06 | 6.93E-09 | 4.16E-09 | 6.93E-09 | 4.79E-09 | 1.27E-08 | 2.97E-07 | 1.04E-08 | 5.76708E-11 | 5.22392E-10 | 0 | 0 | 0.0006 | Res | 0.0040 |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 4.59E-06 | 6.33E-09 | 3.80E-09 | 6.33E-09 | 4.39E-09 | 1.16E-08 | 2.71E-07 | 9.51E-09 | 5.30586E-11 | 4.80614E-10 | 0 | 0 | 0.0005 | Res | 0.0037 |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 4.25E-06 | 5.81E-09 | 3.48E-09 | 5.81E-09 | 4.05E-09 | 1.06E-08 | 2.49E-07 | 8.72E-09 | 4.90934E-11 | 4.44697E-10 | 0 | 0 | 0.0005 | Res | 0.0034 |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 4.00E-06 | 5.43E-09 | 3.26E-09 | 5.43E-09 | 3.80E-09 | 9.92E-09 | 2.33E-07 | 8.14E-09 | 4.62018E-11 | 4.18504E-10 | 0 | 0 | 0.0005 | Res | 0.0032 |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 3.77E-06 | 5.08E-09 | 3.05E-09 | 5.08E-09 | 3.57E-09 | 9.28E-09 | 2.18E-07 | 7.62E-09 | 4.35921E-11 | 3.94865E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 3.59E-06 | 4.80E-09 | 2.88E-09 | 4.80E-09 | 3.39E-09 | 8.77E-09 | 2.05E-07 | 7.19E-09 | 4.1513E-11 | 3.76032E-10 | 0 | 0 | 0.0004 | Res | 0.0029 |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 3.43E-06 | 4.55E-09 | 2.73E-09 | 4.55E-09 | 3.22E-09 | 8.30E-09 | 1.95E-07 | 6.81E-09 | 3.96844E-11 | 3.59468E-10 | 0 | 0 | 0.0004 | Res | 0.0027 |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 3.27E-06 | 4.28E-09 | 2.57E-09 | 4.28E-09 | 3.05E-09 | 7.82E-09 | 1.83E-07 | 6.41E-09 | 3.7763E-11 | 3.42064E-10 | 0 | 0 | 0.0004 | Res | 0.0026 |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 1.07E-05 | 1.56E-08 | 9.36E-09 | 1.56E-08 | 1.05E-08 | 2.86E-08 | 6.72E-07 | 2.36E-08 | 1.23896E-10 | 1.12227E-09 | 0 | 0 | 0.0012 | Res | 0.0087 |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 6.54E-06 | 9.24E-09 | 5.55E-09 | 9.24E-09 | 6.32E-09 | 1.69E-08 | 3.97E-07 | 1.39E-08 | 7.56455E-11 | 6.8521E-10 | 0 | 0 | 0.0008 | Res | 0.0053 |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 5.90E-06 | 8.28E-09 | 4.97E-09 | 8.28E-09 | 5.69E-09 | 1.52E-08 | 3.55E-07 | 1.25E-08 | 6.82262E-11 | 6.18005E-10 | 0 | 0 | 0.0007 | Res | 0.0047 |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 5.34E-06 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 5.13E-09 | 1.36E-08 | 3.19E-07 | 1.12E-08 | 6.16919E-11 | 5.58816E-10 | 0 | 0 | 0.0006 | Res | 0.0043 |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 4.87E-06 | 6.73E-09 | 4.04E-09 | 6.73E-09 | 4.66E-09 | 1.23E-08 | 2.89E-07 | 1.01E-08 | 5.62536E-11 | 5.09555E-10 | 0 | 0 | 0.0006 | Res | 0.0039 |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 4.42E-06 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 4.22E-09 | 1.11E-08 | 2.60E-07 | 9.11E-09 | 5.11275E-11 | 4.63122E-10 | 0 | 0 | 0.0005 | Res | 0.0035 |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 4.07E-06 | 5.54E-09 | 3.33E-09 | 5.54E-09 | 3.88E-09 | 1.01E-08 | 2.38E-07 | 8.32E-09 | 4.70316E-11 | 4.26021E-10 | 0 | 0 | 0.0005 | Res | 0.0033 |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 3.76E-06 | 5.09E-09 | 3.06E-09 | 5.09E-09 | 3.58E-09 | 9.32E-09 | 2.18E-07 | 7.64E-09 | 4.35164E-11 | 3.94179E-10 | 0 | 0 | 0.0004 | Res | 0.0030 |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 3.52E-06 | 4.73E-09 | 2.84E-09 | 4.73E-09 | 3.33E-09 | 8.65E-09 | 2.03E-07 | 7.10E-09 | 4.06922E-11 | 3.68597E-10 | 0 | 0 | 0.0004 | Res | 0.0028 |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 3.31E-06 | 4.43E-09 | 2.66E-09 | 4.43E-09 | 3.13E-09 | 8.09E-09 | 1.90E-07 | 6.63E-09 | 3.82949E-11 | 3.46882E-10 | 0 | 0 | 0.0004 | Res | 0.0027 |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 3.16E-06 | 4.20E-09 | 2.52E-09 | 4.20E-09 | 2.98E-09 | 7.67E-09 | 1.80E-07 | 6.29E-09 | 3.65249E-11 | 3.30849E-10 | 0 | 0 | 0.0004 | Res | 0.0025 |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 3.02E-06 | 3.99E-09 | 2.39E-09 | 3.99E-09 | 2.84E-09 | 7.28E-09 | 1.71E-07 | 5.97E-09 | 3.4909E-11 | 3.16212E-10 | 0 | 0 | 0.0004 | Res | 0.0024 |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 2.87E-06 | 3.76E-09 | 2.26E-09 | 3.76E-09 | 2.69E-09 | 6.87E-09 | 1.61E-07 | 5.63E-09 | 3.31928E-11 | 3.00666E-10 | 0 | 0 | 0.0003 | Res | 0.0023 |

# HRA Permanente Creek Restoration Project

Construction Year 2025

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2025_PAVED | 1.711E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2025 | 0 | 1 | 0 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.127 | 0.000 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 1.40E-04 | 0.00E+00 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 1.52E-03 | 0.00E+00 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 1.07E-03 | 0.00E+00 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 1.90E-03 | 0.00E+00 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 3.43E-03 | 0.00E+00 | 0.00E+00 |
| | Lead | 0.00E+00 | 5.08E-06 | 0.00E+00 | 0.00E+00 |
| | Nickel | 0.00E+00 | 1.15E-04 | 0.00E+00 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 6.47E-02 | 0.00E+00 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 2.00E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 6.54E-08 | 1.85E-07 | 4.35E-06 | 1.53E-07 | 0 | 2.791E-08 | 0 | 0 | 0.0279 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.37E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 4.46E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 1.916E-08 | 0 | 0 | 0.0192 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.25E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 3.78E-09 | 6.52E-09 | 1.51E-07 | 5.15E-09 | 0 | 1.744E-09 | 0 | 0 | 0.0017 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.58E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 5.01E-09 | 1.19E-08 | 2.78E-07 | 9.68E-09 | 0 | 2.21E-09 | 0 | 0 | 0.0022 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.34E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 2.08E-07 | 5.94E-07 | 1.39E-05 | 4.91E-07 | 0 | 8.854E-08 | 0 | 0 | 0.0885 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.28E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 4.20E-07 | 1.20E-06 | 2.83E-05 | 9.95E-07 | 0 | 1.79E-07 | 0 | 0 | 0.1790 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.84E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 1.91E-07 | 5.47E-07 | 1.28E-05 | 4.52E-07 | 0 | 8.154E-08 | 0 | 0 | 0.0815 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.55E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 5.09E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 2.166E-07 | 0 | 0 | 0.2166 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.07E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 3.45E-08 | 9.23E-08 | 2.16E-06 | 7.59E-08 | 0 | 1.49E-08 | 0 | 0 | 0.0149 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.09E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 1.01E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 0 | 4.321E-08 | 0 | 0 | 0.0432 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.29E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 2.37E-08 | 6.59E-08 | 1.55E-06 | 5.43E-08 | 0 | 1.017E-08 | 0 | 0 | 0.0102 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.79E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 5.297E-09 | 0 | 0 | 0.0053 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.55E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 1.12E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 4.96E-09 | 0 | 0 | 0.0050 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.33E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.05E-08 | 2.45E-08 | 5.74E-07 | 2.00E-08 | 0 | 4.655E-09 | 0 | 0 | 0.0047 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.14E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 9.88E-09 | 2.30E-08 | 5.38E-07 | 1.87E-08 | 0 | 4.378E-09 | 0 | 0 | 0.0044 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.96E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.34E-09 | 2.17E-08 | 5.08E-07 | 1.76E-08 | 0 | 4.139E-09 | 0 | 0 | 0.0041 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.79E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 8.79E-09 | 2.04E-08 | 4.77E-07 | 1.66E-08 | 0 | 3.897E-09 | 0 | 0 | 0.0039 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.61E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 8.22E-09 | 1.90E-08 | 4.43E-07 | 1.54E-08 | 0 | 3.645E-09 | 0 | 0 | 0.0036 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.95E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 1.24E-08 | 2.84E-08 | 6.64E-07 | 2.31E-08 | 0 | 5.512E-09 | 0 | 0 | 0.0055 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.84E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.21E-08 | 2.82E-08 | 6.60E-07 | 2.30E-08 | 0 | 5.366E-09 | 0 | 0 | 0.0054 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.63E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.26E-07 | 2.18E-08 | 0 | 5.064E-09 | 0 | 0 | 0.0051 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.41E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.07E-08 | 2.51E-08 | 5.87E-07 | 2.04E-08 | 0 | 4.755E-09 | 0 | 0 | 0.0048 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.19E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.00E-08 | 2.35E-08 | 5.49E-07 | 1.91E-08 | 0 | 4.447E-09 | 0 | 0 | 0.0044 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.99E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 9.42E-09 | 2.19E-08 | 5.13E-07 | 1.78E-08 | 0 | 4.171E-09 | 0 | 0 | 0.0042 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.80E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 8.82E-09 | 2.05E-08 | 4.78E-07 | 1.66E-08 | 0 | 3.91E-09 | 0 | 0 | 0.0039 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.64E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 8.32E-09 | 1.92E-08 | 4.50E-07 | 1.56E-08 | 0 | 3.69E-09 | 0 | 0 | 0.0037 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.49E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 7.84E-09 | 1.80E-08 | 4.22E-07 | 1.47E-08 | 0 | 3.479E-09 | 0 | 0 | 0.0035 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.62E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 1.13E-08 | 2.48E-08 | 5.79E-07 | 2.01E-08 | 0 | 5.052E-09 | 0 | 0 | 0.0051 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.80E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 1.19E-08 | 2.75E-08 | 6.42E-07 | 2.23E-08 | 0 | 5.301E-09 | 0 | 0 | 0.0053 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.68E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.16E-08 | 2.72E-08 | 6.37E-07 | 2.22E-08 | 0 | 5.144E-09 | 0 | 0 | 0.0051 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.47E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.09E-08 | 2.57E-08 | 6.01E-07 | 2.09E-08 | 0 | 4.843E-09 | 0 | 0 | 0.0048 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.26E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.03E-08 | 2.41E-08 | 5.64E-07 | 1.96E-08 | 0 | 4.545E-09 | 0 | 0 | 0.0045 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.06E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 9.66E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 4.275E-09 | 0 | 0 | 0.0043 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.86E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 9.01E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 | 0 | 3.988E-09 | 0 | 0 | 0.0040 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.68E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 8.44E-09 | 1.96E-08 | 4.58E-07 | 1.59E-08 | 0 | 3.74E-09 | 0 | 0 | 0.0037 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.52E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 7.92E-09 | 1.83E-08 | 4.28E-07 | 1.49E-08 | 0 | 3.514E-09 | 0 | 0 | 0.0035 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.36E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 7.43E-09 | 1.71E-08 | 3.99E-07 | 1.39E-08 | 0 | 3.296E-09 | 0 | 0 | 0.0033 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.22E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 6.98E-09 | 1.60E-08 | 3.73E-07 | 1.30E-08 | 0 | 3.101E-09 | 0 | 0 | 0.0031 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.07E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 6.50E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 0 | 2.892E-09 | 0 | 0 | 0.0029 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.86E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.21E-08 | 2.74E-08 | 6.40E-07 | 2.22E-08 | 0 | 5.395E-09 | 0 | 0 | 0.0054 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.72E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.17E-08 | 2.67E-08 | 6.25E-07 | 2.17E-08 | 0 | 5.197E-09 | 0 | 0 | 0.0052 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.70E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.17E-08 | 2.74E-08 | 6.42E-07 | 2.23E-08 | 0 | 5.172E-09 | 0 | 0 | 0.0052 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.52E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 1.11E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 4.916E-09 | 0 | 0 | 0.0049 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.32E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 1.05E-08 | 2.47E-08 | 5.78E-07 | 2.01E-08 | 0 | 4.635E-09 | 0 | 0 | 0.0046 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.12E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.86E-09 | 2.32E-08 | 5.44E-07 | 1.89E-08 | 0 | 4.358E-09 | 0 | 0 | 0.0044 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.93E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.24E-09 | 2.17E-08 | 5.08E-07 | 1.77E-08 | 0 | 4.089E-09 | 0 | 0 | 0.0041 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.74E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 8.65E-09 | 2.02E-08 | 4.73E-07 | 1.65E-08 | 0 | 3.828E-09 | 0 | 0 | 0.0038 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.55E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 8.03E-09 | 1.87E-08 | 4.37E-07 | 1.52E-08 | 0 | 3.559E-09 | 0 | 0 | 0.0036 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.36E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 7.43E-09 | 1.71E-08 | 4.00E-07 | 1.39E-08 | 0 | 3.295E-09 | 0 | 0 | 0.0033 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.17E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 6.80E-09 | 1.55E-08 | 3.63E-07 | 1.26E-08 | 0 | 3.023E-09 | 0 | 0 | 0.0030 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.78E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 1.18E-08 | 2.66E-08 | 6.22E-07 | 2.16E-08 | 0 | 5.27E-09 | 0 | 0 | 0.0053 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.74E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.18E-08 | 2.71E-08 | 6.35E-07 | 2.21E-08 | 0 | 5.226E-09 | 0 | 0 | 0.0052 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.66E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.15E-08 | 2.71E-08 | 6.33E-07 | 2.20E-08 | 0 | 5.11E-09 | 0 | 0 | 0.0051 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.53E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 1.12E-08 | 2.64E-08 | 6.18E-07 | 2.15E-08 | 0 | 4.931E-09 | 0 | 0 | 0.0049 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.36E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 1.06E-08 | 2.52E-08 | 5.91E-07 | 2.06E-08 | 0 | 4.687E-09 | 0 | 0 | 0.0047 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.15E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.97E-09 | 2.36E-08 | 5.53E-07 | 1.92E-08 | 0 | 4.401E-09 | 0 | 0 | 0.0044 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.94E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 9.30E-09 | 2.20E-08 | 5.14E-07 | 1.79E-08 | 0 | 4.108E-09 | 0 | 0 | 0.0041 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.71E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 8.54E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 3.778E-09 | 0 | 0 | 0.0038 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.49E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.86E-09 | 1.83E-08 | 4.27E-07 | 1.49E-08 | 0 | 3.481E-09 | 0 | 0 | 0.0035 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.55E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.44E-08 | 3.51E-08 | 8.21E-07 | 2.86E-08 | 0 | 6.347E-09 | 0 | 0 | 0.0063 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.85E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.53E-08 | 3.53E-08 | 8.25E-07 | 2.87E-08 | 0 | 6.768E-09 | 0 | 0 | 0.0068 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.31E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.35E-08 | 3.07E-08 | 7.17E-07 | 2.49E-08 | 0 | 6.014E-09 | 0 | 0 | 0.0060 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.11E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.29E-08 | 2.95E-08 | 6.91E-07 | 2.40E-08 | 0 | 5.739E-09 | 0 | 0 | 0.0057 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.97E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.25E-08 | 2.90E-08 | 6.79E-07 | 2.36E-08 | 0 | 5.546E-09 | 0 | 0 | 0.0055 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.80E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.28E-08 | 0 | 5.31E-09 | 0 | 0 | 0.0053 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.61E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.27E-07 | 2.18E-08 | 0 | 5.043E-09 | 0 | 0 | 0.0050 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.14E-08 | 2.74E-08 | 6.40E-07 | 2.23E-08 | 0 | 5.024E-09 | 0 | 0 | 0.0050 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.37E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 1.07E-08 | 2.56E-08 | 5.99E-07 | 2.09E-08 | 0 | 4.703E-09 | 0 | 0 | 0.0047 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.12E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 9.86E-09 | 2.35E-08 | 5.51E-07 | 1.92E-08 | 0 | 4.349E-09 | 0 | 0 | 0.0043 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.87E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 9.06E-09 | 2.15E-08 | 5.02E-07 | 1.75E-08 | 0 | 4.003E-09 | 0 | 0 | 0.0040 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.63E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 8.31E-09 | 1.95E-08 | 4.56E-07 | 1.59E-08 | 0 | 3.676E-09 | 0 | 0 | 0.0037 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.41E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 7.61E-09 | 1.77E-08 | 4.14E-07 | 1.44E-08 | 0 | 3.371E-09 | 0 | 0 | 0.0034 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 5.00E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.58E-08 | 3.69E-08 | 8.62E-07 | 3.00E-08 | 0 | 6.987E-09 | 0 | 0 | 0.0070 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.79E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.51E-08 | 3.46E-08 | 8.10E-07 | 2.82E-08 | 0 | 6.684E-09 | 0 | 0 | 0.0067 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.86E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.53E-08 | 3.59E-08 | 8.40E-07 | 2.92E-08 | 0 | 6.786E-09 | 0 | 0 | 0.0068 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.77E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.51E-08 | 3.60E-08 | 8.42E-07 | 2.93E-08 | 0 | 6.658E-09 | 0 | 0 | 0.0067 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.69E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.49E-08 | 3.61E-08 | 8.44E-07 | 2.94E-08 | 0 | 6.543E-09 | 0 | 0 | 0.0065 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.26E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.35E-08 | 3.25E-08 | 7.61E-07 | 2.65E-08 | 0 | 5.95E-09 | 0 | 0 | 0.0059 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.16E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.32E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 0 | 5.802E-09 | 0 | 0 | 0.0058 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.92E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.25E-08 | 3.04E-08 | 7.12E-07 | 2.48E-08 | 0 | 5.472E-09 | 0 | 0 | 0.0055 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.63E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.15E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 5.072E-09 | 0 | 0 | 0.0051 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.34E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.06E-08 | 2.56E-08 | 6.00E-07 | 2.09E-08 | 0 | 4.665E-09 | 0 | 0 | 0.0047 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.06E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.69E-09 | 2.33E-08 | 5.44E-07 | 1.90E-08 | 0 | 4.27E-09 | 0 | 0 | 0.0043 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.80E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 8.85E-09 | 2.10E-08 | 4.92E-07 | 1.71E-08 | 0 | 3.904E-09 | 0 | 0 | 0.0039 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.56E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 8.09E-09 | 1.90E-08 | 4.46E-07 | 1.55E-08 | 0 | 3.575E-09 | 0 | 0 | 0.0036 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.34E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 7.39E-09 | 1.72E-08 | 4.03E-07 | 1.40E-08 | 0 | 3.273E-09 | 0 | 0 | 0.0033 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.13E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.71E-09 | 1.54E-08 | 3.61E-07 | 1.25E-08 | 0 | 2.976E-09 | 0 | 0 | 0.0030 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.90E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 5.97E-09 | 1.35E-08 | 3.15E-07 | 1.09E-08 | 0 | 2.656E-09 | 0 | 0 | 0.0027 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.85E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.18E-08 | 5.40E-08 | 1.27E-06 | 4.42E-08 | 0 | 9.558E-09 | 0 | 0 | 0.0096 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.44E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 2.05E-08 | 5.09E-08 | 1.19E-06 | 4.16E-08 | 0 | 8.99E-09 | 0 | 0 | 0.0090 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.58E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.77E-08 | 4.31E-08 | 1.01E-06 | 3.52E-08 | 0 | 7.785E-09 | 0 | 0 | 0.0078 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 5.01E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.59E-08 | 3.83E-08 | 8.96E-07 | 3.12E-08 | 0 | 7E-09 | 0 | 0 | 0.0070 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.86E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.54E-08 | 3.77E-08 | 8.82E-07 | 3.07E-08 | 0 | 6.789E-09 | 0 | 0 | 0.0068 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.70E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.50E-08 | 3.69E-08 | 8.63E-07 | 3.01E-08 | 0 | 6.566E-09 | 0 | 0 | 0.0066 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.56E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.45E-08 | 3.62E-08 | 8.47E-07 | 2.96E-08 | 0 | 6.37E-09 | 0 | 0 | 0.0064 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.24E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.35E-08 | 3.36E-08 | 7.86E-07 | 2.74E-08 | 0 | 5.919E-09 | 0 | 0 | 0.0059 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.94E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.25E-08 | 3.11E-08 | 7.27E-07 | 2.54E-08 | 0 | 5.497E-09 | 0 | 0 | 0.0055 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.62E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 1.15E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 5.055E-09 | 0 | 0 | 0.0051 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.30E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.05E-08 | 2.57E-08 | 6.01E-07 | 2.10E-08 | 0 | 4.609E-09 | 0 | 0 | 0.0046 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 3.00E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 9.51E-09 | 2.30E-08 | 5.40E-07 | 1.88E-08 | 0 | 4.186E-09 | 0 | 0 | 0.0042 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.73E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 8.64E-09 | 2.07E-08 | 4.85E-07 | 1.69E-08 | 0 | 3.807E-09 | 0 | 0 | 0.0038 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.48E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.83E-09 | 1.86E-08 | 4.34E-07 | 1.51E-08 | 0 | 3.456E-09 | 0 | 0 | 0.0035 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.26E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 7.12E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 3.15E-09 | 0 | 0 | 0.0031 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.06E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.50E-09 | 1.50E-08 | 3.52E-07 | 1.22E-08 | 0 | 2.881E-09 | 0 | 0 | 0.0029 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.89E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 5.93E-09 | 1.36E-08 | 3.17E-07 | 1.10E-08 | 0 | 2.635E-09 | 0 | 0 | 0.0026 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.24E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.32E-08 | 5.99E-08 | 1.40E-06 | 4.91E-08 | 0 | 1.011E-08 | 0 | 0 | 0.0101 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.71E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.15E-08 | 5.54E-08 | 1.30E-06 | 4.54E-08 | 0 | 9.37E-09 | 0 | 0 | 0.0094 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.78E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.85E-08 | 4.69E-08 | 1.10E-06 | 3.84E-08 | 0 | 8.074E-09 | 0 | 0 | 0.0081 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.36E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.71E-08 | 4.34E-08 | 1.02E-06 | 3.55E-08 | 0 | 7.479E-09 | 0 | 0 | 0.0075 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.14E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.65E-08 | 4.20E-08 | 9.84E-07 | 3.44E-08 | 0 | 7.18E-09 | 0 | 0 | 0.0072 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.70E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.50E-08 | 3.82E-08 | 8.95E-07 | 3.13E-08 | 0 | 6.566E-09 | 0 | 0 | 0.0066 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.28E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.37E-08 | 3.46E-08 | 8.10E-07 | 2.83E-08 | 0 | 5.979E-09 | 0 | 0 | 0.0060 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.91E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.25E-08 | 3.14E-08 | 7.35E-07 | 2.57E-08 | 0 | 5.465E-09 | 0 | 0 | 0.0055 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.57E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.14E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 4.982E-09 | 0 | 0 | 0.0050 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.23E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 1.03E-08 | 2.54E-08 | 5.95E-07 | 2.08E-08 | 0 | 4.51E-09 | 0 | 0 | 0.0045 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.90E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 9.23E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 4.055E-09 | 0 | 0 | 0.0041 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.61E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 8.27E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 3.642E-09 | 0 | 0 | 0.0036 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.35E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 7.45E-09 | 1.78E-08 | 4.16E-07 | 1.45E-08 | 0 | 3.285E-09 | 0 | 0 | 0.0033 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.14E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 6.74E-09 | 1.59E-08 | 3.72E-07 | 1.29E-08 | 0 | 2.981E-09 | 0 | 0 | 0.0030 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.95E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 6.16E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 2.727E-09 | 0 | 0 | 0.0027 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.80E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 5.66E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 2.511E-09 | 0 | 0 | 0.0025 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.60E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 5.03E-09 | 1.14E-08 | 2.66E-07 | 9.24E-09 | 0 | 2.239E-09 | 0 | 0 | 0.0022 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.35E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.36E-08 | 6.13E-08 | 1.44E-06 | 5.03E-08 | 0 | 1.026E-08 | 0 | 0 | 0.0103 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.98E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.24E-08 | 5.85E-08 | 1.37E-06 | 4.80E-08 | 0 | 9.743E-09 | 0 | 0 | 0.0097 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.48E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.08E-08 | 5.43E-08 | 1.27E-06 | 4.46E-08 | 0 | 9.05E-09 | 0 | 0 | 0.0090 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.85E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 1.88E-08 | 4.88E-08 | 1.14E-06 | 4.00E-08 | 0 | 8.168E-09 | 0 | 0 | 0.0082 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.24E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.68E-08 | 4.34E-08 | 1.02E-06 | 3.56E-08 | 0 | 7.312E-09 | 0 | 0 | 0.0073 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.70E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.51E-08 | 3.87E-08 | 9.06E-07 | 3.17E-08 | 0 | 6.567E-09 | 0 | 0 | 0.0066 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.25E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.36E-08 | 3.47E-08 | 8.13E-07 | 2.84E-08 | 0 | 5.933E-09 | 0 | 0 | 0.0059 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.85E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.23E-08 | 3.12E-08 | 7.31E-07 | 2.55E-08 | 0 | 5.375E-09 | 0 | 0 | 0.0054 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.46E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.10E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 0 | 4.826E-09 | 0 | 0 | 0.0048 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.08E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 9.80E-09 | 2.43E-08 | 5.70E-07 | 1.99E-08 | 0 | 4.293E-09 | 0 | 0 | 0.0043 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.74E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 8.71E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 3.823E-09 | 0 | 0 | 0.0038 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.45E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 7.78E-09 | 1.89E-08 | 4.41E-07 | 1.54E-08 | 0 | 3.421E-09 | 0 | 0 | 0.0034 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.21E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 6.99E-09 | 1.68E-08 | 3.92E-07 | 1.37E-08 | 0 | 3.084E-09 | 0 | 0 | 0.0031 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 2.01E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.37E-09 | 1.51E-08 | 3.53E-07 | 1.23E-08 | 0 | 2.812E-09 | 0 | 0 | 0.0028 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.85E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 5.83E-09 | 1.36E-08 | 3.19E-07 | 1.11E-08 | 0 | 2.578E-09 | 0 | 0 | 0.0026 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.71E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 5.38E-09 | 1.25E-08 | 2.92E-07 | 1.01E-08 | 0 | 2.385E-09 | 0 | 0 | 0.0024 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.59E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 5.01E-09 | 1.15E-08 | 2.69E-07 | 9.35E-09 | 0 | 2.222E-09 | 0 | 0 | 0.0022 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.40E-08 | 6.33E-08 | 1.48E-06 | 5.19E-08 | 0 | 1.04E-08 | 0 | 0 | 0.0104 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.89E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.22E-08 | 5.85E-08 | 1.37E-06 | 4.81E-08 | 0 | 9.624E-09 | 0 | 0 | 0.0096 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 6.06E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 1.95E-08 | 5.11E-08 | 1.20E-06 | 4.19E-08 | 0 | 8.463E-09 | 0 | 0 | 0.0085 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.33E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.71E-08 | 4.45E-08 | 1.04E-06 | 3.65E-08 | 0 | 7.438E-09 | 0 | 0 | 0.0074 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.73E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.52E-08 | 3.91E-08 | 9.17E-07 | 3.21E-08 | 0 | 6.598E-09 | 0 | 0 | 0.0066 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.22E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.35E-08 | 3.46E-08 | 8.11E-07 | 2.84E-08 | 0 | 5.887E-09 | 0 | 0 | 0.0059 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.73E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.10E-07 | 2.48E-08 | 0 | 5.208E-09 | 0 | 0 | 0.0052 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.28E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.05E-08 | 2.63E-08 | 6.15E-07 | 2.15E-08 | 0 | 4.575E-09 | 0 | 0 | 0.0046 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.89E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 9.20E-09 | 2.28E-08 | 5.34E-07 | 1.86E-08 | 0 | 4.031E-09 | 0 | 0 | 0.0040 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.57E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 8.16E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 3.582E-09 | 0 | 0 | 0.0036 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.30E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 7.29E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 | 0 | 3.21E-09 | 0 | 0 | 0.0032 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.08E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 6.60E-09 | 1.58E-08 | 3.70E-07 | 1.29E-08 | 0 | 2.909E-09 | 0 | 0 | 0.0029 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.90E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 6.02E-09 | 1.42E-08 | 3.33E-07 | 1.16E-08 | 0 | 2.657E-09 | 0 | 0 | 0.0027 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.75E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 5.52E-09 | 1.29E-08 | 3.03E-07 | 1.05E-08 | 0 | 2.442E-09 | 0 | 0 | 0.0024 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.61E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 5.08E-09 | 1.18E-08 | 2.76E-07 | 9.59E-09 | 0 | 2.252E-09 | 0 | 0 | 0.0023 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.49E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 4.70E-09 | 1.08E-08 | 2.52E-07 | 8.77E-09 | 0 | 2.085E-09 | 0 | 0 | 0.0021 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 1.01E-04 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 3.27E-08 | 8.73E-08 | 2.05E-06 | 7.17E-08 | 0 | 1.412E-08 | 0 | 0 | 0.0141 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.77E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 3.16E-08 | 8.46E-08 | 1.98E-06 | 6.96E-08 | 0 | 1.364E-08 | 0 | 0 | 0.0136 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.23E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 2.98E-08 | 8.00E-08 | 1.88E-06 | 6.58E-08 | 0 | 1.288E-08 | 0 | 0 | 0.0129 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.29E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.68E-08 | 7.16E-08 | 1.68E-06 | 5.88E-08 | 0 | 1.158E-08 | 0 | 0 | 0.0116 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.29E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 2.35E-08 | 6.25E-08 | 1.47E-06 | 5.14E-08 | 0 | 1.018E-08 | 0 | 0 | 0.0102 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.27E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.02E-08 | 5.32E-08 | 1.25E-06 | 4.37E-08 | 0 | 8.756E-09 | 0 | 0 | 0.0088 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.47E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.76E-08 | 4.60E-08 | 1.08E-06 | 3.78E-08 | 0 | 7.641E-09 | 0 | 0 | 0.0076 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.75E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.52E-08 | 3.95E-08 | 9.25E-07 | 3.24E-08 | 0 | 6.629E-09 | 0 | 0 | 0.0066 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.12E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.32E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 | 0 | 5.747E-09 | 0 | 0 | 0.0057 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.55E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.14E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 | 0 | 4.957E-09 | 0 | 0 | 0.0050 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.09E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 9.87E-09 | 2.46E-08 | 5.77E-07 | 2.01E-08 | 0 | 4.32E-09 | 0 | 0 | 0.0043 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.73E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 8.69E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 3.812E-09 | 0 | 0 | 0.0038 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.43E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 7.72E-09 | 1.88E-08 | 4.40E-07 | 1.53E-08 | 0 | 3.396E-09 | 0 | 0 | 0.0034 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.19E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.93E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 3.052E-09 | 0 | 0 | 0.0031 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.98E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 6.27E-09 | 1.49E-08 | 3.49E-07 | 1.21E-08 | 0 | 2.766E-09 | 0 | 0 | 0.0028 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.80E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 5.68E-09 | 1.33E-08 | 3.12E-07 | 1.09E-08 | 0 | 2.511E-09 | 0 | 0 | 0.0025 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.64E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 5.18E-09 | 1.21E-08 | 2.82E-07 | 9.80E-09 | 0 | 2.296E-09 | 0 | 0 | 0.0023 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.51E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.76E-09 | 1.09E-08 | 2.56E-07 | 8.89E-09 | 0 | 2.112E-09 | 0 | 0 | 0.0021 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.40E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 4.39E-09 | 9.98E-09 | 2.33E-07 | 8.10E-09 | 0 | 1.95E-09 | 0 | 0 | 0.0019 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.28E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.15E-08 | 1.14E-07 | 2.67E-06 | 9.36E-08 | 0 | 1.784E-08 | 0 | 0 | 0.0178 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.19E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 3.85E-08 | 1.05E-07 | 2.47E-06 | 8.67E-08 | 0 | 1.655E-08 | 0 | 0 | 0.0166 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.02E-04 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 3.29E-08 | 8.94E-08 | 2.10E-06 | 7.36E-08 | 0 | 1.417E-08 | 0 | 0 | 0.0142 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.96E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.90E-08 | 7.85E-08 | 1.84E-06 | 6.46E-08 | 0 | 1.251E-08 | 0 | 0 | 0.0125 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.61E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 2.46E-08 | 6.60E-08 | 1.55E-06 | 5.43E-08 | 0 | 1.063E-08 | 0 | 0 | 0.0106 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.50E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.10E-08 | 5.57E-08 | 1.31E-06 | 4.58E-08 | 0 | 9.068E-09 | 0 | 0 | 0.0091 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.52E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.78E-08 | 4.67E-08 | 1.10E-06 | 3.84E-08 | 0 | 7.709E-09 | 0 | 0 | 0.0077 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.64E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.49E-08 | 3.86E-08 | 9.04E-07 | 3.16E-08 | 0 | 6.472E-09 | 0 | 0 | 0.0065 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.92E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.25E-08 | 3.20E-08 | 7.51E-07 | 2.62E-08 | 0 | 5.47E-09 | 0 | 0 | 0.0055 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.36E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 1.07E-08 | 2.70E-08 | 6.33E-07 | 2.21E-08 | 0 | 4.695E-09 | 0 | 0 | 0.0047 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.94E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 9.36E-09 | 2.32E-08 | 5.44E-07 | 1.90E-08 | 0 | 4.103E-09 | 0 | 0 | 0.0041 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.60E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 8.25E-09 | 2.02E-08 | 4.72E-07 | 1.65E-08 | 0 | 3.624E-09 | 0 | 0 | 0.0036 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.31E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 7.32E-09 | 1.77E-08 | 4.13E-07 | 1.44E-08 | 0 | 3.221E-09 | 0 | 0 | 0.0032 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.07E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 6.55E-09 | 1.56E-08 | 3.65E-07 | 1.27E-08 | 0 | 2.889E-09 | 0 | 0 | 0.0029 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.86E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.88E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 2.602E-09 | 0 | 0 | 0.0026 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.69E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 5.33E-09 | 1.23E-08 | 2.89E-07 | 1.00E-08 | 0 | 2.361E-09 | 0 | 0 | 0.0024 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.55E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 4.87E-09 | 1.11E-08 | 2.61E-07 | 9.05E-09 | 0 | 2.161E-09 | 0 | 0 | 0.0022 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.43E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.48E-09 | 1.01E-08 | 2.37E-07 | 8.22E-09 | 0 | 1.991E-09 | 0 | 0 | 0.0020 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.32E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.14E-09 | 9.27E-09 | 2.17E-07 | 7.52E-09 | 0 | 1.844E-09 | 0 | 0 | 0.0018 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.54E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 5.00E-08 | 1.39E-07 | 3.26E-06 | 1.14E-07 | 0 | 2.146E-08 | 0 | 0 | 0.0215 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.51E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 4.93E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 2.113E-08 | 0 | 0 | 0.0211 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 (per million) | Receptor Type |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.44E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 4.69E-08 | 1.30E-07 | 3.05E-06 | 1.07E-07 | 0 | 2.011E-08 | 0 | 0 | 0.0201 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.38E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.48E-08 | 1.24E-07 | 2.92E-06 | 1.02E-07 | 0 | 1.921E-08 | 0 | 0 | 0.0192 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.19E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 3.87E-08 | 1.07E-07 | 2.51E-06 | 8.81E-08 | 0 | 1.662E-08 | 0 | 0 | 0.0166 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.68E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.14E-08 | 8.61E-08 | 2.02E-06 | 7.09E-08 | 0 | 1.351E-08 | 0 | 0 | 0.0135 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.91E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 2.56E-08 | 6.95E-08 | 1.63E-06 | 5.71E-08 | 0 | 1.104E-08 | 0 | 0 | 0.0110 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.53E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.11E-08 | 5.66E-08 | 1.33E-06 | 4.65E-08 | 0 | 9.112E-09 | 0 | 0 | 0.0091 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.29E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.71E-08 | 4.50E-08 | 1.06E-06 | 3.70E-08 | 0 | 7.388E-09 | 0 | 0 | 0.0074 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.34E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.40E-08 | 3.62E-08 | 8.49E-07 | 2.97E-08 | 0 | 6.063E-09 | 0 | 0 | 0.0061 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.69E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.18E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 5.152E-09 | 0 | 0 | 0.0052 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.16E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 1.01E-08 | 2.53E-08 | 5.93E-07 | 2.07E-08 | 0 | 4.407E-09 | 0 | 0 | 0.0044 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.74E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.73E-09 | 2.16E-08 | 5.05E-07 | 1.76E-08 | 0 | 3.826E-09 | 0 | 0 | 0.0038 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.41E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.65E-09 | 1.86E-08 | 4.35E-07 | 1.52E-08 | 0 | 3.366E-09 | 0 | 0 | 0.0034 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.14E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.78E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 0 | 2.992E-09 | 0 | 0 | 0.0030 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.93E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 6.09E-09 | 1.43E-08 | 3.35E-07 | 1.17E-08 | 0 | 2.691E-09 | 0 | 0 | 0.0027 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.74E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 5.47E-09 | 1.27E-08 | 2.97E-07 | 1.03E-08 | 0 | 2.427E-09 | 0 | 0 | 0.0024 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.59E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 4.99E-09 | 1.14E-08 | 2.66E-07 | 9.25E-09 | 0 | 2.216E-09 | 0 | 0 | 0.0022 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.46E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 4.58E-09 | 1.03E-08 | 2.41E-07 | 8.38E-09 | 0 | 2.039E-09 | 0 | 0 | 0.0020 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.36E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 4.24E-09 | 9.46E-09 | 2.21E-07 | 7.67E-09 | 0 | 1.892E-09 | 0 | 0 | 0.0019 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.27E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 3.95E-09 | 8.73E-09 | 2.04E-07 | 7.07E-09 | 0 | 1.766E-09 | 0 | 0 | 0.0018 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.66E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 5.40E-08 | 1.51E-07 | 3.54E-06 | 1.24E-07 | 0 | 2.313E-08 | 0 | 0 | 0.0231 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.60E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 5.23E-08 | 1.46E-07 | 3.43E-06 | 1.20E-07 | 0 | 2.238E-08 | 0 | 0 | 0.0224 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.60E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 5.22E-08 | 1.46E-07 | 3.43E-06 | 1.21E-07 | 0 | 2.234E-08 | 0 | 0 | 0.0223 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.33E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 4.34E-08 | 1.21E-07 | 2.84E-06 | 9.98E-08 | 0 | 1.859E-08 | 0 | 0 | 0.0186 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.02E-04 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 3.30E-08 | 9.14E-08 | 2.15E-06 | 7.53E-08 | 0 | 1.418E-08 | 0 | 0 | 0.0142 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.93E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.57E-08 | 7.05E-08 | 1.65E-06 | 5.80E-08 | 0 | 1.107E-08 | 0 | 0 | 0.0111 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.21E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 2.01E-08 | 5.43E-08 | 1.27E-06 | 4.47E-08 | 0 | 8.664E-09 | 0 | 0 | 0.0087 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.93E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.59E-08 | 4.23E-08 | 9.91E-07 | 3.47E-08 | 0 | 6.876E-09 | 0 | 0 | 0.0069 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 4.00E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.29E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 0 | 5.585E-09 | 0 | 0 | 0.0056 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.34E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.07E-08 | 2.74E-08 | 6.43E-07 | 2.25E-08 | 0 | 4.66E-09 | 0 | 0 | 0.0047 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.85E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 9.12E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 3.985E-09 | 0 | 0 | 0.0040 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.49E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 7.93E-09 | 1.96E-08 | 4.59E-07 | 1.60E-08 | 0 | 3.478E-09 | 0 | 0 | 0.0035 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.20E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 6.97E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 0 | 3.066E-09 | 0 | 0 | 0.0031 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.96E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 6.21E-09 | 1.48E-08 | 3.46E-07 | 1.20E-08 | 0 | 2.741E-09 | 0 | 0 | 0.0027 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.78E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 5.61E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 0 | 2.483E-09 | 0 | 0 | 0.0025 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.63E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 5.13E-09 | 1.18E-08 | 2.76E-07 | 9.60E-09 | 0 | 2.275E-09 | 0 | 0 | 0.0023 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.51E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 4.73E-09 | 1.07E-08 | 2.51E-07 | 8.72E-09 | 0 | 2.102E-09 | 0 | 0 | 0.0021 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.40E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 4.40E-09 | 9.90E-09 | 2.31E-07 | 8.02E-09 | 0 | 1.961E-09 | 0 | 0 | 0.0020 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.32E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 4.13E-09 | 9.20E-09 | 2.15E-07 | 7.45E-09 | 0 | 1.844E-09 | 0 | 0 | 0.0018 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.25E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 3.89E-09 | 8.59E-09 | 2.01E-07 | 6.95E-09 | 0 | 1.739E-09 | 0 | 0 | 0.0017 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.37E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 7.73E-08 | 2.19E-07 | 5.14E-06 | 1.81E-07 | 0 | 3.302E-08 | 0 | 0 | 0.0330 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 2.02E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 6.60E-08 | 1.87E-07 | 4.38E-06 | 1.54E-07 | 0 | 2.82E-08 | 0 | 0 | 0.0282 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.49E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 4.86E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 2.078E-08 | 0 | 0 | 0.0208 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.05E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 3.42E-08 | 9.52E-08 | 2.23E-06 | 7.84E-08 | 0 | 1.463E-08 | 0 | 0 | 0.0146 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.45E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.42E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 0 | 1.04E-08 | 0 | 0 | 0.0104 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.49E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.78E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 7.66E-09 | 0 | 0 | 0.0077 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.28E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.38E-08 | 3.69E-08 | 8.65E-07 | 3.03E-08 | 0 | 5.982E-09 | 0 | 0 | 0.0060 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.47E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 1.12E-08 | 2.93E-08 | 6.86E-07 | 2.40E-08 | 0 | 4.85E-09 | 0 | 0 | 0.0048 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.91E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 9.34E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 4.068E-09 | 0 | 0 | 0.0041 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.51E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 8.03E-09 | 2.03E-08 | 4.75E-07 | 1.66E-08 | 0 | 3.506E-09 | 0 | 0 | 0.0035 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.21E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 7.05E-09 | 1.75E-08 | 4.09E-07 | 1.43E-08 | 0 | 3.089E-09 | 0 | 0 | 0.0031 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.99E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 6.32E-09 | 1.54E-08 | 3.60E-07 | 1.26E-08 | 0 | 2.777E-09 | 0 | 0 | 0.0028 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.82E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 5.75E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 2.534E-09 | 0 | 0 | 0.0025 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.68E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 5.30E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 0 | 2.342E-09 | 0 | 0 | 0.0023 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.56E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 4.93E-09 | 1.15E-08 | 2.69E-07 | 9.37E-09 | 0 | 2.184E-09 | 0 | 0 | 0.0022 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.47E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.62E-09 | 1.07E-08 | 2.49E-07 | 8.66E-09 | 0 | 2.05E-09 | 0 | 0 | 0.0021 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.38E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.35E-09 | 9.92E-09 | 2.32E-07 | 8.06E-09 | 0 | 1.933E-09 | 0 | 0 | 0.0019 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.31E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 4.12E-09 | 9.32E-09 | 2.18E-07 | 7.56E-09 | 0 | 1.835E-09 | 0 | 0 | 0.0018 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 (per million) | Receptor Type |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.25E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 3.91E-09 | 8.75E-09 | 2.04E-07 | 7.09E-09 | 0 | 1.742E-09 | 0 | 0 | 0.0017 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.47E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 1.13E-07 | 3.23E-07 | 7.58E-06 | 2.66E-07 | 0 | 4.843E-08 | 0 | 0 | 0.0484 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.91E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 1.28E-07 | 3.65E-07 | 8.56E-06 | 3.01E-07 | 0 | 5.459E-08 | 0 | 0 | 0.0546 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.51E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 1.15E-07 | 3.27E-07 | 7.68E-06 | 2.70E-07 | 0 | 4.898E-08 | 0 | 0 | 0.0490 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.66E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 8.69E-08 | 2.47E-07 | 5.79E-06 | 2.04E-07 | 0 | 3.708E-08 | 0 | 0 | 0.0371 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.62E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.28E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 | 0 | 2.256E-08 | 0 | 0 | 0.0226 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.73E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 3.17E-08 | 8.85E-08 | 2.08E-06 | 7.29E-08 | 0 | 1.358E-08 | 0 | 0 | 0.0136 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.34E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.06E-08 | 5.67E-08 | 1.33E-06 | 4.67E-08 | 0 | 8.857E-09 | 0 | 0 | 0.0089 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.61E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.49E-08 | 4.04E-08 | 9.47E-07 | 3.32E-08 | 0 | 6.43E-09 | 0 | 0 | 0.0064 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.60E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.16E-08 | 3.10E-08 | 7.27E-07 | 2.55E-08 | 0 | 5.032E-09 | 0 | 0 | 0.0050 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.97E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.58E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 | 0 | 4.153E-09 | 0 | 0 | 0.0042 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.56E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.21E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 | 0 | 3.572E-09 | 0 | 0 | 0.0036 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.27E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 7.25E-09 | 1.85E-08 | 4.33E-07 | 1.51E-08 | 0 | 3.163E-09 | 0 | 0 | 0.0032 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.04E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 6.53E-09 | 1.64E-08 | 3.84E-07 | 1.34E-08 | 0 | 2.853E-09 | 0 | 0 | 0.0029 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.88E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 5.97E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 | 0 | 2.618E-09 | 0 | 0 | 0.0026 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.73E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 5.51E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 | 0 | 2.42E-09 | 0 | 0 | 0.0024 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.62E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 5.13E-09 | 1.24E-08 | 2.90E-07 | 1.01E-08 | 0 | 2.258E-09 | 0 | 0 | 0.0023 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.52E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 4.81E-09 | 1.15E-08 | 2.69E-07 | 9.36E-09 | 0 | 2.12E-09 | 0 | 0 | 0.0021 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.43E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.52E-09 | 1.07E-08 | 2.50E-07 | 8.69E-09 | 0 | 1.999E-09 | 0 | 0 | 0.0020 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.35E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.26E-09 | 9.94E-09 | 2.33E-07 | 8.09E-09 | 0 | 1.887E-09 | 0 | 0 | 0.0019 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.28E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.03E-09 | 9.30E-09 | 2.17E-07 | 7.56E-09 | 0 | 1.789E-09 | 0 | 0 | 0.0018 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.22E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 3.83E-09 | 8.73E-09 | 2.04E-07 | 7.09E-09 | 0 | 1.701E-09 | 0 | 0 | 0.0017 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.87E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 2.25E-07 | 6.44E-07 | 1.51E-05 | 5.32E-07 | 0 | 9.597E-08 | 0 | 0 | 0.0960 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.34E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 2.40E-07 | 6.88E-07 | 1.62E-05 | 5.68E-07 | 0 | 1.024E-07 | 0 | 0 | 0.1024 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.54E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 2.14E-07 | 6.13E-07 | 1.44E-05 | 5.06E-07 | 0 | 9.131E-08 | 0 | 0 | 0.0913 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.44E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.13E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 | 0 | 4.804E-08 | 0 | 0 | 0.0480 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.40E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 4.59E-08 | 1.29E-07 | 3.03E-06 | 1.07E-07 | 0 | 1.961E-08 | 0 | 0 | 0.0196 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.59E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 2.47E-08 | 6.85E-08 | 1.61E-06 | 5.65E-08 | 0 | 1.06E-08 | 0 | 0 | 0.0106 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.13E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.66E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 7.162E-09 | 0 | 0 | 0.0072 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.95E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.28E-08 | 3.44E-08 | 8.08E-07 | 2.83E-08 | 0 | 5.514E-09 | 0 | 0 | 0.0055 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.25E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.05E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 | 0 | 4.542E-09 | 0 | 0 | 0.0045 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.78E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 8.95E-09 | 2.36E-08 | 5.53E-07 | 1.94E-08 | 0 | 3.88E-09 | 0 | 0 | 0.0039 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.43E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.81E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 0 | 3.392E-09 | 0 | 0 | 0.0034 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.16E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 6.94E-09 | 1.79E-08 | 4.19E-07 | 1.47E-08 | 0 | 3.02E-09 | 0 | 0 | 0.0030 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.95E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 6.24E-09 | 1.59E-08 | 3.73E-07 | 1.30E-08 | 0 | 2.722E-09 | 0 | 0 | 0.0027 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.78E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.69E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 2.484E-09 | 0 | 0 | 0.0025 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.64E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 5.22E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 2.287E-09 | 0 | 0 | 0.0023 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.52E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 4.85E-09 | 1.19E-08 | 2.80E-07 | 9.76E-09 | 0 | 2.126E-09 | 0 | 0 | 0.0021 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.43E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 4.53E-09 | 1.10E-08 | 2.58E-07 | 9.01E-09 | 0 | 1.992E-09 | 0 | 0 | 0.0020 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.34E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 4.26E-09 | 1.03E-08 | 2.40E-07 | 8.36E-09 | 0 | 1.877E-09 | 0 | 0 | 0.0019 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.27E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 4.02E-09 | 9.57E-09 | 2.24E-07 | 7.79E-09 | 0 | 1.775E-09 | 0 | 0 | 0.0018 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.21E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 3.81E-09 | 8.94E-09 | 2.09E-07 | 7.28E-09 | 0 | 1.683E-09 | 0 | 0 | 0.0017 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.15E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 3.62E-09 | 8.41E-09 | 1.97E-07 | 6.84E-09 | 0 | 1.604E-09 | 0 | 0 | 0.0016 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.83E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 5.99E-07 | 1.72E-06 | 4.04E-05 | 1.42E-06 | 0 | 2.553E-07 | 0 | 0 | 0.2553 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.40E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 7.87E-07 | 2.26E-06 | 5.30E-05 | 1.87E-06 | 0 | 3.351E-07 | 0 | 0 | 0.3351 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.79E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 9.15E-07 | 2.63E-06 | 6.17E-05 | 2.17E-06 | 0 | 3.898E-07 | 0 | 0 | 0.3898 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.24E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 7.31E-08 | 2.08E-07 | 4.87E-06 | 1.71E-07 | 0 | 3.122E-08 | 0 | 0 | 0.0312 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.68E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.15E-08 | 8.81E-08 | 2.07E-06 | 7.26E-08 | 0 | 1.351E-08 | 0 | 0 | 0.0135 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.27E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.04E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 | 0 | 8.752E-09 | 0 | 0 | 0.0088 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.64E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.51E-08 | 4.10E-08 | 9.61E-07 | 3.37E-08 | 0 | 6.484E-09 | 0 | 0 | 0.0065 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.69E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.19E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 | 0 | 5.148E-09 | 0 | 0 | 0.0051 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.05E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 9.84E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 | 0 | 4.256E-09 | 0 | 0 | 0.0043 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.59E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.36E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 | 0 | 3.622E-09 | 0 | 0 | 0.0036 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.26E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 7.26E-09 | 1.89E-08 | 4.44E-07 | 1.55E-08 | 0 | 3.151E-09 | 0 | 0 | 0.0032 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 2.00E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 6.42E-09 | 1.66E-08 | 3.88E-07 | 1.36E-08 | 0 | 2.791E-09 | 0 | 0 | 0.0028 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.80E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 5.75E-09 | 1.47E-08 | 3.45E-07 | 1.21E-08 | 0 | 2.507E-09 | 0 | 0 | 0.0025 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.63E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 5.22E-09 | 1.32E-08 | 3.10E-07 | 1.08E-08 | 0 | 2.278E-09 | 0 | 0 | 0.0023 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2025 (per million) | Receptor Type |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.50E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.78E-09 | 1.20E-08 | 2.81E-07 | 9.82E-09 | 0 | 2.09E-09 | 0 | 0 | 0.0021 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.39E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.43E-09 | 1.10E-08 | 2.58E-07 | 9.00E-09 | 0 | 1.94E-09 | 0 | 0 | 0.0019 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.30E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.15E-09 | 1.02E-08 | 2.39E-07 | 8.34E-09 | 0 | 1.819E-09 | 0 | 0 | 0.0018 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.23E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 3.89E-09 | 9.48E-09 | 2.22E-07 | 7.74E-09 | 0 | 1.711E-09 | 0 | 0 | 0.0017 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.16E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 3.69E-09 | 8.88E-09 | 2.08E-07 | 7.25E-09 | 0 | 1.623E-09 | 0 | 0 | 0.0016 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.11E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 3.50E-09 | 8.34E-09 | 1.95E-07 | 6.80E-09 | 0 | 1.543E-09 | 0 | 0 | 0.0015 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.05E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 3.33E-09 | 7.86E-09 | 1.84E-07 | 6.40E-09 | 0 | 1.473E-09 | 0 | 0 | 0.0015 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 3.00E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 9.82E-08 | 2.79E-07 | 6.56E-06 | 2.31E-07 | 0 | 4.192E-08 | 0 | 0 | 0.0419 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.40E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 7.84E-08 | 2.23E-07 | 5.22E-06 | 1.84E-07 | 0 | 3.348E-08 | 0 | 0 | 0.0335 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.30E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 4.23E-08 | 1.19E-07 | 2.79E-06 | 9.81E-08 | 0 | 1.811E-08 | 0 | 0 | 0.0181 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.31E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 2.71E-08 | 7.52E-08 | 1.76E-06 | 6.20E-08 | 0 | 1.16E-08 | 0 | 0 | 0.0116 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 6.05E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 1.97E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 8.446E-09 | 0 | 0 | 0.0084 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.61E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.49E-08 | 4.06E-08 | 9.52E-07 | 3.34E-08 | 0 | 6.434E-09 | 0 | 0 | 0.0064 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.67E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.19E-08 | 3.19E-08 | 7.48E-07 | 2.62E-08 | 0 | 5.127E-09 | 0 | 0 | 0.0051 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 3.04E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.80E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 0 | 4.242E-09 | 0 | 0 | 0.0042 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.57E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 8.29E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 0 | 3.595E-09 | 0 | 0 | 0.0036 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.23E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 7.17E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 0 | 3.116E-09 | 0 | 0 | 0.0031 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.97E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 6.31E-09 | 1.63E-08 | 3.81E-07 | 1.33E-08 | 0 | 2.743E-09 | 0 | 0 | 0.0027 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.62E-09 | 1.44E-08 | 3.36E-07 | 1.18E-08 | 0 | 2.448E-09 | 0 | 0 | 0.0024 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.58E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 5.07E-09 | 1.29E-08 | 3.01E-07 | 1.05E-08 | 0 | 2.212E-09 | 0 | 0 | 0.0022 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.45E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 4.62E-09 | 1.16E-08 | 2.72E-07 | 9.51E-09 | 0 | 2.018E-09 | 0 | 0 | 0.0020 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.33E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 4.24E-09 | 1.06E-08 | 2.48E-07 | 8.66E-09 | 0 | 1.857E-09 | 0 | 0 | 0.0019 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.23E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.92E-09 | 9.71E-09 | 2.27E-07 | 7.93E-09 | 0 | 1.718E-09 | 0 | 0 | 0.0017 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.16E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 3.68E-09 | 9.06E-09 | 2.12E-07 | 7.40E-09 | 0 | 1.617E-09 | 0 | 0 | 0.0016 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.09E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 3.47E-09 | 8.48E-09 | 1.98E-07 | 6.92E-09 | 0 | 1.526E-09 | 0 | 0 | 0.0015 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.04E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 3.30E-09 | 8.00E-09 | 1.87E-07 | 6.53E-09 | 0 | 1.453E-09 | 0 | 0 | 0.0015 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.96E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 3.15E-09 | 7.58E-09 | 1.77E-07 | 6.18E-09 | 0 | 1.39E-09 | 0 | 0 | 0.0014 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.48E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 3.00E-09 | 7.14E-09 | 1.67E-07 | 5.82E-09 | 0 | 1.323E-09 | 0 | 0 | 0.0013 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.12E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 1.01E-08 | 2.66E-08 | 6.24E-07 | 2.19E-08 | 0 | 4.353E-09 | 0 | 0 | 0.0044 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.90E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.08E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 0 | 2.649E-09 | 0 | 0 | 0.0026 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.71E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.47E-09 | 1.39E-08 | 3.25E-07 | 1.14E-08 | 0 | 2.388E-09 | 0 | 0 | 0.0024 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.55E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 4.94E-09 | 1.24E-08 | 2.91E-07 | 1.02E-08 | 0 | 2.158E-09 | 0 | 0 | 0.0022 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.41E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 4.50E-09 | 1.12E-08 | 2.63E-07 | 9.19E-09 | 0 | 1.967E-09 | 0 | 0 | 0.0020 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.28E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 4.08E-09 | 1.01E-08 | 2.37E-07 | 8.27E-09 | 0 | 1.787E-09 | 0 | 0 | 0.0018 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.18E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 3.75E-09 | 9.23E-09 | 2.16E-07 | 7.54E-09 | 0 | 1.644E-09 | 0 | 0 | 0.0016 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.09E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 3.46E-09 | 8.47E-09 | 1.98E-07 | 6.92E-09 | 0 | 1.521E-09 | 0 | 0 | 0.0015 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.02E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 3.23E-09 | 7.86E-09 | 1.84E-07 | 6.42E-09 | 0 | 1.422E-09 | 0 | 0 | 0.0014 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.59E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 3.04E-09 | 7.35E-09 | 1.72E-07 | 6.00E-09 | 0 | 1.339E-09 | 0 | 0 | 0.0013 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.15E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 2.90E-09 | 6.97E-09 | 1.63E-07 | 5.69E-09 | 0 | 1.277E-09 | 0 | 0 | 0.0013 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.75E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 2.77E-09 | 6.62E-09 | 1.55E-07 | 5.40E-09 | 0 | 1.221E-09 | 0 | 0 | 0.0012 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.32E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 2.63E-09 | 6.25E-09 | 1.46E-07 | 5.09E-09 | 0 | 1.162E-09 | 0 | 0 | 0.0012 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2026

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2026_PAVED | 1.681E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2026 | 0 | 0.25 | 0.75 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.032 | 0.013 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 3.49E-05 | 1.40E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 3.81E-04 | 1.52E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 2.67E-04 | 1.07E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 4.76E-04 | 1.91E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 8.57E-04 | 3.43E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 1.27E-06 | 5.08E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 2.89E-05 | 1.16E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 1.62E-02 | 6.48E-03 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.96E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 6.54E-08 | 1.85E-07 | 4.35E-06 | 1.53E-07 | 0 | 6.858E-09 | 2.74656E-09 | 0 | 0.0096 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.35E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 4.46E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 4.71E-09 | 1.88641E-09 | 0 | 0.0066 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.24E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 3.78E-09 | 6.52E-09 | 1.51E-07 | 5.15E-09 | 0 | 4.321E-10 | 1.73051E-10 | 0 | 0.0006 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.56E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 5.01E-09 | 1.19E-08 | 2.78E-07 | 9.68E-09 | 0 | 5.449E-10 | 2.18225E-10 | 0 | 0.0008 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.23E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 2.08E-07 | 5.94E-07 | 1.39E-05 | 4.91E-07 | 0 | 2.175E-08 | 8.71051E-09 | 0 | 0.0305 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.26E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 4.20E-07 | 1.20E-06 | 2.83E-05 | 9.95E-07 | 0 | 4.397E-08 | 1.76109E-08 | 0 | 0.0616 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.74E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 1.91E-07 | 5.47E-07 | 1.28E-05 | 4.52E-07 | 0 | 2.003E-08 | 8.02109E-09 | 0 | 0.0280 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.52E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 5.09E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 5.32E-08 | 2.13092E-08 | 0 | 0.0745 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.05E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 3.45E-08 | 9.23E-08 | 2.16E-06 | 7.59E-08 | 0 | 3.666E-09 | 1.46821E-09 | 0 | 0.0051 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.04E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 1.01E-07 | 2.87E-07 | 6.74E-06 | 2.37E-07 | 0 | 1.061E-08 | 4.25103E-09 | 0 | 0.0149 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.16E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 2.37E-08 | 6.59E-08 | 1.55E-06 | 5.43E-08 | 0 | 2.5E-09 | 1.00133E-09 | 0 | 0.0035 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.74E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 1.306E-09 | 5.23128E-10 | 0 | 0.0018 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.50E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 1.12E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 1.223E-09 | 4.89859E-10 | 0 | 0.0017 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.29E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.05E-08 | 2.45E-08 | 5.74E-07 | 2.00E-08 | 0 | 1.148E-09 | 4.5977E-10 | 0 | 0.0016 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.09E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 9.88E-09 | 2.30E-08 | 5.38E-07 | 1.87E-08 | 0 | 1.08E-09 | 4.32409E-10 | 0 | 0.0015 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.92E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.34E-09 | 2.17E-08 | 5.08E-07 | 1.76E-08 | 0 | 1.021E-09 | 4.08839E-10 | 0 | 0.0014 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.75E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 8.79E-09 | 2.04E-08 | 4.77E-07 | 1.66E-08 | 0 | 9.611E-10 | 3.84938E-10 | 0 | 0.0013 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.58E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 8.22E-09 | 1.90E-08 | 4.43E-07 | 1.54E-08 | 0 | 8.99E-10 | 3.60054E-10 | 0 | 0.0013 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.90E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 1.24E-08 | 2.84E-08 | 6.64E-07 | 2.31E-08 | 0 | 1.36E-09 | 5.44622E-10 | 0 | 0.0019 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.21E-08 | 2.82E-08 | 6.60E-07 | 2.30E-08 | 0 | 1.323E-09 | 5.30044E-10 | 0 | 0.0019 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.58E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.26E-07 | 2.18E-08 | 0 | 1.249E-09 | 5.00153E-10 | 0 | 0.0017 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.36E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.07E-08 | 2.51E-08 | 5.87E-07 | 2.04E-08 | 0 | 1.173E-09 | 4.69705E-10 | 0 | 0.0016 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.14E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.00E-08 | 2.35E-08 | 5.49E-07 | 1.91E-08 | 0 | 1.097E-09 | 4.39274E-10 | 0 | 0.0015 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.95E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 9.42E-09 | 2.19E-08 | 5.13E-07 | 1.78E-08 | 0 | 1.029E-09 | 4.11964E-10 | 0 | 0.0014 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.76E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 8.82E-09 | 2.05E-08 | 4.78E-07 | 1.66E-08 | 0 | 9.643E-10 | 3.86232E-10 | 0 | 0.0014 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.61E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 8.32E-09 | 1.92E-08 | 4.50E-07 | 1.56E-08 | 0 | 9.101E-10 | 3.64501E-10 | 0 | 0.0013 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.46E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 7.84E-09 | 1.80E-08 | 4.22E-07 | 1.47E-08 | 0 | 8.582E-10 | 3.43712E-10 | 0 | 0.0012 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.57E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 1.13E-08 | 2.48E-08 | 5.79E-07 | 2.01E-08 | 0 | 1.247E-09 | 4.99487E-10 | 0 | 0.0017 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.75E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 1.19E-08 | 2.75E-08 | 6.42E-07 | 2.23E-08 | 0 | 1.308E-09 | 5.23724E-10 | 0 | 0.0018 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.63E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.16E-08 | 2.72E-08 | 6.37E-07 | 2.22E-08 | 0 | 1.268E-09 | 5.08016E-10 | 0 | 0.0018 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.42E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.09E-08 | 2.57E-08 | 6.01E-07 | 2.09E-08 | 0 | 1.194E-09 | 4.78303E-10 | 0 | 0.0017 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.21E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.03E-08 | 2.41E-08 | 5.64E-07 | 1.96E-08 | 0 | 1.121E-09 | 4.48889E-10 | 0 | 0.0016 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.02E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 9.66E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 1.054E-09 | 4.22233E-10 | 0 | 0.0015 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.82E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 9.01E-09 | 2.10E-08 | 4.91E-07 | 1.71E-08 | 0 | 9.836E-10 | 3.93961E-10 | 0 | 0.0014 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.64E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 8.44E-09 | 1.96E-08 | 4.58E-07 | 1.59E-08 | 0 | 9.224E-10 | 3.69454E-10 | 0 | 0.0013 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.48E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 7.92E-09 | 1.83E-08 | 4.28E-07 | 1.49E-08 | 0 | 8.667E-10 | 3.47114E-10 | 0 | 0.0012 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.33E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 7.43E-09 | 1.71E-08 | 3.99E-07 | 1.39E-08 | 0 | 8.131E-10 | 3.25648E-10 | 0 | 0.0011 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.19E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 6.98E-09 | 1.60E-08 | 3.73E-07 | 1.30E-08 | 0 | 7.651E-10 | 3.06417E-10 | 0 | 0.0011 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.04E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 6.50E-09 | 1.47E-08 | 3.45E-07 | 1.20E-08 | 0 | 7.135E-10 | 2.85754E-10 | 0 | 0.0010 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.81E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.21E-08 | 2.74E-08 | 6.40E-07 | 2.22E-08 | 0 | 1.331E-09 | 5.33143E-10 | 0 | 0.0019 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.67E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 1.17E-08 | 2.67E-08 | 6.25E-07 | 2.17E-08 | 0 | 1.282E-09 | 5.13532E-10 | 0 | 0.0018 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.65E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.17E-08 | 2.74E-08 | 6.42E-07 | 2.23E-08 | 0 | 1.275E-09 | 5.10764E-10 | 0 | 0.0018 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.47E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 1.11E-08 | 2.62E-08 | 6.14E-07 | 2.13E-08 | 0 | 1.212E-09 | 4.85491E-10 | 0 | 0.0017 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.27E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 1.05E-08 | 2.47E-08 | 5.78E-07 | 2.01E-08 | 0 | 1.143E-09 | 4.57722E-10 | 0 | 0.0016 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.08E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.86E-09 | 2.32E-08 | 5.44E-07 | 1.89E-08 | 0 | 1.075E-09 | 4.3038E-10 | 0 | 0.0015 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.89E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 9.24E-09 | 2.17E-08 | 5.08E-07 | 1.77E-08 | 0 | 1.008E-09 | 4.038E-10 | 0 | 0.0014 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.70E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 8.65E-09 | 2.02E-08 | 4.73E-07 | 1.65E-08 | 0 | 9.44E-10 | 3.78072E-10 | 0 | 0.0013 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.51E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 8.03E-09 | 1.87E-08 | 4.37E-07 | 1.52E-08 | 0 | 8.777E-10 | 3.51525E-10 | 0 | 0.0012 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.33E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 7.43E-09 | 1.71E-08 | 4.00E-07 | 1.39E-08 | 0 | 8.127E-10 | 3.25497E-10 | 0 | 0.0011 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.14E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 6.80E-09 | 1.55E-08 | 3.63E-07 | 1.26E-08 | 0 | 7.459E-10 | 2.98741E-10 | 0 | 0.0010 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.73E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 1.18E-08 | 2.66E-08 | 6.22E-07 | 2.16E-08 | 0 | 1.301E-09 | 5.20889E-10 | 0 | 0.0018 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.69E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 1.18E-08 | 2.71E-08 | 6.35E-07 | 2.21E-08 | 0 | 1.289E-09 | 5.16319E-10 | 0 | 0.0018 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.61E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.15E-08 | 2.71E-08 | 6.33E-07 | 2.20E-08 | 0 | 1.26E-09 | 5.04717E-10 | 0 | 0.0018 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.48E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 1.12E-08 | 2.64E-08 | 6.18E-07 | 2.15E-08 | 0 | 1.216E-09 | 4.86955E-10 | 0 | 0.0017 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.31E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 1.06E-08 | 2.52E-08 | 5.91E-07 | 2.06E-08 | 0 | 1.156E-09 | 4.62843E-10 | 0 | 0.0016 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.11E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 9.97E-09 | 2.36E-08 | 5.53E-07 | 1.92E-08 | 0 | 1.085E-09 | 4.34593E-10 | 0 | 0.0015 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.90E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 9.30E-09 | 2.20E-08 | 5.14E-07 | 1.79E-08 | 0 | 1.013E-09 | 4.05663E-10 | 0 | 0.0014 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.67E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 8.54E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 9.315E-10 | 3.73094E-10 | 0 | 0.0013 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.46E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 7.86E-09 | 1.83E-08 | 4.27E-07 | 1.49E-08 | 0 | 8.584E-10 | 3.43821E-10 | 0 | 0.0012 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.48E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.44E-08 | 3.51E-08 | 8.21E-07 | 2.86E-08 | 0 | 1.564E-09 | 6.26477E-10 | 0 | 0.0022 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.78E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.53E-08 | 3.53E-08 | 8.25E-07 | 2.87E-08 | 0 | 1.669E-09 | 6.6862E-10 | 0 | 0.0023 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.25E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.35E-08 | 3.07E-08 | 7.17E-07 | 2.49E-08 | 0 | 1.484E-09 | 5.94288E-10 | 0 | 0.0021 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.06E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.29E-08 | 2.95E-08 | 6.91E-07 | 2.40E-08 | 0 | 1.416E-09 | 5.67078E-10 | 0 | 0.0020 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.92E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.25E-08 | 2.90E-08 | 6.79E-07 | 2.36E-08 | 0 | 1.368E-09 | 5.47876E-10 | 0 | 0.0019 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.75E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.20E-08 | 2.81E-08 | 6.57E-07 | 2.28E-08 | 0 | 1.309E-09 | 5.24463E-10 | 0 | 0.0018 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.56E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 1.14E-08 | 2.68E-08 | 6.27E-07 | 2.18E-08 | 0 | 1.243E-09 | 4.98034E-10 | 0 | 0.0017 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.55E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.14E-08 | 2.74E-08 | 6.40E-07 | 2.23E-08 | 0 | 1.238E-09 | 4.95978E-10 | 0 | 0.0017 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.32E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 1.07E-08 | 2.56E-08 | 5.99E-07 | 2.09E-08 | 0 | 1.159E-09 | 4.64283E-10 | 0 | 0.0016 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.07E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 9.86E-09 | 2.35E-08 | 5.51E-07 | 1.92E-08 | 0 | 1.072E-09 | 4.29385E-10 | 0 | 0.0015 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.83E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 9.06E-09 | 2.15E-08 | 5.02E-07 | 1.75E-08 | 0 | 9.87E-10 | 3.95314E-10 | 0 | 0.0014 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.60E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 8.31E-09 | 1.95E-08 | 4.56E-07 | 1.59E-08 | 0 | 9.064E-10 | 3.63009E-10 | 0 | 0.0013 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.38E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 7.61E-09 | 1.77E-08 | 4.14E-07 | 1.44E-08 | 0 | 8.314E-10 | 3.32987E-10 | 0 | 0.0012 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.94E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.58E-08 | 3.69E-08 | 8.62E-07 | 3.00E-08 | 0 | 1.723E-09 | 6.90157E-10 | 0 | 0.0024 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.72E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.51E-08 | 3.46E-08 | 8.10E-07 | 2.82E-08 | 0 | 1.649E-09 | 6.60313E-10 | 0 | 0.0023 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.79E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.53E-08 | 3.59E-08 | 8.40E-07 | 2.92E-08 | 0 | 1.673E-09 | 6.70258E-10 | 0 | 0.0023 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.70E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.51E-08 | 3.60E-08 | 8.42E-07 | 2.93E-08 | 0 | 1.641E-09 | 6.57423E-10 | 0 | 0.0023 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.62E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.49E-08 | 3.61E-08 | 8.44E-07 | 2.94E-08 | 0 | 1.612E-09 | 6.45796E-10 | 0 | 0.0023 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.20E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.35E-08 | 3.25E-08 | 7.61E-07 | 2.65E-08 | 0 | 1.467E-09 | 5.87379E-10 | 0 | 0.0021 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.10E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.32E-08 | 3.22E-08 | 7.53E-07 | 2.63E-08 | 0 | 1.43E-09 | 5.72656E-10 | 0 | 0.0020 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.86E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.25E-08 | 3.04E-08 | 7.12E-07 | 2.48E-08 | 0 | 1.348E-09 | 5.40082E-10 | 0 | 0.0019 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.58E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.15E-08 | 2.81E-08 | 6.57E-07 | 2.29E-08 | 0 | 1.25E-09 | 5.0064E-10 | 0 | 0.0018 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.29E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.06E-08 | 2.56E-08 | 6.00E-07 | 2.09E-08 | 0 | 1.15E-09 | 4.60477E-10 | 0 | 0.0016 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.02E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 9.69E-09 | 2.33E-08 | 5.44E-07 | 1.90E-08 | 0 | 1.053E-09 | 4.21565E-10 | 0 | 0.0015 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.76E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 8.85E-09 | 2.10E-08 | 4.92E-07 | 1.71E-08 | 0 | 9.626E-10 | 3.85524E-10 | 0 | 0.0013 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.53E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 8.09E-09 | 1.90E-08 | 4.46E-07 | 1.55E-08 | 0 | 8.816E-10 | 3.53105E-10 | 0 | 0.0012 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.31E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 7.39E-09 | 1.72E-08 | 4.03E-07 | 1.40E-08 | 0 | 8.071E-10 | 3.2325E-10 | 0 | 0.0011 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.10E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.71E-09 | 1.54E-08 | 3.61E-07 | 1.25E-08 | 0 | 7.341E-10 | 2.94006E-10 | 0 | 0.0010 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.88E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 5.97E-09 | 1.35E-08 | 3.15E-07 | 1.09E-08 | 0 | 6.552E-10 | 2.62434E-10 | 0 | 0.0009 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.75E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.18E-08 | 5.40E-08 | 1.27E-06 | 4.42E-08 | 0 | 2.355E-09 | 9.43046E-10 | 0 | 0.0033 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.35E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 2.05E-08 | 5.09E-08 | 1.19E-06 | 4.16E-08 | 0 | 2.215E-09 | 8.87024E-10 | 0 | 0.0031 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.50E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.77E-08 | 4.31E-08 | 1.01E-06 | 3.52E-08 | 0 | 1.918E-09 | 7.68354E-10 | 0 | 0.0027 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.94E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 1.59E-08 | 3.83E-08 | 8.96E-07 | 3.12E-08 | 0 | 1.725E-09 | 6.91077E-10 | 0 | 0.0024 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.79E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.54E-08 | 3.77E-08 | 8.82E-07 | 3.07E-08 | 0 | 1.673E-09 | 6.70012E-10 | 0 | 0.0023 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.64E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.50E-08 | 3.69E-08 | 8.63E-07 | 3.01E-08 | 0 | 1.618E-09 | 6.4793E-10 | 0 | 0.0023 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.50E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.45E-08 | 3.62E-08 | 8.47E-07 | 2.96E-08 | 0 | 1.569E-09 | 6.28442E-10 | 0 | 0.0022 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.18E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.35E-08 | 3.36E-08 | 7.86E-07 | 2.74E-08 | 0 | 1.458E-09 | 5.83987E-10 | 0 | 0.0020 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.88E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.25E-08 | 3.11E-08 | 7.27E-07 | 2.54E-08 | 0 | 1.354E-09 | 5.42336E-10 | 0 | 0.0019 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.57E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 1.15E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 1.246E-09 | 4.98859E-10 | 0 | 0.0017 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.25E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 1.05E-08 | 2.57E-08 | 6.01E-07 | 2.10E-08 | 0 | 1.136E-09 | 4.54894E-10 | 0 | 0.0016 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.96E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 9.51E-09 | 2.30E-08 | 5.40E-07 | 1.88E-08 | 0 | 1.032E-09 | 4.13166E-10 | 0 | 0.0014 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.69E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 8.64E-09 | 2.07E-08 | 4.85E-07 | 1.69E-08 | 0 | 9.384E-10 | 3.7586E-10 | 0 | 0.0013 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.44E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.83E-09 | 1.86E-08 | 4.34E-07 | 1.51E-08 | 0 | 8.521E-10 | 3.41282E-10 | 0 | 0.0012 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.23E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 7.12E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 7.767E-10 | 3.11102E-10 | 0 | 0.0011 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.04E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.50E-09 | 1.50E-08 | 3.52E-07 | 1.22E-08 | 0 | 7.106E-10 | 2.84589E-10 | 0 | 0.0010 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.86E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 5.93E-09 | 1.36E-08 | 3.17E-07 | 1.10E-08 | 0 | 6.501E-10 | 2.6038E-10 | 0 | 0.0009 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.13E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.32E-08 | 5.99E-08 | 1.40E-06 | 4.91E-08 | 0 | 2.489E-09 | 9.96953E-10 | 0 | 0.0035 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.61E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.15E-08 | 5.54E-08 | 1.30E-06 | 4.54E-08 | 0 | 2.307E-09 | 9.23806E-10 | 0 | 0.0032 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.70E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.85E-08 | 4.69E-08 | 1.10E-06 | 3.84E-08 | 0 | 1.988E-09 | 7.96307E-10 | 0 | 0.0028 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.28E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.71E-08 | 4.34E-08 | 1.02E-06 | 3.55E-08 | 0 | 1.842E-09 | 7.37664E-10 | 0 | 0.0026 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.06E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.65E-08 | 4.20E-08 | 9.84E-07 | 3.44E-08 | 0 | 1.768E-09 | 7.08032E-10 | 0 | 0.0025 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.63E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.50E-08 | 3.82E-08 | 8.95E-07 | 3.13E-08 | 0 | 1.617E-09 | 6.47579E-10 | 0 | 0.0023 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.22E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.37E-08 | 3.46E-08 | 8.10E-07 | 2.83E-08 | 0 | 1.472E-09 | 5.89721E-10 | 0 | 0.0021 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.86E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.25E-08 | 3.14E-08 | 7.35E-07 | 2.57E-08 | 0 | 1.346E-09 | 5.39081E-10 | 0 | 0.0019 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.52E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.14E-08 | 2.84E-08 | 6.65E-07 | 2.32E-08 | 0 | 1.227E-09 | 4.91452E-10 | 0 | 0.0017 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.18E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 1.03E-08 | 2.54E-08 | 5.95E-07 | 2.08E-08 | 0 | 1.111E-09 | 4.44979E-10 | 0 | 0.0016 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.86E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 9.23E-09 | 2.26E-08 | 5.29E-07 | 1.84E-08 | 0 | 9.991E-10 | 4.00153E-10 | 0 | 0.0014 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.57E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 8.27E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 8.976E-10 | 3.59513E-10 | 0 | 0.0013 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.32E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 7.45E-09 | 1.78E-08 | 4.16E-07 | 1.45E-08 | 0 | 8.098E-10 | 3.24351E-10 | 0 | 0.0011 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.11E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 6.74E-09 | 1.59E-08 | 3.72E-07 | 1.29E-08 | 0 | 7.351E-10 | 2.94408E-10 | 0 | 0.0010 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.93E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 6.16E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 6.725E-10 | 2.69356E-10 | 0 | 0.0009 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.77E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 5.66E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 6.195E-10 | 2.48112E-10 | 0 | 0.0009 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.58E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 5.03E-09 | 1.14E-08 | 2.66E-07 | 9.24E-09 | 0 | 5.523E-10 | 2.21222E-10 | 0 | 0.0008 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.23E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.36E-08 | 6.13E-08 | 1.44E-06 | 5.03E-08 | 0 | 2.525E-09 | 1.01112E-09 | 0 | 0.0035 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.87E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.24E-08 | 5.85E-08 | 1.37E-06 | 4.80E-08 | 0 | 2.398E-09 | 9.60333E-10 | 0 | 0.0034 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.38E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 2.08E-08 | 5.43E-08 | 1.27E-06 | 4.46E-08 | 0 | 2.227E-09 | 8.92006E-10 | 0 | 0.0031 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.76E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 1.88E-08 | 4.88E-08 | 1.14E-06 | 4.00E-08 | 0 | 2.01E-09 | 8.05133E-10 | 0 | 0.0028 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.16E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.68E-08 | 4.34E-08 | 1.02E-06 | 3.56E-08 | 0 | 1.8E-09 | 7.20924E-10 | 0 | 0.0025 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.63E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.51E-08 | 3.87E-08 | 9.06E-07 | 3.17E-08 | 0 | 1.617E-09 | 6.47531E-10 | 0 | 0.0023 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.19E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.36E-08 | 3.47E-08 | 8.13E-07 | 2.84E-08 | 0 | 1.461E-09 | 5.85093E-10 | 0 | 0.0020 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.79E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.23E-08 | 3.12E-08 | 7.31E-07 | 2.55E-08 | 0 | 1.324E-09 | 5.30132E-10 | 0 | 0.0019 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.41E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 1.10E-08 | 2.77E-08 | 6.49E-07 | 2.27E-08 | 0 | 1.189E-09 | 4.76021E-10 | 0 | 0.0017 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.03E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 9.80E-09 | 2.43E-08 | 5.70E-07 | 1.99E-08 | 0 | 1.058E-09 | 4.23605E-10 | 0 | 0.0015 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.70E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 8.71E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 9.42E-10 | 3.77278E-10 | 0 | 0.0013 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.42E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 7.78E-09 | 1.89E-08 | 4.41E-07 | 1.54E-08 | 0 | 8.432E-10 | 3.37721E-10 | 0 | 0.0012 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.18E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 6.99E-09 | 1.68E-08 | 3.92E-07 | 1.37E-08 | 0 | 7.601E-10 | 3.04442E-10 | 0 | 0.0011 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.99E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 6.37E-09 | 1.51E-08 | 3.53E-07 | 1.23E-08 | 0 | 6.932E-10 | 2.77651E-10 | 0 | 0.0010 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.82E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 5.83E-09 | 1.36E-08 | 3.19E-07 | 1.11E-08 | 0 | 6.356E-10 | 2.54573E-10 | 0 | 0.0009 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.69E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 5.38E-09 | 1.25E-08 | 2.92E-07 | 1.01E-08 | 0 | 5.881E-10 | 2.35564E-10 | 0 | 0.0008 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.57E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 5.01E-09 | 1.15E-08 | 2.69E-07 | 9.35E-09 | 0 | 5.481E-10 | 2.19517E-10 | 0 | 0.0008 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.33E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.40E-08 | 6.33E-08 | 1.48E-06 | 5.19E-08 | 0 | 2.559E-09 | 1.02474E-09 | 0 | 0.0036 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.78E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 2.22E-08 | 5.85E-08 | 1.37E-06 | 4.81E-08 | 0 | 2.368E-09 | 9.48403E-10 | 0 | 0.0033 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.97E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 1.95E-08 | 5.11E-08 | 1.20E-06 | 4.19E-08 | 0 | 2.083E-09 | 8.34135E-10 | 0 | 0.0029 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.24E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.71E-08 | 4.45E-08 | 1.04E-06 | 3.65E-08 | 0 | 1.831E-09 | 7.33198E-10 | 0 | 0.0026 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.65E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.52E-08 | 3.91E-08 | 9.17E-07 | 3.21E-08 | 0 | 1.624E-09 | 6.50454E-10 | 0 | 0.0023 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.15E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.35E-08 | 3.46E-08 | 8.11E-07 | 2.84E-08 | 0 | 1.449E-09 | 5.80521E-10 | 0 | 0.0020 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.67E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.19E-08 | 3.03E-08 | 7.10E-07 | 2.48E-08 | 0 | 1.282E-09 | 5.13623E-10 | 0 | 0.0018 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.23E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.05E-08 | 2.63E-08 | 6.15E-07 | 2.15E-08 | 0 | 1.127E-09 | 4.51334E-10 | 0 | 0.0016 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.84E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 9.20E-09 | 2.28E-08 | 5.34E-07 | 1.86E-08 | 0 | 9.93E-10 | 3.97696E-10 | 0 | 0.0014 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.53E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 8.16E-09 | 2.00E-08 | 4.68E-07 | 1.63E-08 | 0 | 8.827E-10 | 3.53532E-10 | 0 | 0.0012 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.27E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 7.29E-09 | 1.76E-08 | 4.13E-07 | 1.44E-08 | 0 | 7.911E-10 | 3.16866E-10 | 0 | 0.0011 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.05E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 6.60E-09 | 1.58E-08 | 3.70E-07 | 1.29E-08 | 0 | 7.171E-10 | 2.87229E-10 | 0 | 0.0010 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.88E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 6.02E-09 | 1.42E-08 | 3.33E-07 | 1.16E-08 | 0 | 6.551E-10 | 2.62365E-10 | 0 | 0.0009 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.73E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 5.52E-09 | 1.29E-08 | 3.03E-07 | 1.05E-08 | 0 | 6.022E-10 | 2.41192E-10 | 0 | 0.0008 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.59E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 5.08E-09 | 1.18E-08 | 2.76E-07 | 9.59E-09 | 0 | 5.553E-10 | 2.22418E-10 | 0 | 0.0008 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.47E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 4.70E-09 | 1.08E-08 | 2.52E-07 | 8.77E-09 | 0 | 5.143E-10 | 2.05972E-10 | 0 | 0.0007 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 9.95E-05 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 3.27E-08 | 8.73E-08 | 2.05E-06 | 7.17E-08 | 0 | 3.472E-09 | 1.39064E-09 | 0 | 0.0049 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.62E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 3.16E-08 | 8.46E-08 | 1.98E-06 | 6.96E-08 | 0 | 3.356E-09 | 1.34419E-09 | 0 | 0.0047 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.08E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 2.98E-08 | 8.00E-08 | 1.88E-06 | 6.58E-08 | 0 | 3.169E-09 | 1.26905E-09 | 0 | 0.0044 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.16E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 2.68E-08 | 7.16E-08 | 1.68E-06 | 5.88E-08 | 0 | 2.847E-09 | 1.14044E-09 | 0 | 0.0040 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.17E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 2.35E-08 | 6.25E-08 | 1.47E-06 | 5.14E-08 | 0 | 2.504E-09 | 1.00279E-09 | 0 | 0.0035 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.17E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.02E-08 | 5.32E-08 | 1.25E-06 | 4.37E-08 | 0 | 2.154E-09 | 8.62895E-10 | 0 | 0.0030 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.39E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.76E-08 | 4.60E-08 | 1.08E-06 | 3.78E-08 | 0 | 1.88E-09 | 7.53103E-10 | 0 | 0.0026 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.67E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.52E-08 | 3.95E-08 | 9.25E-07 | 3.24E-08 | 0 | 1.632E-09 | 6.53514E-10 | 0 | 0.0023 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.05E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.32E-08 | 3.38E-08 | 7.91E-07 | 2.77E-08 | 0 | 1.415E-09 | 5.66711E-10 | 0 | 0.0020 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.50E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 1.14E-08 | 2.87E-08 | 6.72E-07 | 2.35E-08 | 0 | 1.221E-09 | 4.88887E-10 | 0 | 0.0017 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.05E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 9.87E-09 | 2.46E-08 | 5.77E-07 | 2.01E-08 | 0 | 1.064E-09 | 4.26199E-10 | 0 | 0.0015 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.69E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 8.69E-09 | 2.14E-08 | 5.01E-07 | 1.75E-08 | 0 | 9.391E-10 | 3.76111E-10 | 0 | 0.0013 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.40E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 7.72E-09 | 1.88E-08 | 4.40E-07 | 1.53E-08 | 0 | 8.368E-10 | 3.35166E-10 | 0 | 0.0012 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.16E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.93E-09 | 1.67E-08 | 3.90E-07 | 1.36E-08 | 0 | 7.524E-10 | 3.01343E-10 | 0 | 0.0011 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.95E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 6.27E-09 | 1.49E-08 | 3.49E-07 | 1.21E-08 | 0 | 6.819E-10 | 2.73116E-10 | 0 | 0.0010 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.77E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 5.68E-09 | 1.33E-08 | 3.12E-07 | 1.09E-08 | 0 | 6.191E-10 | 2.47969E-10 | 0 | 0.0009 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.62E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 5.18E-09 | 1.21E-08 | 2.82E-07 | 9.80E-09 | 0 | 5.664E-10 | 2.26843E-10 | 0 | 0.0008 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.49E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.76E-09 | 1.09E-08 | 2.56E-07 | 8.89E-09 | 0 | 5.209E-10 | 2.08633E-10 | 0 | 0.0007 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.38E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 4.39E-09 | 9.98E-09 | 2.33E-07 | 8.10E-09 | 0 | 4.81E-10 | 1.92656E-10 | 0 | 0.0007 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.26E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.15E-08 | 1.14E-07 | 2.67E-06 | 9.36E-08 | 0 | 4.385E-09 | 1.75642E-09 | 0 | 0.0061 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.17E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 3.85E-08 | 1.05E-07 | 2.47E-06 | 8.67E-08 | 0 | 4.07E-09 | 1.63E-09 | 0 | 0.0057 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.99E-05 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 3.29E-08 | 8.94E-08 | 2.10E-06 | 7.36E-08 | 0 | 3.485E-09 | 1.39585E-09 | 0 | 0.0049 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.82E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.90E-08 | 7.85E-08 | 1.84E-06 | 6.46E-08 | 0 | 3.078E-09 | 1.23264E-09 | 0 | 0.0043 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.49E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 2.46E-08 | 6.60E-08 | 1.55E-06 | 5.43E-08 | 0 | 2.615E-09 | 1.04721E-09 | 0 | 0.0037 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.39E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.10E-08 | 5.57E-08 | 1.31E-06 | 4.58E-08 | 0 | 2.231E-09 | 8.93487E-10 | 0 | 0.0031 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.43E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.78E-08 | 4.67E-08 | 1.10E-06 | 3.84E-08 | 0 | 1.897E-09 | 7.59737E-10 | 0 | 0.0027 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.56E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.49E-08 | 3.86E-08 | 9.04E-07 | 3.16E-08 | 0 | 1.593E-09 | 6.38021E-10 | 0 | 0.0022 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.86E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.25E-08 | 3.20E-08 | 7.51E-07 | 2.62E-08 | 0 | 1.347E-09 | 5.39358E-10 | 0 | 0.0019 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.31E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 1.07E-08 | 2.70E-08 | 6.33E-07 | 2.21E-08 | 0 | 1.156E-09 | 4.63068E-10 | 0 | 0.0016 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.90E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 9.36E-09 | 2.32E-08 | 5.44E-07 | 1.90E-08 | 0 | 1.011E-09 | 4.0478E-10 | 0 | 0.0014 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.56E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 8.25E-09 | 2.02E-08 | 4.72E-07 | 1.65E-08 | 0 | 8.929E-10 | 3.57633E-10 | 0 | 0.0013 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.27E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 7.32E-09 | 1.77E-08 | 4.13E-07 | 1.44E-08 | 0 | 7.94E-10 | 3.18006E-10 | 0 | 0.0011 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.04E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 6.55E-09 | 1.56E-08 | 3.65E-07 | 1.27E-08 | 0 | 7.123E-10 | 2.8529E-10 | 0 | 0.0010 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.84E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.88E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 6.417E-10 | 2.57016E-10 | 0 | 0.0009 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.67E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 5.33E-09 | 1.23E-08 | 2.89E-07 | 1.00E-08 | 0 | 5.823E-10 | 2.3321E-10 | 0 | 0.0008 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.53E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 4.87E-09 | 1.11E-08 | 2.61E-07 | 9.05E-09 | 0 | 5.332E-10 | 2.13541E-10 | 0 | 0.0007 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.41E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.48E-09 | 1.01E-08 | 2.37E-07 | 8.22E-09 | 0 | 4.913E-10 | 1.96764E-10 | 0 | 0.0007 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.30E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.14E-09 | 9.27E-09 | 2.17E-07 | 7.52E-09 | 0 | 4.55E-10 | 1.8222E-10 | 0 | 0.0006 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.51E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 5.00E-08 | 1.39E-07 | 3.26E-06 | 1.14E-07 | 0 | 5.274E-09 | 2.1124E-09 | 0 | 0.0074 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.49E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 4.93E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 5.193E-09 | 2.07971E-09 | 0 | 0.0073 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.42E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 4.69E-08 | 1.30E-07 | 3.05E-06 | 1.07E-07 | 0 | 4.942E-09 | 1.9795E-09 | 0 | 0.0069 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.35E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.48E-08 | 1.24E-07 | 2.92E-06 | 1.02E-07 | 0 | 4.721E-09 | 1.89104E-09 | 0 | 0.0066 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.17E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 3.87E-08 | 1.07E-07 | 2.51E-06 | 8.81E-08 | 0 | 4.086E-09 | 1.63638E-09 | 0 | 0.0057 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.52E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.14E-08 | 8.61E-08 | 2.02E-06 | 7.09E-08 | 0 | 3.323E-09 | 1.33077E-09 | 0 | 0.0047 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.78E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 2.56E-08 | 6.95E-08 | 1.63E-06 | 5.71E-08 | 0 | 2.714E-09 | 1.08717E-09 | 0 | 0.0038 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.42E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.11E-08 | 5.66E-08 | 1.33E-06 | 4.65E-08 | 0 | 2.241E-09 | 8.97648E-10 | 0 | 0.0031 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.21E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.71E-08 | 4.50E-08 | 1.06E-06 | 3.70E-08 | 0 | 1.818E-09 | 7.2803E-10 | 0 | 0.0025 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.28E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.40E-08 | 3.62E-08 | 8.49E-07 | 2.97E-08 | 0 | 1.492E-09 | 5.97703E-10 | 0 | 0.0021 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.63E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 1.18E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 1.268E-09 | 5.07981E-10 | 0 | 0.0018 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.11E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 1.01E-08 | 2.53E-08 | 5.93E-07 | 2.07E-08 | 0 | 1.085E-09 | 4.34663E-10 | 0 | 0.0015 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.70E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 8.73E-09 | 2.16E-08 | 5.05E-07 | 1.76E-08 | 0 | 9.426E-10 | 3.77536E-10 | 0 | 0.0013 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.38E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 7.65E-09 | 1.86E-08 | 4.35E-07 | 1.52E-08 | 0 | 8.294E-10 | 3.32205E-10 | 0 | 0.0012 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.11E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 6.78E-09 | 1.62E-08 | 3.79E-07 | 1.32E-08 | 0 | 7.375E-10 | 2.95382E-10 | 0 | 0.0010 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.90E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 6.09E-09 | 1.43E-08 | 3.35E-07 | 1.17E-08 | 0 | 6.636E-10 | 2.65773E-10 | 0 | 0.0009 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.72E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 5.47E-09 | 1.27E-08 | 2.97E-07 | 1.03E-08 | 0 | 5.986E-10 | 2.3976E-10 | 0 | 0.0008 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.57E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 4.99E-09 | 1.14E-08 | 2.66E-07 | 9.25E-09 | 0 | 5.467E-10 | 2.18965E-10 | 0 | 0.0008 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.44E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 4.58E-09 | 1.03E-08 | 2.41E-07 | 8.38E-09 | 0 | 5.032E-10 | 2.01531E-10 | 0 | 0.0007 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.34E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 4.24E-09 | 9.46E-09 | 2.21E-07 | 7.67E-09 | 0 | 4.669E-10 | 1.87012E-10 | 0 | 0.0007 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.25E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 3.95E-09 | 8.73E-09 | 2.04E-07 | 7.07E-09 | 0 | 4.36E-10 | 1.74608E-10 | 0 | 0.0006 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.63E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 5.40E-08 | 1.51E-07 | 3.54E-06 | 1.24E-07 | 0 | 5.683E-09 | 2.27632E-09 | 0 | 0.0080 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.58E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 5.23E-08 | 1.46E-07 | 3.43E-06 | 1.20E-07 | 0 | 5.499E-09 | 2.20249E-09 | 0 | 0.0077 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.57E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 5.22E-08 | 1.46E-07 | 3.43E-06 | 1.21E-07 | 0 | 5.49E-09 | 2.19875E-09 | 0 | 0.0077 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.31E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 4.34E-08 | 1.21E-07 | 2.84E-06 | 9.98E-08 | 0 | 4.568E-09 | 1.8295E-09 | 0 | 0.0064 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.99E-05 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 3.30E-08 | 9.14E-08 | 2.15E-06 | 7.53E-08 | 0 | 3.486E-09 | 1.39606E-09 | 0 | 0.0049 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.80E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.57E-08 | 7.05E-08 | 1.65E-06 | 5.80E-08 | 0 | 2.722E-09 | 1.09024E-09 | 0 | 0.0038 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.10E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 2.01E-08 | 5.43E-08 | 1.27E-06 | 4.47E-08 | 0 | 2.131E-09 | 8.53376E-10 | 0 | 0.0030 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.85E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.59E-08 | 4.23E-08 | 9.91E-07 | 3.47E-08 | 0 | 1.692E-09 | 6.77494E-10 | 0 | 0.0024 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.94E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.29E-08 | 3.36E-08 | 7.88E-07 | 2.76E-08 | 0 | 1.374E-09 | 5.50492E-10 | 0 | 0.0019 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.29E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 1.07E-08 | 2.74E-08 | 6.43E-07 | 2.25E-08 | 0 | 1.147E-09 | 4.59536E-10 | 0 | 0.0016 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.81E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 9.12E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 9.815E-10 | 3.93092E-10 | 0 | 0.0014 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.46E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 7.93E-09 | 1.96E-08 | 4.59E-07 | 1.60E-08 | 0 | 8.569E-10 | 3.4319E-10 | 0 | 0.0012 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.16E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 6.97E-09 | 1.69E-08 | 3.95E-07 | 1.38E-08 | 0 | 7.556E-10 | 3.02616E-10 | 0 | 0.0011 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.94E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 6.21E-09 | 1.48E-08 | 3.46E-07 | 1.20E-08 | 0 | 6.757E-10 | 2.70619E-10 | 0 | 0.0009 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.75E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 5.61E-09 | 1.31E-08 | 3.07E-07 | 1.07E-08 | 0 | 6.122E-10 | 2.45201E-10 | 0 | 0.0009 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.61E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 5.13E-09 | 1.18E-08 | 2.76E-07 | 9.60E-09 | 0 | 5.611E-10 | 2.24718E-10 | 0 | 0.0008 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.49E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 4.73E-09 | 1.07E-08 | 2.51E-07 | 8.72E-09 | 0 | 5.186E-10 | 2.07712E-10 | 0 | 0.0007 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.39E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 4.40E-09 | 9.90E-09 | 2.31E-07 | 8.02E-09 | 0 | 4.84E-10 | 1.93832E-10 | 0 | 0.0007 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.30E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 4.13E-09 | 9.20E-09 | 2.15E-07 | 7.45E-09 | 0 | 4.551E-10 | 1.82279E-10 | 0 | 0.0006 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.23E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 3.89E-09 | 8.59E-09 | 2.01E-07 | 6.95E-09 | 0 | 4.292E-10 | 1.719E-10 | 0 | 0.0006 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.32E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 7.73E-08 | 2.19E-07 | 5.14E-06 | 1.81E-07 | 0 | 8.112E-09 | 3.24894E-09 | 0 | 0.0114 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.99E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 6.60E-08 | 1.87E-07 | 4.38E-06 | 1.54E-07 | 0 | 6.929E-09 | 2.77503E-09 | 0 | 0.0097 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.46E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 4.86E-08 | 1.37E-07 | 3.21E-06 | 1.13E-07 | 0 | 5.106E-09 | 2.04503E-09 | 0 | 0.0072 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.03E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 3.42E-08 | 9.52E-08 | 2.23E-06 | 7.84E-08 | 0 | 3.597E-09 | 1.44051E-09 | 0 | 0.0050 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.33E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.42E-08 | 6.66E-08 | 1.56E-06 | 5.49E-08 | 0 | 2.557E-09 | 1.02412E-09 | 0 | 0.0036 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.40E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 1.78E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 1.884E-09 | 7.54477E-10 | 0 | 0.0026 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.22E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 1.38E-08 | 3.69E-08 | 8.65E-07 | 3.03E-08 | 0 | 1.472E-09 | 5.89383E-10 | 0 | 0.0021 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.42E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 1.12E-08 | 2.93E-08 | 6.86E-07 | 2.40E-08 | 0 | 1.193E-09 | 4.77988E-10 | 0 | 0.0017 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.87E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 9.34E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 1.001E-09 | 4.01069E-10 | 0 | 0.0014 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.47E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 8.03E-09 | 2.03E-08 | 4.75E-07 | 1.66E-08 | 0 | 8.634E-10 | 3.45793E-10 | 0 | 0.0012 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.18E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 7.05E-09 | 1.75E-08 | 4.09E-07 | 1.43E-08 | 0 | 7.61E-10 | 3.04805E-10 | 0 | 0.0011 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.96E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 6.32E-09 | 1.54E-08 | 3.60E-07 | 1.26E-08 | 0 | 6.843E-10 | 2.74062E-10 | 0 | 0.0010 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.79E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 5.75E-09 | 1.38E-08 | 3.23E-07 | 1.12E-08 | 0 | 6.247E-10 | 2.50204E-10 | 0 | 0.0009 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.65E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 5.30E-09 | 1.25E-08 | 2.93E-07 | 1.02E-08 | 0 | 5.775E-10 | 2.3128E-10 | 0 | 0.0008 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.54E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 4.93E-09 | 1.15E-08 | 2.69E-07 | 9.37E-09 | 0 | 5.386E-10 | 2.15716E-10 | 0 | 0.0008 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.45E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.62E-09 | 1.07E-08 | 2.49E-07 | 8.66E-09 | 0 | 5.057E-10 | 2.02548E-10 | 0 | 0.0007 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.37E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.35E-09 | 9.92E-09 | 2.32E-07 | 8.06E-09 | 0 | 4.769E-10 | 1.91001E-10 | 0 | 0.0007 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.30E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 4.12E-09 | 9.32E-09 | 2.18E-07 | 7.56E-09 | 0 | 4.528E-10 | 1.81358E-10 | 0 | 0.0006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 (per million) | Receptor Type |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.23E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 3.91E-09 | 8.75E-09 | 2.04E-07 | 7.09E-09 | 0 | 4.298E-10 | 1.7216E-10 | 0 | 0.0006 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.41E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 1.13E-07 | 3.23E-07 | 7.58E-06 | 2.66E-07 | 0 | 1.19E-08 | 4.76529E-09 | 0 | 0.0167 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.84E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 1.28E-07 | 3.65E-07 | 8.56E-06 | 3.01E-07 | 0 | 1.341E-08 | 5.37078E-09 | 0 | 0.0188 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.45E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 1.15E-07 | 3.27E-07 | 7.68E-06 | 2.70E-07 | 0 | 1.203E-08 | 4.81871E-09 | 0 | 0.0168 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.61E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 8.69E-08 | 2.47E-07 | 5.79E-06 | 2.04E-07 | 0 | 9.108E-09 | 3.64777E-09 | 0 | 0.0128 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.59E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.28E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 | 0 | 5.543E-09 | 2.21989E-09 | 0 | 0.0078 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.56E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 3.17E-08 | 8.85E-08 | 2.08E-06 | 7.29E-08 | 0 | 3.338E-09 | 1.33707E-09 | 0 | 0.0047 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.24E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 2.06E-08 | 5.67E-08 | 1.33E-06 | 4.67E-08 | 0 | 2.177E-09 | 8.72103E-10 | 0 | 0.0030 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.53E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.49E-08 | 4.04E-08 | 9.47E-07 | 3.32E-08 | 0 | 1.581E-09 | 6.33283E-10 | 0 | 0.0022 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.55E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 1.16E-08 | 3.10E-08 | 7.27E-07 | 2.55E-08 | 0 | 1.238E-09 | 4.95751E-10 | 0 | 0.0017 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.93E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.58E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 | 0 | 1.022E-09 | 4.0931E-10 | 0 | 0.0014 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.52E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 8.21E-09 | 2.12E-08 | 4.97E-07 | 1.74E-08 | 0 | 8.793E-10 | 3.52177E-10 | 0 | 0.0012 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.23E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 7.25E-09 | 1.85E-08 | 4.33E-07 | 1.51E-08 | 0 | 7.787E-10 | 3.1187E-10 | 0 | 0.0011 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.01E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 6.53E-09 | 1.64E-08 | 3.84E-07 | 1.34E-08 | 0 | 7.027E-10 | 2.81459E-10 | 0 | 0.0010 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.85E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 5.97E-09 | 1.48E-08 | 3.47E-07 | 1.21E-08 | 0 | 6.449E-10 | 2.58286E-10 | 0 | 0.0009 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.71E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 5.51E-09 | 1.35E-08 | 3.16E-07 | 1.10E-08 | 0 | 5.962E-10 | 2.3878E-10 | 0 | 0.0008 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.59E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 5.13E-09 | 1.24E-08 | 2.90E-07 | 1.01E-08 | 0 | 5.565E-10 | 2.22893E-10 | 0 | 0.0008 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.50E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 4.81E-09 | 1.15E-08 | 2.69E-07 | 9.36E-09 | 0 | 5.226E-10 | 2.09308E-10 | 0 | 0.0007 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.41E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 4.52E-09 | 1.07E-08 | 2.50E-07 | 8.69E-09 | 0 | 4.928E-10 | 1.97369E-10 | 0 | 0.0007 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.33E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 4.26E-09 | 9.94E-09 | 2.33E-07 | 8.09E-09 | 0 | 4.653E-10 | 1.86344E-10 | 0 | 0.0007 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.26E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 4.03E-09 | 9.30E-09 | 2.17E-07 | 7.56E-09 | 0 | 4.412E-10 | 1.76706E-10 | 0 | 0.0006 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.20E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 3.83E-09 | 8.73E-09 | 2.04E-07 | 7.09E-09 | 0 | 4.197E-10 | 1.68101E-10 | 0 | 0.0006 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.75E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 2.25E-07 | 6.44E-07 | 1.51E-05 | 5.32E-07 | 0 | 2.357E-08 | 9.44094E-09 | 0 | 0.0330 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.21E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 2.40E-07 | 6.88E-07 | 1.62E-05 | 5.68E-07 | 0 | 2.516E-08 | 1.00776E-08 | 0 | 0.0352 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.43E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 2.14E-07 | 6.13E-07 | 1.44E-05 | 5.06E-07 | 0 | 2.243E-08 | 8.98255E-09 | 0 | 0.0314 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.38E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.13E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 | 0 | 1.18E-08 | 4.72602E-09 | 0 | 0.0165 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.38E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 4.59E-08 | 1.29E-07 | 3.03E-06 | 1.07E-07 | 0 | 4.818E-09 | 1.92954E-09 | 0 | 0.0067 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.46E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 2.47E-08 | 6.85E-08 | 1.61E-06 | 5.65E-08 | 0 | 2.605E-09 | 1.04331E-09 | 0 | 0.0036 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.05E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.66E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 1.761E-09 | 7.05242E-10 | 0 | 0.0025 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.89E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.28E-08 | 3.44E-08 | 8.08E-07 | 2.83E-08 | 0 | 1.356E-09 | 5.43191E-10 | 0 | 0.0019 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.20E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 1.05E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 | 0 | 1.117E-09 | 4.47459E-10 | 0 | 0.0016 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.74E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 8.95E-09 | 2.36E-08 | 5.53E-07 | 1.94E-08 | 0 | 9.548E-10 | 3.82398E-10 | 0 | 0.0013 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.39E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 7.81E-09 | 2.04E-08 | 4.77E-07 | 1.67E-08 | 0 | 8.347E-10 | 3.34307E-10 | 0 | 0.0012 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.13E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 6.94E-09 | 1.79E-08 | 4.19E-07 | 1.47E-08 | 0 | 7.433E-10 | 2.9771E-10 | 0 | 0.0010 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.92E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 6.24E-09 | 1.59E-08 | 3.73E-07 | 1.30E-08 | 0 | 6.701E-10 | 2.684E-10 | 0 | 0.0009 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.69E-09 | 1.43E-08 | 3.36E-07 | 1.17E-08 | 0 | 6.118E-10 | 2.45037E-10 | 0 | 0.0009 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.61E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 5.22E-09 | 1.30E-08 | 3.05E-07 | 1.06E-08 | 0 | 5.632E-10 | 2.25577E-10 | 0 | 0.0008 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.50E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 4.85E-09 | 1.19E-08 | 2.80E-07 | 9.76E-09 | 0 | 5.239E-10 | 2.09832E-10 | 0 | 0.0007 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.41E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 4.53E-09 | 1.10E-08 | 2.58E-07 | 9.01E-09 | 0 | 4.91E-10 | 1.96648E-10 | 0 | 0.0007 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.33E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 4.26E-09 | 1.03E-08 | 2.40E-07 | 8.36E-09 | 0 | 4.626E-10 | 1.85274E-10 | 0 | 0.0006 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.25E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 4.02E-09 | 9.57E-09 | 2.24E-07 | 7.79E-09 | 0 | 4.377E-10 | 1.75311E-10 | 0 | 0.0006 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.19E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 3.81E-09 | 8.94E-09 | 2.09E-07 | 7.28E-09 | 0 | 4.151E-10 | 1.66264E-10 | 0 | 0.0006 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.13E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 3.62E-09 | 8.41E-09 | 1.97E-07 | 6.84E-09 | 0 | 3.956E-10 | 1.58462E-10 | 0 | 0.0006 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.80E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 5.99E-07 | 1.72E-06 | 4.04E-05 | 1.42E-06 | 0 | 6.271E-08 | 2.51156E-08 | 0 | 0.0878 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.36E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 7.87E-07 | 2.26E-06 | 5.30E-05 | 1.87E-06 | 0 | 8.23E-08 | 3.29622E-08 | 0 | 0.1153 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.74E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 9.15E-07 | 2.63E-06 | 6.17E-05 | 2.17E-06 | 0 | 9.573E-08 | 3.83416E-08 | 0 | 0.1341 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.20E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 7.31E-08 | 2.08E-07 | 4.87E-06 | 1.71E-07 | 0 | 7.67E-09 | 3.07203E-09 | 0 | 0.0107 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.51E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.15E-08 | 8.81E-08 | 2.07E-06 | 7.26E-08 | 0 | 3.319E-09 | 1.32948E-09 | 0 | 0.0046 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.16E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.04E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 | 0 | 2.151E-09 | 8.61663E-10 | 0 | 0.0030 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.57E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.51E-08 | 4.10E-08 | 9.61E-07 | 3.37E-08 | 0 | 1.594E-09 | 6.38556E-10 | 0 | 0.0022 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.63E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.19E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 | 0 | 1.266E-09 | 5.07076E-10 | 0 | 0.0018 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.00E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 9.84E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 | 0 | 1.047E-09 | 4.19332E-10 | 0 | 0.0015 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.55E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.36E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 | 0 | 8.911E-10 | 3.56899E-10 | 0 | 0.0012 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.22E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 7.26E-09 | 1.89E-08 | 4.44E-07 | 1.55E-08 | 0 | 7.754E-10 | 3.10566E-10 | 0 | 0.0011 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.97E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 6.42E-09 | 1.66E-08 | 3.88E-07 | 1.36E-08 | 0 | 6.87E-10 | 2.75162E-10 | 0 | 0.0010 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.77E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 5.75E-09 | 1.47E-08 | 3.45E-07 | 1.21E-08 | 0 | 6.172E-10 | 2.47211E-10 | 0 | 0.0009 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.61E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 5.22E-09 | 1.32E-08 | 3.10E-07 | 1.08E-08 | 0 | 5.61E-10 | 2.2469E-10 | 0 | 0.0008 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2026 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.47E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 4.78E-09 | 1.20E-08 | 2.81E-07 | 9.82E-09 | 0 | 5.148E-10 | 2.06189E-10 | 0 | 0.0007 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.37E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 4.43E-09 | 1.10E-08 | 2.58E-07 | 9.00E-09 | 0 | 4.779E-10 | 1.91404E-10 | 0 | 0.0007 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.28E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 4.15E-09 | 1.02E-08 | 2.39E-07 | 8.34E-09 | 0 | 4.482E-10 | 1.79511E-10 | 0 | 0.0006 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.21E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 3.89E-09 | 9.48E-09 | 2.22E-07 | 7.74E-09 | 0 | 4.216E-10 | 1.68841E-10 | 0 | 0.0006 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.15E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 3.69E-09 | 8.88E-09 | 2.08E-07 | 7.25E-09 | 0 | 4E-10 | 1.60217E-10 | 0 | 0.0006 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.09E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 3.50E-09 | 8.34E-09 | 1.95E-07 | 6.80E-09 | 0 | 3.805E-10 | 1.52392E-10 | 0 | 0.0005 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.04E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 3.33E-09 | 7.86E-09 | 1.84E-07 | 6.40E-09 | 0 | 3.631E-10 | 1.45437E-10 | 0 | 0.0005 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.95E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 9.82E-08 | 2.79E-07 | 6.56E-06 | 2.31E-07 | 0 | 1.03E-08 | 4.12481E-09 | 0 | 0.0144 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.36E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 7.84E-08 | 2.23E-07 | 5.22E-06 | 1.84E-07 | 0 | 8.224E-09 | 3.29366E-09 | 0 | 0.0115 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.28E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 4.23E-08 | 1.19E-07 | 2.79E-06 | 9.81E-08 | 0 | 4.45E-09 | 1.78238E-09 | 0 | 0.0062 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.17E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 2.71E-08 | 7.52E-08 | 1.76E-06 | 6.20E-08 | 0 | 2.851E-09 | 1.14195E-09 | 0 | 0.0040 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.95E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 1.97E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 2.076E-09 | 8.31568E-10 | 0 | 0.0029 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.53E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.49E-08 | 4.06E-08 | 9.52E-07 | 3.34E-08 | 0 | 1.582E-09 | 6.33654E-10 | 0 | 0.0022 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.61E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.19E-08 | 3.19E-08 | 7.48E-07 | 2.62E-08 | 0 | 1.261E-09 | 5.05018E-10 | 0 | 0.0018 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.99E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.80E-09 | 2.60E-08 | 6.10E-07 | 2.14E-08 | 0 | 1.043E-09 | 4.17931E-10 | 0 | 0.0015 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.53E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 8.29E-09 | 2.18E-08 | 5.11E-07 | 1.79E-08 | 0 | 8.846E-10 | 3.54298E-10 | 0 | 0.0012 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.20E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 7.17E-09 | 1.87E-08 | 4.37E-07 | 1.53E-08 | 0 | 7.668E-10 | 3.07116E-10 | 0 | 0.0011 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.93E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 6.31E-09 | 1.63E-08 | 3.81E-07 | 1.33E-08 | 0 | 6.753E-10 | 2.70486E-10 | 0 | 0.0009 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.73E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 5.62E-09 | 1.44E-08 | 3.36E-07 | 1.18E-08 | 0 | 6.027E-10 | 2.41378E-10 | 0 | 0.0008 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.56E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 5.07E-09 | 1.29E-08 | 3.01E-07 | 1.05E-08 | 0 | 5.447E-10 | 2.1817E-10 | 0 | 0.0008 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.42E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 4.62E-09 | 1.16E-08 | 2.72E-07 | 9.51E-09 | 0 | 4.97E-10 | 1.99076E-10 | 0 | 0.0007 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.31E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 4.24E-09 | 1.06E-08 | 2.48E-07 | 8.66E-09 | 0 | 4.573E-10 | 1.83156E-10 | 0 | 0.0006 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.21E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 3.92E-09 | 9.71E-09 | 2.27E-07 | 7.93E-09 | 0 | 4.232E-10 | 1.69494E-10 | 0 | 0.0006 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.14E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 3.68E-09 | 9.06E-09 | 2.12E-07 | 7.40E-09 | 0 | 3.984E-10 | 1.59548E-10 | 0 | 0.0006 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.08E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 3.47E-09 | 8.48E-09 | 1.98E-07 | 6.92E-09 | 0 | 3.76E-10 | 1.5059E-10 | 0 | 0.0005 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.03E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 3.30E-09 | 8.00E-09 | 1.87E-07 | 6.53E-09 | 0 | 3.582E-10 | 1.43467E-10 | 0 | 0.0005 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.82E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 3.15E-09 | 7.58E-09 | 1.77E-07 | 6.18E-09 | 0 | 3.426E-10 | 1.37215E-10 | 0 | 0.0005 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.35E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 3.00E-09 | 7.14E-09 | 1.67E-07 | 5.82E-09 | 0 | 3.262E-10 | 1.30658E-10 | 0 | 0.0005 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.07E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 1.01E-08 | 2.66E-08 | 6.24E-07 | 2.19E-08 | 0 | 1.071E-09 | 4.28907E-10 | 0 | 0.0015 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.87E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 6.08E-09 | 1.55E-08 | 3.64E-07 | 1.27E-08 | 0 | 6.521E-10 | 2.6119E-10 | 0 | 0.0009 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.68E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 5.47E-09 | 1.39E-08 | 3.25E-07 | 1.14E-08 | 0 | 5.88E-10 | 2.35489E-10 | 0 | 0.0008 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.52E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 4.94E-09 | 1.24E-08 | 2.91E-07 | 1.02E-08 | 0 | 5.315E-10 | 2.12867E-10 | 0 | 0.0007 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.39E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 4.50E-09 | 1.12E-08 | 2.63E-07 | 9.19E-09 | 0 | 4.845E-10 | 1.94052E-10 | 0 | 0.0007 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.26E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 4.08E-09 | 1.01E-08 | 2.37E-07 | 8.27E-09 | 0 | 4.403E-10 | 1.76343E-10 | 0 | 0.0006 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.16E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 3.75E-09 | 9.23E-09 | 2.16E-07 | 7.54E-09 | 0 | 4.05E-10 | 1.62207E-10 | 0 | 0.0006 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.07E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 3.46E-09 | 8.47E-09 | 1.98E-07 | 6.92E-09 | 0 | 3.747E-10 | 1.50093E-10 | 0 | 0.0005 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.00E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 3.23E-09 | 7.86E-09 | 1.84E-07 | 6.42E-09 | 0 | 3.505E-10 | 1.40378E-10 | 0 | 0.0005 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.45E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 3.04E-09 | 7.35E-09 | 1.72E-07 | 6.00E-09 | 0 | 3.299E-10 | 1.32145E-10 | 0 | 0.0005 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.02E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 2.90E-09 | 6.97E-09 | 1.63E-07 | 5.69E-09 | 0 | 3.148E-10 | 1.26076E-10 | 0 | 0.0004 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.62E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 2.77E-09 | 6.62E-09 | 1.55E-07 | 5.40E-09 | 0 | 3.01E-10 | 1.20549E-10 | 0 | 0.0004 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.20E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 2.63E-09 | 6.25E-09 | 1.46E-07 | 5.09E-09 | 0 | 2.864E-10 | 1.14693E-10 | 0 | 0.0004 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2027

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 5.566E-05 | 3.53E-08 | 2.12E-08 | 3.53E-08 | 1.81E-07 | 3.95E-07 | 3.53E-08 | 5.65E-09 | 6.49E-07 | 7.06E-08 | 2.82E-09 | 1.05E-04 |
| Paved road | 2027_PAVED | 1.614E-04 | 8.60E-08 | 5.16E-08 | 8.60E-08 | 5.50E-08 | 1.72E-06 | 1.58E-07 | 9.63E-09 | 3.71E-06 | 1.72E-07 | 1.31E-07 | 4.88E-04 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2027 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.86E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.03E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.42E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.54E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.57E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.78E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.54E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.64E-03 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 9.94E-08 | 5.96E-08 | 9.94E-08 | 6.70E-08 | 1.82E-07 | 4.28E-06 | 1.50E-07 | 0 | 0 | 3.47384E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 6.68E-08 | 4.01E-08 | 6.68E-08 | 4.96E-08 | 1.22E-07 | 2.85E-06 | 9.93E-08 | 0 | 0 | 2.32887E-09 | 0 | 0.0023 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 8.15E-06 | 4.54E-09 | 2.72E-09 | 4.54E-09 | 8.41E-09 | 7.31E-09 | 1.65E-07 | 5.12E-09 | 0 | 0 | 1.51817E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.28E-05 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 7.63E-09 | 1.22E-08 | 2.82E-07 | 9.53E-09 | 0 | 0 | 2.39007E-10 | 0 | 0.0002 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.96E-04 | 3.17E-07 | 1.90E-07 | 3.17E-07 | 2.07E-07 | 5.83E-07 | 1.37E-05 | 4.81E-07 | 0 | 0 | 1.10995E-08 | 0 | 0.0111 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.21E-03 | 6.43E-07 | 3.86E-07 | 6.43E-07 | 4.16E-07 | 1.18E-06 | 2.77E-05 | 9.76E-07 | 0 | 0 | 2.24885E-08 | 0 | 0.0225 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.48E-04 | 2.92E-07 | 1.75E-07 | 2.92E-07 | 1.91E-07 | 5.37E-07 | 1.26E-05 | 4.43E-07 | 0 | 0 | 1.02231E-08 | 0 | 0.0102 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.46E-03 | 7.78E-07 | 4.67E-07 | 7.78E-07 | 5.02E-07 | 1.43E-06 | 3.36E-05 | 1.18E-06 | 0 | 0 | 2.72283E-08 | 0 | 0.0272 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.49E-05 | 5.09E-08 | 3.05E-08 | 5.09E-08 | 4.13E-08 | 9.20E-08 | 2.15E-06 | 7.45E-08 | 0 | 0 | 1.76904E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.89E-04 | 1.54E-07 | 9.24E-08 | 1.54E-07 | 1.03E-07 | 2.82E-07 | 6.62E-06 | 2.32E-07 | 0 | 0 | 5.38163E-09 | 0 | 0.0054 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.68E-05 | 3.57E-08 | 2.14E-08 | 3.57E-08 | 2.58E-08 | 6.51E-08 | 1.52E-06 | 5.33E-08 | 0 | 0 | 1.24457E-09 | 0 | 0.0012 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.05E-05 | 1.65E-08 | 9.91E-09 | 1.65E-08 | 1.86E-08 | 2.89E-08 | 6.69E-07 | 2.25E-08 | 0 | 0 | 5.68127E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.85E-05 | 1.54E-08 | 9.27E-09 | 1.54E-08 | 1.75E-08 | 2.70E-08 | 6.25E-07 | 2.10E-08 | 0 | 0 | 5.309E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.67E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 1.65E-08 | 2.53E-08 | 5.85E-07 | 1.97E-08 | 0 | 0 | 4.97202E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.50E-05 | 1.36E-08 | 8.15E-09 | 1.36E-08 | 1.56E-08 | 2.37E-08 | 5.49E-07 | 1.84E-08 | 0 | 0 | 4.66738E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.36E-05 | 1.28E-08 | 7.69E-09 | 1.28E-08 | 1.48E-08 | 2.24E-08 | 5.18E-07 | 1.74E-08 | 0 | 0 | 4.40565E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 1.39E-08 | 2.10E-08 | 4.86E-07 | 1.63E-08 | 0 | 0 | 4.1407E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.12E-08 | 6.75E-09 | 1.12E-08 | 1.31E-08 | 1.96E-08 | 4.53E-07 | 1.52E-08 | 0 | 0 | 3.85976E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.11E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 2.01E-08 | 2.94E-08 | 6.80E-07 | 2.27E-08 | 0 | 0 | 5.80355E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.07E-05 | 1.67E-08 | 9.99E-09 | 1.67E-08 | 1.91E-08 | 2.91E-08 | 6.73E-07 | 2.26E-08 | 0 | 0 | 5.72378E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.91E-05 | 1.58E-08 | 9.46E-09 | 1.58E-08 | 1.79E-08 | 2.76E-08 | 6.38E-07 | 2.15E-08 | 0 | 0 | 5.42017E-10 | 0 | 0.0005 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.73E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 1.68E-08 | 2.58E-08 | 5.98E-07 | 2.01E-08 | 0 | 0 | 5.0836E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.55E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 1.57E-08 | 2.42E-08 | 5.59E-07 | 1.88E-08 | 0 | 0 | 4.75266E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.39E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 1.48E-08 | 2.26E-08 | 5.23E-07 | 1.76E-08 | 0 | 0 | 4.44606E-10 | 0 | 0.0004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.23E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 1.40E-08 | 2.11E-08 | 4.88E-07 | 1.64E-08 | 0 | 0 | 4.15607E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.10E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 1.32E-08 | 1.98E-08 | 4.59E-07 | 1.54E-08 | 0 | 0 | 3.91229E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.07E-08 | 6.43E-09 | 1.07E-08 | 1.26E-08 | 1.86E-08 | 4.31E-07 | 1.45E-08 | 0 | 0 | 3.67877E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.77E-05 | 1.51E-08 | 9.05E-09 | 1.51E-08 | 1.94E-08 | 2.59E-08 | 5.98E-07 | 1.98E-08 | 0 | 0 | 5.15849E-10 | 0 | 0.0005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.01E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 1.92E-08 | 2.84E-08 | 6.57E-07 | 2.20E-08 | 0 | 0 | 5.60165E-10 | 0 | 0.0006 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.96E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 1.81E-08 | 2.80E-08 | 6.49E-07 | 2.18E-08 | 0 | 0 | 5.50942E-10 | 0 | 0.0006 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.79E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.70E-08 | 2.64E-08 | 6.12E-07 | 2.06E-08 | 0 | 0 | 5.19628E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.61E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 1.60E-08 | 2.48E-08 | 5.74E-07 | 1.93E-08 | 0 | 0 | 4.87335E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.46E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 1.51E-08 | 2.33E-08 | 5.39E-07 | 1.81E-08 | 0 | 0 | 4.57733E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 1.41E-08 | 2.16E-08 | 5.01E-07 | 1.68E-08 | 0 | 0 | 4.25721E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 1.33E-08 | 2.02E-08 | 4.68E-07 | 1.57E-08 | 0 | 0 | 3.9801E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.26E-08 | 1.89E-08 | 4.37E-07 | 1.47E-08 | 0 | 0 | 3.72693E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 1.19E-08 | 1.76E-08 | 4.08E-07 | 1.37E-08 | 0 | 0 | 3.48173E-10 | 0 | 0.0003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 9.51E-09 | 5.70E-09 | 9.51E-09 | 1.13E-08 | 1.65E-08 | 3.82E-07 | 1.28E-08 | 0 | 0 | 3.26176E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.62E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 1.07E-08 | 1.53E-08 | 3.53E-07 | 1.18E-08 | 0 | 0 | 3.02343E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.02E-05 | 1.64E-08 | 9.85E-09 | 1.64E-08 | 2.00E-08 | 2.84E-08 | 6.57E-07 | 2.19E-08 | 0 | 0 | 5.62597E-10 | 0 | 0.0006 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.93E-05 | 1.59E-08 | 9.56E-09 | 1.59E-08 | 1.90E-08 | 2.77E-08 | 6.40E-07 | 2.14E-08 | 0 | 0 | 5.46477E-10 | 0 | 0.0005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.98E-05 | 1.61E-08 | 9.68E-09 | 1.61E-08 | 1.82E-08 | 2.82E-08 | 6.53E-07 | 2.20E-08 | 0 | 0 | 5.5456E-10 | 0 | 0.0006 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.84E-05 | 1.54E-08 | 9.23E-09 | 1.54E-08 | 1.71E-08 | 2.69E-08 | 6.24E-07 | 2.10E-08 | 0 | 0 | 5.2909E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.68E-05 | 1.45E-08 | 8.70E-09 | 1.45E-08 | 1.62E-08 | 2.54E-08 | 5.88E-07 | 1.98E-08 | 0 | 0 | 4.98863E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.52E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 1.52E-08 | 2.39E-08 | 5.53E-07 | 1.86E-08 | 0 | 0 | 4.68843E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 1.43E-08 | 2.23E-08 | 5.17E-07 | 1.74E-08 | 0 | 0 | 4.38938E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.19E-08 | 7.15E-09 | 1.19E-08 | 1.35E-08 | 2.08E-08 | 4.82E-07 | 1.62E-08 | 0 | 0 | 4.09623E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 1.27E-08 | 1.92E-08 | 4.45E-07 | 1.50E-08 | 0 | 0 | 3.78979E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.19E-08 | 1.77E-08 | 4.09E-07 | 1.37E-08 | 0 | 0 | 3.48781E-10 | 0 | 0.0003 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.70E-05 | 9.26E-09 | 5.56E-09 | 9.26E-09 | 1.10E-08 | 1.61E-08 | 3.72E-07 | 1.24E-08 | 0 | 0 | 3.17649E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.94E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 1.96E-08 | 2.77E-08 | 6.39E-07 | 2.13E-08 | 0 | 0 | 5.4783E-10 | 0 | 0.0005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.97E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 1.88E-08 | 2.80E-08 | 6.49E-07 | 2.17E-08 | 0 | 0 | 5.52926E-10 | 0 | 0.0006 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.94E-05 | 1.59E-08 | 9.55E-09 | 1.59E-08 | 1.80E-08 | 2.78E-08 | 6.45E-07 | 2.17E-08 | 0 | 0 | 5.4742E-10 | 0 | 0.0005 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.86E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 1.71E-08 | 2.71E-08 | 6.29E-07 | 2.12E-08 | 0 | 0 | 5.32385E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 1.62E-08 | 2.59E-08 | 6.00E-07 | 2.03E-08 | 0 | 0 | 5.07561E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 1.52E-08 | 2.42E-08 | 5.62E-07 | 1.90E-08 | 0 | 0 | 4.75697E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 1.43E-08 | 2.25E-08 | 5.22E-07 | 1.76E-08 | 0 | 0 | 4.42784E-10 | 0 | 0.0004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.17E-05 | 1.18E-08 | 7.07E-09 | 1.18E-08 | 1.33E-08 | 2.06E-08 | 4.77E-07 | 1.61E-08 | 0 | 0 | 4.04911E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.99E-05 | 1.08E-08 | 6.47E-09 | 1.08E-08 | 1.24E-08 | 1.88E-08 | 4.36E-07 | 1.46E-08 | 0 | 0 | 3.70758E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.75E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 2.11E-08 | 3.57E-08 | 8.30E-07 | 2.82E-08 | 0 | 0 | 6.98773E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.85E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 2.43E-08 | 3.64E-08 | 8.43E-07 | 2.83E-08 | 0 | 0 | 7.18025E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.37E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 2.22E-08 | 3.18E-08 | 7.35E-07 | 2.45E-08 | 0 | 0 | 6.29048E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.24E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 2.09E-08 | 3.06E-08 | 7.07E-07 | 2.37E-08 | 0 | 0 | 6.0392E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.16E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.98E-08 | 2.99E-08 | 6.93E-07 | 2.33E-08 | 0 | 0 | 5.89603E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.05E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 1.87E-08 | 2.89E-08 | 6.69E-07 | 2.25E-08 | 0 | 0 | 5.68215E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.91E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 1.77E-08 | 2.76E-08 | 6.38E-07 | 2.15E-08 | 0 | 0 | 5.41665E-10 | 0 | 0.0005 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 1.59E-08 | 9.54E-09 | 1.59E-08 | 1.71E-08 | 2.80E-08 | 6.49E-07 | 2.20E-08 | 0 | 0 | 5.47959E-10 | 0 | 0.0005 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 1.60E-08 | 2.62E-08 | 6.07E-07 | 2.06E-08 | 0 | 0 | 5.12866E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.53E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 1.49E-08 | 2.41E-08 | 5.59E-07 | 1.89E-08 | 0 | 0 | 4.72272E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.32E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 1.39E-08 | 2.20E-08 | 5.10E-07 | 1.72E-08 | 0 | 0 | 4.32277E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.12E-05 | 1.15E-08 | 6.88E-09 | 1.15E-08 | 1.29E-08 | 2.01E-08 | 4.65E-07 | 1.56E-08 | 0 | 0 | 3.94282E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.93E-05 | 1.04E-08 | 6.27E-09 | 1.04E-08 | 1.20E-08 | 1.82E-08 | 4.22E-07 | 1.42E-08 | 0 | 0 | 3.58969E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.01E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 2.47E-08 | 3.79E-08 | 8.79E-07 | 2.95E-08 | 0 | 0 | 7.46697E-10 | 0 | 0.0007 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.79E-05 | 2.06E-08 | 1.23E-08 | 2.06E-08 | 2.41E-08 | 3.58E-08 | 8.28E-07 | 2.78E-08 | 0 | 0 | 7.06389E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.90E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 2.39E-08 | 3.70E-08 | 8.56E-07 | 2.88E-08 | 0 | 0 | 7.26785E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.88E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 2.28E-08 | 3.69E-08 | 8.55E-07 | 2.89E-08 | 0 | 0 | 7.22642E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.86E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 2.18E-08 | 3.68E-08 | 8.54E-07 | 2.90E-08 | 0 | 0 | 7.19303E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.49E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 2.01E-08 | 3.32E-08 | 7.71E-07 | 2.61E-08 | 0 | 0 | 6.50201E-10 | 0 | 0.0007 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.44E-05 | 1.86E-08 | 1.11E-08 | 1.86E-08 | 1.92E-08 | 3.28E-08 | 7.61E-07 | 2.59E-08 | 0 | 0 | 6.40358E-10 | 0 | 0.0006 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.81E-08 | 3.10E-08 | 7.20E-07 | 2.45E-08 | 0 | 0 | 6.04921E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 1.68E-08 | 2.86E-08 | 6.65E-07 | 2.26E-08 | 0 | 0 | 5.59171E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 1.48E-08 | 8.91E-09 | 1.48E-08 | 1.56E-08 | 2.62E-08 | 6.08E-07 | 2.06E-08 | 0 | 0 | 5.11936E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.50E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 1.45E-08 | 2.38E-08 | 5.52E-07 | 1.87E-08 | 0 | 0 | 4.65783E-10 | 0 | 0.0005 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.27E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.34E-08 | 2.16E-08 | 5.00E-07 | 1.69E-08 | 0 | 0 | 4.22985E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.06E-05 | 1.12E-08 | 6.71E-09 | 1.12E-08 | 1.25E-08 | 1.96E-08 | 4.53E-07 | 1.53E-08 | 0 | 0 | 3.84524E-10 | 0 | 0.0004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.16E-08 | 1.77E-08 | 4.11E-07 | 1.38E-08 | 0 | 0 | 3.49165E-10 | 0 | 0.0003 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.69E-05 | 9.16E-09 | 5.50E-09 | 9.16E-09 | 1.08E-08 | 1.59E-08 | 3.69E-07 | 1.24E-08 | 0 | 0 | 3.1455E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.49E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 9.82E-09 | 1.40E-08 | 3.24E-07 | 1.08E-08 | 0 | 0 | 2.77152E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.73E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 3.08E-08 | 5.48E-08 | 1.27E-06 | 4.34E-08 | 0 | 0 | 1.06792E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.40E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 2.89E-08 | 5.17E-08 | 1.20E-06 | 4.10E-08 | 0 | 0 | 1.00603E-09 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.60E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 2.59E-08 | 4.39E-08 | 1.02E-06 | 3.46E-08 | 0 | 0 | 8.57751E-10 | 0 | 0.0009 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.11E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 2.36E-08 | 3.91E-08 | 9.08E-07 | 3.07E-08 | 0 | 0 | 7.65585E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.02E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 2.25E-08 | 3.84E-08 | 8.91E-07 | 3.03E-08 | 0 | 0 | 7.49364E-10 | 0 | 0.0007 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.92E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 2.14E-08 | 3.75E-08 | 8.70E-07 | 2.96E-08 | 0 | 0 | 7.3042E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 2.04E-08 | 3.67E-08 | 8.53E-07 | 2.91E-08 | 0 | 0 | 7.14017E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.55E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 1.90E-08 | 3.40E-08 | 7.91E-07 | 2.70E-08 | 0 | 0 | 6.62549E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.29E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.77E-08 | 3.15E-08 | 7.33E-07 | 2.50E-08 | 0 | 0 | 6.1401E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.02E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 1.64E-08 | 2.88E-08 | 6.70E-07 | 2.28E-08 | 0 | 0 | 5.62454E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 1.52E-08 | 2.61E-08 | 6.07E-07 | 2.06E-08 | 0 | 0 | 5.09931E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.47E-05 | 1.33E-08 | 8.00E-09 | 1.33E-08 | 1.40E-08 | 2.35E-08 | 5.46E-07 | 1.85E-08 | 0 | 0 | 4.59794E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.23E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 1.29E-08 | 2.12E-08 | 4.91E-07 | 1.66E-08 | 0 | 0 | 4.15017E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.20E-08 | 1.90E-08 | 4.41E-07 | 1.49E-08 | 0 | 0 | 3.73571E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.81E-05 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 1.11E-08 | 1.72E-08 | 3.97E-07 | 1.34E-08 | 0 | 0 | 3.37496E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.64E-05 | 8.91E-09 | 5.34E-09 | 8.91E-09 | 1.03E-08 | 1.55E-08 | 3.59E-07 | 1.21E-08 | 0 | 0 | 3.05936E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.49E-05 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 9.60E-09 | 1.40E-08 | 3.25E-07 | 1.09E-08 | 0 | 0 | 2.77285E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.25E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 3.03E-08 | 6.02E-08 | 1.40E-06 | 4.83E-08 | 0 | 0 | 1.16509E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.81E-08 | 5.57E-08 | 1.30E-06 | 4.47E-08 | 0 | 0 | 1.07875E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 2.65E-08 | 1.59E-08 | 2.65E-08 | 2.50E-08 | 4.73E-08 | 1.10E-06 | 3.78E-08 | 0 | 0 | 9.18551E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 2.46E-08 | 1.47E-08 | 2.46E-08 | 2.32E-08 | 4.38E-08 | 1.02E-06 | 3.50E-08 | 0 | 0 | 8.50321E-10 | 0 | 0.0009 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.40E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 2.20E-08 | 4.23E-08 | 9.85E-07 | 3.38E-08 | 0 | 0 | 8.20251E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.01E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 2.02E-08 | 3.85E-08 | 8.98E-07 | 3.08E-08 | 0 | 0 | 7.47822E-10 | 0 | 0.0007 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.64E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.86E-08 | 3.49E-08 | 8.12E-07 | 2.78E-08 | 0 | 0 | 6.77835E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.31E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.72E-08 | 3.17E-08 | 7.38E-07 | 2.52E-08 | 0 | 0 | 6.16827E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.00E-05 | 1.62E-08 | 9.71E-09 | 1.62E-08 | 1.59E-08 | 2.87E-08 | 6.69E-07 | 2.28E-08 | 0 | 0 | 5.59355E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.70E-05 | 1.46E-08 | 8.74E-09 | 1.46E-08 | 1.46E-08 | 2.58E-08 | 6.00E-07 | 2.04E-08 | 0 | 0 | 5.03062E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.41E-05 | 1.30E-08 | 7.80E-09 | 1.30E-08 | 1.34E-08 | 2.30E-08 | 5.34E-07 | 1.81E-08 | 0 | 0 | 4.48618E-10 | 0 | 0.0004 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 1.22E-08 | 2.04E-08 | 4.74E-07 | 1.61E-08 | 0 | 0 | 3.99312E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.91E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 1.12E-08 | 1.82E-08 | 4.22E-07 | 1.43E-08 | 0 | 0 | 3.56839E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.72E-05 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 1.04E-08 | 1.63E-08 | 3.78E-07 | 1.28E-08 | 0 | 0 | 3.20828E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.56E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 9.68E-09 | 1.48E-08 | 3.42E-07 | 1.15E-08 | 0 | 0 | 2.90877E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.43E-05 | 7.74E-09 | 4.64E-09 | 7.74E-09 | 9.06E-09 | 1.35E-08 | 3.12E-07 | 1.04E-08 | 0 | 0 | 2.65682E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.25E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 8.27E-09 | 1.18E-08 | 2.73E-07 | 9.11E-09 | 0 | 0 | 2.33798E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 3.03E-08 | 6.15E-08 | 1.43E-06 | 4.94E-08 | 0 | 0 | 1.18914E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.08E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 2.85E-08 | 5.86E-08 | 1.37E-06 | 4.72E-08 | 0 | 0 | 1.13282E-09 | 0 | 0.0011 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 2.65E-08 | 5.45E-08 | 1.27E-06 | 4.38E-08 | 0 | 0 | 1.05237E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.08E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 2.41E-08 | 4.90E-08 | 1.14E-06 | 3.93E-08 | 0 | 0 | 9.46661E-10 | 0 | 0.0009 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.53E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 2.18E-08 | 4.36E-08 | 1.02E-06 | 3.50E-08 | 0 | 0 | 8.4356E-10 | 0 | 0.0008 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.04E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.99E-08 | 3.89E-08 | 9.07E-07 | 3.12E-08 | 0 | 0 | 7.53864E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.64E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 1.82E-08 | 3.50E-08 | 8.14E-07 | 2.79E-08 | 0 | 0 | 6.77793E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.28E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.66E-08 | 3.15E-08 | 7.33E-07 | 2.51E-08 | 0 | 0 | 6.10974E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.92E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 1.52E-08 | 2.80E-08 | 6.52E-07 | 2.23E-08 | 0 | 0 | 5.44923E-10 | 0 | 0.0005 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.58E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 1.38E-08 | 2.47E-08 | 5.74E-07 | 1.96E-08 | 0 | 0 | 4.80762E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.25E-08 | 2.17E-08 | 5.05E-07 | 1.72E-08 | 0 | 0 | 4.24176E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.02E-05 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 1.14E-08 | 1.92E-08 | 4.46E-07 | 1.51E-08 | 0 | 0 | 3.76057E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.80E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 1.05E-08 | 1.71E-08 | 3.98E-07 | 1.34E-08 | 0 | 0 | 3.35794E-10 | 0 | 0.0003 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.63E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 9.74E-09 | 1.55E-08 | 3.58E-07 | 1.21E-08 | 0 | 0 | 3.03577E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.48E-05 | 8.03E-09 | 4.82E-09 | 8.03E-09 | 9.08E-09 | 1.40E-08 | 3.25E-07 | 1.09E-08 | 0 | 0 | 2.76055E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.36E-05 | 7.38E-09 | 4.43E-09 | 7.38E-09 | 8.52E-09 | 1.29E-08 | 2.98E-07 | 1.00E-08 | 0 | 0 | 2.5358E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.26E-05 | 6.84E-09 | 4.10E-09 | 6.84E-09 | 8.04E-09 | 1.19E-08 | 2.75E-07 | 9.22E-09 | 0 | 0 | 2.34718E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 2.98E-08 | 6.32E-08 | 1.48E-06 | 5.10E-08 | 0 | 0 | 1.2196E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 2.75E-08 | 5.85E-08 | 1.37E-06 | 4.72E-08 | 0 | 0 | 1.12883E-09 | 0 | 0.0011 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.30E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 2.46E-08 | 5.12E-08 | 1.19E-06 | 4.12E-08 | 0 | 0 | 9.87492E-10 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.63E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 2.19E-08 | 4.46E-08 | 1.04E-06 | 3.59E-08 | 0 | 0 | 8.62714E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.08E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 1.97E-08 | 3.93E-08 | 9.17E-07 | 3.15E-08 | 0 | 0 | 7.60848E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.62E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.79E-08 | 3.48E-08 | 8.12E-07 | 2.79E-08 | 0 | 0 | 6.75082E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.18E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.61E-08 | 3.06E-08 | 7.12E-07 | 2.44E-08 | 0 | 0 | 5.92901E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.77E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 1.44E-08 | 2.66E-08 | 6.18E-07 | 2.11E-08 | 0 | 0 | 5.16321E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 1.30E-08 | 2.31E-08 | 5.38E-07 | 1.83E-08 | 0 | 0 | 4.50576E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.13E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 1.18E-08 | 2.03E-08 | 4.72E-07 | 1.61E-08 | 0 | 0 | 3.96738E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.89E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 1.08E-08 | 1.80E-08 | 4.18E-07 | 1.42E-08 | 0 | 0 | 3.5228E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.70E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 9.92E-09 | 1.62E-08 | 3.75E-07 | 1.27E-08 | 0 | 0 | 3.1662E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.54E-05 | 8.34E-09 | 5.00E-09 | 8.34E-09 | 9.20E-09 | 1.46E-08 | 3.39E-07 | 1.14E-08 | 0 | 0 | 2.8693E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.40E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 8.59E-09 | 1.33E-08 | 3.08E-07 | 1.04E-08 | 0 | 0 | 2.61766E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.29E-05 | 6.97E-09 | 4.18E-09 | 6.97E-09 | 8.03E-09 | 1.22E-08 | 2.81E-07 | 9.45E-09 | 0 | 0 | 2.39532E-10 | 0 | 0.0002 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.18E-05 | 6.41E-09 | 3.85E-09 | 6.41E-09 | 7.55E-09 | 1.12E-08 | 2.58E-07 | 8.64E-09 | 0 | 0 | 2.20139E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.98E-05 | 4.81E-08 | 2.89E-08 | 4.81E-08 | 3.92E-08 | 8.70E-08 | 2.03E-06 | 7.04E-08 | 0 | 0 | 1.67342E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 4.66E-08 | 2.80E-08 | 4.66E-08 | 3.77E-08 | 8.43E-08 | 1.97E-06 | 6.83E-08 | 0 | 0 | 1.62135E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.22E-05 | 4.40E-08 | 2.64E-08 | 4.40E-08 | 3.55E-08 | 7.97E-08 | 1.86E-06 | 6.46E-08 | 0 | 0 | 1.53197E-09 | 0 | 0.0015 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.37E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 3.22E-08 | 7.13E-08 | 1.67E-06 | 5.78E-08 | 0 | 0 | 1.37278E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.86E-08 | 6.24E-08 | 1.46E-06 | 5.05E-08 | 0 | 0 | 1.20155E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.51E-05 | 2.96E-08 | 1.77E-08 | 2.96E-08 | 2.51E-08 | 5.32E-08 | 1.24E-06 | 4.30E-08 | 0 | 0 | 1.02669E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.78E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 2.23E-08 | 4.61E-08 | 1.08E-06 | 3.71E-08 | 0 | 0 | 8.90138E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.11E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.97E-08 | 3.96E-08 | 9.24E-07 | 3.18E-08 | 0 | 0 | 7.66326E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.53E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.74E-08 | 3.40E-08 | 7.92E-07 | 2.72E-08 | 0 | 0 | 6.58723E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.02E-05 | 1.63E-08 | 9.75E-09 | 1.63E-08 | 1.54E-08 | 2.90E-08 | 6.74E-07 | 2.31E-08 | 0 | 0 | 5.62395E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.60E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 1.38E-08 | 2.49E-08 | 5.80E-07 | 1.98E-08 | 0 | 0 | 4.85304E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 1.24E-08 | 2.17E-08 | 5.05E-07 | 1.72E-08 | 0 | 0 | 4.24042E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.01E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 1.13E-08 | 1.92E-08 | 4.45E-07 | 1.51E-08 | 0 | 0 | 3.74306E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.79E-05 | 9.68E-09 | 5.81E-09 | 9.68E-09 | 1.03E-08 | 1.70E-08 | 3.95E-07 | 1.34E-08 | 0 | 0 | 3.33528E-10 | 0 | 0.0003 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.61E-05 | 8.70E-09 | 5.22E-09 | 8.70E-09 | 9.52E-09 | 1.53E-08 | 3.54E-07 | 1.20E-08 | 0 | 0 | 2.99673E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.45E-05 | 7.84E-09 | 4.70E-09 | 7.84E-09 | 8.79E-09 | 1.37E-08 | 3.18E-07 | 1.07E-08 | 0 | 0 | 2.69661E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.31E-05 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 8.18E-09 | 1.24E-08 | 2.88E-07 | 9.66E-09 | 0 | 0 | 2.44597E-10 | 0 | 0.0002 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.20E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 7.64E-09 | 1.13E-08 | 2.62E-07 | 8.76E-09 | 0 | 0 | 2.23105E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.10E-05 | 5.96E-09 | 3.58E-09 | 5.96E-09 | 7.15E-09 | 1.03E-08 | 2.39E-07 | 7.99E-09 | 0 | 0 | 2.04373E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 4.67E-08 | 1.13E-07 | 2.64E-06 | 9.19E-08 | 0 | 0 | 2.1594E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 5.74E-08 | 3.45E-08 | 5.74E-08 | 4.35E-08 | 1.04E-07 | 2.44E-06 | 8.51E-08 | 0 | 0 | 2.00074E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.14E-05 | 4.89E-08 | 2.93E-08 | 4.89E-08 | 3.79E-08 | 8.88E-08 | 2.08E-06 | 7.22E-08 | 0 | 0 | 1.70333E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.04E-05 | 4.30E-08 | 2.58E-08 | 4.30E-08 | 3.39E-08 | 7.80E-08 | 1.82E-06 | 6.34E-08 | 0 | 0 | 1.49818E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.78E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.93E-08 | 6.57E-08 | 1.54E-06 | 5.33E-08 | 0 | 0 | 1.264E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.74E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.55E-08 | 5.56E-08 | 1.30E-06 | 4.49E-08 | 0 | 0 | 1.0703E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.84E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 2.22E-08 | 4.68E-08 | 1.09E-06 | 3.77E-08 | 0 | 0 | 9.02013E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.02E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.92E-08 | 3.87E-08 | 9.03E-07 | 3.11E-08 | 0 | 0 | 7.49034E-10 | 0 | 0.0007 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.36E-05 | 1.81E-08 | 1.08E-08 | 1.81E-08 | 1.67E-08 | 3.23E-08 | 7.52E-07 | 2.58E-08 | 0 | 0 | 6.25607E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.85E-05 | 1.53E-08 | 9.21E-09 | 1.53E-08 | 1.47E-08 | 2.73E-08 | 6.36E-07 | 2.17E-08 | 0 | 0 | 5.30722E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.46E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 1.32E-08 | 2.36E-08 | 5.48E-07 | 1.87E-08 | 0 | 0 | 4.58823E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.15E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 1.19E-08 | 2.05E-08 | 4.77E-07 | 1.62E-08 | 0 | 0 | 4.00987E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.89E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 1.08E-08 | 1.80E-08 | 4.18E-07 | 1.42E-08 | 0 | 0 | 3.52738E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.68E-05 | 9.10E-09 | 5.46E-09 | 9.10E-09 | 9.93E-09 | 1.60E-08 | 3.70E-07 | 1.25E-08 | 0 | 0 | 3.13197E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.50E-05 | 8.12E-09 | 4.87E-09 | 8.12E-09 | 9.13E-09 | 1.42E-08 | 3.29E-07 | 1.11E-08 | 0 | 0 | 2.79262E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.35E-05 | 7.30E-09 | 4.38E-09 | 7.30E-09 | 8.44E-09 | 1.27E-08 | 2.95E-07 | 9.89E-09 | 0 | 0 | 2.50906E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.22E-05 | 6.64E-09 | 3.98E-09 | 6.64E-09 | 7.86E-09 | 1.15E-08 | 2.67E-07 | 8.92E-09 | 0 | 0 | 2.27667E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.12E-05 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 7.35E-09 | 1.05E-08 | 2.43E-07 | 8.11E-09 | 0 | 0 | 2.0803E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.03E-05 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 6.90E-09 | 9.65E-09 | 2.23E-07 | 7.41E-09 | 0 | 0 | 1.91153E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 7.52E-08 | 4.51E-08 | 7.52E-08 | 5.44E-08 | 1.37E-07 | 3.22E-06 | 1.12E-07 | 0 | 0 | 2.62493E-09 | 0 | 0.0026 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 7.41E-08 | 4.45E-08 | 7.41E-08 | 5.35E-08 | 1.35E-07 | 3.17E-06 | 1.11E-07 | 0 | 0 | 2.58558E-09 | 0 | 0.0026 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 7.05E-08 | 4.23E-08 | 7.05E-08 | 5.10E-08 | 1.29E-07 | 3.01E-06 | 1.05E-07 | 0 | 0 | 2.45936E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 6.73E-08 | 4.04E-08 | 6.73E-08 | 4.88E-08 | 1.23E-07 | 2.88E-06 | 1.01E-07 | 0 | 0 | 2.34881E-09 | 0 | 0.0023 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 5.81E-08 | 3.48E-08 | 5.81E-08 | 4.27E-08 | 1.06E-07 | 2.48E-06 | 8.65E-08 | 0 | 0 | 2.02459E-09 | 0 | 0.0020 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.77E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 3.55E-08 | 8.53E-08 | 2.00E-06 | 6.96E-08 | 0 | 0 | 1.63475E-09 | 0 | 0.0016 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.11E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.97E-08 | 6.90E-08 | 1.61E-06 | 5.61E-08 | 0 | 0 | 1.32444E-09 | 0 | 0.0013 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.81E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.51E-08 | 5.63E-08 | 1.32E-06 | 4.57E-08 | 0 | 0 | 1.08345E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.66E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 2.11E-08 | 4.50E-08 | 1.05E-06 | 3.63E-08 | 0 | 0 | 8.67886E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.77E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.79E-08 | 3.64E-08 | 8.48E-07 | 2.92E-08 | 0 | 0 | 7.02742E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.16E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.57E-08 | 3.04E-08 | 7.09E-07 | 2.43E-08 | 0 | 0 | 5.89782E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.67E-05 | 1.44E-08 | 8.63E-09 | 1.44E-08 | 1.38E-08 | 2.56E-08 | 5.96E-07 | 2.04E-08 | 0 | 0 | 4.97781E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.29E-05 | 1.24E-08 | 7.41E-09 | 1.24E-08 | 1.24E-08 | 2.19E-08 | 5.09E-07 | 1.73E-08 | 0 | 0 | 4.26567E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 1.99E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 1.12E-08 | 1.90E-08 | 4.40E-07 | 1.49E-08 | 0 | 0 | 3.70456E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.75E-05 | 9.44E-09 | 5.67E-09 | 9.44E-09 | 1.02E-08 | 1.66E-08 | 3.85E-07 | 1.30E-08 | 0 | 0 | 3.25256E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.55E-05 | 8.41E-09 | 5.05E-09 | 8.41E-09 | 9.42E-09 | 1.47E-08 | 3.41E-07 | 1.15E-08 | 0 | 0 | 2.89192E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.38E-05 | 7.51E-09 | 4.50E-09 | 7.51E-09 | 8.69E-09 | 1.31E-08 | 3.03E-07 | 1.02E-08 | 0 | 0 | 2.57811E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.25E-05 | 6.79E-09 | 4.08E-09 | 6.79E-09 | 8.09E-09 | 1.18E-08 | 2.73E-07 | 9.12E-09 | 0 | 0 | 2.3299E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.14E-05 | 6.20E-09 | 3.72E-09 | 6.20E-09 | 7.57E-09 | 1.07E-08 | 2.48E-07 | 8.26E-09 | 0 | 0 | 2.12412E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.05E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 7.13E-09 | 9.86E-09 | 2.27E-07 | 7.56E-09 | 0 | 0 | 1.95486E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 9.72E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 6.73E-09 | 9.12E-09 | 2.10E-07 | 6.98E-09 | 0 | 0 | 1.81228E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 8.15E-08 | 4.89E-08 | 8.15E-08 | 5.77E-08 | 1.49E-07 | 3.49E-06 | 1.22E-07 | 0 | 0 | 2.84446E-09 | 0 | 0.0028 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 5.57E-08 | 1.44E-07 | 3.38E-06 | 1.18E-07 | 0 | 0 | 2.75289E-09 | 0 | 0.0028 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 5.52E-08 | 1.44E-07 | 3.38E-06 | 1.18E-07 | 0 | 0 | 2.75492E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 6.54E-08 | 3.93E-08 | 6.54E-08 | 4.65E-08 | 1.20E-07 | 2.80E-06 | 9.80E-08 | 0 | 0 | 2.28377E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.28E-05 | 4.96E-08 | 2.98E-08 | 4.96E-08 | 3.63E-08 | 9.04E-08 | 2.12E-06 | 7.39E-08 | 0 | 0 | 1.72974E-09 | 0 | 0.0017 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.18E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 2.91E-08 | 6.99E-08 | 1.64E-06 | 5.70E-08 | 0 | 0 | 1.33907E-09 | 0 | 0.0013 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.56E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 2.35E-08 | 5.40E-08 | 1.26E-06 | 4.38E-08 | 0 | 0 | 1.03658E-09 | 0 | 0.0010 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.36E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.93E-08 | 4.22E-08 | 9.85E-07 | 3.41E-08 | 0 | 0 | 8.12175E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.49E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.63E-08 | 3.37E-08 | 7.86E-07 | 2.71E-08 | 0 | 0 | 6.50307E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.87E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.41E-08 | 2.76E-08 | 6.43E-07 | 2.21E-08 | 0 | 0 | 5.34746E-10 | 0 | 0.0005 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 1.25E-08 | 2.32E-08 | 5.40E-07 | 1.85E-08 | 0 | 0 | 4.50584E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.08E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 1.13E-08 | 1.99E-08 | 4.62E-07 | 1.57E-08 | 0 | 0 | 3.87641E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.81E-05 | 9.77E-09 | 5.86E-09 | 9.77E-09 | 1.02E-08 | 1.72E-08 | 4.00E-07 | 1.36E-08 | 0 | 0 | 3.36838E-10 | 0 | 0.0003 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.59E-05 | 8.63E-09 | 5.18E-09 | 8.63E-09 | 9.43E-09 | 1.51E-08 | 3.51E-07 | 1.19E-08 | 0 | 0 | 2.97036E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.43E-05 | 7.73E-09 | 4.64E-09 | 7.73E-09 | 8.76E-09 | 1.35E-08 | 3.13E-07 | 1.05E-08 | 0 | 0 | 2.65697E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.29E-05 | 7.01E-09 | 4.21E-09 | 7.01E-09 | 8.20E-09 | 1.22E-08 | 2.82E-07 | 9.46E-09 | 0 | 0 | 2.40716E-10 | 0 | 0.0002 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.18E-05 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 7.72E-09 | 1.11E-08 | 2.57E-07 | 8.60E-09 | 0 | 0 | 2.20246E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.09E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 7.31E-09 | 1.03E-08 | 2.38E-07 | 7.92E-09 | 0 | 0 | 2.03777E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.02E-05 | 5.56E-09 | 3.34E-09 | 5.56E-09 | 6.96E-09 | 9.59E-09 | 2.21E-07 | 7.35E-09 | 0 | 0 | 1.90247E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 9.57E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 6.64E-09 | 8.97E-09 | 2.07E-07 | 6.86E-09 | 0 | 0 | 1.78281E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.17E-07 | 7.05E-08 | 1.17E-07 | 7.95E-08 | 2.15E-07 | 5.05E-06 | 1.77E-07 | 0 | 0 | 4.10524E-09 | 0 | 0.0041 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.00E-07 | 6.01E-08 | 1.00E-07 | 6.82E-08 | 1.84E-07 | 4.31E-06 | 1.51E-07 | 0 | 0 | 3.50109E-09 | 0 | 0.0035 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 7.35E-08 | 4.41E-08 | 7.35E-08 | 5.10E-08 | 1.35E-07 | 3.15E-06 | 1.11E-07 | 0 | 0 | 2.56832E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.63E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 3.68E-08 | 9.40E-08 | 2.20E-06 | 7.70E-08 | 0 | 0 | 1.79563E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.78E-05 | 3.62E-08 | 2.17E-08 | 3.62E-08 | 2.70E-08 | 6.60E-08 | 1.54E-06 | 5.39E-08 | 0 | 0 | 1.26349E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.93E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 2.06E-08 | 4.79E-08 | 1.12E-06 | 3.89E-08 | 0 | 0 | 9.18993E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.80E-05 | 2.04E-08 | 1.22E-08 | 2.04E-08 | 1.67E-08 | 3.68E-08 | 8.60E-07 | 2.98E-08 | 0 | 0 | 7.08161E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.04E-05 | 1.63E-08 | 9.78E-09 | 1.63E-08 | 1.41E-08 | 2.93E-08 | 6.84E-07 | 2.36E-08 | 0 | 0 | 5.65993E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.51E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 1.22E-08 | 2.42E-08 | 5.63E-07 | 1.94E-08 | 0 | 0 | 4.67881E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.13E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 1.09E-08 | 2.05E-08 | 4.76E-07 | 1.63E-08 | 0 | 0 | 3.97457E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.85E-05 | 1.00E-08 | 6.00E-09 | 1.00E-08 | 9.94E-09 | 1.77E-08 | 4.12E-07 | 1.41E-08 | 0 | 0 | 3.45344E-10 | 0 | 0.0003 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.64E-05 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 9.20E-09 | 1.57E-08 | 3.64E-07 | 1.24E-08 | 0 | 0 | 3.06407E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.48E-05 | 8.02E-09 | 4.81E-09 | 8.02E-09 | 8.61E-09 | 1.41E-08 | 3.27E-07 | 1.11E-08 | 0 | 0 | 2.76344E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.36E-05 | 7.34E-09 | 4.41E-09 | 7.34E-09 | 8.13E-09 | 1.29E-08 | 2.98E-07 | 1.01E-08 | 0 | 0 | 2.52658E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.25E-05 | 6.79E-09 | 4.07E-09 | 6.79E-09 | 7.73E-09 | 1.19E-08 | 2.75E-07 | 9.23E-09 | 0 | 0 | 2.33314E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.16E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 7.38E-09 | 1.10E-08 | 2.55E-07 | 8.54E-09 | 0 | 0 | 2.17117E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.09E-05 | 5.92E-09 | 3.55E-09 | 5.92E-09 | 7.07E-09 | 1.03E-08 | 2.38E-07 | 7.95E-09 | 0 | 0 | 2.03055E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 6.79E-09 | 9.67E-09 | 2.23E-07 | 7.46E-09 | 0 | 0 | 1.9143E-10 | 0 | 0.0002 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 9.68E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 6.53E-09 | 9.10E-09 | 2.10E-07 | 7.00E-09 | 0 | 0 | 1.80455E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.24E-04 | 1.73E-07 | 1.04E-07 | 1.73E-07 | 1.15E-07 | 3.17E-07 | 7.44E-06 | 2.61E-07 | 0 | 0 | 6.04333E-09 | 0 | 0.0060 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.66E-04 | 1.95E-07 | 1.17E-07 | 1.95E-07 | 1.29E-07 | 3.58E-07 | 8.41E-06 | 2.95E-07 | 0 | 0 | 6.82275E-09 | 0 | 0.0068 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.28E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 1.16E-07 | 3.21E-07 | 7.54E-06 | 2.65E-07 | 0 | 0 | 6.11897E-09 | 0 | 0.0061 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.32E-07 | 7.93E-08 | 1.32E-07 | 8.84E-08 | 2.43E-07 | 5.69E-06 | 2.00E-07 | 0 | 0 | 4.62275E-09 | 0 | 0.0046 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.01E-08 | 4.80E-08 | 8.01E-08 | 5.48E-08 | 1.47E-07 | 3.44E-06 | 1.21E-07 | 0 | 0 | 2.79695E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.95E-05 | 4.78E-08 | 2.87E-08 | 4.78E-08 | 3.40E-08 | 8.73E-08 | 2.05E-06 | 7.16E-08 | 0 | 0 | 1.66859E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.77E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.30E-08 | 5.61E-08 | 1.31E-06 | 4.58E-08 | 0 | 0 | 1.07476E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.13E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.74E-08 | 4.01E-08 | 9.38E-07 | 3.26E-08 | 0 | 0 | 7.70185E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.19E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.41E-08 | 3.09E-08 | 7.22E-07 | 2.50E-08 | 0 | 0 | 5.94997E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.60E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 1.20E-08 | 2.51E-08 | 5.86E-07 | 2.02E-08 | 0 | 0 | 4.85016E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.21E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 1.07E-08 | 2.13E-08 | 4.97E-07 | 1.71E-08 | 0 | 0 | 4.12333E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 1.94E-05 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 9.69E-09 | 1.86E-08 | 4.34E-07 | 1.49E-08 | 0 | 0 | 3.61054E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.73E-05 | 9.32E-09 | 5.59E-09 | 9.32E-09 | 8.97E-09 | 1.66E-08 | 3.86E-07 | 1.32E-08 | 0 | 0 | 3.22341E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.57E-05 | 8.47E-09 | 5.08E-09 | 8.47E-09 | 8.42E-09 | 1.50E-08 | 3.50E-07 | 1.19E-08 | 0 | 0 | 2.92796E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.44E-05 | 7.76E-09 | 4.66E-09 | 7.76E-09 | 7.95E-09 | 1.37E-08 | 3.19E-07 | 1.08E-08 | 0 | 0 | 2.67963E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.33E-05 | 7.19E-09 | 4.31E-09 | 7.19E-09 | 7.57E-09 | 1.27E-08 | 2.94E-07 | 9.97E-09 | 0 | 0 | 2.47725E-10 | 0 | 0.0002 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.24E-05 | 6.69E-09 | 4.01E-09 | 6.69E-09 | 7.25E-09 | 1.18E-08 | 2.73E-07 | 9.22E-09 | 0 | 0 | 2.30454E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.16E-05 | 6.26E-09 | 3.76E-09 | 6.26E-09 | 6.96E-09 | 1.10E-08 | 2.54E-07 | 8.57E-09 | 0 | 0 | 2.15329E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.08E-05 | 5.86E-09 | 3.52E-09 | 5.86E-09 | 6.68E-09 | 1.02E-08 | 2.37E-07 | 7.97E-09 | 0 | 0 | 2.01456E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.02E-05 | 5.52E-09 | 3.31E-09 | 5.52E-09 | 6.44E-09 | 9.60E-09 | 2.22E-07 | 7.45E-09 | 0 | 0 | 1.89397E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 9.59E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 6.22E-09 | 9.05E-09 | 2.09E-07 | 6.99E-09 | 0 | 0 | 1.78701E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.46E-04 | 3.44E-07 | 2.06E-07 | 3.44E-07 | 2.24E-07 | 6.32E-07 | 1.48E-05 | 5.22E-07 | 0 | 0 | 1.20326E-08 | 0 | 0.0120 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.89E-04 | 3.67E-07 | 2.20E-07 | 3.67E-07 | 2.39E-07 | 6.75E-07 | 1.58E-05 | 5.57E-07 | 0 | 0 | 1.28509E-08 | 0 | 0.0129 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.14E-04 | 3.27E-07 | 1.96E-07 | 3.27E-07 | 2.13E-07 | 6.02E-07 | 1.41E-05 | 4.96E-07 | 0 | 0 | 1.14519E-08 | 0 | 0.0115 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.22E-04 | 1.72E-07 | 1.03E-07 | 1.72E-07 | 1.13E-07 | 3.15E-07 | 7.40E-06 | 2.60E-07 | 0 | 0 | 6.0053E-09 | 0 | 0.0060 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 6.95E-08 | 4.17E-08 | 6.95E-08 | 4.78E-08 | 1.27E-07 | 2.98E-06 | 1.05E-07 | 0 | 0 | 2.42755E-09 | 0 | 0.0024 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.95E-05 | 3.71E-08 | 2.23E-08 | 3.71E-08 | 2.70E-08 | 6.77E-08 | 1.59E-06 | 5.54E-08 | 0 | 0 | 1.29514E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.64E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.89E-08 | 4.51E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 8.64128E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.53E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.50E-08 | 3.43E-08 | 8.01E-07 | 2.78E-08 | 0 | 0 | 6.58311E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.88E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 1.27E-08 | 2.79E-08 | 6.52E-07 | 2.26E-08 | 0 | 0 | 5.37116E-10 | 0 | 0.0005 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.44E-05 | 1.31E-08 | 7.86E-09 | 1.31E-08 | 1.11E-08 | 2.36E-08 | 5.51E-07 | 1.90E-08 | 0 | 0 | 4.54946E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.12E-05 | 1.14E-08 | 6.82E-09 | 1.14E-08 | 9.94E-09 | 2.04E-08 | 4.76E-07 | 1.64E-08 | 0 | 0 | 3.9426E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.87E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 9.04E-09 | 1.80E-08 | 4.19E-07 | 1.44E-08 | 0 | 0 | 3.48068E-10 | 0 | 0.0003 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.67E-05 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 8.32E-09 | 1.60E-08 | 3.74E-07 | 1.28E-08 | 0 | 0 | 3.11026E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.51E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 7.76E-09 | 1.45E-08 | 3.37E-07 | 1.15E-08 | 0 | 0 | 2.81417E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.38E-05 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 7.29E-09 | 1.32E-08 | 3.07E-07 | 1.05E-08 | 0 | 0 | 2.56685E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.27E-05 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 6.92E-09 | 1.21E-08 | 2.82E-07 | 9.60E-09 | 0 | 0 | 2.36587E-10 | 0 | 0.0002 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.18E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 6.61E-09 | 1.12E-08 | 2.61E-07 | 8.87E-09 | 0 | 0 | 2.1971E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.10E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 6.34E-09 | 1.05E-08 | 2.43E-07 | 8.23E-09 | 0 | 0 | 2.05129E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 6.11E-09 | 9.80E-09 | 2.27E-07 | 7.68E-09 | 0 | 0 | 1.92334E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 9.70E-06 | 5.26E-09 | 3.15E-09 | 5.26E-09 | 5.90E-09 | 9.19E-09 | 2.13E-07 | 7.17E-09 | 0 | 0 | 1.80731E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.16E-06 | 4.97E-09 | 2.98E-09 | 4.97E-09 | 5.72E-09 | 8.67E-09 | 2.01E-07 | 6.74E-09 | 0 | 0 | 1.70743E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.72E-03 | 9.18E-07 | 5.51E-07 | 9.18E-07 | 5.91E-07 | 1.69E-06 | 3.96E-05 | 1.39E-06 | 0 | 0 | 3.21019E-08 | 0 | 0.0321 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.26E-03 | 1.20E-06 | 7.23E-07 | 1.20E-06 | 7.75E-07 | 2.22E-06 | 5.20E-05 | 1.83E-06 | 0 | 0 | 4.215E-08 | 0 | 0.0422 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.63E-03 | 1.40E-06 | 8.41E-07 | 1.40E-06 | 9.01E-07 | 2.58E-06 | 6.05E-05 | 2.13E-06 | 0 | 0 | 4.90392E-08 | 0 | 0.0490 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.09E-04 | 1.11E-07 | 6.68E-08 | 1.11E-07 | 7.46E-08 | 2.04E-07 | 4.79E-06 | 1.68E-07 | 0 | 0 | 3.8893E-09 | 0 | 0.0039 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.91E-05 | 4.76E-08 | 2.85E-08 | 4.76E-08 | 3.37E-08 | 8.69E-08 | 2.04E-06 | 7.13E-08 | 0 | 0 | 1.66071E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.71E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.26E-08 | 5.56E-08 | 1.30E-06 | 4.54E-08 | 0 | 0 | 1.06392E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.19E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.73E-08 | 4.07E-08 | 9.51E-07 | 3.31E-08 | 0 | 0 | 7.80197E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.29E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.41E-08 | 3.19E-08 | 7.46E-07 | 2.59E-08 | 0 | 0 | 6.13638E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.70E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 1.19E-08 | 2.61E-08 | 6.10E-07 | 2.11E-08 | 0 | 0 | 5.02948E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.28E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 1.04E-08 | 2.20E-08 | 5.14E-07 | 1.78E-08 | 0 | 0 | 4.24463E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 1.97E-05 | 1.06E-08 | 6.34E-09 | 1.06E-08 | 9.22E-09 | 1.90E-08 | 4.43E-07 | 1.53E-08 | 0 | 0 | 3.66427E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.73E-05 | 9.29E-09 | 5.57E-09 | 9.29E-09 | 8.32E-09 | 1.67E-08 | 3.88E-07 | 1.34E-08 | 0 | 0 | 3.22165E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.54E-05 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 7.62E-09 | 1.48E-08 | 3.45E-07 | 1.19E-08 | 0 | 0 | 2.87241E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.39E-05 | 7.48E-09 | 4.49E-09 | 7.48E-09 | 7.05E-09 | 1.33E-08 | 3.11E-07 | 1.07E-08 | 0 | 0 | 2.59091E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2027 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.27E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 6.58E-09 | 1.21E-08 | 2.82E-07 | 9.65E-09 | 0 | 0 | 2.35907E-10 | 0 | 0.0002 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.17E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 6.22E-09 | 1.12E-08 | 2.60E-07 | 8.85E-09 | 0 | 0 | 2.17299E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.09E-05 | 5.86E-09 | 3.51E-09 | 5.86E-09 | 5.93E-09 | 1.04E-08 | 2.41E-07 | 8.20E-09 | 0 | 0 | 2.02253E-10 | 0 | 0.0002 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.01E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 5.67E-09 | 9.66E-09 | 2.24E-07 | 7.62E-09 | 0 | 0 | 1.88674E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 9.53E-06 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 5.47E-09 | 9.07E-09 | 2.11E-07 | 7.13E-09 | 0 | 0 | 1.77613E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 8.99E-06 | 4.87E-09 | 2.92E-09 | 4.87E-09 | 5.29E-09 | 8.55E-09 | 1.98E-07 | 6.70E-09 | 0 | 0 | 1.67555E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 8.51E-06 | 4.61E-09 | 2.77E-09 | 4.61E-09 | 5.13E-09 | 8.07E-09 | 1.87E-07 | 6.31E-09 | 0 | 0 | 1.58572E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.81E-04 | 1.50E-07 | 8.98E-08 | 1.50E-07 | 9.96E-08 | 2.75E-07 | 6.44E-06 | 2.26E-07 | 0 | 0 | 5.23216E-09 | 0 | 0.0052 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.24E-04 | 1.19E-07 | 7.16E-08 | 1.19E-07 | 8.00E-08 | 2.19E-07 | 5.13E-06 | 1.80E-07 | 0 | 0 | 4.1705E-09 | 0 | 0.0042 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 6.41E-08 | 3.84E-08 | 6.41E-08 | 4.45E-08 | 1.17E-07 | 2.75E-06 | 9.63E-08 | 0 | 0 | 2.23791E-09 | 0 | 0.0022 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.62E-05 | 4.07E-08 | 2.44E-08 | 4.07E-08 | 2.93E-08 | 7.43E-08 | 1.74E-06 | 6.08E-08 | 0 | 0 | 1.42016E-09 | 0 | 0.0014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.50E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 2.20E-08 | 5.35E-08 | 1.25E-06 | 4.37E-08 | 0 | 0 | 1.02467E-09 | 0 | 0.0010 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.15E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.72E-08 | 4.03E-08 | 9.42E-07 | 3.28E-08 | 0 | 0 | 7.73121E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.27E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.41E-08 | 3.17E-08 | 7.42E-07 | 2.57E-08 | 0 | 0 | 6.10202E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.68E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 1.20E-08 | 2.60E-08 | 6.07E-07 | 2.10E-08 | 0 | 0 | 5.00375E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.26E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 1.04E-08 | 2.18E-08 | 5.09E-07 | 1.76E-08 | 0 | 0 | 4.20532E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 1.94E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 9.16E-09 | 1.87E-08 | 4.36E-07 | 1.50E-08 | 0 | 0 | 3.6163E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.70E-05 | 9.12E-09 | 5.47E-09 | 9.12E-09 | 8.22E-09 | 1.63E-08 | 3.81E-07 | 1.31E-08 | 0 | 0 | 3.16158E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.50E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 7.45E-09 | 1.45E-08 | 3.37E-07 | 1.16E-08 | 0 | 0 | 2.80194E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.35E-05 | 7.27E-09 | 4.36E-09 | 7.27E-09 | 6.84E-09 | 1.30E-08 | 3.02E-07 | 1.03E-08 | 0 | 0 | 2.51644E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.22E-05 | 6.60E-09 | 3.96E-09 | 6.60E-09 | 6.33E-09 | 1.17E-08 | 2.73E-07 | 9.35E-09 | 0 | 0 | 2.28221E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.12E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 5.90E-09 | 1.07E-08 | 2.50E-07 | 8.52E-09 | 0 | 0 | 2.08701E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.03E-05 | 5.56E-09 | 3.33E-09 | 5.56E-09 | 5.54E-09 | 9.85E-09 | 2.29E-07 | 7.81E-09 | 0 | 0 | 1.91912E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 9.64E-06 | 5.20E-09 | 3.12E-09 | 5.20E-09 | 5.27E-09 | 9.21E-09 | 2.14E-07 | 7.29E-09 | 0 | 0 | 1.79679E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.04E-06 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 5.04E-09 | 8.63E-09 | 2.00E-07 | 6.81E-09 | 0 | 0 | 1.68571E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 8.57E-06 | 4.63E-09 | 2.78E-09 | 4.63E-09 | 4.86E-09 | 8.16E-09 | 1.90E-07 | 6.43E-09 | 0 | 0 | 1.59653E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.14E-06 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 4.71E-09 | 7.75E-09 | 1.80E-07 | 6.09E-09 | 0 | 0 | 1.51749E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 7.70E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 4.55E-09 | 7.31E-09 | 1.70E-07 | 5.73E-09 | 0 | 0 | 1.43454E-10 | 0 | 0.0001 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.75E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 1.23E-08 | 2.66E-08 | 6.21E-07 | 2.15E-08 | 0 | 0 | 5.12285E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.63E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 8.05E-09 | 1.57E-08 | 3.65E-07 | 1.25E-08 | 0 | 0 | 3.03397E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.46E-05 | 7.85E-09 | 4.71E-09 | 7.85E-09 | 7.37E-09 | 1.40E-08 | 3.26E-07 | 1.12E-08 | 0 | 0 | 2.71835E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.31E-05 | 7.06E-09 | 4.23E-09 | 7.06E-09 | 6.76E-09 | 1.26E-08 | 2.93E-07 | 1.00E-08 | 0 | 0 | 2.44175E-10 | 0 | 0.0002 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.19E-05 | 6.40E-09 | 3.84E-09 | 6.40E-09 | 6.24E-09 | 1.14E-08 | 2.65E-07 | 9.04E-09 | 0 | 0 | 2.21309E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.07E-05 | 5.78E-09 | 3.47E-09 | 5.78E-09 | 5.75E-09 | 1.03E-08 | 2.39E-07 | 8.13E-09 | 0 | 0 | 1.99838E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 9.81E-06 | 5.29E-09 | 3.18E-09 | 5.29E-09 | 5.35E-09 | 9.37E-09 | 2.18E-07 | 7.42E-09 | 0 | 0 | 1.82822E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.03E-06 | 4.88E-09 | 2.93E-09 | 4.88E-09 | 5.01E-09 | 8.62E-09 | 2.00E-07 | 6.81E-09 | 0 | 0 | 1.68294E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 8.40E-06 | 4.54E-09 | 2.73E-09 | 4.54E-09 | 4.73E-09 | 8.02E-09 | 1.86E-07 | 6.32E-09 | 0 | 0 | 1.56658E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 7.88E-06 | 4.26E-09 | 2.55E-09 | 4.26E-09 | 4.49E-09 | 7.50E-09 | 1.74E-07 | 5.90E-09 | 0 | 0 | 1.46798E-10 | 0 | 0.0001 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 7.49E-06 | 4.05E-09 | 2.43E-09 | 4.05E-09 | 4.32E-09 | 7.13E-09 | 1.65E-07 | 5.60E-09 | 0 | 0 | 1.39529E-10 | 0 | 0.0001 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.13E-06 | 3.86E-09 | 2.31E-09 | 3.86E-09 | 4.17E-09 | 6.78E-09 | 1.57E-07 | 5.32E-09 | 0 | 0 | 1.32814E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 6.74E-06 | 3.65E-09 | 2.19E-09 | 3.65E-09 | 4.01E-09 | 6.40E-09 | 1.48E-07 | 5.01E-09 | 0 | 0 | 1.25678E-10 | 0 | 0.0001 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2028

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 3.324E-05 | 9.075E-09 | 5.445E-09 | 9.075E-09 | 4.647E-08 | 1.016E-07 | 9.075E-09 | 1.452E-09 | 1.670E-07 | 1.815E-08 | 7.260E-10 | 2.696E-05 |
| Paved road | 2028_PAVED | 1.603E-04 | 8.608E-08 | 5.165E-08 | 8.608E-08 | 5.509E-08 | 1.722E-06 | 1.584E-07 | 9.641E-09 | 3.719E-06 | 1.722E-07 | 1.308E-07 | 4.889E-04 |
| Unpaved road | 2028_UNPAVED | 9.795E-05 | 4.259E-07 | 2.555E-07 | 4.259E-07 | 2.726E-07 | 8.517E-06 | 7.836E-07 | 4.770E-08 | 1.840E-05 | 8.517E-07 | 6.473E-07 | 2.419E-03 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2028 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.86E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.03E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.42E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.54E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.57E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.78E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.54E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.64E-03 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.87E-04 | 1.10E-07 | 6.58E-08 | 1.10E-07 | 7.08E-08 | 2.02E-07 | 4.73E-06 | 1.66E-07 | 0 | 0 | 3.48473E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.92E-08 | 4.75E-08 | 7.92E-08 | 5.13E-08 | 1.46E-07 | 3.42E-06 | 1.20E-07 | 0 | 0 | 2.33794E-09 | 0 | 0.0023 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.14E-08 | 1.29E-08 | 2.14E-08 | 1.47E-08 | 3.92E-08 | 9.20E-07 | 3.22E-08 | 0 | 0 | 2.07045E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.53E-07 | 2.64E-08 | 0 | 0 | 2.72807E-10 | 0 | 0.0003 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.93E-04 | 3.26E-07 | 1.96E-07 | 3.26E-07 | 2.09E-07 | 6.00E-07 | 1.41E-05 | 4.96E-07 | 0 | 0 | 1.1047E-08 | 0 | 0.0110 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.53E-07 | 3.92E-07 | 6.53E-07 | 4.18E-07 | 1.20E-06 | 2.82E-05 | 9.92E-07 | 0 | 0 | 2.23612E-08 | 0 | 0.0224 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.46E-04 | 3.00E-07 | 1.80E-07 | 3.00E-07 | 1.93E-07 | 5.53E-07 | 1.30E-05 | 4.56E-07 | 0 | 0 | 1.01755E-08 | 0 | 0.0102 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.88E-07 | 4.73E-07 | 7.88E-07 | 5.05E-07 | 1.45E-06 | 3.40E-05 | 1.20E-06 | 0 | 0 | 2.70695E-08 | 0 | 0.0271 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.48E-05 | 6.23E-08 | 3.74E-08 | 6.23E-08 | 4.06E-08 | 1.15E-07 | 2.69E-06 | 9.45E-08 | 0 | 0 | 1.76734E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.88E-04 | 1.64E-07 | 9.85E-08 | 1.64E-07 | 1.06E-07 | 3.02E-07 | 7.09E-06 | 2.49E-07 | 0 | 0 | 5.37031E-09 | 0 | 0.0054 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.79E-05 | 4.44E-08 | 2.67E-08 | 4.44E-08 | 2.90E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.26587E-09 | 0 | 0.0013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.64E-08 | 4.55E-08 | 1.07E-06 | 3.75E-08 | 0 | 0 | 5.63214E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.83E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.55E-08 | 4.29E-08 | 1.01E-06 | 3.53E-08 | 0 | 0 | 5.26922E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.65E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 1.47E-08 | 4.05E-08 | 9.50E-07 | 3.34E-08 | 0 | 0 | 4.9404E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.49E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.39E-08 | 3.83E-08 | 8.99E-07 | 3.16E-08 | 0 | 0 | 4.64346E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.32E-08 | 3.64E-08 | 8.55E-07 | 3.00E-08 | 0 | 0 | 4.38821E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.26E-08 | 3.45E-08 | 8.10E-07 | 2.85E-08 | 0 | 0 | 4.13034E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 1.19E-08 | 3.26E-08 | 7.65E-07 | 2.69E-08 | 0 | 0 | 3.85624E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.05E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 1.67E-08 | 4.62E-08 | 1.08E-06 | 3.80E-08 | 0 | 0 | 5.68968E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.03E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.63E-08 | 4.51E-08 | 1.06E-06 | 3.72E-08 | 0 | 0 | 5.64207E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.88E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 1.55E-08 | 4.30E-08 | 1.01E-06 | 3.54E-08 | 0 | 0 | 5.36024E-10 | 0 | 0.0005 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.70E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.47E-08 | 4.07E-08 | 9.54E-07 | 3.35E-08 | 0 | 0 | 5.03593E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.53E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 1.39E-08 | 3.84E-08 | 9.01E-07 | 3.16E-08 | 0 | 0 | 4.71962E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.37E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.53E-07 | 2.99E-08 | 0 | 0 | 4.42243E-10 | 0 | 0.0004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.14086E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.69E-07 | 2.70E-08 | 0 | 0 | 3.90427E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.14E-08 | 3.12E-08 | 7.32E-07 | 2.57E-08 | 0 | 0 | 3.67768E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.69E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 1.54E-08 | 4.24E-08 | 9.94E-07 | 3.49E-08 | 0 | 0 | 5.01087E-10 | 0 | 0.0005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.95E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.42E-08 | 1.04E-06 | 3.64E-08 | 0 | 0 | 5.49649E-10 | 0 | 0.0005 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.92E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 1.56E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.44025E-10 | 0 | 0.0005 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.76E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 1.49E-08 | 4.11E-08 | 9.65E-07 | 3.39E-08 | 0 | 0 | 5.14666E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.60E-05 | 2.13E-08 | 1.28E-08 | 2.13E-08 | 1.41E-08 | 3.90E-08 | 9.15E-07 | 3.21E-08 | 0 | 0 | 4.83834E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.35E-08 | 3.71E-08 | 8.70E-07 | 3.05E-08 | 0 | 0 | 4.55396E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 1.27E-08 | 3.50E-08 | 8.22E-07 | 2.88E-08 | 0 | 0 | 4.24468E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.32E-08 | 7.80E-07 | 2.74E-08 | 0 | 0 | 3.97696E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.42E-07 | 2.60E-08 | 0 | 0 | 3.7318E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.64E-08 | 9.83E-09 | 1.64E-08 | 1.10E-08 | 3.00E-08 | 7.05E-07 | 2.47E-08 | 0 | 0 | 3.49364E-10 | 0 | 0.0003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.76E-05 | 1.56E-08 | 9.37E-09 | 1.56E-08 | 1.05E-08 | 2.86E-08 | 6.72E-07 | 2.36E-08 | 0 | 0 | 3.27958E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.64E-05 | 1.48E-08 | 8.88E-09 | 1.48E-08 | 9.94E-09 | 2.71E-08 | 6.37E-07 | 2.23E-08 | 0 | 0 | 3.04766E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.95E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 1.62E-08 | 4.48E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 5.49103E-10 | 0 | 0.0005 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.88E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.35E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.35911E-10 | 0 | 0.0005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.35E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.48E-10 | 0 | 0.0005 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.18E-08 | 9.81E-07 | 3.44E-08 | 0 | 0 | 5.24663E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.66E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.44E-08 | 3.98E-08 | 9.35E-07 | 3.28E-08 | 0 | 0 | 4.95967E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.38E-08 | 3.79E-08 | 8.89E-07 | 3.12E-08 | 0 | 0 | 4.67374E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.45E-07 | 2.97E-08 | 0 | 0 | 4.38574E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.42E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 4.10213E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.04E-05 | 1.76E-08 | 1.05E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.57E-07 | 2.66E-08 | 0 | 0 | 3.8043E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 1.11E-08 | 3.04E-08 | 7.13E-07 | 2.50E-08 | 0 | 0 | 3.51025E-10 | 0 | 0.0004 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.72E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.68E-07 | 2.34E-08 | 0 | 0 | 3.20674E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.87E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.61E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.3551E-10 | 0 | 0.0005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.92E-05 | 2.41E-08 | 1.44E-08 | 2.41E-08 | 1.60E-08 | 4.42E-08 | 1.04E-06 | 3.64E-08 | 0 | 0 | 5.44318E-10 | 0 | 0.0005 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.57E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 0 | 0 | 5.41952E-10 | 0 | 0.0005 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.84E-05 | 2.31E-08 | 1.38E-08 | 2.31E-08 | 1.53E-08 | 4.23E-08 | 9.93E-07 | 3.49E-08 | 0 | 0 | 5.29355E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 1.47E-08 | 4.06E-08 | 9.54E-07 | 3.35E-08 | 0 | 0 | 5.06318E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.40E-08 | 3.86E-08 | 9.06E-07 | 3.18E-08 | 0 | 0 | 4.75598E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.33E-08 | 3.65E-08 | 8.57E-07 | 3.01E-08 | 0 | 0 | 4.43767E-10 | 0 | 0.0004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.42E-08 | 8.03E-07 | 2.82E-08 | 0 | 0 | 4.06922E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.53E-07 | 2.64E-08 | 0 | 0 | 3.73593E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.80E-05 | 3.17E-08 | 1.90E-08 | 3.17E-08 | 2.10E-08 | 5.82E-08 | 1.37E-06 | 4.80E-08 | 0 | 0 | 7.08149E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.79E-05 | 3.11E-08 | 1.86E-08 | 3.11E-08 | 2.06E-08 | 5.70E-08 | 1.34E-06 | 4.70E-08 | 0 | 0 | 7.06111E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.29E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 1.80E-08 | 4.99E-08 | 1.17E-06 | 4.11E-08 | 0 | 0 | 6.14006E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.18E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.74E-08 | 4.81E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 5.92028E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.12E-05 | 2.56E-08 | 1.53E-08 | 2.56E-08 | 1.70E-08 | 4.69E-08 | 1.10E-06 | 3.87E-08 | 0 | 0 | 5.81152E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.02E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 1.64E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 0 | 5.62575E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.89E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.38291E-10 | 0 | 0.0005 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.57E-08 | 4.35E-08 | 1.02E-06 | 3.58E-08 | 0 | 0 | 5.47322E-10 | 0 | 0.0005 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.49E-08 | 4.12E-08 | 9.67E-07 | 3.40E-08 | 0 | 0 | 5.13722E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.87E-08 | 9.08E-07 | 3.19E-08 | 0 | 0 | 4.7416E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.62E-08 | 8.50E-07 | 2.98E-08 | 0 | 0 | 4.35025E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.23E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 3.97809E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.95E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 1.15E-08 | 3.17E-08 | 7.43E-07 | 2.61E-08 | 0 | 0 | 3.63159E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.95E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.12E-08 | 5.89E-08 | 1.38E-06 | 4.86E-08 | 0 | 0 | 7.35883E-10 | 0 | 0.0007 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.71E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.01E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 6.92307E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.83E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.02E-08 | 5.61E-08 | 1.32E-06 | 4.62E-08 | 0 | 0 | 7.1377E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.83E-05 | 3.01E-08 | 1.81E-08 | 3.01E-08 | 1.99E-08 | 5.53E-08 | 1.30E-06 | 4.56E-08 | 0 | 0 | 7.1367E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.83E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 1.97E-08 | 5.47E-08 | 1.28E-06 | 4.51E-08 | 0 | 0 | 7.14129E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.47E-05 | 2.75E-08 | 1.65E-08 | 2.75E-08 | 1.82E-08 | 5.05E-08 | 1.19E-06 | 4.16E-08 | 0 | 0 | 6.46651E-10 | 0 | 0.0006 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.43E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 1.78E-08 | 4.95E-08 | 1.16E-06 | 4.08E-08 | 0 | 0 | 6.39522E-10 | 0 | 0.0006 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 1.70E-08 | 4.72E-08 | 1.11E-06 | 3.89E-08 | 0 | 0 | 6.05762E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.01E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.61169E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.50E-08 | 4.14E-08 | 9.71E-07 | 3.41E-08 | 0 | 0 | 5.14916E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.52E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.39E-08 | 3.85E-08 | 9.04E-07 | 3.17E-08 | 0 | 0 | 4.69544E-10 | 0 | 0.0005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.30E-08 | 3.59E-08 | 8.42E-07 | 2.95E-08 | 0 | 0 | 4.27418E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.09E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.22E-08 | 3.35E-08 | 7.85E-07 | 2.76E-08 | 0 | 0 | 3.89502E-10 | 0 | 0.0004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 1.14E-08 | 3.12E-08 | 7.33E-07 | 2.57E-08 | 0 | 0 | 3.5466E-10 | 0 | 0.0004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.72E-05 | 1.58E-08 | 9.50E-09 | 1.58E-08 | 1.06E-08 | 2.90E-08 | 6.81E-07 | 2.39E-08 | 0 | 0 | 3.20511E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 9.77E-09 | 2.67E-08 | 6.26E-07 | 2.20E-08 | 0 | 0 | 2.83678E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.66E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 2.73E-08 | 7.64E-08 | 1.79E-06 | 6.30E-08 | 0 | 0 | 1.05521E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.35E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 2.59E-08 | 7.25E-08 | 1.70E-06 | 5.98E-08 | 0 | 0 | 9.96268E-10 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.55E-05 | 3.49E-08 | 2.09E-08 | 3.49E-08 | 2.30E-08 | 6.40E-08 | 1.50E-06 | 5.28E-08 | 0 | 0 | 8.48821E-10 | 0 | 0.0008 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.07E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 2.10E-08 | 5.86E-08 | 1.37E-06 | 4.83E-08 | 0 | 0 | 7.58616E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.00E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 2.05E-08 | 5.71E-08 | 1.34E-06 | 4.71E-08 | 0 | 0 | 7.4567E-10 | 0 | 0.0007 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.91E-05 | 3.02E-08 | 1.81E-08 | 3.02E-08 | 1.99E-08 | 5.55E-08 | 1.30E-06 | 4.58E-08 | 0 | 0 | 7.29439E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.84E-05 | 2.95E-08 | 1.77E-08 | 2.95E-08 | 1.94E-08 | 5.41E-08 | 1.27E-06 | 4.46E-08 | 0 | 0 | 7.15403E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.57E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 1.83E-08 | 5.08E-08 | 1.19E-06 | 4.19E-08 | 0 | 0 | 6.65216E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.78E-08 | 1.12E-06 | 3.94E-08 | 0 | 0 | 6.17734E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.04E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.45E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 5.66995E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 1.49E-08 | 4.13E-08 | 9.69E-07 | 3.40E-08 | 0 | 0 | 5.15219E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.38E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 4.65649E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.26E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 1.29E-08 | 3.54E-08 | 8.31E-07 | 2.92E-08 | 0 | 0 | 4.21342E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.70E-07 | 2.70E-08 | 0 | 0 | 3.80311E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.85E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.44547E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.55E-08 | 9.32E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.69E-07 | 2.35E-08 | 0 | 0 | 3.13244E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.53E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 9.75E-09 | 2.66E-08 | 6.25E-07 | 2.19E-08 | 0 | 0 | 2.84835E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.24E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 2.89E-08 | 8.11E-08 | 1.90E-06 | 6.69E-08 | 0 | 0 | 1.16295E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 4.13E-08 | 2.48E-08 | 4.13E-08 | 2.71E-08 | 7.59E-08 | 1.78E-06 | 6.26E-08 | 0 | 0 | 1.07852E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 2.39E-08 | 6.68E-08 | 1.57E-06 | 5.50E-08 | 0 | 0 | 9.18948E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.57E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 2.24E-08 | 6.25E-08 | 1.47E-06 | 5.15E-08 | 0 | 0 | 8.52472E-10 | 0 | 0.0009 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.42E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 2.16E-08 | 6.03E-08 | 1.41E-06 | 4.97E-08 | 0 | 0 | 8.2432E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.04E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.00E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 7.52966E-10 | 0 | 0.0008 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.67E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 1.85E-08 | 5.16E-08 | 1.21E-06 | 4.25E-08 | 0 | 0 | 6.83755E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.34E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 1.72E-08 | 4.78E-08 | 1.12E-06 | 3.94E-08 | 0 | 0 | 6.23403E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.04E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.60E-08 | 4.43E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.66503E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.74E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.09E-08 | 9.59E-07 | 3.37E-08 | 0 | 0 | 5.10704E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.45E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 1.36E-08 | 3.75E-08 | 8.80E-07 | 3.09E-08 | 0 | 0 | 4.56663E-10 | 0 | 0.0005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.09E-07 | 2.84E-08 | 0 | 0 | 4.07717E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.96E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 1.16E-08 | 3.18E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.65502E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.77E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 1.08E-08 | 2.95E-08 | 6.93E-07 | 2.43E-08 | 0 | 0 | 3.29679E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.61E-05 | 1.50E-08 | 9.02E-09 | 1.50E-08 | 1.01E-08 | 2.76E-08 | 6.47E-07 | 2.27E-08 | 0 | 0 | 2.99859E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.41E-08 | 8.47E-09 | 1.41E-08 | 9.48E-09 | 2.59E-08 | 6.07E-07 | 2.13E-08 | 0 | 0 | 2.74744E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.30E-08 | 7.79E-09 | 1.30E-08 | 8.74E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.43128E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.93E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.18914E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.09E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 2.80E-08 | 7.86E-08 | 1.84E-06 | 6.48E-08 | 0 | 0 | 1.13506E-09 | 0 | 0.0011 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.67E-05 | 4.01E-08 | 2.40E-08 | 4.01E-08 | 2.62E-08 | 7.36E-08 | 1.73E-06 | 6.07E-08 | 0 | 0 | 1.05635E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.11E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 2.41E-08 | 6.74E-08 | 1.58E-06 | 5.55E-08 | 0 | 0 | 9.51974E-10 | 0 | 0.0010 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.56E-05 | 3.34E-08 | 2.00E-08 | 3.34E-08 | 2.19E-08 | 6.13E-08 | 1.44E-06 | 5.05E-08 | 0 | 0 | 8.49967E-10 | 0 | 0.0008 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.08E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.61E-08 | 0 | 0 | 7.61172E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.68E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 1.85E-08 | 5.14E-08 | 1.21E-06 | 4.24E-08 | 0 | 0 | 6.85823E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.32E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.70E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 6.19578E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.97E-05 | 2.36E-08 | 1.42E-08 | 2.36E-08 | 1.56E-08 | 4.34E-08 | 1.02E-06 | 3.57E-08 | 0 | 0 | 5.54035E-10 | 0 | 0.0006 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.63E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.43E-08 | 3.95E-08 | 9.26E-07 | 3.25E-08 | 0 | 0 | 4.9031E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.34071E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.31E-08 | 7.76E-07 | 2.72E-08 | 0 | 0 | 3.86225E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.86E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.46152E-10 | 0 | 0.0003 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.68E-07 | 2.34E-08 | 0 | 0 | 3.14017E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.54E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 9.74E-09 | 2.66E-08 | 6.25E-07 | 2.19E-08 | 0 | 0 | 2.86552E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.42E-05 | 1.37E-08 | 8.21E-09 | 1.37E-08 | 9.20E-09 | 2.51E-08 | 5.88E-07 | 2.06E-08 | 0 | 0 | 2.64085E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.32E-05 | 1.30E-08 | 7.77E-09 | 1.30E-08 | 8.72E-09 | 2.38E-08 | 5.57E-07 | 1.95E-08 | 0 | 0 | 2.45176E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.56E-05 | 4.50E-08 | 2.70E-08 | 4.50E-08 | 2.94E-08 | 8.28E-08 | 1.94E-06 | 6.83E-08 | 0 | 0 | 1.22223E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.08E-05 | 4.20E-08 | 2.52E-08 | 4.20E-08 | 2.75E-08 | 7.72E-08 | 1.81E-06 | 6.37E-08 | 0 | 0 | 1.13324E-09 | 0 | 0.0011 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.33E-05 | 3.76E-08 | 2.26E-08 | 3.76E-08 | 2.47E-08 | 6.92E-08 | 1.62E-06 | 5.70E-08 | 0 | 0 | 9.93303E-10 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.67E-05 | 3.37E-08 | 2.02E-08 | 3.37E-08 | 2.22E-08 | 6.20E-08 | 1.45E-06 | 5.11E-08 | 0 | 0 | 8.69714E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.12E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.62E-08 | 0 | 0 | 7.6878E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.67E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 1.83E-08 | 5.10E-08 | 1.20E-06 | 4.20E-08 | 0 | 0 | 6.83808E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.23E-05 | 2.51E-08 | 1.51E-08 | 2.51E-08 | 1.66E-08 | 4.61E-08 | 1.08E-06 | 3.80E-08 | 0 | 0 | 6.02322E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.82E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.50E-08 | 4.16E-08 | 9.76E-07 | 3.43E-08 | 0 | 0 | 5.2635E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.36E-08 | 3.77E-08 | 8.84E-07 | 3.10E-08 | 0 | 0 | 4.61078E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.19E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.07619E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.42E-07 | 2.61E-08 | 0 | 0 | 3.63433E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.76E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.89E-07 | 2.42E-08 | 0 | 0 | 3.27945E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.49E-08 | 8.97E-09 | 1.49E-08 | 1.00E-08 | 2.74E-08 | 6.43E-07 | 2.26E-08 | 0 | 0 | 2.98369E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.47E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 9.43E-09 | 2.57E-08 | 6.04E-07 | 2.12E-08 | 0 | 0 | 2.73266E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.35E-05 | 1.32E-08 | 7.92E-09 | 1.32E-08 | 8.89E-09 | 2.42E-08 | 5.68E-07 | 1.99E-08 | 0 | 0 | 2.51051E-10 | 0 | 0.0003 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 8.41E-09 | 2.29E-08 | 5.36E-07 | 1.88E-08 | 0 | 0 | 2.3164E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.97E-05 | 5.91E-08 | 3.55E-08 | 5.91E-08 | 3.85E-08 | 1.09E-07 | 2.55E-06 | 8.96E-08 | 0 | 0 | 1.67172E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 5.71E-08 | 3.43E-08 | 5.71E-08 | 3.72E-08 | 1.05E-07 | 2.46E-06 | 8.66E-08 | 0 | 0 | 1.62107E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.23E-05 | 5.41E-08 | 3.25E-08 | 5.41E-08 | 3.53E-08 | 9.95E-08 | 2.34E-06 | 8.21E-08 | 0 | 0 | 1.53316E-09 | 0 | 0.0015 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.38E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 3.21E-08 | 9.04E-08 | 2.12E-06 | 7.46E-08 | 0 | 0 | 1.37551E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.47E-05 | 4.39E-08 | 2.63E-08 | 4.39E-08 | 2.87E-08 | 8.07E-08 | 1.89E-06 | 6.65E-08 | 0 | 0 | 1.20578E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.54E-05 | 3.86E-08 | 2.31E-08 | 3.86E-08 | 2.53E-08 | 7.08E-08 | 1.66E-06 | 5.84E-08 | 0 | 0 | 1.03231E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.81E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 2.25E-08 | 6.31E-08 | 1.48E-06 | 5.20E-08 | 0 | 0 | 8.96871E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.15E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.60E-08 | 1.31E-06 | 4.62E-08 | 0 | 0 | 7.74051E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.58E-05 | 2.71E-08 | 1.63E-08 | 2.71E-08 | 1.79E-08 | 4.98E-08 | 1.17E-06 | 4.10E-08 | 0 | 0 | 6.67341E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.07E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.59E-08 | 4.42E-08 | 1.04E-06 | 3.65E-08 | 0 | 0 | 5.71798E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.66E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.44E-08 | 3.97E-08 | 9.32E-07 | 3.27E-08 | 0 | 0 | 4.95354E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.31E-08 | 3.60E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.34585E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.30E-08 | 7.74E-07 | 2.72E-08 | 0 | 0 | 3.85251E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.85E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 1.11E-08 | 3.05E-08 | 7.15E-07 | 2.51E-08 | 0 | 0 | 3.44796E-10 | 0 | 0.0003 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.67E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 1.03E-08 | 2.83E-08 | 6.64E-07 | 2.33E-08 | 0 | 0 | 3.11162E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.51E-05 | 1.44E-08 | 8.62E-09 | 1.44E-08 | 9.65E-09 | 2.64E-08 | 6.18E-07 | 2.17E-08 | 0 | 0 | 2.8133E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.38E-05 | 1.35E-08 | 8.08E-09 | 1.35E-08 | 9.06E-09 | 2.47E-08 | 5.79E-07 | 2.03E-08 | 0 | 0 | 2.56389E-10 | 0 | 0.0003 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.55E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.34957E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 8.09E-09 | 2.19E-08 | 5.15E-07 | 1.81E-08 | 0 | 0 | 2.16271E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.27E-08 | 4.36E-08 | 7.27E-08 | 4.72E-08 | 1.34E-07 | 3.14E-06 | 1.10E-07 | 0 | 0 | 2.1611E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.40E-08 | 1.25E-07 | 2.92E-06 | 1.03E-07 | 0 | 0 | 2.00268E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.15E-05 | 5.88E-08 | 3.53E-08 | 5.88E-08 | 3.83E-08 | 1.08E-07 | 2.54E-06 | 8.92E-08 | 0 | 0 | 1.70633E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.06E-05 | 5.25E-08 | 3.15E-08 | 5.25E-08 | 3.42E-08 | 9.66E-08 | 2.27E-06 | 7.97E-08 | 0 | 0 | 1.50223E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.81E-05 | 4.55E-08 | 2.73E-08 | 4.55E-08 | 2.97E-08 | 8.36E-08 | 1.96E-06 | 6.89E-08 | 0 | 0 | 1.26923E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.78E-05 | 3.96E-08 | 2.38E-08 | 3.96E-08 | 2.59E-08 | 7.27E-08 | 1.71E-06 | 6.00E-08 | 0 | 0 | 1.07654E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.88E-05 | 3.45E-08 | 2.07E-08 | 3.45E-08 | 2.26E-08 | 6.33E-08 | 1.49E-06 | 5.22E-08 | 0 | 0 | 9.09153E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.06E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 1.96E-08 | 5.47E-08 | 1.28E-06 | 4.51E-08 | 0 | 0 | 7.57022E-10 | 0 | 0.0008 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.40E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.34342E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.90E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.22E-08 | 9.91E-07 | 3.48E-08 | 0 | 0 | 5.4005E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.38E-08 | 3.80E-08 | 8.92E-07 | 3.13E-08 | 0 | 0 | 4.68641E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.21E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.11E-07 | 2.85E-08 | 0 | 0 | 4.11179E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 1.15E-08 | 3.16E-08 | 7.41E-07 | 2.60E-08 | 0 | 0 | 3.63263E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.74E-05 | 1.59E-08 | 9.53E-09 | 1.59E-08 | 1.06E-08 | 2.91E-08 | 6.84E-07 | 2.40E-08 | 0 | 0 | 3.2401E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.56E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 9.88E-09 | 2.70E-08 | 6.33E-07 | 2.22E-08 | 0 | 0 | 2.90317E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.41E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.23E-09 | 2.52E-08 | 5.90E-07 | 2.07E-08 | 0 | 0 | 2.6216E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 8.68E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.39054E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.18E-05 | 1.21E-08 | 7.29E-09 | 1.21E-08 | 8.20E-09 | 2.23E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.19537E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.09E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 7.78E-09 | 2.11E-08 | 4.95E-07 | 1.73E-08 | 0 | 0 | 2.02734E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 5.62E-08 | 1.60E-07 | 3.74E-06 | 1.32E-07 | 0 | 0 | 2.63119E-09 | 0 | 0.0026 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.51E-08 | 5.11E-08 | 8.51E-08 | 5.51E-08 | 1.57E-07 | 3.67E-06 | 1.29E-07 | 0 | 0 | 2.59079E-09 | 0 | 0.0026 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 (per million) | Receptor Type |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 5.25E-08 | 1.49E-07 | 3.50E-06 | 1.23E-07 | 0 | 0 | 2.46404E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.74E-08 | 4.64E-08 | 7.74E-08 | 5.01E-08 | 1.42E-07 | 3.34E-06 | 1.17E-07 | 0 | 0 | 2.35316E-09 | 0 | 0.0024 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 4.39E-08 | 1.24E-07 | 2.92E-06 | 1.03E-07 | 0 | 0 | 2.02983E-09 | 0 | 0.0020 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.81E-05 | 5.62E-08 | 3.37E-08 | 5.62E-08 | 3.65E-08 | 1.03E-07 | 2.42E-06 | 8.52E-08 | 0 | 0 | 1.64135E-09 | 0 | 0.0016 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.15E-05 | 4.69E-08 | 2.82E-08 | 4.69E-08 | 3.06E-08 | 8.63E-08 | 2.02E-06 | 7.12E-08 | 0 | 0 | 1.33204E-09 | 0 | 0.0013 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.86E-05 | 3.97E-08 | 2.38E-08 | 3.97E-08 | 2.60E-08 | 7.30E-08 | 1.71E-06 | 6.02E-08 | 0 | 0 | 1.09178E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.70E-05 | 3.32E-08 | 1.99E-08 | 3.32E-08 | 2.18E-08 | 6.11E-08 | 1.43E-06 | 5.04E-08 | 0 | 0 | 8.76858E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.82E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 1.86E-08 | 5.18E-08 | 1.22E-06 | 4.27E-08 | 0 | 0 | 7.12158E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.22E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 1.63E-08 | 4.54E-08 | 1.07E-06 | 3.74E-08 | 0 | 0 | 5.99456E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.72E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.45E-08 | 4.01E-08 | 9.41E-07 | 3.30E-08 | 0 | 0 | 5.07653E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.34E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 1.30E-08 | 3.59E-08 | 8.42E-07 | 2.96E-08 | 0 | 0 | 4.36598E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.18E-08 | 3.25E-08 | 7.63E-07 | 2.68E-08 | 0 | 0 | 3.80608E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.80E-05 | 1.62E-08 | 9.74E-09 | 1.62E-08 | 1.09E-08 | 2.98E-08 | 6.99E-07 | 2.45E-08 | 0 | 0 | 3.35539E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.61E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 1.01E-08 | 2.75E-08 | 6.46E-07 | 2.27E-08 | 0 | 0 | 2.99563E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.44E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 9.35E-09 | 2.55E-08 | 5.99E-07 | 2.10E-08 | 0 | 0 | 2.68298E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.31E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 8.77E-09 | 2.39E-08 | 5.60E-07 | 1.97E-08 | 0 | 0 | 2.43549E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.20E-05 | 1.23E-08 | 7.36E-09 | 1.23E-08 | 8.28E-09 | 2.25E-08 | 5.28E-07 | 1.85E-08 | 0 | 0 | 2.23052E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.11E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 7.86E-09 | 2.13E-08 | 5.00E-07 | 1.75E-08 | 0 | 0 | 2.06177E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.49E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 1.91975E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 9.25E-08 | 5.55E-08 | 9.25E-08 | 5.98E-08 | 1.70E-07 | 3.99E-06 | 1.40E-07 | 0 | 0 | 2.8509E-09 | 0 | 0.0029 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 8.94E-08 | 5.37E-08 | 8.94E-08 | 5.78E-08 | 1.64E-07 | 3.86E-06 | 1.36E-07 | 0 | 0 | 2.75906E-09 | 0 | 0.0028 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.86E-08 | 5.31E-08 | 8.86E-08 | 5.73E-08 | 1.63E-07 | 3.82E-06 | 1.34E-07 | 0 | 0 | 2.75974E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 7.47E-08 | 4.48E-08 | 7.47E-08 | 4.84E-08 | 1.37E-07 | 3.22E-06 | 1.13E-07 | 0 | 0 | 2.29048E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.33E-05 | 5.85E-08 | 3.51E-08 | 5.85E-08 | 3.80E-08 | 1.08E-07 | 2.52E-06 | 8.87E-08 | 0 | 0 | 1.73877E-09 | 0 | 0.0017 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.24E-05 | 4.70E-08 | 2.82E-08 | 4.70E-08 | 3.06E-08 | 8.64E-08 | 2.03E-06 | 7.12E-08 | 0 | 0 | 1.34944E-09 | 0 | 0.0013 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.62E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 2.48E-08 | 6.99E-08 | 1.64E-06 | 5.76E-08 | 0 | 0 | 1.04774E-09 | 0 | 0.0010 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.42E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.05E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 8.23706E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.55E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 1.74E-08 | 4.85E-08 | 1.14E-06 | 4.00E-08 | 0 | 0 | 6.61877E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.93E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.19E-08 | 9.83E-07 | 3.45E-08 | 0 | 0 | 5.46195E-10 | 0 | 0.0005 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.48E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 1.34E-08 | 3.70E-08 | 8.69E-07 | 3.05E-08 | 0 | 0 | 4.61794E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.14E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.33E-08 | 7.81E-07 | 2.74E-08 | 0 | 0 | 3.98572E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 1.10E-08 | 3.02E-08 | 7.09E-07 | 2.49E-08 | 0 | 0 | 3.47538E-10 | 0 | 0.0003 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.65E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 1.01E-08 | 2.77E-08 | 6.51E-07 | 2.28E-08 | 0 | 0 | 3.07516E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 9.42E-09 | 2.58E-08 | 6.04E-07 | 2.12E-08 | 0 | 0 | 2.75989E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.35E-05 | 1.31E-08 | 7.89E-09 | 1.31E-08 | 8.84E-09 | 2.41E-08 | 5.66E-07 | 1.98E-08 | 0 | 0 | 2.50835E-10 | 0 | 0.0003 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.24E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 8.34E-09 | 2.27E-08 | 5.33E-07 | 1.87E-08 | 0 | 0 | 2.30218E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.15E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 7.93E-09 | 2.16E-08 | 5.06E-07 | 1.77E-08 | 0 | 0 | 2.13655E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 7.58E-09 | 2.06E-08 | 4.82E-07 | 1.69E-08 | 0 | 0 | 2.00016E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 7.26E-09 | 1.97E-08 | 4.61E-07 | 1.62E-08 | 0 | 0 | 1.87997E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.27E-07 | 7.62E-08 | 1.27E-07 | 8.18E-08 | 2.34E-07 | 5.48E-06 | 1.93E-07 | 0 | 0 | 4.10244E-09 | 0 | 0.0041 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.09E-07 | 6.56E-08 | 1.09E-07 | 7.05E-08 | 2.01E-07 | 4.72E-06 | 1.66E-07 | 0 | 0 | 3.5016E-09 | 0 | 0.0035 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.23E-08 | 4.94E-08 | 8.23E-08 | 5.32E-08 | 1.51E-07 | 3.55E-06 | 1.25E-07 | 0 | 0 | 2.57411E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.69E-05 | 5.98E-08 | 3.59E-08 | 5.98E-08 | 3.88E-08 | 1.10E-07 | 2.58E-06 | 9.08E-08 | 0 | 0 | 1.80552E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.85E-05 | 4.43E-08 | 2.66E-08 | 4.43E-08 | 2.89E-08 | 8.15E-08 | 1.91E-06 | 6.72E-08 | 0 | 0 | 1.27583E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.00E-05 | 3.42E-08 | 2.05E-08 | 3.42E-08 | 2.24E-08 | 6.28E-08 | 1.47E-06 | 5.18E-08 | 0 | 0 | 9.32508E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.87E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 1.83E-08 | 5.12E-08 | 1.20E-06 | 4.22E-08 | 0 | 0 | 7.21983E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.11E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.55E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.79685E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.58E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 1.36E-08 | 3.76E-08 | 8.83E-07 | 3.10E-08 | 0 | 0 | 4.8119E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.20E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.21E-08 | 3.35E-08 | 7.86E-07 | 2.76E-08 | 0 | 0 | 4.10277E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.92E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 1.10E-08 | 3.03E-08 | 7.12E-07 | 2.50E-08 | 0 | 0 | 3.57582E-10 | 0 | 0.0004 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.71E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 1.02E-08 | 2.79E-08 | 6.55E-07 | 2.30E-08 | 0 | 0 | 3.18069E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 9.48E-09 | 2.60E-08 | 6.09E-07 | 2.14E-08 | 0 | 0 | 2.87457E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 8.92E-09 | 2.44E-08 | 5.72E-07 | 2.01E-08 | 0 | 0 | 2.63278E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.31E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 8.45E-09 | 2.31E-08 | 5.41E-07 | 1.90E-08 | 0 | 0 | 2.43469E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.22E-05 | 1.20E-08 | 7.17E-09 | 1.20E-08 | 8.04E-09 | 2.19E-08 | 5.14E-07 | 1.80E-08 | 0 | 0 | 2.26895E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 7.68E-09 | 2.09E-08 | 4.90E-07 | 1.72E-08 | 0 | 0 | 2.12485E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.08E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 7.37E-09 | 2.00E-08 | 4.70E-07 | 1.65E-08 | 0 | 0 | 2.00545E-10 | 0 | 0.0002 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.02E-05 | 1.05E-08 | 6.28E-09 | 1.05E-08 | 7.08E-09 | 1.92E-08 | 4.50E-07 | 1.58E-08 | 0 | 0 | 1.89329E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.23E-04 | 1.82E-07 | 1.09E-07 | 1.82E-07 | 1.17E-07 | 3.36E-07 | 7.88E-06 | 2.77E-07 | 0 | 0 | 6.02642E-09 | 0 | 0.0060 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.65E-04 | 2.04E-07 | 1.23E-07 | 2.04E-07 | 1.31E-07 | 3.76E-07 | 8.83E-06 | 3.10E-07 | 0 | 0 | 6.80072E-09 | 0 | 0.0068 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.27E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 1.18E-07 | 3.38E-07 | 7.94E-06 | 2.79E-07 | 0 | 0 | 6.10125E-09 | 0 | 0.0061 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.41E-07 | 8.44E-08 | 1.41E-07 | 9.06E-08 | 2.59E-07 | 6.08E-06 | 2.14E-07 | 0 | 0 | 4.61452E-09 | 0 | 0.0046 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.82E-08 | 5.29E-08 | 8.82E-08 | 5.69E-08 | 1.62E-07 | 3.81E-06 | 1.34E-07 | 0 | 0 | 2.80027E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.01E-05 | 5.56E-08 | 3.34E-08 | 5.56E-08 | 3.61E-08 | 1.02E-07 | 2.40E-06 | 8.44E-08 | 0 | 0 | 1.67878E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.84E-05 | 3.84E-08 | 2.30E-08 | 3.84E-08 | 2.50E-08 | 7.05E-08 | 1.66E-06 | 5.82E-08 | 0 | 0 | 1.08819E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.21E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 1.93E-08 | 5.40E-08 | 1.27E-06 | 4.45E-08 | 0 | 0 | 7.84895E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.27E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 1.59E-08 | 4.43E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.10051E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.68E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.81E-08 | 8.94E-07 | 3.14E-08 | 0 | 0 | 4.99961E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.29E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 4.26865E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.54E-08 | 0 | 0 | 3.75021E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.80E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 1.03E-08 | 2.84E-08 | 6.66E-07 | 2.34E-08 | 0 | 0 | 3.35651E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.64E-05 | 1.44E-08 | 8.65E-09 | 1.44E-08 | 9.63E-09 | 2.65E-08 | 6.21E-07 | 2.18E-08 | 0 | 0 | 3.05417E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 9.05E-09 | 2.48E-08 | 5.82E-07 | 2.04E-08 | 0 | 0 | 2.79917E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 8.56E-09 | 2.34E-08 | 5.50E-07 | 1.93E-08 | 0 | 0 | 2.59022E-10 | 0 | 0.0003 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 8.13E-09 | 2.22E-08 | 5.21E-07 | 1.83E-08 | 0 | 0 | 2.41103E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.15E-08 | 6.92E-09 | 1.15E-08 | 7.75E-09 | 2.12E-08 | 4.96E-07 | 1.74E-08 | 0 | 0 | 2.25397E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 7.40E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 2.10995E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.05E-08 | 6.31E-09 | 1.05E-08 | 7.09E-09 | 1.93E-08 | 4.52E-07 | 1.59E-08 | 0 | 0 | 1.98483E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.01E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 6.80E-09 | 1.85E-08 | 4.33E-07 | 1.52E-08 | 0 | 0 | 1.87339E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.42E-04 | 3.53E-07 | 2.12E-07 | 3.53E-07 | 2.27E-07 | 6.50E-07 | 1.53E-05 | 5.37E-07 | 0 | 0 | 1.19747E-08 | 0 | 0.0120 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.86E-04 | 3.76E-07 | 2.26E-07 | 3.76E-07 | 2.41E-07 | 6.92E-07 | 1.63E-05 | 5.72E-07 | 0 | 0 | 1.27874E-08 | 0 | 0.0128 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.11E-04 | 3.36E-07 | 2.02E-07 | 3.36E-07 | 2.15E-07 | 6.18E-07 | 1.45E-05 | 5.10E-07 | 0 | 0 | 1.13973E-08 | 0 | 0.0114 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.21E-04 | 1.80E-07 | 1.08E-07 | 1.80E-07 | 1.16E-07 | 3.31E-07 | 7.76E-06 | 2.73E-07 | 0 | 0 | 5.98625E-09 | 0 | 0.0060 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 4.98E-08 | 1.42E-07 | 3.33E-06 | 1.17E-07 | 0 | 0 | 2.43177E-09 | 0 | 0.0024 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.01E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 2.89E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.30647E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.71E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 2.08E-08 | 5.86E-08 | 1.37E-06 | 4.83E-08 | 0 | 0 | 8.77906E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.61E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.69E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 6.73025E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.96E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 1.45E-08 | 4.05E-08 | 9.51E-07 | 3.34E-08 | 0 | 0 | 5.52152E-10 | 0 | 0.0006 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.52E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.29E-08 | 3.58E-08 | 8.40E-07 | 2.95E-08 | 0 | 0 | 4.69959E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.16E-08 | 3.22E-08 | 7.56E-07 | 2.65E-08 | 0 | 0 | 4.0904E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.90E-07 | 2.42E-08 | 0 | 0 | 3.62493E-10 | 0 | 0.0004 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 9.84E-09 | 2.71E-08 | 6.36E-07 | 2.23E-08 | 0 | 0 | 3.24978E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.37E-08 | 8.25E-09 | 1.37E-08 | 9.18E-09 | 2.52E-08 | 5.92E-07 | 2.08E-08 | 0 | 0 | 2.94804E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.45E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 8.60E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.69467E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 8.13E-09 | 2.22E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.48733E-10 | 0 | 0.0002 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 7.71E-09 | 2.11E-08 | 4.94E-07 | 1.73E-08 | 0 | 0 | 2.31186E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.16E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 7.34E-09 | 2.00E-08 | 4.70E-07 | 1.65E-08 | 0 | 0 | 2.15971E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.09E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.01E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 0 | 0 | 2.02544E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 9.95E-09 | 5.97E-09 | 9.95E-09 | 6.70E-09 | 1.82E-08 | 4.28E-07 | 1.50E-08 | 0 | 0 | 1.90349E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.65E-06 | 9.53E-09 | 5.72E-09 | 9.53E-09 | 6.43E-09 | 1.75E-08 | 4.10E-07 | 1.44E-08 | 0 | 0 | 1.79792E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.27E-07 | 5.56E-07 | 9.27E-07 | 5.94E-07 | 1.71E-06 | 4.00E-05 | 1.41E-06 | 0 | 0 | 3.19109E-08 | 0 | 0.0319 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.25E-03 | 1.21E-06 | 7.28E-07 | 1.21E-06 | 7.78E-07 | 2.23E-06 | 5.24E-05 | 1.85E-06 | 0 | 0 | 4.18927E-08 | 0 | 0.0419 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.41E-06 | 8.47E-07 | 1.41E-06 | 9.03E-07 | 2.60E-06 | 6.10E-05 | 2.14E-06 | 0 | 0 | 4.87363E-08 | 0 | 0.0487 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.19E-07 | 7.13E-08 | 1.19E-07 | 7.65E-08 | 2.19E-07 | 5.13E-06 | 1.81E-07 | 0 | 0 | 3.88315E-09 | 0 | 0.0039 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.95E-05 | 5.49E-08 | 3.29E-08 | 5.49E-08 | 3.56E-08 | 1.01E-07 | 2.37E-06 | 8.33E-08 | 0 | 0 | 1.66894E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.77E-05 | 3.75E-08 | 2.25E-08 | 3.75E-08 | 2.45E-08 | 6.90E-08 | 1.62E-06 | 5.69E-08 | 0 | 0 | 1.07578E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.26E-05 | 2.92E-08 | 1.75E-08 | 2.92E-08 | 1.91E-08 | 5.36E-08 | 1.26E-06 | 4.42E-08 | 0 | 0 | 7.93621E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.37E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.59E-08 | 4.44E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.27857E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.78E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 5.17576E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.36E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.21E-08 | 3.37E-08 | 7.91E-07 | 2.78E-08 | 0 | 0 | 4.39245E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.05E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 1.09E-08 | 3.03E-08 | 7.10E-07 | 2.50E-08 | 0 | 0 | 3.8119E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.81E-05 | 1.50E-08 | 9.03E-09 | 1.50E-08 | 1.00E-08 | 2.76E-08 | 6.48E-07 | 2.27E-08 | 0 | 0 | 3.36777E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.62E-05 | 1.39E-08 | 8.32E-09 | 1.39E-08 | 9.24E-09 | 2.54E-08 | 5.97E-07 | 2.09E-08 | 0 | 0 | 3.01569E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.47E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 8.60E-09 | 2.36E-08 | 5.54E-07 | 1.95E-08 | 0 | 0 | 2.73057E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2028 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.34E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 8.06E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 0 | 0 | 2.49424E-10 | 0 | 0.0002 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.24E-05 | 1.14E-08 | 6.81E-09 | 1.14E-08 | 7.61E-09 | 2.08E-08 | 4.89E-07 | 1.71E-08 | 0 | 0 | 2.30304E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.08E-08 | 6.46E-09 | 1.08E-08 | 7.23E-09 | 1.98E-08 | 4.64E-07 | 1.63E-08 | 0 | 0 | 2.14694E-10 | 0 | 0.0002 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.08E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 6.89E-09 | 1.88E-08 | 4.40E-07 | 1.55E-08 | 0 | 0 | 2.00525E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 6.59E-09 | 1.79E-08 | 4.21E-07 | 1.48E-08 | 0 | 0 | 1.88838E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.56E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 6.31E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 0 | 0 | 1.78167E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.04E-06 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 6.06E-09 | 1.65E-08 | 3.86E-07 | 1.35E-08 | 0 | 0 | 1.68585E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.80E-04 | 1.58E-07 | 9.47E-08 | 1.58E-07 | 1.02E-07 | 2.90E-07 | 6.82E-06 | 2.40E-07 | 0 | 0 | 5.21793E-09 | 0 | 0.0052 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.27E-07 | 7.63E-08 | 1.27E-07 | 8.19E-08 | 2.34E-07 | 5.49E-06 | 1.93E-07 | 0 | 0 | 4.16293E-09 | 0 | 0.0042 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.17E-08 | 4.30E-08 | 7.17E-08 | 4.63E-08 | 1.32E-07 | 3.09E-06 | 1.09E-07 | 0 | 0 | 2.24273E-09 | 0 | 0.0022 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.67E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 3.12E-08 | 8.83E-08 | 2.07E-06 | 7.29E-08 | 0 | 0 | 1.43005E-09 | 0 | 0.0014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.56E-05 | 3.65E-08 | 2.19E-08 | 3.65E-08 | 2.38E-08 | 6.70E-08 | 1.57E-06 | 5.53E-08 | 0 | 0 | 1.03681E-09 | 0 | 0.0010 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.22E-05 | 2.90E-08 | 1.74E-08 | 2.90E-08 | 1.90E-08 | 5.34E-08 | 1.25E-06 | 4.40E-08 | 0 | 0 | 7.86563E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.35E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.59E-08 | 4.44E-08 | 1.04E-06 | 3.66E-08 | 0 | 0 | 6.24397E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.76E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.37E-08 | 3.82E-08 | 8.97E-07 | 3.15E-08 | 0 | 0 | 5.14989E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.34E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.21E-08 | 3.36E-08 | 7.89E-07 | 2.77E-08 | 0 | 0 | 4.35372E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.02E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 1.09E-08 | 3.02E-08 | 7.08E-07 | 2.48E-08 | 0 | 0 | 3.76539E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.78E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 9.93E-09 | 2.74E-08 | 6.43E-07 | 2.26E-08 | 0 | 0 | 3.31067E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 9.15E-09 | 2.52E-08 | 5.91E-07 | 2.07E-08 | 0 | 0 | 2.95003E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.43E-05 | 1.27E-08 | 7.64E-09 | 1.27E-08 | 8.51E-09 | 2.34E-08 | 5.48E-07 | 1.92E-08 | 0 | 0 | 2.66311E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 7.96E-09 | 2.18E-08 | 5.12E-07 | 1.80E-08 | 0 | 0 | 2.42646E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.20E-05 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 7.49E-09 | 2.05E-08 | 4.81E-07 | 1.69E-08 | 0 | 0 | 2.22832E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 7.07E-09 | 1.93E-08 | 4.53E-07 | 1.59E-08 | 0 | 0 | 2.05691E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.04E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 6.74E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 0 | 0 | 1.93021E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.73E-06 | 9.56E-09 | 5.74E-09 | 9.56E-09 | 6.44E-09 | 1.75E-08 | 4.11E-07 | 1.44E-08 | 0 | 0 | 1.81416E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.23E-06 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 6.18E-09 | 1.68E-08 | 3.94E-07 | 1.38E-08 | 0 | 0 | 1.71982E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.77E-06 | 8.81E-09 | 5.29E-09 | 8.81E-09 | 5.95E-09 | 1.62E-08 | 3.79E-07 | 1.33E-08 | 0 | 0 | 1.63529E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.30E-06 | 8.44E-09 | 5.07E-09 | 8.44E-09 | 5.71E-09 | 1.55E-08 | 3.63E-07 | 1.27E-08 | 0 | 0 | 1.54681E-10 | 0 | 0.0002 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.83E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 1.42E-08 | 3.94E-08 | 9.25E-07 | 3.25E-08 | 0 | 0 | 5.27574E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.71E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 9.80E-09 | 2.70E-08 | 6.34E-07 | 2.22E-08 | 0 | 0 | 3.18715E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.54E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.09E-09 | 2.50E-08 | 5.87E-07 | 2.06E-08 | 0 | 0 | 2.87045E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.47E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.59278E-10 | 0 | 0.0003 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.27E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 7.93E-09 | 2.17E-08 | 5.10E-07 | 1.79E-08 | 0 | 0 | 2.36277E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.42E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 2.14651E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 7.00E-09 | 1.91E-08 | 4.48E-07 | 1.57E-08 | 0 | 0 | 1.9743E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.80E-06 | 9.84E-09 | 5.90E-09 | 9.84E-09 | 6.63E-09 | 1.80E-08 | 4.23E-07 | 1.49E-08 | 0 | 0 | 1.82655E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.16E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 6.31E-09 | 1.72E-08 | 4.03E-07 | 1.41E-08 | 0 | 0 | 1.7072E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.61E-06 | 8.93E-09 | 5.36E-09 | 8.93E-09 | 6.03E-09 | 1.64E-08 | 3.84E-07 | 1.35E-08 | 0 | 0 | 1.60514E-10 | 0 | 0.0002 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.20E-06 | 8.59E-09 | 5.15E-09 | 8.59E-09 | 5.80E-09 | 1.57E-08 | 3.69E-07 | 1.30E-08 | 0 | 0 | 1.52836E-10 | 0 | 0.0002 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.82E-06 | 8.27E-09 | 4.96E-09 | 8.27E-09 | 5.59E-09 | 1.52E-08 | 3.55E-07 | 1.25E-08 | 0 | 0 | 1.45692E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.41E-06 | 7.93E-09 | 4.76E-09 | 7.93E-09 | 5.37E-09 | 1.45E-08 | 3.41E-07 | 1.20E-08 | 0 | 0 | 1.38111E-10 | 0 | 0.0001 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2029

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 3.324E-05 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2029_PAVED | 1.598E-04 | 8.67E-08 | 5.20E-08 | 8.67E-08 | 5.55E-08 | 1.73E-06 | 1.60E-07 | 9.71E-09 | 3.75E-06 | 1.73E-07 | 1.32E-07 | 4.93E-04 |
| Unpaved road | 2029_UNPAVED | 9.761E-05 | 4.29E-07 | 2.57E-07 | 4.29E-07 | 2.75E-07 | 8.58E-06 | 7.89E-07 | 4.81E-08 | 1.85E-05 | 8.58E-07 | 6.52E-07 | 2.44E-03 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Exposure Duration, ED**

| | Exposure Start | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| Years | 1/1/2029 | 0 | 0 | 1 | 0 |

**Risk Factors**

| | Abbreviation | UOM | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|---|
| Daily Breathing Rate (95th %'ile) | DBR | L/kg-day | 361 | 1090 | 572 | 261 |
| Fraction Of Time At Home [a] | FAH | unitless | 0.85 | 0.85 | 0.72 | 0.73 |
| Exposure Frequency | EF | days/year | 0.96 | 0.96 | 0.96 | 0.96 |
| Age Sensitivity Factor | ASF | unitless | 10 | 10 | 3 | 1 |
| Inhalation Absorption Factor | A | unitless | 1 | 1 | 1 | 1 |
| Conversion Factor | $CF_1$ | $m^3/L$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Conversion Factor | $CF_2$ | $\mu g/m^3$ | 0.001 | 0.001 | 0.001 | 0.001 |
| Averaging Time (for residential exposure) | AT | years | 70.00 | 70.00 | 70.00 | 70.00 |

[a] assume school or daycare will have cancer risk of >1 per million

**Cancer Potency Factor, CPF**

| TAC | UOM | |
|---|---|---|
| DPM | $mg/kg\text{-}day^{-1}$ | 1.1 |
| Arsenic | $mg/kg\text{-}day^{-1}$ | 12 |
| Beryllium | $mg/kg\text{-}day^{-1}$ | 8.4 |
| Cadmium | $mg/kg\text{-}day^{-1}$ | 15 |
| Cobalt | $mg/kg\text{-}day^{-1}$ | 27 |
| Lead | $mg/kg\text{-}day^{-1}$ | 0.04 |
| Nickel | $mg/kg\text{-}day^{-1}$ | 0.91 |
| Chromium VI | $mg/kg\text{-}day^{-1}$ | 510 |

**Intake Factor for Inhalation, IF ($m^3$/kg-day)**

| Equation | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|
| DBR*FAH*EF*ED*ASF*A*CF/AT | 0.000 | 0.000 | 0.017 | 0.000 |

**Risk Calculation Part 1, R1**

| | TAC | 3rd Trimester | 0<2 | 2<16 | 16<30 |
|---|---|---|---|---|---|
| IF*CPF*CF | DPM | 0.00E+00 | 0.00E+00 | 1.86E-05 | 0.00E+00 |
| | Arsenic | 0.00E+00 | 0.00E+00 | 2.03E-04 | 0.00E+00 |
| | Beryllium | 0.00E+00 | 0.00E+00 | 1.42E-04 | 0.00E+00 |
| | Cadmium | 0.00E+00 | 0.00E+00 | 2.54E-04 | 0.00E+00 |
| | Cobalt | 0.00E+00 | 0.00E+00 | 4.57E-04 | 0.00E+00 |
| | Lead | 0.00E+00 | 0.00E+00 | 6.78E-07 | 0.00E+00 |
| | Nickel | 0.00E+00 | 0.00E+00 | 1.54E-05 | 0.00E+00 |
| | Chromium VI | 0.00E+00 | 0.00E+00 | 8.64E-03 | 0.00E+00 |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 1.10E-07 | 6.63E-08 | 1.10E-07 | 7.13E-08 | 2.03E-07 | 4.77E-06 | 1.68E-07 | 0 | 0 | 3.47291E-09 | 0 | 0.0035 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.98E-08 | 4.79E-08 | 7.98E-08 | 5.17E-08 | 1.47E-07 | 3.44E-06 | 1.21E-07 | 0 | 0 | 2.33003E-09 | 0 | 0.0023 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 1.48E-08 | 3.95E-08 | 9.27E-07 | 3.25E-08 | 0 | 0 | 2.06394E-10 | 0 | 0.0002 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.58E-07 | 2.66E-08 | 0 | 0 | 2.71908E-10 | 0 | 0.0003 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.91E-04 | 3.29E-07 | 1.97E-07 | 3.29E-07 | 2.11E-07 | 6.05E-07 | 1.42E-05 | 4.99E-07 | 0 | 0 | 1.10095E-08 | 0 | 0.0110 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.57E-07 | 3.94E-07 | 6.57E-07 | 4.21E-07 | 1.21E-06 | 2.84E-05 | 9.99E-07 | 0 | 0 | 2.22851E-08 | 0 | 0.0223 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.44E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 1.94E-07 | 5.57E-07 | 1.31E-05 | 4.60E-07 | 0 | 0 | 1.01409E-08 | 0 | 0.0101 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.94E-07 | 4.76E-07 | 7.94E-07 | 5.08E-07 | 1.46E-06 | 3.43E-05 | 1.21E-06 | 0 | 0 | 2.69775E-08 | 0 | 0.0270 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.45E-05 | 6.28E-08 | 3.77E-08 | 6.28E-08 | 4.09E-08 | 1.15E-07 | 2.71E-06 | 9.52E-08 | 0 | 0 | 1.76136E-09 | 0 | 0.0018 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.87E-04 | 1.65E-07 | 9.92E-08 | 1.65E-07 | 1.06E-07 | 3.04E-07 | 7.14E-06 | 2.51E-07 | 0 | 0 | 5.35208E-09 | 0 | 0.0054 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.77E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.92E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.2616E-09 | 0 | 0.0013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.01E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 1.65E-08 | 4.58E-08 | 1.08E-06 | 3.78E-08 | 0 | 0 | 5.61329E-10 | 0 | 0.0006 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.82E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 1.56E-08 | 4.32E-08 | 1.01E-06 | 3.56E-08 | 0 | 0 | 5.25159E-10 | 0 | 0.0005 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.64E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.48E-08 | 4.08E-08 | 9.57E-07 | 3.36E-08 | 0 | 0 | 4.92388E-10 | 0 | 0.0005 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.48E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.40E-08 | 3.86E-08 | 9.06E-07 | 3.18E-08 | 0 | 0 | 4.62794E-10 | 0 | 0.0005 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.33E-08 | 3.67E-08 | 8.61E-07 | 3.02E-08 | 0 | 0 | 4.37356E-10 | 0 | 0.0004 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.21E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.27E-08 | 3.48E-08 | 8.17E-07 | 2.87E-08 | 0 | 0 | 4.11656E-10 | 0 | 0.0004 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.06E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.20E-08 | 3.29E-08 | 7.71E-07 | 2.71E-08 | 0 | 0 | 3.84338E-10 | 0 | 0.0004 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.04E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 1.68E-08 | 4.65E-08 | 1.09E-06 | 3.83E-08 | 0 | 0 | 5.67065E-10 | 0 | 0.0006 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 1.64E-08 | 4.55E-08 | 1.07E-06 | 3.75E-08 | 0 | 0 | 5.62318E-10 | 0 | 0.0006 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.87E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 1.57E-08 | 4.33E-08 | 1.02E-06 | 3.57E-08 | 0 | 0 | 5.34231E-10 | 0 | 0.0005 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.69E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.10E-08 | 9.61E-07 | 3.38E-08 | 0 | 0 | 5.01909E-10 | 0 | 0.0005 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.52E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.87E-08 | 9.08E-07 | 3.19E-08 | 0 | 0 | 4.70385E-10 | 0 | 0.0005 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.36E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 1.33E-08 | 3.66E-08 | 8.59E-07 | 3.02E-08 | 0 | 0 | 4.40767E-10 | 0 | 0.0004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.21E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.13E-07 | 2.86E-08 | 0 | 0 | 4.12705E-10 | 0 | 0.0004 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.30E-08 | 7.74E-07 | 2.72E-08 | 0 | 0 | 3.89126E-10 | 0 | 0.0004 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.15E-08 | 3.14E-08 | 7.37E-07 | 2.59E-08 | 0 | 0 | 3.66544E-10 | 0 | 0.0004 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.68E-05 | 2.33E-08 | 1.40E-08 | 2.33E-08 | 1.55E-08 | 4.27E-08 | 1.00E-06 | 3.52E-08 | 0 | 0 | 4.99414E-10 | 0 | 0.0005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.94E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.45E-08 | 1.04E-06 | 3.67E-08 | 0 | 0 | 5.4781E-10 | 0 | 0.0005 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.58E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.42205E-10 | 0 | 0.0005 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.75E-05 | 2.26E-08 | 1.35E-08 | 2.26E-08 | 1.50E-08 | 4.14E-08 | 9.72E-07 | 3.41E-08 | 0 | 0 | 5.12945E-10 | 0 | 0.0005 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.59E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 1.42E-08 | 3.93E-08 | 9.22E-07 | 3.24E-08 | 0 | 0 | 4.82217E-10 | 0 | 0.0005 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.36E-08 | 3.73E-08 | 8.76E-07 | 3.08E-08 | 0 | 0 | 4.53876E-10 | 0 | 0.0005 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.27E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 1.28E-08 | 3.53E-08 | 8.28E-07 | 2.91E-08 | 0 | 0 | 4.23051E-10 | 0 | 0.0004 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.22E-08 | 3.35E-08 | 7.86E-07 | 2.76E-08 | 0 | 0 | 3.9637E-10 | 0 | 0.0004 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.71937E-10 | 0 | 0.0004 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 1.11E-08 | 3.03E-08 | 7.10E-07 | 2.49E-08 | 0 | 0 | 3.48201E-10 | 0 | 0.0003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 1.57E-08 | 9.44E-09 | 1.57E-08 | 1.05E-08 | 2.89E-08 | 6.77E-07 | 2.38E-08 | 0 | 0 | 3.26868E-10 | 0 | 0.0003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.63E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 1.00E-08 | 2.73E-08 | 6.41E-07 | 2.25E-08 | 0 | 0 | 3.03754E-10 | 0 | 0.0003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.94E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 1.63E-08 | 4.51E-08 | 1.06E-06 | 3.72E-08 | 0 | 0 | 5.47268E-10 | 0 | 0.0005 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.87E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.3412E-10 | 0 | 0.0005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.39E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.46167E-10 | 0 | 0.0005 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.21E-08 | 9.88E-07 | 3.47E-08 | 0 | 0 | 5.22908E-10 | 0 | 0.0005 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.65E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 1.45E-08 | 4.01E-08 | 9.42E-07 | 3.31E-08 | 0 | 0 | 4.94309E-10 | 0 | 0.0005 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 1.39E-08 | 3.82E-08 | 8.96E-07 | 3.15E-08 | 0 | 0 | 4.65812E-10 | 0 | 0.0005 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.51E-07 | 2.99E-08 | 0 | 0 | 4.3711E-10 | 0 | 0.0004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.44E-08 | 8.07E-07 | 2.83E-08 | 0 | 0 | 4.08845E-10 | 0 | 0.0004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.18E-08 | 3.25E-08 | 7.62E-07 | 2.68E-08 | 0 | 0 | 3.79162E-10 | 0 | 0.0004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.12E-08 | 3.06E-08 | 7.18E-07 | 2.52E-08 | 0 | 0 | 3.49856E-10 | 0 | 0.0003 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.71E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 1.05E-08 | 2.87E-08 | 6.73E-07 | 2.36E-08 | 0 | 0 | 3.19609E-10 | 0 | 0.0003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.86E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.62E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.3372E-10 | 0 | 0.0005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.91E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 1.61E-08 | 4.45E-08 | 1.04E-06 | 3.67E-08 | 0 | 0 | 5.42498E-10 | 0 | 0.0005 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.90E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.59E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.40139E-10 | 0 | 0.0005 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.83E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 1.54E-08 | 4.26E-08 | 1.00E-06 | 3.51E-08 | 0 | 0 | 5.27584E-10 | 0 | 0.0005 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.71E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 1.48E-08 | 4.09E-08 | 9.61E-07 | 3.37E-08 | 0 | 0 | 5.04624E-10 | 0 | 0.0005 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.41E-08 | 3.89E-08 | 9.13E-07 | 3.21E-08 | 0 | 0 | 4.74008E-10 | 0 | 0.0005 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.37E-05 | 2.01E-08 | 1.20E-08 | 2.01E-08 | 1.34E-08 | 3.68E-08 | 8.64E-07 | 3.03E-08 | 0 | 0 | 4.42285E-10 | 0 | 0.0004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 1.25E-08 | 3.45E-08 | 8.09E-07 | 2.84E-08 | 0 | 0 | 4.05564E-10 | 0 | 0.0004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 1.18E-08 | 3.23E-08 | 7.59E-07 | 2.66E-08 | 0 | 0 | 3.72349E-10 | 0 | 0.0004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.79E-05 | 3.19E-08 | 1.92E-08 | 3.19E-08 | 2.12E-08 | 5.86E-08 | 1.38E-06 | 4.83E-08 | 0 | 0 | 7.05779E-10 | 0 | 0.0007 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.78E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.07E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 7.03746E-10 | 0 | 0.0007 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.28E-05 | 2.74E-08 | 1.64E-08 | 2.74E-08 | 1.82E-08 | 5.03E-08 | 1.18E-06 | 4.15E-08 | 0 | 0 | 6.11951E-10 | 0 | 0.0006 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.17E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 1.75E-08 | 4.85E-08 | 1.14E-06 | 4.00E-08 | 0 | 0 | 5.90047E-10 | 0 | 0.0006 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.11E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 1.71E-08 | 4.73E-08 | 1.11E-06 | 3.90E-08 | 0 | 0 | 5.79207E-10 | 0 | 0.0006 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.01E-05 | 2.49E-08 | 1.50E-08 | 2.49E-08 | 1.65E-08 | 4.57E-08 | 1.07E-06 | 3.77E-08 | 0 | 0 | 5.60692E-10 | 0 | 0.0006 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.88E-05 | 2.39E-08 | 1.44E-08 | 2.39E-08 | 1.59E-08 | 4.39E-08 | 1.03E-06 | 3.62E-08 | 0 | 0 | 5.3649E-10 | 0 | 0.0005 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 1.58E-08 | 4.38E-08 | 1.03E-06 | 3.61E-08 | 0 | 0 | 5.4549E-10 | 0 | 0.0005 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 2.26E-08 | 1.36E-08 | 2.26E-08 | 1.50E-08 | 4.15E-08 | 9.74E-07 | 3.42E-08 | 0 | 0 | 5.12003E-10 | 0 | 0.0005 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 1.41E-08 | 3.90E-08 | 9.15E-07 | 3.21E-08 | 0 | 0 | 4.72575E-10 | 0 | 0.0005 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 1.32E-08 | 3.65E-08 | 8.56E-07 | 3.01E-08 | 0 | 0 | 4.33572E-10 | 0 | 0.0004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.24E-08 | 3.41E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 3.96482E-10 | 0 | 0.0004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.49E-07 | 2.63E-08 | 0 | 0 | 3.61949E-10 | 0 | 0.0004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.93E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 2.14E-08 | 5.94E-08 | 1.39E-06 | 4.89E-08 | 0 | 0 | 7.33416E-10 | 0 | 0.0007 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.70E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.03E-08 | 5.63E-08 | 1.32E-06 | 4.64E-08 | 0 | 0 | 6.89987E-10 | 0 | 0.0007 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.82E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 2.03E-08 | 5.65E-08 | 1.33E-06 | 4.66E-08 | 0 | 0 | 7.11377E-10 | 0 | 0.0007 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.82E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 2.01E-08 | 5.58E-08 | 1.31E-06 | 4.60E-08 | 0 | 0 | 7.11276E-10 | 0 | 0.0007 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.82E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 1.98E-08 | 5.51E-08 | 1.29E-06 | 4.54E-08 | 0 | 0 | 7.11732E-10 | 0 | 0.0007 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.46E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 1.83E-08 | 5.09E-08 | 1.19E-06 | 4.20E-08 | 0 | 0 | 6.44483E-10 | 0 | 0.0006 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.42E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 1.80E-08 | 4.99E-08 | 1.17E-06 | 4.11E-08 | 0 | 0 | 6.37377E-10 | 0 | 0.0006 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.24E-05 | 2.59E-08 | 1.55E-08 | 2.59E-08 | 1.71E-08 | 4.75E-08 | 1.11E-06 | 3.92E-08 | 0 | 0 | 6.03731E-10 | 0 | 0.0006 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.59289E-10 | 0 | 0.0006 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.51E-08 | 4.17E-08 | 9.78E-07 | 3.43E-08 | 0 | 0 | 5.13193E-10 | 0 | 0.0005 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.51E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 1.40E-08 | 3.88E-08 | 9.11E-07 | 3.20E-08 | 0 | 0 | 4.67974E-10 | 0 | 0.0005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.61E-08 | 8.48E-07 | 2.98E-08 | 0 | 0 | 4.25991E-10 | 0 | 0.0004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.08E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.22E-08 | 3.37E-08 | 7.91E-07 | 2.78E-08 | 0 | 0 | 3.88203E-10 | 0 | 0.0004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 1.15E-08 | 3.15E-08 | 7.38E-07 | 2.59E-08 | 0 | 0 | 3.53479E-10 | 0 | 0.0004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.71E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 1.07E-08 | 2.93E-08 | 6.86E-07 | 2.41E-08 | 0 | 0 | 3.19446E-10 | 0 | 0.0003 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.47E-08 | 8.80E-09 | 1.47E-08 | 9.84E-09 | 2.69E-08 | 6.31E-07 | 2.21E-08 | 0 | 0 | 2.82737E-10 | 0 | 0.0003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.64E-05 | 4.19E-08 | 2.52E-08 | 4.19E-08 | 2.75E-08 | 7.70E-08 | 1.81E-06 | 6.35E-08 | 0 | 0 | 1.05165E-09 | 0 | 0.0011 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.33E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 2.61E-08 | 7.30E-08 | 1.71E-06 | 6.02E-08 | 0 | 0 | 9.92915E-10 | 0 | 0.0010 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 2.31E-08 | 6.45E-08 | 1.51E-06 | 5.32E-08 | 0 | 0 | 8.45968E-10 | 0 | 0.0008 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.06E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.12E-08 | 5.90E-08 | 1.38E-06 | 4.86E-08 | 0 | 0 | 7.56069E-10 | 0 | 0.0008 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 3.99E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 2.07E-08 | 5.75E-08 | 1.35E-06 | 4.74E-08 | 0 | 0 | 7.43166E-10 | 0 | 0.0007 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.90E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 2.01E-08 | 5.59E-08 | 1.31E-06 | 4.61E-08 | 0 | 0 | 7.2699E-10 | 0 | 0.0007 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 1.96E-08 | 5.45E-08 | 1.28E-06 | 4.49E-08 | 0 | 0 | 7.13001E-10 | 0 | 0.0007 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.56E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 1.84E-08 | 5.12E-08 | 1.20E-06 | 4.22E-08 | 0 | 0 | 6.62984E-10 | 0 | 0.0007 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.30E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.81E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 6.15661E-10 | 0 | 0.0006 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.03E-05 | 2.44E-08 | 1.47E-08 | 2.44E-08 | 1.62E-08 | 4.49E-08 | 1.05E-06 | 3.70E-08 | 0 | 0 | 5.65095E-10 | 0 | 0.0006 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 1.50E-08 | 4.16E-08 | 9.77E-07 | 3.43E-08 | 0 | 0 | 5.13494E-10 | 0 | 0.0005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.39E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 4.64092E-10 | 0 | 0.0005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.25E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 1.29E-08 | 3.57E-08 | 8.38E-07 | 2.94E-08 | 0 | 0 | 4.19935E-10 | 0 | 0.0004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.03E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 1.20E-08 | 3.31E-08 | 7.76E-07 | 2.73E-08 | 0 | 0 | 3.79043E-10 | 0 | 0.0004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.84E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 0 | 0 | 3.434E-10 | 0 | 0.0003 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.57E-08 | 9.39E-09 | 1.57E-08 | 1.05E-08 | 2.87E-08 | 6.74E-07 | 2.37E-08 | 0 | 0 | 3.12203E-10 | 0 | 0.0003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.52E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 9.81E-09 | 2.68E-08 | 6.30E-07 | 2.21E-08 | 0 | 0 | 2.83889E-10 | 0 | 0.0003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.22E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 2.91E-08 | 8.17E-08 | 1.92E-06 | 6.74E-08 | 0 | 0 | 1.15903E-09 | 0 | 0.0012 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.77E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 2.73E-08 | 7.64E-08 | 1.79E-06 | 6.30E-08 | 0 | 0 | 1.07489E-09 | 0 | 0.0011 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.91E-05 | 3.66E-08 | 2.20E-08 | 3.66E-08 | 2.41E-08 | 6.73E-08 | 1.58E-06 | 5.55E-08 | 0 | 0 | 9.15856E-10 | 0 | 0.0009 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 2.25E-08 | 6.30E-08 | 1.48E-06 | 5.19E-08 | 0 | 0 | 8.49605E-10 | 0 | 0.0008 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.41E-05 | 3.31E-08 | 1.98E-08 | 3.31E-08 | 2.17E-08 | 6.07E-08 | 1.42E-06 | 5.01E-08 | 0 | 0 | 8.21548E-10 | 0 | 0.0008 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.03E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 2.02E-08 | 5.63E-08 | 1.32E-06 | 4.64E-08 | 0 | 0 | 7.50435E-10 | 0 | 0.0008 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.66E-05 | 2.83E-08 | 1.70E-08 | 2.83E-08 | 1.87E-08 | 5.20E-08 | 1.22E-06 | 4.28E-08 | 0 | 0 | 6.81458E-10 | 0 | 0.0007 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.33E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.82E-08 | 1.13E-06 | 3.97E-08 | 0 | 0 | 6.21311E-10 | 0 | 0.0006 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.03E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 5.64603E-10 | 0 | 0.0006 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.73E-05 | 2.24E-08 | 1.35E-08 | 2.24E-08 | 1.49E-08 | 4.12E-08 | 9.66E-07 | 3.39E-08 | 0 | 0 | 5.08994E-10 | 0 | 0.0005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.44E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 1.37E-08 | 3.78E-08 | 8.87E-07 | 3.11E-08 | 0 | 0 | 4.55136E-10 | 0 | 0.0005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.18E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.15E-07 | 2.86E-08 | 0 | 0 | 4.06356E-10 | 0 | 0.0004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.95E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 1.17E-08 | 3.21E-08 | 7.52E-07 | 2.64E-08 | 0 | 0 | 3.64284E-10 | 0 | 0.0004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.76E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 1.08E-08 | 2.97E-08 | 6.98E-07 | 2.45E-08 | 0 | 0 | 3.28582E-10 | 0 | 0.0003 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.60E-05 | 1.51E-08 | 9.09E-09 | 1.51E-08 | 1.01E-08 | 2.78E-08 | 6.52E-07 | 2.29E-08 | 0 | 0 | 2.98863E-10 | 0 | 0.0003 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 9.54E-09 | 2.61E-08 | 6.12E-07 | 2.15E-08 | 0 | 0 | 2.73832E-10 | 0 | 0.0003 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.31E-08 | 7.85E-09 | 1.31E-08 | 8.80E-09 | 2.40E-08 | 5.63E-07 | 1.97E-08 | 0 | 0 | 2.42324E-10 | 0 | 0.0002 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.36E-05 | 4.51E-08 | 2.71E-08 | 4.51E-08 | 2.95E-08 | 8.29E-08 | 1.95E-06 | 6.84E-08 | 0 | 0 | 1.18513E-09 | 0 | 0.0012 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.07E-05 | 4.31E-08 | 2.58E-08 | 4.31E-08 | 2.82E-08 | 7.92E-08 | 1.86E-06 | 6.53E-08 | 0 | 0 | 1.13123E-09 | 0 | 0.0011 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 4.04E-08 | 2.42E-08 | 4.04E-08 | 2.64E-08 | 7.42E-08 | 1.74E-06 | 6.12E-08 | 0 | 0 | 1.05279E-09 | 0 | 0.0011 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.09E-05 | 3.69E-08 | 2.22E-08 | 3.69E-08 | 2.42E-08 | 6.79E-08 | 1.59E-06 | 5.60E-08 | 0 | 0 | 9.48768E-10 | 0 | 0.0009 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.54E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 2.21E-08 | 6.17E-08 | 1.45E-06 | 5.09E-08 | 0 | 0 | 8.47107E-10 | 0 | 0.0008 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.07E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.58613E-10 | 0 | 0.0008 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.67E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 1.86E-08 | 5.18E-08 | 1.22E-06 | 4.27E-08 | 0 | 0 | 6.83519E-10 | 0 | 0.0007 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 1.72E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.17499E-10 | 0 | 0.0006 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.96E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 1.57E-08 | 4.37E-08 | 1.02E-06 | 3.60E-08 | 0 | 0 | 5.52178E-10 | 0 | 0.0006 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.62E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 1.44E-08 | 3.98E-08 | 9.33E-07 | 3.28E-08 | 0 | 0 | 4.8867E-10 | 0 | 0.0005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.52E-07 | 2.99E-08 | 0 | 0 | 4.32621E-10 | 0 | 0.0004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 1.21E-08 | 3.33E-08 | 7.82E-07 | 2.74E-08 | 0 | 0 | 3.84937E-10 | 0 | 0.0004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.85E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 1.12E-08 | 3.08E-08 | 7.22E-07 | 2.53E-08 | 0 | 0 | 3.44999E-10 | 0 | 0.0003 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 1.05E-08 | 2.87E-08 | 6.73E-07 | 2.36E-08 | 0 | 0 | 3.12973E-10 | 0 | 0.0003 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.53E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 9.81E-09 | 2.68E-08 | 6.29E-07 | 2.21E-08 | 0 | 0 | 2.85601E-10 | 0 | 0.0003 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.41E-05 | 1.38E-08 | 8.27E-09 | 1.38E-08 | 9.26E-09 | 2.53E-08 | 5.93E-07 | 2.08E-08 | 0 | 0 | 2.6321E-10 | 0 | 0.0003 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.31E-05 | 1.30E-08 | 7.83E-09 | 1.30E-08 | 8.78E-09 | 2.39E-08 | 5.61E-07 | 1.97E-08 | 0 | 0 | 2.44364E-10 | 0 | 0.0002 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 4.54E-08 | 2.72E-08 | 4.54E-08 | 2.97E-08 | 8.34E-08 | 1.96E-06 | 6.88E-08 | 0 | 0 | 1.21811E-09 | 0 | 0.0012 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 4.24E-08 | 2.54E-08 | 4.24E-08 | 2.77E-08 | 7.78E-08 | 1.83E-06 | 6.42E-08 | 0 | 0 | 1.12942E-09 | 0 | 0.0011 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.31E-05 | 3.79E-08 | 2.28E-08 | 3.79E-08 | 2.49E-08 | 6.97E-08 | 1.64E-06 | 5.75E-08 | 0 | 0 | 9.89956E-10 | 0 | 0.0010 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.65E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 2.23E-08 | 6.24E-08 | 1.47E-06 | 5.15E-08 | 0 | 0 | 8.66786E-10 | 0 | 0.0009 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.11E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.66195E-10 | 0 | 0.0008 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.66E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 1.84E-08 | 5.14E-08 | 1.21E-06 | 4.23E-08 | 0 | 0 | 6.81511E-10 | 0 | 0.0007 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.22E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 1.67E-08 | 4.65E-08 | 1.09E-06 | 3.83E-08 | 0 | 0 | 6.00302E-10 | 0 | 0.0006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 1.51E-08 | 4.19E-08 | 9.84E-07 | 3.45E-08 | 0 | 0 | 5.24587E-10 | 0 | 0.0005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.37E-08 | 3.80E-08 | 8.91E-07 | 3.13E-08 | 0 | 0 | 4.59536E-10 | 0 | 0.0005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.18E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 1.26E-08 | 3.47E-08 | 8.13E-07 | 2.85E-08 | 0 | 0 | 4.06259E-10 | 0 | 0.0004 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.19E-08 | 7.48E-07 | 2.63E-08 | 0 | 0 | 3.62222E-10 | 0 | 0.0004 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.75E-05 | 1.61E-08 | 9.67E-09 | 1.61E-08 | 1.08E-08 | 2.96E-08 | 6.94E-07 | 2.44E-08 | 0 | 0 | 3.26854E-10 | 0 | 0.0003 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.01E-08 | 2.76E-08 | 6.48E-07 | 2.27E-08 | 0 | 0 | 2.97378E-10 | 0 | 0.0003 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.46E-05 | 1.41E-08 | 8.48E-09 | 1.41E-08 | 9.49E-09 | 2.59E-08 | 6.08E-07 | 2.13E-08 | 0 | 0 | 2.7236E-10 | 0 | 0.0003 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.34E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 8.95E-09 | 2.44E-08 | 5.72E-07 | 2.01E-08 | 0 | 0 | 2.5022E-10 | 0 | 0.0003 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 8.47E-09 | 2.30E-08 | 5.40E-07 | 1.90E-08 | 0 | 0 | 2.30874E-10 | 0 | 0.0002 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.94E-05 | 5.95E-08 | 3.57E-08 | 5.95E-08 | 3.88E-08 | 1.09E-07 | 2.57E-06 | 9.03E-08 | 0 | 0 | 1.66607E-09 | 0 | 0.0017 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.67E-05 | 5.76E-08 | 3.45E-08 | 5.76E-08 | 3.75E-08 | 1.06E-07 | 2.48E-06 | 8.73E-08 | 0 | 0 | 1.61559E-09 | 0 | 0.0016 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.20E-05 | 5.45E-08 | 3.27E-08 | 5.45E-08 | 3.55E-08 | 1.00E-07 | 2.35E-06 | 8.27E-08 | 0 | 0 | 1.52798E-09 | 0 | 0.0015 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.35E-05 | 4.95E-08 | 2.97E-08 | 4.95E-08 | 3.23E-08 | 9.11E-08 | 2.14E-06 | 7.51E-08 | 0 | 0 | 1.37087E-09 | 0 | 0.0014 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 2.89E-08 | 8.13E-08 | 1.91E-06 | 6.70E-08 | 0 | 0 | 1.20171E-09 | 0 | 0.0012 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.52E-05 | 3.88E-08 | 2.33E-08 | 3.88E-08 | 2.54E-08 | 7.14E-08 | 1.67E-06 | 5.89E-08 | 0 | 0 | 1.02883E-09 | 0 | 0.0010 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.80E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 2.27E-08 | 6.35E-08 | 1.49E-06 | 5.24E-08 | 0 | 0 | 8.93851E-10 | 0 | 0.0009 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.14E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 2.02E-08 | 5.64E-08 | 1.32E-06 | 4.65E-08 | 0 | 0 | 7.71447E-10 | 0 | 0.0008 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.57E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 1.80E-08 | 5.02E-08 | 1.18E-06 | 4.14E-08 | 0 | 0 | 6.651E-10 | 0 | 0.0007 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.06E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.61E-08 | 4.46E-08 | 1.05E-06 | 3.67E-08 | 0 | 0 | 5.69881E-10 | 0 | 0.0006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.65E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 1.45E-08 | 4.00E-08 | 9.39E-07 | 3.30E-08 | 0 | 0 | 4.93696E-10 | 0 | 0.0005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 1.32E-08 | 3.63E-08 | 8.52E-07 | 2.99E-08 | 0 | 0 | 4.33133E-10 | 0 | 0.0004 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.06E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 1.21E-08 | 3.33E-08 | 7.80E-07 | 2.74E-08 | 0 | 0 | 3.83967E-10 | 0 | 0.0004 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.84E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.12E-08 | 3.07E-08 | 7.20E-07 | 2.53E-08 | 0 | 0 | 3.43648E-10 | 0 | 0.0003 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.66E-05 | 1.55E-08 | 9.33E-09 | 1.55E-08 | 1.04E-08 | 2.85E-08 | 6.69E-07 | 2.35E-08 | 0 | 0 | 3.10128E-10 | 0 | 0.0003 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.50E-05 | 1.45E-08 | 8.69E-09 | 1.45E-08 | 9.72E-09 | 2.66E-08 | 6.23E-07 | 2.19E-08 | 0 | 0 | 2.80397E-10 | 0 | 0.0003 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.37E-05 | 1.36E-08 | 8.14E-09 | 1.36E-08 | 9.13E-09 | 2.49E-08 | 5.84E-07 | 2.05E-08 | 0 | 0 | 2.5554E-10 | 0 | 0.0003 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 8.61E-09 | 2.34E-08 | 5.49E-07 | 1.93E-08 | 0 | 0 | 2.34181E-10 | 0 | 0.0002 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 8.14E-09 | 2.21E-08 | 5.19E-07 | 1.82E-08 | 0 | 0 | 2.15557E-10 | 0 | 0.0002 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.33E-08 | 4.40E-08 | 7.33E-08 | 4.75E-08 | 1.35E-07 | 3.16E-06 | 1.11E-07 | 0 | 0 | 2.15379E-09 | 0 | 0.0022 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 4.43E-08 | 1.25E-07 | 2.94E-06 | 1.04E-07 | 0 | 0 | 1.9959E-09 | 0 | 0.0020 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.12E-05 | 5.93E-08 | 3.56E-08 | 5.93E-08 | 3.85E-08 | 1.09E-07 | 2.56E-06 | 8.99E-08 | 0 | 0 | 1.70056E-09 | 0 | 0.0017 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.03E-05 | 5.29E-08 | 3.18E-08 | 5.29E-08 | 3.45E-08 | 9.73E-08 | 2.28E-06 | 8.03E-08 | 0 | 0 | 1.49716E-09 | 0 | 0.0015 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.79E-05 | 4.58E-08 | 2.75E-08 | 4.58E-08 | 2.99E-08 | 8.42E-08 | 1.98E-06 | 6.94E-08 | 0 | 0 | 1.26495E-09 | 0 | 0.0013 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.76E-05 | 3.99E-08 | 2.39E-08 | 3.99E-08 | 2.61E-08 | 7.33E-08 | 1.72E-06 | 6.04E-08 | 0 | 0 | 1.07291E-09 | 0 | 0.0011 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.86E-05 | 3.47E-08 | 2.08E-08 | 3.47E-08 | 2.28E-08 | 6.38E-08 | 1.50E-06 | 5.26E-08 | 0 | 0 | 9.06091E-10 | 0 | 0.0009 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.05E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 1.97E-08 | 5.51E-08 | 1.29E-06 | 4.54E-08 | 0 | 0 | 7.54476E-10 | 0 | 0.0008 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.39E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 1.73E-08 | 4.81E-08 | 1.13E-06 | 3.96E-08 | 0 | 0 | 6.32212E-10 | 0 | 0.0006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.89E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 1.53E-08 | 4.26E-08 | 9.99E-07 | 3.51E-08 | 0 | 0 | 5.3824E-10 | 0 | 0.0005 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.39E-08 | 3.83E-08 | 8.99E-07 | 3.16E-08 | 0 | 0 | 4.67073E-10 | 0 | 0.0005 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.20E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 1.26E-08 | 3.48E-08 | 8.17E-07 | 2.87E-08 | 0 | 0 | 4.09806E-10 | 0 | 0.0004 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 1.16E-08 | 3.18E-08 | 7.47E-07 | 2.62E-08 | 0 | 0 | 3.62052E-10 | 0 | 0.0004 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.73E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 1.07E-08 | 2.94E-08 | 6.89E-07 | 2.42E-08 | 0 | 0 | 3.22933E-10 | 0 | 0.0003 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.55E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 9.95E-09 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 0 | 0 | 2.89353E-10 | 0 | 0.0003 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.40E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 9.29E-09 | 2.53E-08 | 5.95E-07 | 2.09E-08 | 0 | 0 | 2.61291E-10 | 0 | 0.0003 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.74E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.38264E-10 | 0 | 0.0002 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.17E-05 | 1.22E-08 | 7.34E-09 | 1.22E-08 | 8.26E-09 | 2.24E-08 | 5.26E-07 | 1.85E-08 | 0 | 0 | 2.18813E-10 | 0 | 0.0002 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.08E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 7.84E-09 | 2.12E-08 | 4.98E-07 | 1.75E-08 | 0 | 0 | 2.02066E-10 | 0 | 0.0002 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.74E-08 | 5.24E-08 | 8.74E-08 | 5.66E-08 | 1.61E-07 | 3.77E-06 | 1.33E-07 | 0 | 0 | 2.62228E-09 | 0 | 0.0026 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.58E-08 | 5.15E-08 | 8.58E-08 | 5.55E-08 | 1.58E-07 | 3.70E-06 | 1.30E-07 | 0 | 0 | 2.58201E-09 | 0 | 0.0026 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.16E-08 | 4.90E-08 | 8.16E-08 | 5.29E-08 | 1.50E-07 | 3.52E-06 | 1.24E-07 | 0 | 0 | 2.45569E-09 | 0 | 0.0025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.80E-08 | 4.68E-08 | 7.80E-08 | 5.05E-08 | 1.43E-07 | 3.37E-06 | 1.18E-07 | 0 | 0 | 2.34519E-09 | 0 | 0.0023 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 4.42E-08 | 1.25E-07 | 2.94E-06 | 1.03E-07 | 0 | 0 | 2.02296E-09 | 0 | 0.0020 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.78E-05 | 5.66E-08 | 3.40E-08 | 5.66E-08 | 3.68E-08 | 1.04E-07 | 2.44E-06 | 8.58E-08 | 0 | 0 | 1.6358E-09 | 0 | 0.0016 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.12E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 3.08E-08 | 8.69E-08 | 2.04E-06 | 7.17E-08 | 0 | 0 | 1.32754E-09 | 0 | 0.0013 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.84E-05 | 4.00E-08 | 2.40E-08 | 4.00E-08 | 2.62E-08 | 7.35E-08 | 1.73E-06 | 6.06E-08 | 0 | 0 | 1.08809E-09 | 0 | 0.0011 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.69E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 2.20E-08 | 6.15E-08 | 1.44E-06 | 5.07E-08 | 0 | 0 | 8.73904E-10 | 0 | 0.0009 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.81E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 1.87E-08 | 5.22E-08 | 1.23E-06 | 4.31E-08 | 0 | 0 | 7.09764E-10 | 0 | 0.0007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.21E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 1.64E-08 | 4.57E-08 | 1.07E-06 | 3.77E-08 | 0 | 0 | 5.97444E-10 | 0 | 0.0006 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.71E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 1.46E-08 | 4.04E-08 | 9.48E-07 | 3.33E-08 | 0 | 0 | 5.05953E-10 | 0 | 0.0005 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 1.31E-08 | 3.62E-08 | 8.49E-07 | 2.98E-08 | 0 | 0 | 4.35139E-10 | 0 | 0.0004 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 1.19E-08 | 3.28E-08 | 7.69E-07 | 2.70E-08 | 0 | 0 | 3.79338E-10 | 0 | 0.0004 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.79E-05 | 1.64E-08 | 9.81E-09 | 1.64E-08 | 1.09E-08 | 3.00E-08 | 7.04E-07 | 2.47E-08 | 0 | 0 | 3.34422E-10 | 0 | 0.0003 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.60E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 1.01E-08 | 2.77E-08 | 6.50E-07 | 2.28E-08 | 0 | 0 | 2.98568E-10 | 0 | 0.0003 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.43E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 9.42E-09 | 2.57E-08 | 6.03E-07 | 2.12E-08 | 0 | 0 | 2.67409E-10 | 0 | 0.0003 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.30E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 8.83E-09 | 2.41E-08 | 5.64E-07 | 1.98E-08 | 0 | 0 | 2.42744E-10 | 0 | 0.0002 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.19E-05 | 1.24E-08 | 7.42E-09 | 1.24E-08 | 8.34E-09 | 2.27E-08 | 5.32E-07 | 1.86E-08 | 0 | 0 | 2.22315E-10 | 0 | 0.0002 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.10E-05 | 1.17E-08 | 7.03E-09 | 1.17E-08 | 7.91E-09 | 2.15E-08 | 5.04E-07 | 1.77E-08 | 0 | 0 | 2.05498E-10 | 0 | 0.0002 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 7.54E-09 | 2.04E-08 | 4.79E-07 | 1.68E-08 | 0 | 0 | 1.91344E-10 | 0 | 0.0002 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.52E-04 | 9.32E-08 | 5.59E-08 | 9.32E-08 | 6.03E-08 | 1.71E-07 | 4.02E-06 | 1.41E-07 | 0 | 0 | 2.84123E-09 | 0 | 0.0028 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 9.01E-08 | 5.41E-08 | 9.01E-08 | 5.83E-08 | 1.66E-07 | 3.89E-06 | 1.37E-07 | 0 | 0 | 2.74971E-09 | 0 | 0.0027 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.92E-08 | 5.35E-08 | 8.92E-08 | 5.77E-08 | 1.64E-07 | 3.85E-06 | 1.35E-07 | 0 | 0 | 2.75039E-09 | 0 | 0.0028 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.22E-04 | 7.53E-08 | 4.52E-08 | 7.53E-08 | 4.87E-08 | 1.38E-07 | 3.25E-06 | 1.14E-07 | 0 | 0 | 2.28272E-09 | 0 | 0.0023 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.30E-05 | 5.89E-08 | 3.54E-08 | 5.89E-08 | 3.83E-08 | 1.08E-07 | 2.54E-06 | 8.94E-08 | 0 | 0 | 1.73289E-09 | 0 | 0.0017 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.22E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 3.08E-08 | 8.70E-08 | 2.04E-06 | 7.18E-08 | 0 | 0 | 1.34488E-09 | 0 | 0.0013 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.60E-05 | 3.83E-08 | 2.30E-08 | 3.83E-08 | 2.50E-08 | 7.04E-08 | 1.65E-06 | 5.81E-08 | 0 | 0 | 1.04421E-09 | 0 | 0.0010 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.40E-05 | 3.15E-08 | 1.89E-08 | 3.15E-08 | 2.07E-08 | 5.79E-08 | 1.36E-06 | 4.78E-08 | 0 | 0 | 8.20931E-10 | 0 | 0.0008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.54E-05 | 2.66E-08 | 1.60E-08 | 2.66E-08 | 1.75E-08 | 4.88E-08 | 1.15E-06 | 4.03E-08 | 0 | 0 | 6.59652E-10 | 0 | 0.0007 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.92E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 1.52E-08 | 4.22E-08 | 9.91E-07 | 3.48E-08 | 0 | 0 | 5.44363E-10 | 0 | 0.0005 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.47E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 1.35E-08 | 3.73E-08 | 8.75E-07 | 3.07E-08 | 0 | 0 | 4.60248E-10 | 0 | 0.0005 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 1.22E-08 | 3.35E-08 | 7.87E-07 | 2.76E-08 | 0 | 0 | 3.97241E-10 | 0 | 0.0004 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.66E-08 | 9.95E-09 | 1.66E-08 | 1.11E-08 | 3.04E-08 | 7.14E-07 | 2.51E-08 | 0 | 0 | 3.4638E-10 | 0 | 0.0003 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.64E-05 | 1.52E-08 | 9.14E-09 | 1.52E-08 | 1.02E-08 | 2.80E-08 | 6.56E-07 | 2.30E-08 | 0 | 0 | 3.06494E-10 | 0 | 0.0003 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.41E-08 | 8.49E-09 | 1.41E-08 | 9.49E-09 | 2.59E-08 | 6.09E-07 | 2.14E-08 | 0 | 0 | 2.75074E-10 | 0 | 0.0003 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.34E-05 | 1.32E-08 | 7.95E-09 | 1.32E-08 | 8.90E-09 | 2.43E-08 | 5.70E-07 | 2.00E-08 | 0 | 0 | 2.50004E-10 | 0 | 0.0003 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.23E-05 | 1.25E-08 | 7.49E-09 | 1.25E-08 | 8.40E-09 | 2.29E-08 | 5.37E-07 | 1.88E-08 | 0 | 0 | 2.29457E-10 | 0 | 0.0002 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.14E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 7.99E-09 | 2.17E-08 | 5.09E-07 | 1.79E-08 | 0 | 0 | 2.1295E-10 | 0 | 0.0002 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.13E-08 | 6.78E-09 | 1.13E-08 | 7.63E-09 | 2.07E-08 | 4.86E-07 | 1.70E-08 | 0 | 0 | 1.99356E-10 | 0 | 0.0002 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.08E-08 | 6.49E-09 | 1.08E-08 | 7.31E-09 | 1.98E-08 | 4.65E-07 | 1.63E-08 | 0 | 0 | 1.87378E-10 | 0 | 0.0002 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.19E-04 | 1.28E-07 | 7.68E-08 | 1.28E-07 | 8.24E-08 | 2.35E-07 | 5.52E-06 | 1.94E-07 | 0 | 0 | 4.08852E-09 | 0 | 0.0041 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.87E-04 | 1.10E-07 | 6.61E-08 | 1.10E-07 | 7.10E-08 | 2.03E-07 | 4.75E-06 | 1.67E-07 | 0 | 0 | 3.48973E-09 | 0 | 0.0035 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.29E-08 | 4.97E-08 | 8.29E-08 | 5.36E-08 | 1.52E-07 | 3.58E-06 | 1.26E-07 | 0 | 0 | 2.56538E-09 | 0 | 0.0026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.65E-05 | 6.03E-08 | 3.62E-08 | 6.03E-08 | 3.91E-08 | 1.11E-07 | 2.60E-06 | 9.15E-08 | 0 | 0 | 1.7994E-09 | 0 | 0.0018 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.82E-05 | 4.47E-08 | 2.68E-08 | 4.47E-08 | 2.91E-08 | 8.21E-08 | 1.93E-06 | 6.77E-08 | 0 | 0 | 1.27152E-09 | 0 | 0.0013 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.99E-05 | 3.44E-08 | 2.07E-08 | 3.44E-08 | 2.25E-08 | 6.33E-08 | 1.48E-06 | 5.22E-08 | 0 | 0 | 9.29363E-10 | 0 | 0.0009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.86E-05 | 2.81E-08 | 1.68E-08 | 2.81E-08 | 1.84E-08 | 5.16E-08 | 1.21E-06 | 4.25E-08 | 0 | 0 | 7.19553E-10 | 0 | 0.0007 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.10E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 1.56E-08 | 4.36E-08 | 1.02E-06 | 3.59E-08 | 0 | 0 | 5.77738E-10 | 0 | 0.0006 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.57E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 1.37E-08 | 3.79E-08 | 8.89E-07 | 3.12E-08 | 0 | 0 | 4.79578E-10 | 0 | 0.0005 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.19E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 1.22E-08 | 3.37E-08 | 7.92E-07 | 2.78E-08 | 0 | 0 | 4.08905E-10 | 0 | 0.0004 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.91E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 1.11E-08 | 3.06E-08 | 7.17E-07 | 2.52E-08 | 0 | 0 | 3.56389E-10 | 0 | 0.0004 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.70E-05 | 1.53E-08 | 9.20E-09 | 1.53E-08 | 1.02E-08 | 2.81E-08 | 6.60E-07 | 2.32E-08 | 0 | 0 | 3.1701E-10 | 0 | 0.0003 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.43E-08 | 8.56E-09 | 1.43E-08 | 9.55E-09 | 2.62E-08 | 6.14E-07 | 2.15E-08 | 0 | 0 | 2.86501E-10 | 0 | 0.0003 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.34E-08 | 8.04E-09 | 1.34E-08 | 8.99E-09 | 2.46E-08 | 5.77E-07 | 2.02E-08 | 0 | 0 | 2.62404E-10 | 0 | 0.0003 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.30E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 8.51E-09 | 2.32E-08 | 5.45E-07 | 1.91E-08 | 0 | 0 | 2.42662E-10 | 0 | 0.0002 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.21E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 8.10E-09 | 2.21E-08 | 5.18E-07 | 1.82E-08 | 0 | 0 | 2.26144E-10 | 0 | 0.0002 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 7.74E-09 | 2.11E-08 | 4.94E-07 | 1.73E-08 | 0 | 0 | 2.11783E-10 | 0 | 0.0002 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.07E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.42E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 1.99883E-10 | 0 | 0.0002 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | Risk Calculation Part 2, $\sum R1*C_{TAC}$ | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 (per million) | Receptor Type |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.01E-05 | 1.05E-08 | 6.33E-09 | 1.05E-08 | 7.13E-09 | 1.93E-08 | 4.54E-07 | 1.59E-08 | 0 | 0 | 1.88705E-10 | 0 | 0.0002 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.22E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 1.18E-07 | 3.38E-07 | 7.94E-06 | 2.79E-07 | 0 | 0 | 6.00596E-09 | 0 | 0.0060 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.64E-04 | 2.06E-07 | 1.24E-07 | 2.06E-07 | 1.32E-07 | 3.79E-07 | 8.89E-06 | 3.13E-07 | 0 | 0 | 6.77762E-09 | 0 | 0.0068 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.26E-04 | 1.85E-07 | 1.11E-07 | 1.85E-07 | 1.19E-07 | 3.41E-07 | 8.00E-06 | 2.81E-07 | 0 | 0 | 6.08053E-09 | 0 | 0.0061 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.47E-04 | 1.42E-07 | 8.51E-08 | 1.42E-07 | 9.13E-08 | 2.61E-07 | 6.12E-06 | 2.15E-07 | 0 | 0 | 4.59886E-09 | 0 | 0.0046 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.89E-08 | 5.33E-08 | 8.89E-08 | 5.74E-08 | 1.63E-07 | 3.84E-06 | 1.35E-07 | 0 | 0 | 2.79077E-09 | 0 | 0.0028 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.98E-05 | 5.61E-08 | 3.36E-08 | 5.61E-08 | 3.64E-08 | 1.03E-07 | 2.42E-06 | 8.50E-08 | 0 | 0 | 1.6731E-09 | 0 | 0.0017 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.82E-05 | 3.87E-08 | 2.32E-08 | 3.87E-08 | 2.52E-08 | 7.11E-08 | 1.67E-06 | 5.86E-08 | 0 | 0 | 1.08452E-09 | 0 | 0.0011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.20E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 1.94E-08 | 5.44E-08 | 1.28E-06 | 4.49E-08 | 0 | 0 | 7.8225E-10 | 0 | 0.0008 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.26E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.60E-08 | 4.47E-08 | 1.05E-06 | 3.68E-08 | 0 | 0 | 6.08E-10 | 0 | 0.0006 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.67E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 1.38E-08 | 3.84E-08 | 9.01E-07 | 3.17E-08 | 0 | 0 | 4.98283E-10 | 0 | 0.0005 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.28E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 1.23E-08 | 3.41E-08 | 8.01E-07 | 2.81E-08 | 0 | 0 | 4.25436E-10 | 0 | 0.0004 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 1.12E-08 | 3.10E-08 | 7.28E-07 | 2.56E-08 | 0 | 0 | 3.73767E-10 | 0 | 0.0004 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 1.04E-08 | 2.86E-08 | 6.71E-07 | 2.35E-08 | 0 | 0 | 3.34531E-10 | 0 | 0.0003 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.63E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 9.70E-09 | 2.67E-08 | 6.25E-07 | 2.20E-08 | 0 | 0 | 3.04399E-10 | 0 | 0.0003 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 9.12E-09 | 2.50E-08 | 5.87E-07 | 2.06E-08 | 0 | 0 | 2.78986E-10 | 0 | 0.0003 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 8.63E-09 | 2.36E-08 | 5.54E-07 | 1.94E-08 | 0 | 0 | 2.58161E-10 | 0 | 0.0003 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 8.19E-09 | 2.24E-08 | 5.25E-07 | 1.84E-08 | 0 | 0 | 2.40303E-10 | 0 | 0.0002 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 7.81E-09 | 2.13E-08 | 5.00E-07 | 1.75E-08 | 0 | 0 | 2.2465E-10 | 0 | 0.0002 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 7.45E-09 | 2.03E-08 | 4.76E-07 | 1.67E-08 | 0 | 0 | 2.10296E-10 | 0 | 0.0002 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.06E-08 | 6.35E-09 | 1.06E-08 | 7.14E-09 | 1.94E-08 | 4.55E-07 | 1.60E-08 | 0 | 0 | 1.97826E-10 | 0 | 0.0002 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.00E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 6.85E-09 | 1.86E-08 | 4.36E-07 | 1.53E-08 | 0 | 0 | 1.8672E-10 | 0 | 0.0002 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.40E-04 | 3.56E-07 | 2.13E-07 | 3.56E-07 | 2.28E-07 | 6.55E-07 | 1.54E-05 | 5.41E-07 | 0 | 0 | 1.1934E-08 | 0 | 0.0119 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.84E-04 | 3.79E-07 | 2.27E-07 | 3.79E-07 | 2.43E-07 | 6.97E-07 | 1.64E-05 | 5.76E-07 | 0 | 0 | 1.27439E-08 | 0 | 0.0127 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.09E-04 | 3.38E-07 | 2.03E-07 | 3.38E-07 | 2.17E-07 | 6.23E-07 | 1.46E-05 | 5.14E-07 | 0 | 0 | 1.13585E-08 | 0 | 0.0114 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.20E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 1.16E-07 | 3.33E-07 | 7.82E-06 | 2.75E-07 | 0 | 0 | 5.96592E-09 | 0 | 0.0060 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.77E-08 | 4.66E-08 | 7.77E-08 | 5.02E-08 | 1.43E-07 | 3.35E-06 | 1.18E-07 | 0 | 0 | 2.42352E-09 | 0 | 0.0024 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.99E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 2.91E-08 | 8.23E-08 | 1.93E-06 | 6.79E-08 | 0 | 0 | 1.30205E-09 | 0 | 0.0013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.69E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 2.10E-08 | 5.90E-08 | 1.39E-06 | 4.87E-08 | 0 | 0 | 8.74943E-10 | 0 | 0.0009 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.60E-05 | 2.59E-08 | 1.56E-08 | 2.59E-08 | 1.70E-08 | 4.77E-08 | 1.12E-06 | 3.93E-08 | 0 | 0 | 6.70759E-10 | 0 | 0.0007 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.95E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 1.46E-08 | 4.08E-08 | 9.58E-07 | 3.37E-08 | 0 | 0 | 5.50296E-10 | 0 | 0.0006 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.51E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 1.30E-08 | 3.61E-08 | 8.46E-07 | 2.97E-08 | 0 | 0 | 4.68382E-10 | 0 | 0.0005 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 1.17E-08 | 3.25E-08 | 7.62E-07 | 2.67E-08 | 0 | 0 | 4.0767E-10 | 0 | 0.0004 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.61E-08 | 9.69E-09 | 1.61E-08 | 1.07E-08 | 2.96E-08 | 6.95E-07 | 2.44E-08 | 0 | 0 | 3.61281E-10 | 0 | 0.0004 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 9.91E-09 | 2.73E-08 | 6.41E-07 | 2.25E-08 | 0 | 0 | 3.23893E-10 | 0 | 0.0003 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.39E-08 | 8.31E-09 | 1.39E-08 | 9.24E-09 | 2.54E-08 | 5.96E-07 | 2.09E-08 | 0 | 0 | 2.93821E-10 | 0 | 0.0003 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.44E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.67E-09 | 2.38E-08 | 5.58E-07 | 1.96E-08 | 0 | 0 | 2.6857E-10 | 0 | 0.0003 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 8.18E-09 | 2.24E-08 | 5.26E-07 | 1.85E-08 | 0 | 0 | 2.47906E-10 | 0 | 0.0002 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.16E-08 | 6.94E-09 | 1.16E-08 | 7.76E-09 | 2.12E-08 | 4.98E-07 | 1.75E-08 | 0 | 0 | 2.30419E-10 | 0 | 0.0002 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.15E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 7.39E-09 | 2.02E-08 | 4.73E-07 | 1.66E-08 | 0 | 0 | 2.15255E-10 | 0 | 0.0002 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.08E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 7.06E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 0 | 0 | 2.01873E-10 | 0 | 0.0002 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 1.00E-08 | 6.01E-09 | 1.00E-08 | 6.75E-09 | 1.84E-08 | 4.31E-07 | 1.51E-08 | 0 | 0 | 1.89719E-10 | 0 | 0.0002 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.61E-06 | 9.60E-09 | 5.76E-09 | 9.60E-09 | 6.48E-09 | 1.76E-08 | 4.13E-07 | 1.45E-08 | 0 | 0 | 1.79198E-10 | 0 | 0.0002 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.34E-07 | 5.60E-07 | 9.34E-07 | 5.98E-07 | 1.72E-06 | 4.03E-05 | 1.42E-06 | 0 | 0 | 3.18025E-08 | 0 | 0.0318 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.24E-03 | 1.22E-06 | 7.34E-07 | 1.22E-06 | 7.83E-07 | 2.25E-06 | 5.28E-05 | 1.86E-06 | 0 | 0 | 4.17503E-08 | 0 | 0.0418 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.42E-06 | 8.53E-07 | 1.42E-06 | 9.10E-07 | 2.62E-06 | 6.14E-05 | 2.16E-06 | 0 | 0 | 4.85706E-08 | 0 | 0.0486 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.20E-07 | 7.19E-08 | 1.20E-07 | 7.71E-08 | 2.20E-07 | 5.17E-06 | 1.82E-07 | 0 | 0 | 3.86997E-09 | 0 | 0.0039 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.92E-05 | 5.53E-08 | 3.32E-08 | 5.53E-08 | 3.58E-08 | 1.02E-07 | 2.39E-06 | 8.39E-08 | 0 | 0 | 1.66329E-09 | 0 | 0.0017 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.75E-05 | 3.78E-08 | 2.27E-08 | 3.78E-08 | 2.46E-08 | 6.95E-08 | 1.63E-06 | 5.73E-08 | 0 | 0 | 1.07215E-09 | 0 | 0.0011 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.24E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 1.92E-08 | 5.40E-08 | 1.27E-06 | 4.46E-08 | 0 | 0 | 7.90944E-10 | 0 | 0.0008 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.36E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 1.60E-08 | 4.48E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 6.25744E-10 | 0 | 0.0006 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.77E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.38E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 5.15837E-10 | 0 | 0.0005 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.40E-08 | 7.97E-07 | 2.80E-08 | 0 | 0 | 4.37772E-10 | 0 | 0.0004 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.04E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 1.10E-08 | 3.05E-08 | 7.16E-07 | 2.51E-08 | 0 | 0 | 3.79914E-10 | 0 | 0.0004 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.80E-05 | 1.52E-08 | 9.09E-09 | 1.52E-08 | 1.01E-08 | 2.78E-08 | 6.53E-07 | 2.29E-08 | 0 | 0 | 3.35651E-10 | 0 | 0.0003 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.61E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 9.30E-09 | 2.56E-08 | 6.01E-07 | 2.11E-08 | 0 | 0 | 3.00563E-10 | 0 | 0.0003 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.46E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 8.66E-09 | 2.38E-08 | 5.59E-07 | 1.96E-08 | 0 | 0 | 2.72147E-10 | 0 | 0.0003 | Res |

Risk Calculation Part 2, $\sum R1*C_{TAC}$

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | 3rd Trimester | 0<2 | 2<16 | 16<30 | Cancer Risk - 2029 | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Cobalt | Lead | Nickel | Chromium VI | | | | | (per million) | |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 8.12E-09 | 2.23E-08 | 5.22E-07 | 1.83E-08 | 0 | 0 | 2.48594E-10 | 0 | 0.0002 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.23E-05 | 1.14E-08 | 6.86E-09 | 1.14E-08 | 7.67E-09 | 2.10E-08 | 4.92E-07 | 1.73E-08 | 0 | 0 | 2.29539E-10 | 0 | 0.0002 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 7.28E-09 | 1.99E-08 | 4.67E-07 | 1.64E-08 | 0 | 0 | 2.13981E-10 | 0 | 0.0002 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.07E-05 | 1.03E-08 | 6.19E-09 | 1.03E-08 | 6.93E-09 | 1.89E-08 | 4.44E-07 | 1.56E-08 | 0 | 0 | 1.9986E-10 | 0 | 0.0002 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.85E-09 | 5.91E-09 | 9.85E-09 | 6.63E-09 | 1.81E-08 | 4.24E-07 | 1.49E-08 | 0 | 0 | 1.88212E-10 | 0 | 0.0002 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.53E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.35E-09 | 1.73E-08 | 4.06E-07 | 1.42E-08 | 0 | 0 | 1.77578E-10 | 0 | 0.0002 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.01E-06 | 9.04E-09 | 5.43E-09 | 9.04E-09 | 6.10E-09 | 1.66E-08 | 3.89E-07 | 1.36E-08 | 0 | 0 | 1.68028E-10 | 0 | 0.0002 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.79E-04 | 1.59E-07 | 9.54E-08 | 1.59E-07 | 1.02E-07 | 2.93E-07 | 6.87E-06 | 2.42E-07 | 0 | 0 | 5.20021E-09 | 0 | 0.0052 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.28E-07 | 7.69E-08 | 1.28E-07 | 8.25E-08 | 2.36E-07 | 5.54E-06 | 1.95E-07 | 0 | 0 | 4.1488E-09 | 0 | 0.0041 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.22E-08 | 4.33E-08 | 7.22E-08 | 4.67E-08 | 1.33E-07 | 3.12E-06 | 1.10E-07 | 0 | 0 | 2.23513E-09 | 0 | 0.0022 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.65E-05 | 4.84E-08 | 2.90E-08 | 4.84E-08 | 3.14E-08 | 8.90E-08 | 2.09E-06 | 7.34E-08 | 0 | 0 | 1.42521E-09 | 0 | 0.0014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.54E-05 | 3.68E-08 | 2.21E-08 | 3.68E-08 | 2.40E-08 | 6.75E-08 | 1.59E-06 | 5.57E-08 | 0 | 0 | 1.0333E-09 | 0 | 0.0010 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.21E-05 | 2.93E-08 | 1.76E-08 | 2.93E-08 | 1.92E-08 | 5.38E-08 | 1.26E-06 | 4.43E-08 | 0 | 0 | 7.83911E-10 | 0 | 0.0008 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.34E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 1.60E-08 | 4.47E-08 | 1.05E-06 | 3.69E-08 | 0 | 0 | 6.22295E-10 | 0 | 0.0006 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.75E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 1.38E-08 | 3.85E-08 | 9.03E-07 | 3.17E-08 | 0 | 0 | 5.13258E-10 | 0 | 0.0005 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.33E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 1.22E-08 | 3.39E-08 | 7.95E-07 | 2.79E-08 | 0 | 0 | 4.33912E-10 | 0 | 0.0004 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.01E-05 | 1.66E-08 | 9.93E-09 | 1.66E-08 | 1.10E-08 | 3.04E-08 | 7.13E-07 | 2.50E-08 | 0 | 0 | 3.75278E-10 | 0 | 0.0004 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.77E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 1.00E-08 | 2.76E-08 | 6.48E-07 | 2.28E-08 | 0 | 0 | 3.2996E-10 | 0 | 0.0003 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 9.21E-09 | 2.54E-08 | 5.95E-07 | 2.09E-08 | 0 | 0 | 2.94019E-10 | 0 | 0.0003 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.42E-05 | 1.28E-08 | 7.70E-09 | 1.28E-08 | 8.57E-09 | 2.35E-08 | 5.52E-07 | 1.94E-08 | 0 | 0 | 2.65424E-10 | 0 | 0.0003 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.20E-08 | 7.19E-09 | 1.20E-08 | 8.01E-09 | 2.20E-08 | 5.16E-07 | 1.81E-08 | 0 | 0 | 2.41839E-10 | 0 | 0.0002 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.19E-05 | 1.13E-08 | 6.75E-09 | 1.13E-08 | 7.54E-09 | 2.06E-08 | 4.84E-07 | 1.70E-08 | 0 | 0 | 2.22092E-10 | 0 | 0.0002 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 7.12E-09 | 1.95E-08 | 4.56E-07 | 1.60E-08 | 0 | 0 | 2.05008E-10 | 0 | 0.0002 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.03E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 6.79E-09 | 1.85E-08 | 4.35E-07 | 1.53E-08 | 0 | 0 | 1.92382E-10 | 0 | 0.0002 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.70E-06 | 9.63E-09 | 5.78E-09 | 9.63E-09 | 6.48E-09 | 1.77E-08 | 4.14E-07 | 1.45E-08 | 0 | 0 | 1.80816E-10 | 0 | 0.0002 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.20E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 6.23E-09 | 1.69E-08 | 3.97E-07 | 1.39E-08 | 0 | 0 | 1.71413E-10 | 0 | 0.0002 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.74E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 5.99E-09 | 1.63E-08 | 3.82E-07 | 1.34E-08 | 0 | 0 | 1.62989E-10 | 0 | 0.0002 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.27E-06 | 8.51E-09 | 5.10E-09 | 8.51E-09 | 5.75E-09 | 1.56E-08 | 3.66E-07 | 1.28E-08 | 0 | 0 | 1.54171E-10 | 0 | 0.0002 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.82E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 1.43E-08 | 3.97E-08 | 9.32E-07 | 3.28E-08 | 0 | 0 | 5.25802E-10 | 0 | 0.0005 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.70E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 9.87E-09 | 2.72E-08 | 6.38E-07 | 2.24E-08 | 0 | 0 | 3.17651E-10 | 0 | 0.0003 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.53E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 9.16E-09 | 2.52E-08 | 5.91E-07 | 2.08E-08 | 0 | 0 | 2.86088E-10 | 0 | 0.0003 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 8.53E-09 | 2.34E-08 | 5.49E-07 | 1.93E-08 | 0 | 0 | 2.58416E-10 | 0 | 0.0003 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.26E-05 | 1.19E-08 | 7.16E-09 | 1.19E-08 | 7.99E-09 | 2.19E-08 | 5.13E-07 | 1.80E-08 | 0 | 0 | 2.35492E-10 | 0 | 0.0002 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 7.48E-09 | 2.04E-08 | 4.80E-07 | 1.68E-08 | 0 | 0 | 2.13938E-10 | 0 | 0.0002 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 7.05E-09 | 1.92E-08 | 4.51E-07 | 1.58E-08 | 0 | 0 | 1.96776E-10 | 0 | 0.0002 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.77E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 6.67E-09 | 1.82E-08 | 4.26E-07 | 1.50E-08 | 0 | 0 | 1.82051E-10 | 0 | 0.0002 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.13E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 6.36E-09 | 1.73E-08 | 4.06E-07 | 1.42E-08 | 0 | 0 | 1.70156E-10 | 0 | 0.0002 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.58E-06 | 9.00E-09 | 5.40E-09 | 9.00E-09 | 6.07E-09 | 1.65E-08 | 3.87E-07 | 1.36E-08 | 0 | 0 | 1.59984E-10 | 0 | 0.0002 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.17E-06 | 8.65E-09 | 5.19E-09 | 8.65E-09 | 5.84E-09 | 1.59E-08 | 3.72E-07 | 1.31E-08 | 0 | 0 | 1.52333E-10 | 0 | 0.0002 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.79E-06 | 8.33E-09 | 5.00E-09 | 8.33E-09 | 5.63E-09 | 1.53E-08 | 3.58E-07 | 1.26E-08 | 0 | 0 | 1.45212E-10 | 0 | 0.0001 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.39E-06 | 7.99E-09 | 4.79E-09 | 7.99E-09 | 5.41E-09 | 1.46E-08 | 3.44E-07 | 1.20E-08 | 0 | 0 | 1.37657E-10 | 0 | 0.0001 | Res |

# B-3 $PM_{2.5}$ Concentrations Calculations

# HRA Permanente Creek Restoration Project

Annual Average $PM_{2.5}$ Concentration

**Emissions Inputs**

| Construction Activity | Construction Year & Source | PM2.5 Exhaust (tons/year) | PM2.5 Road Dust[1] (tons/year) | PM2.5 Total[1] (tons/year) |
|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | | 1.00E-05 |
| Paved road | 2024_PAVED | 1.04E-04 | | 1.04E-04 |
| Unpaved road | 2024_CCP_UNPV | 3.15E-05 | | 3.15E-05 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | | 1.93E-03 |
| Paved road | 2024_PAVED | 9.02E-04 | | 9.02E-04 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | | 5.90E-03 |
| Paved road | 2025_PAVED | 2.92E-03 | | 2.92E-03 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.022 | | 2.19E-02 |
| Paved road | 2026_PAVED | 2.82E-03 | | 2.82E-03 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | | 1.93E-03 |
| Paved road | 2027_PAVED | 2.67E-03 | | 2.67E-03 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | | 1.16E-03 |
| Paved road | 2028_PAVED | 2.62E-03 | | 2.62E-03 |
| Unpaved road | 2028_UNPAVED | 1.60E-03 | | 1.60E-03 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | | 1.16E-03 |
| Paved road | 2029_PAVED | 2.58E-03 | | 2.58E-03 |
| Unpaved road | 2029_UNPAVED | 1.57E-03 | | 1.57E-03 |

[1]Values for construction areas (e.g. Concrete Channel, Rock Pile Area, etc.) are PM2.5 exhaust (since on-site fugitive PM2.5 can be mitigated with BMPs); values for paved and unpaved roads are entrained road dust.

| Construction Activity | Construction Year | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|
| | | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) | (g/s) |
| Concrete Channel 2024 | 2024_CONCRTE | 2.877E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 2.987E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 9.051E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 5.566E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 2.596E-05 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 1.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 8.40E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 6.31E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 8.11E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 5.57E-05 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 7.69E-05 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 3.324E-05 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 7.523E-05 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 4.596E-05 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.32E-05 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.41E-05 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.53E-05 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

| | Max | |
|---|---|---|
| CT House | 0.000 | 2026 |
| Res | 0.001 | 2025 |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 3.47E-05 | 1.00E-04 | 1.06E-04 | 8.94E-05 | 8.80E-05 | 8.67E-05 | 1.06E-04 | 2026 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 2.50E-05 | 7.11E-05 | 8.87E-05 | 6.08E-05 | 5.91E-05 | 5.83E-05 | 8.87E-05 | 2026 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 3.09E-06 | 9.15E-06 | 2.51E-05 | 4.89E-06 | 5.65E-06 | 5.58E-06 | 2.51E-05 | 2026 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 3.41E-06 | 9.52E-06 | 1.86E-05 | 6.69E-06 | 7.11E-06 | 7.01E-06 | 1.86E-05 | 2026 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 1.08E-04 | 3.14E-04 | 3.15E-04 | 2.84E-04 | 2.78E-04 | 2.74E-04 | 3.15E-04 | 2026 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 2.18E-04 | 6.32E-04 | 6.24E-04 | 5.75E-04 | 5.63E-04 | 5.55E-04 | 6.32E-04 | 2025 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 9.96E-05 | 2.89E-04 | 2.89E-04 | 2.62E-04 | 2.56E-04 | 2.53E-04 | 2.89E-04 | 2026 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 2.63E-04 | 7.64E-04 | 7.50E-04 | 6.96E-04 | 6.82E-04 | 6.72E-04 | 7.64E-04 | 2025 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 2.00E-05 | 5.72E-05 | 8.10E-05 | 4.68E-05 | 4.48E-05 | 4.41E-05 | 8.10E-05 | 2026 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 5.37E-05 | 1.55E-04 | 1.63E-04 | 1.38E-04 | 1.35E-04 | 1.33E-04 | 1.63E-04 | 2026 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 1.30E-05 | 3.74E-05 | 4.48E-05 | 3.23E-05 | 3.21E-05 | 3.17E-05 | 4.48E-05 | 2026 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 8.08E-06 | 2.30E-05 | 4.59E-05 | 1.60E-05 | 1.44E-05 | 1.42E-05 | 4.59E-05 | 2026 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 7.57E-06 | 2.16E-05 | 4.33E-05 | 1.50E-05 | 1.35E-05 | 1.33E-05 | 4.33E-05 | 2026 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 7.11E-06 | 2.03E-05 | 4.09E-05 | 1.40E-05 | 1.27E-05 | 1.25E-05 | 4.09E-05 | 2026 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 6.68E-06 | 1.91E-05 | 3.87E-05 | 1.32E-05 | 1.19E-05 | 1.18E-05 | 3.87E-05 | 2026 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 6.32E-06 | 1.81E-05 | 3.68E-05 | 1.25E-05 | 1.13E-05 | 1.11E-05 | 3.68E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 5.95E-06 | 1.71E-05 | 3.49E-05 | 1.17E-05 | 1.06E-05 | 1.05E-05 | 3.49E-05 | 2026 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 5.57E-06 | 1.61E-05 | 3.30E-05 | 1.10E-05 | 9.92E-06 | 9.78E-06 | 3.30E-05 | 2026 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 8.52E-06 | 2.44E-05 | 5.09E-05 | 1.65E-05 | 1.46E-05 | 1.44E-05 | 5.09E-05 | 2026 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 8.23E-06 | 2.35E-05 | 4.74E-05 | 1.62E-05 | 1.45E-05 | 1.42E-05 | 4.74E-05 | 2026 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 7.72E-06 | 2.21E-05 | 4.42E-05 | 1.53E-05 | 1.37E-05 | 1.35E-05 | 4.42E-05 | 2026 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 7.25E-06 | 2.07E-05 | 4.17E-05 | 1.43E-05 | 1.29E-05 | 1.27E-05 | 4.17E-05 | 2026 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 6.76E-06 | 1.94E-05 | 3.91E-05 | 1.34E-05 | 1.21E-05 | 1.19E-05 | 3.91E-05 | 2026 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 6.34E-06 | 1.82E-05 | 3.69E-05 | 1.26E-05 | 1.14E-05 | 1.12E-05 | 3.69E-05 | 2026 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 5.96E-06 | 1.72E-05 | 3.50E-05 | 1.18E-05 | 1.06E-05 | 1.05E-05 | 3.50E-05 | 2026 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 5.63E-06 | 1.62E-05 | 3.33E-05 | 1.11E-05 | 1.00E-05 | 9.91E-06 | 3.33E-05 | 2026 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 5.32E-06 | 1.54E-05 | 3.17E-05 | 1.04E-05 | 9.47E-06 | 9.34E-06 | 3.17E-05 | 2026 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 7.97E-06 | 2.31E-05 | 5.12E-05 | 1.50E-05 | 1.29E-05 | 1.27E-05 | 5.12E-05 | 2026 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 8.16E-06 | 2.34E-05 | 4.83E-05 | 1.59E-05 | 1.41E-05 | 1.39E-05 | 4.83E-05 | 2026 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 7.83E-06 | 2.24E-05 | 4.48E-05 | 1.55E-05 | 1.39E-05 | 1.37E-05 | 4.48E-05 | 2026 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 7.34E-06 | 2.10E-05 | 4.19E-05 | 1.46E-05 | 1.32E-05 | 1.30E-05 | 4.19E-05 | 2026 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 6.87E-06 | 1.98E-05 | 3.95E-05 | 1.37E-05 | 1.24E-05 | 1.22E-05 | 3.95E-05 | 2026 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 6.46E-06 | 1.86E-05 | 3.73E-05 | 1.29E-05 | 1.17E-05 | 1.15E-05 | 3.73E-05 | 2026 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 6.04E-06 | 1.74E-05 | 3.52E-05 | 1.20E-05 | 1.09E-05 | 1.08E-05 | 3.52E-05 | 2026 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 5.68E-06 | 1.64E-05 | 3.33E-05 | 1.13E-05 | 1.02E-05 | 1.01E-05 | 3.33E-05 | 2026 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 5.35E-06 | 1.55E-05 | 3.16E-05 | 1.06E-05 | 9.61E-06 | 9.47E-06 | 3.16E-05 | 2026 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 5.03E-06 | 1.46E-05 | 3.01E-05 | 9.90E-06 | 9.01E-06 | 8.88E-06 | 3.01E-05 | 2026 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 4.75E-06 | 1.38E-05 | 2.87E-05 | 9.30E-06 | 8.46E-06 | 8.34E-06 | 2.87E-05 | 2026 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 4.46E-06 | 1.29E-05 | 2.73E-05 | 8.65E-06 | 7.88E-06 | 7.76E-06 | 2.73E-05 | 2026 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 8.35E-06 | 2.42E-05 | 5.13E-05 | 1.61E-05 | 1.41E-05 | 1.39E-05 | 5.13E-05 | 2026 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 8.00E-06 | 2.31E-05 | 4.82E-05 | 1.56E-05 | 1.37E-05 | 1.36E-05 | 4.82E-05 | 2026 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 7.85E-06 | 2.25E-05 | 4.49E-05 | 1.56E-05 | 1.40E-05 | 1.38E-05 | 4.49E-05 | 2026 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 7.42E-06 | 2.13E-05 | 4.21E-05 | 1.49E-05 | 1.35E-05 | 1.33E-05 | 4.21E-05 | 2026 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 6.98E-06 | 2.01E-05 | 3.97E-05 | 1.40E-05 | 1.27E-05 | 1.25E-05 | 3.97E-05 | 2026 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 6.55E-06 | 1.89E-05 | 3.74E-05 | 1.32E-05 | 1.20E-05 | 1.18E-05 | 3.74E-05 | 2026 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 6.15E-06 | 1.77E-05 | 3.53E-05 | 1.24E-05 | 1.13E-05 | 1.11E-05 | 3.53E-05 | 2026 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 5.77E-06 | 1.67E-05 | 3.35E-05 | 1.15E-05 | 1.05E-05 | 1.04E-05 | 3.35E-05 | 2026 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 5.39E-06 | 1.56E-05 | 3.16E-05 | 1.07E-05 | 9.79E-06 | 9.65E-06 | 3.16E-05 | 2026 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 5.02E-06 | 1.45E-05 | 2.99E-05 | 9.90E-06 | 9.05E-06 | 8.92E-06 | 2.99E-05 | 2026 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 4.64E-06 | 1.34E-05 | 2.81E-05 | 9.06E-06 | 8.28E-06 | 8.16E-06 | 2.81E-05 | 2026 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 8.16E-06 | 2.37E-05 | 5.06E-05 | 1.57E-05 | 1.37E-05 | 1.35E-05 | 5.06E-05 | 2026 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 7.99E-06 | 2.30E-05 | 4.75E-05 | 1.57E-05 | 1.40E-05 | 1.38E-05 | 4.75E-05 | 2026 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 7.75E-06 | 2.22E-05 | 4.45E-05 | 1.54E-05 | 1.39E-05 | 1.37E-05 | 4.45E-05 | 2026 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 7.41E-06 | 2.13E-05 | 4.18E-05 | 1.49E-05 | 1.36E-05 | 1.34E-05 | 4.18E-05 | 2026 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 7.00E-06 | 2.02E-05 | 3.93E-05 | 1.42E-05 | 1.30E-05 | 1.28E-05 | 3.93E-05 | 2026 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 6.58E-06 | 1.90E-05 | 3.71E-05 | 1.33E-05 | 1.22E-05 | 1.20E-05 | 3.71E-05 | 2026 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 6.15E-06 | 1.78E-05 | 3.50E-05 | 1.24E-05 | 1.14E-05 | 1.12E-05 | 3.50E-05 | 2026 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 5.68E-06 | 1.64E-05 | 3.28E-05 | 1.14E-05 | 1.05E-05 | 1.03E-05 | 3.28E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 5.27E-06 | 1.52E-05 | 3.09E-05 | 1.05E-05 | 9.62E-06 | 9.48E-06 | 3.09E-05 | 2026 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 9.32E-06 | 2.68E-05 | 5.00E-05 | 1.94E-05 | 1.81E-05 | 1.79E-05 | 5.00E-05 | 2026 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.03E-05 | 2.98E-05 | 6.09E-05 | 2.04E-05 | 1.81E-05 | 1.78E-05 | 6.09E-05 | 2026 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 9.25E-06 | 2.68E-05 | 5.67E-05 | 1.80E-05 | 1.57E-05 | 1.55E-05 | 5.67E-05 | 2026 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 8.78E-06 | 2.55E-05 | 5.31E-05 | 1.72E-05 | 1.52E-05 | 1.50E-05 | 5.31E-05 | 2026 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 8.42E-06 | 2.43E-05 | 4.96E-05 | 1.67E-05 | 1.49E-05 | 1.47E-05 | 4.96E-05 | 2026 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 8.04E-06 | 2.31E-05 | 4.64E-05 | 1.60E-05 | 1.44E-05 | 1.42E-05 | 4.64E-05 | 2026 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 7.61E-06 | 2.19E-05 | 4.35E-05 | 1.52E-05 | 1.38E-05 | 1.36E-05 | 4.35E-05 | 2026 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 7.45E-06 | 2.14E-05 | 4.10E-05 | 1.53E-05 | 1.40E-05 | 1.38E-05 | 4.10E-05 | 2026 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 6.96E-06 | 2.01E-05 | 3.84E-05 | 1.43E-05 | 1.32E-05 | 1.30E-05 | 3.84E-05 | 2026 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 6.46E-06 | 1.86E-05 | 3.61E-05 | 1.32E-05 | 1.22E-05 | 1.20E-05 | 3.61E-05 | 2026 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 5.98E-06 | 1.73E-05 | 3.39E-05 | 1.21E-05 | 1.12E-05 | 1.10E-05 | 3.39E-05 | 2026 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 5.52E-06 | 1.60E-05 | 3.19E-05 | 1.11E-05 | 1.02E-05 | 1.01E-05 | 3.19E-05 | 2026 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 5.10E-06 | 1.48E-05 | 3.00E-05 | 1.02E-05 | 9.35E-06 | 9.22E-06 | 3.00E-05 | 2026 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 1.05E-05 | 3.05E-05 | 6.14E-05 | 2.11E-05 | 1.88E-05 | 1.86E-05 | 6.14E-05 | 2026 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 1.02E-05 | 2.95E-05 | 6.09E-05 | 2.01E-05 | 1.77E-05 | 1.75E-05 | 6.09E-05 | 2026 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 1.02E-05 | 2.95E-05 | 5.92E-05 | 2.05E-05 | 1.82E-05 | 1.80E-05 | 5.92E-05 | 2026 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 9.90E-06 | 2.86E-05 | 5.53E-05 | 2.02E-05 | 1.82E-05 | 1.80E-05 | 5.53E-05 | 2026 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 9.65E-06 | 2.76E-05 | 5.18E-05 | 1.99E-05 | 1.82E-05 | 1.80E-05 | 5.18E-05 | 2026 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 8.82E-06 | 2.53E-05 | 4.82E-05 | 1.81E-05 | 1.65E-05 | 1.63E-05 | 4.82E-05 | 2026 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 8.51E-06 | 2.44E-05 | 4.52E-05 | 1.77E-05 | 1.63E-05 | 1.61E-05 | 4.52E-05 | 2026 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 7.99E-06 | 2.30E-05 | 4.24E-05 | 1.67E-05 | 1.55E-05 | 1.53E-05 | 4.24E-05 | 2026 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 7.42E-06 | 2.14E-05 | 3.97E-05 | 1.55E-05 | 1.44E-05 | 1.42E-05 | 3.97E-05 | 2026 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 6.85E-06 | 1.98E-05 | 3.72E-05 | 1.42E-05 | 1.32E-05 | 1.30E-05 | 3.72E-05 | 2026 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 6.31E-06 | 1.82E-05 | 3.48E-05 | 1.30E-05 | 1.20E-05 | 1.19E-05 | 3.48E-05 | 2026 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 5.81E-06 | 1.68E-05 | 3.27E-05 | 1.18E-05 | 1.10E-05 | 1.08E-05 | 3.27E-05 | 2026 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 5.36E-06 | 1.55E-05 | 3.07E-05 | 1.08E-05 | 1.00E-05 | 9.88E-06 | 3.07E-05 | 2026 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 4.94E-06 | 1.43E-05 | 2.89E-05 | 9.86E-06 | 9.14E-06 | 9.01E-06 | 2.89E-05 | 2026 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 4.54E-06 | 1.31E-05 | 2.71E-05 | 8.94E-06 | 8.27E-06 | 8.15E-06 | 2.71E-05 | 2026 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 4.10E-06 | 1.19E-05 | 2.52E-05 | 7.94E-06 | 7.34E-06 | 7.24E-06 | 2.52E-05 | 2026 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 1.38E-05 | 3.96E-05 | 7.08E-05 | 2.93E-05 | 2.69E-05 | 2.65E-05 | 7.08E-05 | 2026 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 1.30E-05 | 3.72E-05 | 6.62E-05 | 2.76E-05 | 2.54E-05 | 2.50E-05 | 6.62E-05 | 2026 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.14E-05 | 3.28E-05 | 6.11E-05 | 2.37E-05 | 2.16E-05 | 2.13E-05 | 6.11E-05 | 2026 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 1.03E-05 | 2.98E-05 | 5.65E-05 | 2.13E-05 | 1.94E-05 | 1.91E-05 | 5.65E-05 | 2026 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 9.92E-06 | 2.86E-05 | 5.29E-05 | 2.07E-05 | 1.90E-05 | 1.88E-05 | 5.29E-05 | 2026 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 9.55E-06 | 2.74E-05 | 4.95E-05 | 2.01E-05 | 1.86E-05 | 1.84E-05 | 4.95E-05 | 2026 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 9.18E-06 | 2.63E-05 | 4.65E-05 | 1.96E-05 | 1.83E-05 | 1.80E-05 | 4.65E-05 | 2026 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 8.53E-06 | 2.45E-05 | 4.35E-05 | 1.82E-05 | 1.70E-05 | 1.67E-05 | 4.35E-05 | 2026 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 7.93E-06 | 2.28E-05 | 4.07E-05 | 1.69E-05 | 1.58E-05 | 1.56E-05 | 4.07E-05 | 2026 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 7.32E-06 | 2.11E-05 | 3.81E-05 | 1.55E-05 | 1.45E-05 | 1.43E-05 | 3.81E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 6.71E-06 | 1.93E-05 | 3.56E-05 | 1.41E-05 | 1.32E-05 | 1.30E-05 | 3.56E-05 | 2026 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 6.14E-06 | 1.77E-05 | 3.32E-05 | 1.28E-05 | 1.19E-05 | 1.18E-05 | 3.32E-05 | 2026 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 5.63E-06 | 1.62E-05 | 3.11E-05 | 1.16E-05 | 1.08E-05 | 1.07E-05 | 3.11E-05 | 2026 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 5.15E-06 | 1.49E-05 | 2.92E-05 | 1.05E-05 | 9.78E-06 | 9.64E-06 | 2.92E-05 | 2026 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 4.74E-06 | 1.37E-05 | 2.74E-05 | 9.51E-06 | 8.88E-06 | 8.75E-06 | 2.74E-05 | 2026 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 4.37E-06 | 1.27E-05 | 2.58E-05 | 8.67E-06 | 8.09E-06 | 7.97E-06 | 2.58E-05 | 2026 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 4.03E-06 | 1.17E-05 | 2.44E-05 | 7.90E-06 | 7.37E-06 | 7.26E-06 | 2.44E-05 | 2026 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 1.42E-05 | 4.04E-05 | 6.49E-05 | 3.14E-05 | 2.96E-05 | 2.91E-05 | 6.49E-05 | 2026 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 1.32E-05 | 3.74E-05 | 6.04E-05 | 2.91E-05 | 2.74E-05 | 2.70E-05 | 6.04E-05 | 2026 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 1.15E-05 | 3.28E-05 | 5.52E-05 | 2.49E-05 | 2.34E-05 | 2.31E-05 | 5.52E-05 | 2026 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 1.06E-05 | 3.04E-05 | 5.13E-05 | 2.31E-05 | 2.17E-05 | 2.14E-05 | 5.13E-05 | 2026 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.01E-05 | 2.90E-05 | 4.81E-05 | 2.22E-05 | 2.10E-05 | 2.07E-05 | 4.81E-05 | 2026 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 9.27E-06 | 2.66E-05 | 4.46E-05 | 2.03E-05 | 1.92E-05 | 1.89E-05 | 4.46E-05 | 2026 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 8.48E-06 | 2.44E-05 | 4.15E-05 | 1.84E-05 | 1.75E-05 | 1.72E-05 | 4.15E-05 | 2026 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 7.78E-06 | 2.24E-05 | 3.87E-05 | 1.68E-05 | 1.59E-05 | 1.57E-05 | 3.87E-05 | 2026 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 7.13E-06 | 2.05E-05 | 3.61E-05 | 1.53E-05 | 1.45E-05 | 1.43E-05 | 3.61E-05 | 2026 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 6.50E-06 | 1.87E-05 | 3.36E-05 | 1.38E-05 | 1.31E-05 | 1.29E-05 | 3.36E-05 | 2026 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 5.90E-06 | 1.70E-05 | 3.13E-05 | 1.24E-05 | 1.17E-05 | 1.15E-05 | 3.13E-05 | 2026 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 5.35E-06 | 1.54E-05 | 2.91E-05 | 1.11E-05 | 1.05E-05 | 1.03E-05 | 2.91E-05 | 2026 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 4.87E-06 | 1.41E-05 | 2.72E-05 | 9.97E-06 | 9.41E-06 | 9.27E-06 | 2.72E-05 | 2026 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 4.46E-06 | 1.29E-05 | 2.55E-05 | 9.01E-06 | 8.50E-06 | 8.38E-06 | 2.55E-05 | 2026 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 4.12E-06 | 1.19E-05 | 2.41E-05 | 8.22E-06 | 7.75E-06 | 7.64E-06 | 2.41E-05 | 2026 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 3.82E-06 | 1.11E-05 | 2.28E-05 | 7.54E-06 | 7.11E-06 | 7.01E-06 | 2.28E-05 | 2026 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 3.45E-06 | 1.00E-05 | 2.12E-05 | 6.69E-06 | 6.31E-06 | 6.22E-06 | 2.12E-05 | 2026 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 1.42E-05 | 4.06E-05 | 6.38E-05 | 3.19E-05 | 3.02E-05 | 2.98E-05 | 6.38E-05 | 2026 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 1.35E-05 | 3.84E-05 | 5.97E-05 | 3.03E-05 | 2.88E-05 | 2.84E-05 | 5.97E-05 | 2026 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 1.25E-05 | 3.57E-05 | 5.54E-05 | 2.82E-05 | 2.69E-05 | 2.65E-05 | 5.54E-05 | 2026 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 1.13E-05 | 3.24E-05 | 5.09E-05 | 2.54E-05 | 2.42E-05 | 2.39E-05 | 5.09E-05 | 2026 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 1.02E-05 | 2.91E-05 | 4.67E-05 | 2.27E-05 | 2.16E-05 | 2.13E-05 | 4.67E-05 | 2026 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 9.18E-06 | 2.63E-05 | 4.30E-05 | 2.04E-05 | 1.94E-05 | 1.91E-05 | 4.30E-05 | 2026 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 8.33E-06 | 2.39E-05 | 3.97E-05 | 1.84E-05 | 1.75E-05 | 1.72E-05 | 3.97E-05 | 2026 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 7.59E-06 | 2.18E-05 | 3.69E-05 | 1.66E-05 | 1.58E-05 | 1.56E-05 | 3.69E-05 | 2026 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 6.86E-06 | 1.98E-05 | 3.41E-05 | 1.49E-05 | 1.42E-05 | 1.40E-05 | 3.41E-05 | 2026 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 6.16E-06 | 1.78E-05 | 3.15E-05 | 1.32E-05 | 1.26E-05 | 1.24E-05 | 3.15E-05 | 2026 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 5.54E-06 | 1.60E-05 | 2.92E-05 | 1.17E-05 | 1.11E-05 | 1.10E-05 | 2.92E-05 | 2026 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 5.01E-06 | 1.45E-05 | 2.71E-05 | 1.04E-05 | 9.93E-06 | 9.79E-06 | 2.71E-05 | 2026 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 4.56E-06 | 1.32E-05 | 2.53E-05 | 9.36E-06 | 8.92E-06 | 8.79E-06 | 2.53E-05 | 2026 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 4.19E-06 | 1.21E-05 | 2.38E-05 | 8.51E-06 | 8.11E-06 | 7.99E-06 | 2.38E-05 | 2026 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 3.88E-06 | 1.12E-05 | 2.25E-05 | 7.78E-06 | 7.41E-06 | 7.31E-06 | 2.25E-05 | 2026 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 3.61E-06 | 1.05E-05 | 2.13E-05 | 7.18E-06 | 6.84E-06 | 6.74E-06 | 2.13E-05 | 2026 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 3.39E-06 | 9.81E-06 | 2.03E-05 | 6.67E-06 | 6.36E-06 | 6.27E-06 | 2.03E-05 | 2026 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 1.42E-05 | 4.06E-05 | 6.07E-05 | 3.25E-05 | 3.10E-05 | 3.06E-05 | 6.07E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 1.31E-05 | 3.75E-05 | 5.61E-05 | 3.01E-05 | 2.88E-05 | 2.84E-05 | 5.61E-05 | 2026 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 1.16E-05 | 3.32E-05 | 5.08E-05 | 2.64E-05 | 2.53E-05 | 2.49E-05 | 5.08E-05 | 2026 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 1.03E-05 | 2.94E-05 | 4.61E-05 | 2.31E-05 | 2.21E-05 | 2.18E-05 | 4.61E-05 | 2026 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 9.15E-06 | 2.63E-05 | 4.22E-05 | 2.05E-05 | 1.96E-05 | 1.93E-05 | 4.22E-05 | 2026 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 8.22E-06 | 2.36E-05 | 3.87E-05 | 1.82E-05 | 1.74E-05 | 1.72E-05 | 3.87E-05 | 2026 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 7.33E-06 | 2.11E-05 | 3.55E-05 | 1.61E-05 | 1.54E-05 | 1.52E-05 | 3.55E-05 | 2026 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 6.51E-06 | 1.87E-05 | 3.24E-05 | 1.41E-05 | 1.35E-05 | 1.33E-05 | 3.24E-05 | 2026 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 5.79E-06 | 1.67E-05 | 2.98E-05 | 1.24E-05 | 1.18E-05 | 1.17E-05 | 2.98E-05 | 2026 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 5.20E-06 | 1.50E-05 | 2.75E-05 | 1.09E-05 | 1.05E-05 | 1.03E-05 | 2.75E-05 | 2026 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 4.71E-06 | 1.36E-05 | 2.56E-05 | 9.78E-06 | 9.36E-06 | 9.22E-06 | 2.56E-05 | 2026 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 4.30E-06 | 1.24E-05 | 2.39E-05 | 8.83E-06 | 8.46E-06 | 8.34E-06 | 2.39E-05 | 2026 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 3.96E-06 | 1.15E-05 | 2.25E-05 | 8.04E-06 | 7.71E-06 | 7.60E-06 | 2.25E-05 | 2026 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 3.67E-06 | 1.06E-05 | 2.12E-05 | 7.37E-06 | 7.07E-06 | 6.97E-06 | 2.12E-05 | 2026 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 3.41E-06 | 9.87E-06 | 2.01E-05 | 6.78E-06 | 6.51E-06 | 6.42E-06 | 2.01E-05 | 2026 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 3.18E-06 | 9.21E-06 | 1.91E-05 | 6.26E-06 | 6.02E-06 | 5.93E-06 | 1.91E-05 | 2026 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 1.90E-05 | 5.43E-05 | 7.73E-05 | 4.43E-05 | 4.24E-05 | 4.18E-05 | 7.73E-05 | 2026 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 1.83E-05 | 5.23E-05 | 7.37E-05 | 4.29E-05 | 4.11E-05 | 4.05E-05 | 7.37E-05 | 2026 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 1.72E-05 | 4.93E-05 | 6.92E-05 | 4.05E-05 | 3.89E-05 | 3.83E-05 | 6.92E-05 | 2026 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 1.55E-05 | 4.45E-05 | 6.33E-05 | 3.63E-05 | 3.49E-05 | 3.44E-05 | 6.33E-05 | 2026 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 1.37E-05 | 3.93E-05 | 5.72E-05 | 3.19E-05 | 3.06E-05 | 3.02E-05 | 5.72E-05 | 2026 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 1.19E-05 | 3.42E-05 | 5.12E-05 | 2.74E-05 | 2.62E-05 | 2.59E-05 | 5.12E-05 | 2026 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 1.04E-05 | 3.01E-05 | 4.63E-05 | 2.38E-05 | 2.28E-05 | 2.25E-05 | 4.63E-05 | 2026 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 9.15E-06 | 2.63E-05 | 4.18E-05 | 2.06E-05 | 1.97E-05 | 1.94E-05 | 4.18E-05 | 2026 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 8.02E-06 | 2.31E-05 | 3.79E-05 | 1.78E-05 | 1.70E-05 | 1.68E-05 | 3.79E-05 | 2026 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 7.00E-06 | 2.02E-05 | 3.43E-05 | 1.53E-05 | 1.46E-05 | 1.44E-05 | 3.43E-05 | 2026 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 6.17E-06 | 1.78E-05 | 3.13E-05 | 1.33E-05 | 1.27E-05 | 1.25E-05 | 3.13E-05 | 2026 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 5.50E-06 | 1.59E-05 | 2.87E-05 | 1.17E-05 | 1.12E-05 | 1.10E-05 | 2.87E-05 | 2026 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 4.96E-06 | 1.43E-05 | 2.66E-05 | 1.04E-05 | 9.91E-06 | 9.77E-06 | 2.66E-05 | 2026 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 4.50E-06 | 1.30E-05 | 2.47E-05 | 9.28E-06 | 8.89E-06 | 8.76E-06 | 2.47E-05 | 2026 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 4.11E-06 | 1.19E-05 | 2.31E-05 | 8.38E-06 | 8.03E-06 | 7.92E-06 | 2.31E-05 | 2026 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 3.77E-06 | 1.09E-05 | 2.17E-05 | 7.59E-06 | 7.28E-06 | 7.18E-06 | 2.17E-05 | 2026 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 3.48E-06 | 1.01E-05 | 2.04E-05 | 6.92E-06 | 6.65E-06 | 6.55E-06 | 2.04E-05 | 2026 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 3.22E-06 | 9.33E-06 | 1.93E-05 | 6.34E-06 | 6.10E-06 | 6.02E-06 | 1.93E-05 | 2026 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 3.00E-06 | 8.68E-06 | 1.82E-05 | 5.84E-06 | 5.63E-06 | 5.55E-06 | 1.82E-05 | 2026 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 2.33E-05 | 6.66E-05 | 8.51E-05 | 5.65E-05 | 5.47E-05 | 5.39E-05 | 8.51E-05 | 2026 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 2.16E-05 | 6.19E-05 | 7.99E-05 | 5.24E-05 | 5.07E-05 | 4.99E-05 | 7.99E-05 | 2026 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.86E-05 | 5.35E-05 | 7.11E-05 | 4.47E-05 | 4.32E-05 | 4.26E-05 | 7.11E-05 | 2026 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 1.65E-05 | 4.75E-05 | 6.45E-05 | 3.94E-05 | 3.81E-05 | 3.75E-05 | 6.45E-05 | 2026 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 1.41E-05 | 4.07E-05 | 5.72E-05 | 3.34E-05 | 3.22E-05 | 3.17E-05 | 5.72E-05 | 2026 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 1.22E-05 | 3.51E-05 | 5.10E-05 | 2.84E-05 | 2.73E-05 | 2.69E-05 | 5.10E-05 | 2026 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.05E-05 | 3.02E-05 | 4.56E-05 | 2.41E-05 | 2.31E-05 | 2.28E-05 | 4.56E-05 | 2026 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 8.91E-06 | 2.57E-05 | 4.06E-05 | 2.01E-05 | 1.93E-05 | 1.90E-05 | 4.06E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 7.64E-06 | 2.20E-05 | 3.64E-05 | 1.69E-05 | 1.62E-05 | 1.60E-05 | 3.64E-05 | 2026 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 6.65E-06 | 1.92E-05 | 3.30E-05 | 1.45E-05 | 1.38E-05 | 1.36E-05 | 3.30E-05 | 2026 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 5.89E-06 | 1.70E-05 | 3.03E-05 | 1.26E-05 | 1.20E-05 | 1.18E-05 | 3.03E-05 | 2026 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 5.27E-06 | 1.52E-05 | 2.79E-05 | 1.11E-05 | 1.06E-05 | 1.04E-05 | 2.79E-05 | 2026 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 4.74E-06 | 1.37E-05 | 2.59E-05 | 9.80E-06 | 9.35E-06 | 9.22E-06 | 2.59E-05 | 2026 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 4.30E-06 | 1.24E-05 | 2.41E-05 | 8.76E-06 | 8.36E-06 | 8.24E-06 | 2.41E-05 | 2026 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 3.91E-06 | 1.13E-05 | 2.25E-05 | 7.86E-06 | 7.51E-06 | 7.40E-06 | 2.25E-05 | 2026 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 3.58E-06 | 1.04E-05 | 2.11E-05 | 7.10E-06 | 6.79E-06 | 6.70E-06 | 2.11E-05 | 2026 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 3.31E-06 | 9.57E-06 | 1.99E-05 | 6.48E-06 | 6.21E-06 | 6.12E-06 | 1.99E-05 | 2026 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 3.08E-06 | 8.90E-06 | 1.88E-05 | 5.95E-06 | 5.71E-06 | 5.63E-06 | 1.88E-05 | 2026 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 2.87E-06 | 8.30E-06 | 1.78E-05 | 5.50E-06 | 5.29E-06 | 5.21E-06 | 1.78E-05 | 2026 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 2.77E-05 | 7.89E-05 | 9.47E-05 | 6.82E-05 | 6.65E-05 | 6.55E-05 | 9.47E-05 | 2026 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 2.72E-05 | 7.76E-05 | 9.29E-05 | 6.72E-05 | 6.55E-05 | 6.45E-05 | 9.29E-05 | 2026 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 2.58E-05 | 7.40E-05 | 8.89E-05 | 6.39E-05 | 6.23E-05 | 6.14E-05 | 8.89E-05 | 2026 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 2.46E-05 | 7.07E-05 | 8.51E-05 | 6.11E-05 | 5.95E-05 | 5.86E-05 | 8.51E-05 | 2026 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 2.14E-05 | 6.15E-05 | 7.58E-05 | 5.27E-05 | 5.14E-05 | 5.06E-05 | 7.58E-05 | 2026 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 1.75E-05 | 5.05E-05 | 6.48E-05 | 4.28E-05 | 4.16E-05 | 4.10E-05 | 6.48E-05 | 2026 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 1.45E-05 | 4.17E-05 | 5.60E-05 | 3.48E-05 | 3.38E-05 | 3.33E-05 | 5.60E-05 | 2026 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 1.21E-05 | 3.49E-05 | 4.90E-05 | 2.86E-05 | 2.77E-05 | 2.73E-05 | 4.90E-05 | 2026 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 9.98E-06 | 2.88E-05 | 4.27E-05 | 2.31E-05 | 2.23E-05 | 2.20E-05 | 4.27E-05 | 2026 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 8.34E-06 | 2.40E-05 | 3.78E-05 | 1.89E-05 | 1.82E-05 | 1.79E-05 | 3.78E-05 | 2026 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 7.20E-06 | 2.07E-05 | 3.41E-05 | 1.59E-05 | 1.53E-05 | 1.51E-05 | 3.41E-05 | 2026 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 6.26E-06 | 1.80E-05 | 3.11E-05 | 1.36E-05 | 1.30E-05 | 1.28E-05 | 3.11E-05 | 2026 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 5.52E-06 | 1.59E-05 | 2.86E-05 | 1.17E-05 | 1.12E-05 | 1.10E-05 | 2.86E-05 | 2026 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 4.93E-06 | 1.42E-05 | 2.65E-05 | 1.03E-05 | 9.79E-06 | 9.65E-06 | 2.65E-05 | 2026 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 4.44E-06 | 1.28E-05 | 2.47E-05 | 9.08E-06 | 8.65E-06 | 8.53E-06 | 2.47E-05 | 2026 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 4.04E-06 | 1.17E-05 | 2.32E-05 | 8.13E-06 | 7.74E-06 | 7.63E-06 | 2.32E-05 | 2026 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 3.69E-06 | 1.07E-05 | 2.18E-05 | 7.30E-06 | 6.95E-06 | 6.85E-06 | 2.18E-05 | 2026 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 3.40E-06 | 9.84E-06 | 2.05E-05 | 6.64E-06 | 6.32E-06 | 6.23E-06 | 2.05E-05 | 2026 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 3.16E-06 | 9.14E-06 | 1.95E-05 | 6.09E-06 | 5.80E-06 | 5.72E-06 | 1.95E-05 | 2026 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 2.96E-06 | 8.55E-06 | 1.85E-05 | 5.63E-06 | 5.37E-06 | 5.30E-06 | 1.85E-05 | 2026 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 2.78E-06 | 8.04E-06 | 1.76E-05 | 5.25E-06 | 5.01E-06 | 4.94E-06 | 1.76E-05 | 2026 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 2.94E-05 | 8.43E-05 | 9.77E-05 | 7.37E-05 | 7.20E-05 | 7.10E-05 | 9.77E-05 | 2026 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 2.84E-05 | 8.16E-05 | 9.43E-05 | 7.13E-05 | 6.97E-05 | 6.87E-05 | 9.43E-05 | 2026 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 2.82E-05 | 8.12E-05 | 9.23E-05 | 7.13E-05 | 6.97E-05 | 6.87E-05 | 9.23E-05 | 2026 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 2.36E-05 | 6.79E-05 | 7.92E-05 | 5.92E-05 | 5.79E-05 | 5.70E-05 | 7.92E-05 | 2026 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.82E-05 | 5.24E-05 | 6.40E-05 | 4.50E-05 | 4.40E-05 | 4.34E-05 | 6.40E-05 | 2026 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 1.44E-05 | 4.14E-05 | 5.32E-05 | 3.50E-05 | 3.42E-05 | 3.37E-05 | 5.32E-05 | 2026 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 1.14E-05 | 3.29E-05 | 4.48E-05 | 2.73E-05 | 2.66E-05 | 2.62E-05 | 4.48E-05 | 2026 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 9.24E-06 | 2.66E-05 | 3.85E-05 | 2.16E-05 | 2.10E-05 | 2.07E-05 | 3.85E-05 | 2026 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 7.65E-06 | 2.20E-05 | 3.39E-05 | 1.74E-05 | 1.69E-05 | 1.66E-05 | 3.39E-05 | 2026 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 6.51E-06 | 1.87E-05 | 3.06E-05 | 1.44E-05 | 1.40E-05 | 1.38E-05 | 3.06E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 5.66E-06 | 1.63E-05 | 2.80E-05 | 1.23E-05 | 1.18E-05 | 1.17E-05 | 2.80E-05 | 2026 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 5.03E-06 | 1.45E-05 | 2.60E-05 | 1.07E-05 | 1.02E-05 | 1.01E-05 | 2.60E-05 | 2026 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 4.50E-06 | 1.30E-05 | 2.43E-05 | 9.34E-06 | 8.95E-06 | 8.82E-06 | 2.43E-05 | 2026 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 4.09E-06 | 1.18E-05 | 2.29E-05 | 8.31E-06 | 7.93E-06 | 7.82E-06 | 2.29E-05 | 2026 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 3.75E-06 | 1.08E-05 | 2.17E-05 | 7.49E-06 | 7.14E-06 | 7.04E-06 | 2.17E-05 | 2026 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 3.48E-06 | 1.00E-05 | 2.06E-05 | 6.83E-06 | 6.50E-06 | 6.41E-06 | 2.06E-05 | 2026 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 3.24E-06 | 9.36E-06 | 1.97E-05 | 6.29E-06 | 5.98E-06 | 5.89E-06 | 1.97E-05 | 2026 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 3.05E-06 | 8.81E-06 | 1.89E-05 | 5.85E-06 | 5.56E-06 | 5.48E-06 | 1.89E-05 | 2026 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 2.89E-06 | 8.35E-06 | 1.81E-05 | 5.49E-06 | 5.21E-06 | 5.14E-06 | 1.81E-05 | 2026 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 2.74E-06 | 7.92E-06 | 1.74E-05 | 5.16E-06 | 4.90E-06 | 4.84E-06 | 1.74E-05 | 2026 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 4.11E-05 | 1.18E-04 | 1.27E-04 | 1.06E-04 | 1.04E-04 | 1.02E-04 | 1.27E-04 | 2026 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 3.52E-05 | 1.01E-04 | 1.10E-04 | 9.02E-05 | 8.84E-05 | 8.71E-05 | 1.10E-04 | 2026 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 2.61E-05 | 7.52E-05 | 8.42E-05 | 6.63E-05 | 6.50E-05 | 6.41E-05 | 8.42E-05 | 2026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.86E-05 | 5.36E-05 | 6.30E-05 | 4.66E-05 | 4.57E-05 | 4.50E-05 | 6.30E-05 | 2026 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 1.34E-05 | 3.86E-05 | 4.84E-05 | 3.30E-05 | 3.23E-05 | 3.19E-05 | 4.84E-05 | 2026 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.01E-05 | 2.90E-05 | 3.89E-05 | 2.42E-05 | 2.37E-05 | 2.33E-05 | 3.89E-05 | 2026 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 8.03E-06 | 2.30E-05 | 3.31E-05 | 1.88E-05 | 1.84E-05 | 1.81E-05 | 3.31E-05 | 2026 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 6.64E-06 | 1.90E-05 | 2.91E-05 | 1.51E-05 | 1.48E-05 | 1.46E-05 | 2.91E-05 | 2026 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 5.68E-06 | 1.63E-05 | 2.63E-05 | 1.26E-05 | 1.23E-05 | 1.21E-05 | 2.63E-05 | 2026 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 4.98E-06 | 1.43E-05 | 2.43E-05 | 1.08E-05 | 1.05E-05 | 1.04E-05 | 2.43E-05 | 2026 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 4.46E-06 | 1.28E-05 | 2.28E-05 | 9.48E-06 | 9.19E-06 | 9.06E-06 | 2.28E-05 | 2026 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 4.07E-06 | 1.17E-05 | 2.17E-05 | 8.48E-06 | 8.19E-06 | 8.08E-06 | 2.17E-05 | 2026 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 3.76E-06 | 1.08E-05 | 2.07E-05 | 7.70E-06 | 7.42E-06 | 7.31E-06 | 2.07E-05 | 2026 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 3.51E-06 | 1.01E-05 | 1.99E-05 | 7.09E-06 | 6.81E-06 | 6.71E-06 | 1.99E-05 | 2026 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 3.31E-06 | 9.53E-06 | 1.92E-05 | 6.58E-06 | 6.30E-06 | 6.22E-06 | 1.92E-05 | 2026 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 3.13E-06 | 9.03E-06 | 1.86E-05 | 6.16E-06 | 5.88E-06 | 5.80E-06 | 1.86E-05 | 2026 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 2.97E-06 | 8.59E-06 | 1.80E-05 | 5.79E-06 | 5.52E-06 | 5.44E-06 | 1.80E-05 | 2026 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 2.84E-06 | 8.21E-06 | 1.74E-05 | 5.48E-06 | 5.21E-06 | 5.14E-06 | 1.74E-05 | 2026 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 2.71E-06 | 7.85E-06 | 1.69E-05 | 5.19E-06 | 4.93E-06 | 4.86E-06 | 1.69E-05 | 2026 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 5.99E-05 | 1.73E-04 | 1.80E-04 | 1.55E-04 | 1.52E-04 | 1.50E-04 | 1.80E-04 | 2026 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 6.72E-05 | 1.94E-04 | 2.00E-04 | 1.75E-04 | 1.71E-04 | 1.69E-04 | 2.00E-04 | 2026 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 6.03E-05 | 1.74E-04 | 1.80E-04 | 1.57E-04 | 1.54E-04 | 1.52E-04 | 1.80E-04 | 2026 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 4.58E-05 | 1.32E-04 | 1.39E-04 | 1.19E-04 | 1.16E-04 | 1.15E-04 | 1.39E-04 | 2026 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 2.82E-05 | 8.13E-05 | 8.90E-05 | 7.21E-05 | 7.07E-05 | 6.97E-05 | 8.90E-05 | 2026 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 1.73E-05 | 4.96E-05 | 5.80E-05 | 4.33E-05 | 4.25E-05 | 4.18E-05 | 5.80E-05 | 2026 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 1.15E-05 | 3.30E-05 | 4.15E-05 | 2.81E-05 | 2.76E-05 | 2.72E-05 | 4.15E-05 | 2026 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 8.51E-06 | 2.44E-05 | 3.30E-05 | 2.03E-05 | 2.00E-05 | 1.97E-05 | 3.30E-05 | 2026 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 6.79E-06 | 1.94E-05 | 2.80E-05 | 1.58E-05 | 1.56E-05 | 1.53E-05 | 2.80E-05 | 2026 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 5.70E-06 | 1.63E-05 | 2.48E-05 | 1.30E-05 | 1.28E-05 | 1.26E-05 | 2.48E-05 | 2026 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 4.97E-06 | 1.42E-05 | 2.27E-05 | 1.11E-05 | 1.09E-05 | 1.08E-05 | 2.27E-05 | 2026 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 4.46E-06 | 1.28E-05 | 2.12E-05 | 9.78E-06 | 9.62E-06 | 9.48E-06 | 2.12E-05 | 2026 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 4.08E-06 | 1.17E-05 | 2.01E-05 | 8.79E-06 | 8.63E-06 | 8.50E-06 | 2.01E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 3.78E-06 | 1.08E-05 | 1.93E-05 | 8.03E-06 | 7.86E-06 | 7.75E-06 | 1.93E-05 | 2026 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 3.53E-06 | 1.01E-05 | 1.86E-05 | 7.40E-06 | 7.22E-06 | 7.12E-06 | 1.86E-05 | 2026 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 3.33E-06 | 9.57E-06 | 1.80E-05 | 6.88E-06 | 6.69E-06 | 6.59E-06 | 1.80E-05 | 2026 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 3.15E-06 | 9.08E-06 | 1.75E-05 | 6.43E-06 | 6.23E-06 | 6.15E-06 | 1.75E-05 | 2026 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 3.00E-06 | 8.64E-06 | 1.71E-05 | 6.05E-06 | 5.84E-06 | 5.75E-06 | 1.71E-05 | 2026 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 2.86E-06 | 8.24E-06 | 1.66E-05 | 5.69E-06 | 5.47E-06 | 5.39E-06 | 1.66E-05 | 2026 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 2.73E-06 | 7.88E-06 | 1.62E-05 | 5.38E-06 | 5.15E-06 | 5.08E-06 | 1.62E-05 | 2026 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 2.62E-06 | 7.56E-06 | 1.58E-05 | 5.10E-06 | 4.87E-06 | 4.80E-06 | 1.58E-05 | 2026 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 1.17E-04 | 3.40E-04 | 3.41E-04 | 3.08E-04 | 3.02E-04 | 2.97E-04 | 3.41E-04 | 2026 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 1.25E-04 | 3.62E-04 | 3.62E-04 | 3.29E-04 | 3.22E-04 | 3.17E-04 | 3.62E-04 | 2025 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 1.12E-04 | 3.23E-04 | 3.23E-04 | 2.93E-04 | 2.87E-04 | 2.83E-04 | 3.23E-04 | 2025 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 5.90E-05 | 1.71E-04 | 1.75E-04 | 1.54E-04 | 1.51E-04 | 1.49E-04 | 1.75E-04 | 2026 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 2.45E-05 | 7.08E-05 | 7.83E-05 | 6.26E-05 | 6.14E-05 | 6.05E-05 | 7.83E-05 | 2026 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 1.36E-05 | 3.90E-05 | 4.71E-05 | 3.37E-05 | 3.31E-05 | 3.26E-05 | 4.71E-05 | 2026 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 9.37E-06 | 2.69E-05 | 3.50E-05 | 2.26E-05 | 2.23E-05 | 2.20E-05 | 3.50E-05 | 2026 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 7.34E-06 | 2.10E-05 | 2.89E-05 | 1.74E-05 | 1.71E-05 | 1.69E-05 | 2.89E-05 | 2026 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 6.12E-06 | 1.75E-05 | 2.52E-05 | 1.42E-05 | 1.41E-05 | 1.39E-05 | 2.52E-05 | 2026 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 5.30E-06 | 1.51E-05 | 2.27E-05 | 1.21E-05 | 1.20E-05 | 1.18E-05 | 2.27E-05 | 2026 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 4.68E-06 | 1.34E-05 | 2.08E-05 | 1.06E-05 | 1.05E-05 | 1.03E-05 | 2.08E-05 | 2026 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 4.21E-06 | 1.20E-05 | 1.93E-05 | 9.37E-06 | 9.30E-06 | 9.16E-06 | 1.93E-05 | 2026 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 3.84E-06 | 1.10E-05 | 1.82E-05 | 8.42E-06 | 8.35E-06 | 8.23E-06 | 1.82E-05 | 2026 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 3.54E-06 | 1.01E-05 | 1.73E-05 | 7.66E-06 | 7.59E-06 | 7.48E-06 | 1.73E-05 | 2026 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 3.29E-06 | 9.43E-06 | 1.66E-05 | 7.03E-06 | 6.94E-06 | 6.85E-06 | 1.66E-05 | 2026 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 3.09E-06 | 8.86E-06 | 1.60E-05 | 6.51E-06 | 6.42E-06 | 6.33E-06 | 1.60E-05 | 2026 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 2.92E-06 | 8.39E-06 | 1.56E-05 | 6.08E-06 | 5.97E-06 | 5.89E-06 | 1.56E-05 | 2026 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 2.78E-06 | 7.98E-06 | 1.52E-05 | 5.71E-06 | 5.59E-06 | 5.51E-06 | 1.52E-05 | 2026 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 2.65E-06 | 7.63E-06 | 1.49E-05 | 5.38E-06 | 5.25E-06 | 5.17E-06 | 1.49E-05 | 2026 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 2.54E-06 | 7.31E-06 | 1.46E-05 | 5.09E-06 | 4.94E-06 | 4.87E-06 | 1.46E-05 | 2026 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 2.44E-06 | 7.03E-06 | 1.43E-05 | 4.83E-06 | 4.67E-06 | 4.60E-06 | 1.43E-05 | 2026 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 3.10E-04 | 9.00E-04 | 8.81E-04 | 8.21E-04 | 8.04E-04 | 7.92E-04 | 9.00E-04 | 2025 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 4.07E-04 | 1.18E-03 | 1.15E-03 | 1.08E-03 | 1.05E-03 | 1.04E-03 | 1.18E-03 | 2025 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 4.73E-04 | 1.37E-03 | 1.34E-03 | 1.25E-03 | 1.23E-03 | 1.21E-03 | 1.37E-03 | 2025 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 3.86E-05 | 1.12E-04 | 1.18E-04 | 1.00E-04 | 9.79E-05 | 9.65E-05 | 1.18E-04 | 2026 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.71E-05 | 4.93E-05 | 5.72E-05 | 4.30E-05 | 4.22E-05 | 4.16E-05 | 5.72E-05 | 2026 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 1.13E-05 | 3.25E-05 | 4.05E-05 | 2.78E-05 | 2.73E-05 | 2.69E-05 | 4.05E-05 | 2026 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 8.51E-06 | 2.44E-05 | 3.23E-05 | 2.05E-05 | 2.02E-05 | 1.99E-05 | 3.23E-05 | 2026 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 6.85E-06 | 1.96E-05 | 2.73E-05 | 1.62E-05 | 1.60E-05 | 1.58E-05 | 2.73E-05 | 2026 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 5.74E-06 | 1.64E-05 | 2.38E-05 | 1.33E-05 | 1.32E-05 | 1.30E-05 | 2.38E-05 | 2026 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 4.94E-06 | 1.41E-05 | 2.12E-05 | 1.13E-05 | 1.12E-05 | 1.11E-05 | 2.12E-05 | 2026 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 4.34E-06 | 1.24E-05 | 1.93E-05 | 9.82E-06 | 9.76E-06 | 9.62E-06 | 1.93E-05 | 2026 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 3.88E-06 | 1.11E-05 | 1.78E-05 | 8.67E-06 | 8.64E-06 | 8.52E-06 | 1.78E-05 | 2026 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 3.52E-06 | 1.01E-05 | 1.66E-05 | 7.76E-06 | 7.75E-06 | 7.64E-06 | 1.66E-05 | 2026 | Res |

| Receptor Lookup | Receptor Location | | $PM_{2.5}$ Concentration, $C_{PM2.5}$ ($\mu g/m^3$) | | | | | | Max | Max Year | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | ($\mu g/m^3$) | | |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 3.23E-06 | 9.25E-06 | 1.56E-05 | 7.04E-06 | 7.03E-06 | 6.93E-06 | 1.56E-05 | 2026 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 2.99E-06 | 8.56E-06 | 1.48E-05 | 6.44E-06 | 6.43E-06 | 6.34E-06 | 1.48E-05 | 2026 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 2.80E-06 | 8.02E-06 | 1.42E-05 | 5.96E-06 | 5.95E-06 | 5.86E-06 | 1.42E-05 | 2026 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 2.64E-06 | 7.59E-06 | 1.38E-05 | 5.57E-06 | 5.55E-06 | 5.47E-06 | 1.38E-05 | 2026 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 2.51E-06 | 7.20E-06 | 1.34E-05 | 5.22E-06 | 5.19E-06 | 5.12E-06 | 1.34E-05 | 2026 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 2.40E-06 | 6.90E-06 | 1.31E-05 | 4.94E-06 | 4.90E-06 | 4.83E-06 | 1.31E-05 | 2026 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 2.30E-06 | 6.62E-06 | 1.28E-05 | 4.68E-06 | 4.62E-06 | 4.56E-06 | 1.28E-05 | 2026 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 2.21E-06 | 6.37E-06 | 1.26E-05 | 4.45E-06 | 4.38E-06 | 4.32E-06 | 1.26E-05 | 2026 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 5.17E-05 | 1.50E-04 | 1.56E-04 | 1.34E-04 | 1.32E-04 | 1.30E-04 | 1.56E-04 | 2026 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 4.14E-05 | 1.20E-04 | 1.26E-04 | 1.07E-04 | 1.05E-04 | 1.03E-04 | 1.26E-04 | 2026 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 2.27E-05 | 6.56E-05 | 7.36E-05 | 5.78E-05 | 5.67E-05 | 5.58E-05 | 7.36E-05 | 2026 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 1.48E-05 | 4.26E-05 | 5.09E-05 | 3.69E-05 | 3.62E-05 | 3.57E-05 | 5.09E-05 | 2026 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 1.09E-05 | 3.14E-05 | 3.97E-05 | 2.68E-05 | 2.63E-05 | 2.59E-05 | 3.97E-05 | 2026 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 8.45E-06 | 2.43E-05 | 3.23E-05 | 2.03E-05 | 2.00E-05 | 1.97E-05 | 3.23E-05 | 2026 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 6.83E-06 | 1.96E-05 | 2.74E-05 | 1.61E-05 | 1.59E-05 | 1.57E-05 | 2.74E-05 | 2026 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 5.73E-06 | 1.64E-05 | 2.39E-05 | 1.33E-05 | 1.31E-05 | 1.29E-05 | 2.39E-05 | 2026 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 4.91E-06 | 1.41E-05 | 2.13E-05 | 1.12E-05 | 1.11E-05 | 1.10E-05 | 2.13E-05 | 2026 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 4.30E-06 | 1.23E-05 | 1.93E-05 | 9.70E-06 | 9.64E-06 | 9.51E-06 | 1.93E-05 | 2026 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 3.82E-06 | 1.09E-05 | 1.76E-05 | 8.52E-06 | 8.50E-06 | 8.37E-06 | 1.76E-05 | 2026 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 3.44E-06 | 9.85E-06 | 1.62E-05 | 7.58E-06 | 7.58E-06 | 7.48E-06 | 1.62E-05 | 2026 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 3.13E-06 | 8.97E-06 | 1.51E-05 | 6.83E-06 | 6.86E-06 | 6.76E-06 | 1.51E-05 | 2026 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 2.88E-06 | 8.25E-06 | 1.42E-05 | 6.22E-06 | 6.26E-06 | 6.17E-06 | 1.42E-05 | 2026 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 2.67E-06 | 7.64E-06 | 1.34E-05 | 5.71E-06 | 5.76E-06 | 5.68E-06 | 1.34E-05 | 2026 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 2.48E-06 | 7.12E-06 | 1.27E-05 | 5.27E-06 | 5.32E-06 | 5.25E-06 | 1.27E-05 | 2026 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 2.35E-06 | 6.75E-06 | 1.22E-05 | 4.95E-06 | 5.00E-06 | 4.93E-06 | 1.22E-05 | 2026 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 2.23E-06 | 6.41E-06 | 1.18E-05 | 4.66E-06 | 4.71E-06 | 4.64E-06 | 1.18E-05 | 2026 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 2.14E-06 | 6.15E-06 | 1.15E-05 | 4.43E-06 | 4.47E-06 | 4.40E-06 | 1.15E-05 | 2026 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 2.06E-06 | 5.92E-06 | 1.13E-05 | 4.23E-06 | 4.25E-06 | 4.19E-06 | 1.13E-05 | 2026 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 1.97E-06 | 5.68E-06 | 1.10E-05 | 4.01E-06 | 4.03E-06 | 3.97E-06 | 1.10E-05 | 2026 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 5.90E-06 | 1.69E-05 | 2.49E-05 | 1.36E-05 | 1.35E-05 | 1.33E-05 | 2.49E-05 | 2026 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 3.72E-06 | 1.07E-05 | 1.75E-05 | 8.20E-06 | 8.19E-06 | 8.07E-06 | 1.75E-05 | 2026 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 3.38E-06 | 9.68E-06 | 1.63E-05 | 7.38E-06 | 7.39E-06 | 7.28E-06 | 1.63E-05 | 2026 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 3.08E-06 | 8.81E-06 | 1.51E-05 | 6.65E-06 | 6.68E-06 | 6.59E-06 | 1.51E-05 | 2026 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 2.82E-06 | 8.09E-06 | 1.41E-05 | 6.05E-06 | 6.10E-06 | 6.01E-06 | 1.41E-05 | 2026 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 2.58E-06 | 7.40E-06 | 1.32E-05 | 5.48E-06 | 5.55E-06 | 5.47E-06 | 1.32E-05 | 2026 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 2.39E-06 | 6.85E-06 | 1.24E-05 | 5.03E-06 | 5.12E-06 | 5.04E-06 | 1.24E-05 | 2026 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 2.23E-06 | 6.38E-06 | 1.17E-05 | 4.65E-06 | 4.74E-06 | 4.67E-06 | 1.17E-05 | 2026 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 2.09E-06 | 6.00E-06 | 1.12E-05 | 4.34E-06 | 4.44E-06 | 4.38E-06 | 1.12E-05 | 2026 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 1.98E-06 | 5.67E-06 | 1.07E-05 | 4.08E-06 | 4.18E-06 | 4.12E-06 | 1.07E-05 | 2026 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 1.89E-06 | 5.44E-06 | 1.04E-05 | 3.88E-06 | 3.98E-06 | 3.93E-06 | 1.04E-05 | 2026 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 1.82E-06 | 5.22E-06 | 1.01E-05 | 3.71E-06 | 3.80E-06 | 3.75E-06 | 1.01E-05 | 2026 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 1.74E-06 | 5.00E-06 | 9.76E-06 | 3.52E-06 | 3.61E-06 | 3.56E-06 | 9.76E-06 | 2026 | Res |

# B-4 Chronic Hazard Index Calculations

# HRA Permanente Creek Restoration Project

Construction Year 2024

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 2.877E-07 | 8.36E-14 | 5.02E-14 | 8.36E-14 | 4.28E-13 | 9.37E-13 | 8.36E-14 | 1.34E-14 | 1.54E-12 | 1.67E-13 | 6.69E-15 | 2.48E-10 |
| Paved road | 2024_PAVED | 5.948E-06 | 3.00E-09 | 1.80E-09 | 3.00E-09 | 1.92E-09 | 6.01E-08 | 5.53E-09 | 3.36E-10 | 1.30E-07 | 6.01E-09 | 4.56E-09 | 1.71E-05 |
| Unpaved road | 2024_CCP_UNPV | 1.802E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 4.72E-09 | 1.47E-07 | 1.36E-08 | 8.26E-10 | 3.18E-07 | 1.47E-08 | 1.12E-08 | 4.19E-05 |
| Channel Widening 2024 | 2024_CHAN_RCK | 5.566E-05 | 5.889E-09 | 3.533E-09 | 5.889E-09 | 3.015E-08 | 6.595E-08 | 5.889E-09 | 9.422E-10 | 1.084E-07 | 1.178E-08 | 4.711E-10 | 1.749E-05 |
| Paved road | 2024_PAVED | 5.173E-05 | 8.597E-08 | 5.158E-08 | 8.597E-08 | 5.502E-08 | 1.719E-06 | 1.582E-07 | 9.629E-09 | 3.714E-06 | 1.719E-07 | 1.307E-07 | 4.883E-04 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Chronic Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Total HI | Receptor Type |
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 6.80E-05 | 1.05E-07 | 6.28E-08 | 1.05E-07 | 2.09E-06 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.94E-04 | 0.00055633 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 4.73E-05 | 7.23E-08 | 4.34E-08 | 7.23E-08 | 1.44E-06 | 8.11E-09 | 3.12E-06 | 1.45E-07 | 1.09E-07 | 4.10E-04 | 0.000383995 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 4.22E-06 | 3.82E-09 | 2.29E-09 | 3.82E-09 | 7.46E-08 | 4.38E-10 | 1.60E-07 | 7.64E-09 | 5.51E-09 | 2.11E-05 | 2.0132E-05 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 5.66E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 1.57E-07 | 8.89E-10 | 3.38E-07 | 1.58E-08 | 1.18E-08 | 4.45E-05 | 4.17598E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 2.14E-04 | 3.30E-07 | 1.98E-07 | 3.30E-07 | 6.60E-06 | 3.70E-08 | 1.43E-05 | 6.60E-07 | 5.01E-07 | 1.87E-03 | 0.001756077 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 4.33E-04 | 6.68E-07 | 4.01E-07 | 6.68E-07 | 1.34E-05 | 7.48E-08 | 2.88E-05 | 1.34E-06 | 1.01E-06 | 3.79E-03 | 0.003554185 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.97E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 6.07E-06 | 3.40E-08 | 1.31E-05 | 6.07E-07 | 4.61E-07 | 1.72E-03 | 0.00161475 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 5.24E-04 | 8.07E-07 | 4.84E-07 | 8.07E-07 | 1.61E-05 | 9.04E-08 | 3.49E-05 | 1.61E-06 | 1.23E-06 | 4.58E-03 | 0.004295471 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 3.68E-05 | 5.44E-08 | 3.27E-08 | 5.44E-08 | 1.09E-06 | 6.11E-09 | 2.34E-06 | 1.09E-07 | 8.23E-08 | 3.08E-04 | 0.000289155 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 1.05E-04 | 1.62E-07 | 9.74E-08 | 1.62E-07 | 3.25E-06 | 1.82E-08 | 7.01E-06 | 3.25E-07 | 2.47E-07 | 9.22E-04 | 0.000863806 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 2.49E-05 | 3.77E-08 | 2.26E-08 | 3.77E-08 | 7.53E-07 | 4.23E-09 | 1.63E-06 | 7.54E-08 | 5.72E-08 | 2.14E-04 | 0.000200494 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.32E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.48E-07 | 1.98E-09 | 7.50E-07 | 3.51E-08 | 2.62E-08 | 9.88E-05 | 9.29423E-05 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.24E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.24E-07 | 1.84E-09 | 6.98E-07 | 3.26E-08 | 2.44E-08 | 9.19E-05 | 8.64056E-05 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 3.01E-07 | 1.71E-09 | 6.49E-07 | 3.04E-08 | 2.27E-08 | 8.55E-05 | 8.04285E-05 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.09E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 2.81E-07 | 1.60E-09 | 6.05E-07 | 2.83E-08 | 2.11E-08 | 7.97E-05 | 7.49901E-05 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.03E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 2.63E-07 | 1.50E-09 | 5.68E-07 | 2.66E-08 | 1.98E-08 | 7.48E-05 | 7.0359E-05 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 9.65E-06 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 2.46E-07 | 1.40E-09 | 5.30E-07 | 2.48E-08 | 1.85E-08 | 6.98E-05 | 6.56808E-05 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 9.01E-06 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 2.28E-07 | 1.30E-09 | 4.91E-07 | 2.30E-08 | 1.71E-08 | 6.47E-05 | 6.08835E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 1.37E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.50E-07 | 1.99E-09 | 7.53E-07 | 3.53E-08 | 2.63E-08 | 9.92E-05 | 9.34052E-05 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 1.34E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.51E-07 | 1.99E-09 | 7.55E-07 | 3.53E-08 | 2.64E-08 | 9.95E-05 | 9.35626E-05 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.26E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 3.30E-07 | 1.88E-09 | 7.11E-07 | 3.32E-08 | 2.48E-08 | 9.36E-05 | 8.80389E-05 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.18E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 3.07E-07 | 1.75E-09 | 6.61E-07 | 3.09E-08 | 2.31E-08 | 8.71E-05 | 8.1947E-05 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.10E-05 | 1.43E-08 | 8.59E-09 | 1.43E-08 | 2.84E-07 | 1.62E-09 | 6.12E-07 | 2.86E-08 | 2.14E-08 | 8.06E-05 | 7.5834E-05 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.03E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 2.64E-07 | 1.50E-09 | 5.69E-07 | 2.66E-08 | 1.99E-08 | 7.49E-05 | 7.05197E-05 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 9.66E-06 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 2.46E-07 | 1.40E-09 | 5.29E-07 | 2.48E-08 | 1.85E-08 | 6.97E-05 | 6.55829E-05 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 9.11E-06 | 1.16E-08 | 6.96E-09 | 1.16E-08 | 2.30E-07 | 1.31E-09 | 4.96E-07 | 2.32E-08 | 1.73E-08 | 6.53E-05 | 6.14681E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 8.58E-06 | 1.09E-08 | 6.52E-09 | 1.09E-08 | 2.15E-07 | 1.23E-09 | 4.64E-07 | 2.17E-08 | 1.62E-08 | 6.11E-05 | 5.75696E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 1.24E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 2.97E-07 | 1.70E-09 | 6.39E-07 | 3.00E-08 | 2.23E-08 | 8.42E-05 | 7.94233E-05 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 1.32E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.37E-07 | 1.92E-09 | 7.25E-07 | 3.40E-08 | 2.53E-08 | 9.55E-05 | 8.9913E-05 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.28E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.34E-07 | 1.90E-09 | 7.20E-07 | 3.37E-08 | 2.52E-08 | 9.48E-05 | 8.91874E-05 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.20E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 3.12E-07 | 1.77E-09 | 6.72E-07 | 3.14E-08 | 2.35E-08 | 8.85E-05 | 8.33083E-05 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.13E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 2.90E-07 | 1.65E-09 | 6.26E-07 | 2.93E-08 | 2.19E-08 | 8.24E-05 | 7.75148E-05 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.06E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 2.71E-07 | 1.54E-09 | 5.84E-07 | 2.73E-08 | 2.04E-08 | 7.69E-05 | 7.23905E-05 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 9.84E-06 | 1.26E-08 | 7.58E-09 | 1.26E-08 | 2.51E-07 | 1.43E-09 | 5.40E-07 | 2.53E-08 | 1.89E-08 | 7.12E-05 | 6.69914E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 9.22E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 2.33E-07 | 1.33E-09 | 5.03E-07 | 2.35E-08 | 1.76E-08 | 6.63E-05 | 6.23743E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 8.66E-06 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 2.18E-07 | 1.24E-09 | 4.69E-07 | 2.20E-08 | 1.64E-08 | 6.18E-05 | 5.81932E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 2.03E-07 | 1.16E-09 | 4.37E-07 | 2.05E-08 | 1.53E-08 | 5.75E-05 | 5.41808E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 7.63E-06 | 9.55E-09 | 5.73E-09 | 9.55E-09 | 1.89E-07 | 1.08E-09 | 4.08E-07 | 1.91E-08 | 1.42E-08 | 5.37E-05 | 5.06132E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 7.11E-06 | 8.83E-09 | 5.30E-09 | 8.83E-09 | 1.75E-07 | 9.98E-10 | 3.77E-07 | 1.77E-08 | 1.32E-08 | 4.96E-05 | 4.67699E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 1.33E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 3.28E-07 | 1.87E-09 | 7.07E-07 | 3.31E-08 | 2.47E-08 | 9.32E-05 | 8.77756E-05 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 1.29E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 3.23E-07 | 1.84E-09 | 6.96E-07 | 3.26E-08 | 2.43E-08 | 9.16E-05 | 8.62702E-05 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 1.29E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 3.35E-07 | 1.90E-09 | 7.22E-07 | 3.38E-08 | 2.52E-08 | 9.51E-05 | 8.94463E-05 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 1.22E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 3.17E-07 | 1.80E-09 | 6.84E-07 | 3.20E-08 | 2.39E-08 | 9.00E-05 | 8.47099E-05 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.15E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 2.97E-07 | 1.69E-09 | 6.40E-07 | 2.99E-08 | 2.24E-08 | 8.43E-05 | 7.93159E-05 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.08E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 2.77E-07 | 1.58E-09 | 5.98E-07 | 2.79E-08 | 2.09E-08 | 7.87E-05 | 7.40541E-05 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.01E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 2.58E-07 | 1.47E-09 | 5.57E-07 | 2.60E-08 | 1.95E-08 | 7.33E-05 | 6.90072E-05 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 9.43E-06 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 2.40E-07 | 1.37E-09 | 5.18E-07 | 2.42E-08 | 1.81E-08 | 6.82E-05 | 6.41581E-05 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 8.76E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 2.21E-07 | 1.26E-09 | 4.77E-07 | 2.23E-08 | 1.67E-08 | 6.28E-05 | 5.91443E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 8.11E-06 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 2.03E-07 | 1.16E-09 | 4.37E-07 | 2.05E-08 | 1.53E-08 | 5.76E-05 | 5.42463E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 7.44E-06 | 9.29E-09 | 5.58E-09 | 9.29E-09 | 1.84E-07 | 1.05E-09 | 3.97E-07 | 1.86E-08 | 1.38E-08 | 5.23E-05 | 4.92253E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 1.30E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 3.16E-07 | 1.80E-09 | 6.80E-07 | 3.19E-08 | 2.37E-08 | 8.96E-05 | 8.44644E-05 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 1.29E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 3.27E-07 | 1.86E-09 | 7.03E-07 | 3.29E-08 | 2.46E-08 | 9.27E-05 | 8.72287E-05 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 1.27E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 3.28E-07 | 1.87E-09 | 7.08E-07 | 3.31E-08 | 2.47E-08 | 9.32E-05 | 8.76812E-05 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 1.22E-05 | 1.61E-08 | 9.63E-09 | 1.61E-08 | 3.19E-07 | 1.81E-09 | 6.87E-07 | 3.21E-08 | 2.40E-08 | 9.04E-05 | 8.50737E-05 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.16E-05 | 1.52E-08 | 9.11E-09 | 1.52E-08 | 3.01E-07 | 1.71E-09 | 6.50E-07 | 3.04E-08 | 2.27E-08 | 8.55E-05 | 8.04707E-05 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.09E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 2.81E-07 | 1.60E-09 | 6.06E-07 | 2.83E-08 | 2.12E-08 | 7.98E-05 | 7.50549E-05 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.01E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 2.60E-07 | 1.48E-09 | 5.61E-07 | 2.62E-08 | 1.96E-08 | 7.39E-05 | 6.95468E-05 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 9.30E-06 | 1.19E-08 | 7.17E-09 | 1.19E-08 | 2.37E-07 | 1.35E-09 | 5.11E-07 | 2.39E-08 | 1.79E-08 | 6.73E-05 | 6.33373E-05 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 8.56E-06 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 2.16E-07 | 1.23E-09 | 4.66E-07 | 2.18E-08 | 1.63E-08 | 6.14E-05 | 5.78019E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.57E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 4.19E-07 | 2.37E-09 | 9.03E-07 | 4.21E-08 | 3.16E-08 | 1.19E-04 | 0.000111724 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.67E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.19E-07 | 2.39E-09 | 9.03E-07 | 4.23E-08 | 3.15E-08 | 1.19E-04 | 0.000111941 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.48E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 3.62E-07 | 2.07E-09 | 7.81E-07 | 3.66E-08 | 2.72E-08 | 1.03E-04 | 9.68905E-05 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.41E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.50E-07 | 1.99E-09 | 7.53E-07 | 3.53E-08 | 2.63E-08 | 9.92E-05 | 9.34546E-05 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.37E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.46E-07 | 1.97E-09 | 7.46E-07 | 3.49E-08 | 2.61E-08 | 9.82E-05 | 9.24921E-05 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 1.31E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.38E-07 | 1.92E-09 | 7.28E-07 | 3.41E-08 | 2.54E-08 | 9.59E-05 | 9.02437E-05 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 1.25E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.24E-07 | 1.84E-09 | 6.98E-07 | 3.26E-08 | 2.44E-08 | 9.19E-05 | 8.64831E-05 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.24E-05 | 1.64E-08 | 9.87E-09 | 1.64E-08 | 3.27E-07 | 1.85E-09 | 7.04E-07 | 3.29E-08 | 2.46E-08 | 9.27E-05 | 8.71815E-05 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 1.16E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 3.03E-07 | 1.72E-09 | 6.54E-07 | 3.06E-08 | 2.29E-08 | 8.61E-05 | 8.10175E-05 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 1.07E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 2.78E-07 | 1.58E-09 | 6.00E-07 | 2.80E-08 | 2.10E-08 | 7.90E-05 | 7.43108E-05 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 9.85E-06 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 2.54E-07 | 1.44E-09 | 5.47E-07 | 2.56E-08 | 1.91E-08 | 7.20E-05 | 6.77906E-05 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 9.04E-06 | 1.16E-08 | 6.98E-09 | 1.16E-08 | 2.31E-07 | 1.31E-09 | 4.97E-07 | 2.33E-08 | 1.74E-08 | 6.55E-05 | 6.16308E-05 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 8.29E-06 | 1.06E-08 | 6.33E-09 | 1.06E-08 | 2.09E-07 | 1.19E-09 | 4.51E-07 | 2.11E-08 | 1.58E-08 | 5.94E-05 | 5.59269E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 1.72E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 4.35E-07 | 2.48E-09 | 9.37E-07 | 4.39E-08 | 3.28E-08 | 1.23E-04 | 0.000116223 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 1.64E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 4.07E-07 | 2.32E-09 | 8.77E-07 | 4.11E-08 | 3.06E-08 | 1.16E-04 | 0.000108837 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 1.67E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 4.24E-07 | 2.41E-09 | 9.14E-07 | 4.28E-08 | 3.19E-08 | 1.20E-04 | 0.000113347 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 1.64E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 4.28E-07 | 2.43E-09 | 9.22E-07 | 4.31E-08 | 3.23E-08 | 1.21E-04 | 0.000114269 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 1.62E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 4.35E-07 | 2.47E-09 | 9.38E-07 | 4.38E-08 | 3.28E-08 | 1.24E-04 | 0.000116136 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 1.47E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 3.91E-07 | 2.22E-09 | 8.44E-07 | 3.94E-08 | 2.95E-08 | 1.11E-04 | 0.000104445 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 1.44E-05 | 1.94E-08 | 1.16E-08 | 1.94E-08 | 3.86E-07 | 2.19E-09 | 8.32E-07 | 3.88E-08 | 2.91E-08 | 1.09E-04 | 0.000102914 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 1.35E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 3.61E-07 | 2.05E-09 | 7.79E-07 | 3.64E-08 | 2.73E-08 | 1.03E-04 | 9.64085E-05 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 1.25E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.32E-07 | 1.88E-09 | 7.16E-07 | 3.34E-08 | 2.51E-08 | 9.43E-05 | 8.86615E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 1.15E-05 | 1.52E-08 | 9.15E-09 | 1.52E-08 | 3.03E-07 | 1.72E-09 | 6.53E-07 | 3.05E-08 | 2.28E-08 | 8.60E-05 | 8.08426E-05 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 1.05E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 2.75E-07 | 1.56E-09 | 5.92E-07 | 2.77E-08 | 2.07E-08 | 7.79E-05 | 7.33072E-05 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 9.61E-06 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 2.48E-07 | 1.41E-09 | 5.36E-07 | 2.50E-08 | 1.87E-08 | 7.05E-05 | 6.63521E-05 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 8.79E-06 | 1.13E-08 | 6.81E-09 | 1.13E-08 | 2.25E-07 | 1.28E-09 | 4.85E-07 | 2.27E-08 | 1.70E-08 | 6.39E-05 | 6.01225E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 8.05E-06 | 1.03E-08 | 6.16E-09 | 1.03E-08 | 2.04E-07 | 1.16E-09 | 4.39E-07 | 2.05E-08 | 1.53E-08 | 5.78E-05 | 5.44045E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 7.32E-06 | 9.21E-09 | 5.53E-09 | 9.21E-09 | 1.83E-07 | 1.04E-09 | 3.93E-07 | 1.84E-08 | 1.37E-08 | 5.18E-05 | 4.88064E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 6.53E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 1.60E-07 | 9.13E-10 | 3.45E-07 | 1.62E-08 | 1.20E-08 | 4.54E-05 | 4.27722E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.37E-05 | 3.27E-08 | 1.96E-08 | 3.27E-08 | 6.50E-07 | 3.68E-09 | 1.40E-06 | 6.54E-08 | 4.91E-08 | 1.85E-04 | 0.000173386 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.23E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 6.11E-07 | 3.46E-09 | 1.32E-06 | 6.14E-08 | 4.61E-08 | 1.73E-04 | 0.000162865 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.92E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 5.09E-07 | 2.88E-09 | 1.10E-06 | 5.12E-08 | 3.84E-08 | 1.44E-04 | 0.000135751 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 1.72E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 4.50E-07 | 2.56E-09 | 9.70E-07 | 4.53E-08 | 3.39E-08 | 1.28E-04 | 0.00012019 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 1.67E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 4.47E-07 | 2.53E-09 | 9.63E-07 | 4.50E-08 | 3.37E-08 | 1.27E-04 | 0.000119231 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 1.63E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.42E-07 | 2.50E-09 | 9.53E-07 | 4.45E-08 | 3.34E-08 | 1.25E-04 | 0.000117924 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 1.58E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 4.32E-07 | 2.45E-09 | 9.32E-07 | 4.35E-08 | 3.26E-08 | 1.23E-04 | 0.000115261 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 1.46E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 3.98E-07 | 2.26E-09 | 8.59E-07 | 4.01E-08 | 3.01E-08 | 1.13E-04 | 0.000106255 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 1.36E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.67E-07 | 2.08E-09 | 7.91E-07 | 3.69E-08 | 2.77E-08 | 1.04E-04 | 9.79115E-05 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 1.25E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.35E-07 | 1.90E-09 | 7.22E-07 | 3.37E-08 | 2.53E-08 | 9.50E-05 | 8.93053E-05 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 1.13E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 3.02E-07 | 1.71E-09 | 6.52E-07 | 3.04E-08 | 2.28E-08 | 8.58E-05 | 8.06551E-05 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 1.03E-05 | 1.37E-08 | 8.20E-09 | 1.37E-08 | 2.72E-07 | 1.54E-09 | 5.85E-07 | 2.73E-08 | 2.05E-08 | 7.71E-05 | 7.24791E-05 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 9.36E-06 | 1.23E-08 | 7.38E-09 | 1.23E-08 | 2.44E-07 | 1.39E-09 | 5.26E-07 | 2.46E-08 | 1.84E-08 | 6.93E-05 | 6.51932E-05 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 8.50E-06 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.72E-07 | 2.21E-08 | 1.65E-08 | 6.21E-05 | 5.84579E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 7.74E-06 | 9.92E-09 | 5.95E-09 | 9.92E-09 | 1.97E-07 | 1.12E-09 | 4.24E-07 | 1.98E-08 | 1.48E-08 | 5.59E-05 | 5.26006E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 7.08E-06 | 8.96E-09 | 5.38E-09 | 8.96E-09 | 1.78E-07 | 1.01E-09 | 3.83E-07 | 1.79E-08 | 1.34E-08 | 5.04E-05 | 4.7475E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 6.47E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 1.60E-07 | 9.13E-10 | 3.45E-07 | 1.62E-08 | 1.20E-08 | 4.55E-05 | 4.28251E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 2.52E-05 | 3.64E-08 | 2.18E-08 | 3.64E-08 | 7.25E-07 | 4.09E-09 | 1.56E-06 | 7.28E-08 | 5.49E-08 | 2.06E-04 | 0.000193231 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.33E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 6.68E-07 | 3.77E-09 | 1.44E-06 | 6.70E-08 | 5.05E-08 | 1.90E-04 | 0.0001779 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.00E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 5.60E-07 | 3.17E-09 | 1.21E-06 | 5.63E-08 | 4.23E-08 | 1.59E-04 | 0.000149284 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 1.85E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 5.19E-07 | 2.93E-09 | 1.12E-06 | 5.21E-08 | 3.92E-08 | 1.47E-04 | 0.000138323 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.77E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 4.98E-07 | 2.81E-09 | 1.07E-06 | 5.00E-08 | 3.76E-08 | 1.41E-04 | 0.000132727 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 1.62E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 4.51E-07 | 2.55E-09 | 9.73E-07 | 4.53E-08 | 3.41E-08 | 1.28E-04 | 0.000120296 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 1.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 4.07E-07 | 2.30E-09 | 8.78E-07 | 4.09E-08 | 3.08E-08 | 1.16E-04 | 0.0001086 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 1.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.69E-07 | 2.09E-09 | 7.96E-07 | 3.71E-08 | 2.79E-08 | 1.05E-04 | 9.84296E-05 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 1.23E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.33E-07 | 1.89E-09 | 7.19E-07 | 3.35E-08 | 2.52E-08 | 9.46E-05 | 8.89291E-05 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 1.11E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 2.99E-07 | 1.69E-09 | 6.44E-07 | 3.00E-08 | 2.25E-08 | 8.48E-05 | 7.96893E-05 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 9.97E-06 | 1.33E-08 | 8.01E-09 | 1.33E-08 | 2.65E-07 | 1.50E-09 | 5.72E-07 | 2.67E-08 | 2.00E-08 | 7.53E-05 | 7.08045E-05 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 8.96E-06 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 2.35E-07 | 1.33E-09 | 5.07E-07 | 2.37E-08 | 1.77E-08 | 6.67E-05 | 6.27729E-05 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 8.08E-06 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 2.09E-07 | 1.19E-09 | 4.51E-07 | 2.11E-08 | 1.58E-08 | 5.94E-05 | 5.58585E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 7.33E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 1.87E-07 | 1.06E-09 | 4.03E-07 | 1.89E-08 | 1.41E-08 | 5.31E-05 | 5.00022E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 6.70E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 1.69E-07 | 9.61E-10 | 3.64E-07 | 1.70E-08 | 1.27E-08 | 4.79E-05 | 4.51345E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 6.17E-06 | 7.75E-09 | 4.65E-09 | 7.75E-09 | 1.54E-07 | 8.75E-10 | 3.31E-07 | 1.55E-08 | 1.16E-08 | 4.36E-05 | 4.10445E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 5.49E-06 | 6.77E-09 | 4.06E-09 | 6.77E-09 | 1.34E-07 | 7.66E-10 | 2.89E-07 | 1.35E-08 | 1.01E-08 | 3.81E-05 | 3.5889E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.54E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 7.31E-07 | 4.12E-09 | 1.58E-06 | 7.33E-08 | 5.53E-08 | 2.07E-04 | 0.00019462 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 2.42E-05 | 3.50E-08 | 2.10E-08 | 3.50E-08 | 6.98E-07 | 3.94E-09 | 1.51E-06 | 7.00E-08 | 5.28E-08 | 1.98E-04 | 0.000185903 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 2.24E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 6.44E-07 | 3.63E-09 | 1.39E-06 | 6.46E-08 | 4.87E-08 | 1.83E-04 | 0.000171461 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 2.02E-05 | 2.89E-08 | 1.73E-08 | 2.89E-08 | 5.76E-07 | 3.25E-09 | 1.24E-06 | 5.78E-08 | 4.36E-08 | 1.63E-04 | 0.000153363 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 1.80E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 5.11E-07 | 2.88E-09 | 1.10E-06 | 5.13E-08 | 3.86E-08 | 1.45E-04 | 0.000136076 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 1.62E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 4.54E-07 | 2.57E-09 | 9.80E-07 | 4.56E-08 | 3.44E-08 | 1.29E-04 | 0.000121124 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 1.46E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 4.07E-07 | 2.30E-09 | 8.78E-07 | 4.09E-08 | 3.08E-08 | 1.16E-04 | 0.000108495 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 1.32E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.65E-07 | 2.07E-09 | 7.88E-07 | 3.67E-08 | 2.76E-08 | 1.04E-04 | 9.74384E-05 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 1.19E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.25E-07 | 1.84E-09 | 7.00E-07 | 3.26E-08 | 2.45E-08 | 9.22E-05 | 8.65957E-05 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 1.06E-05 | 1.43E-08 | 8.61E-09 | 1.43E-08 | 2.85E-07 | 1.62E-09 | 6.15E-07 | 2.87E-08 | 2.15E-08 | 8.10E-05 | 7.61256E-05 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 9.40E-06 | 1.26E-08 | 7.57E-09 | 1.26E-08 | 2.51E-07 | 1.42E-09 | 5.41E-07 | 2.52E-08 | 1.89E-08 | 7.12E-05 | 6.69097E-05 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 8.41E-06 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 2.21E-07 | 1.26E-09 | 4.77E-07 | 2.23E-08 | 1.67E-08 | 6.28E-05 | 5.90824E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 7.58E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 1.97E-07 | 1.12E-09 | 4.24E-07 | 1.98E-08 | 1.48E-08 | 5.58E-05 | 5.25419E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 6.91E-06 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 1.77E-07 | 1.01E-09 | 3.82E-07 | 1.78E-08 | 1.33E-08 | 5.03E-05 | 4.73148E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 6.33E-06 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 1.60E-07 | 9.12E-10 | 3.46E-07 | 1.62E-08 | 1.21E-08 | 4.55E-05 | 4.28522E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 5.86E-06 | 7.40E-09 | 4.44E-09 | 7.40E-09 | 1.47E-07 | 8.36E-10 | 3.16E-07 | 1.48E-08 | 1.10E-08 | 4.16E-05 | 3.92168E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 5.45E-06 | 6.83E-09 | 4.10E-09 | 6.83E-09 | 1.35E-07 | 7.71E-10 | 2.92E-07 | 1.37E-08 | 1.02E-08 | 3.84E-05 | 3.61737E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 2.57E-05 | 3.74E-08 | 2.25E-08 | 3.74E-08 | 7.46E-07 | 4.21E-09 | 1.61E-06 | 7.49E-08 | 5.65E-08 | 2.12E-04 | 0.000198819 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.37E-05 | 3.44E-08 | 2.06E-08 | 3.44E-08 | 6.85E-07 | 3.86E-09 | 1.48E-06 | 6.87E-08 | 5.19E-08 | 1.94E-04 | 0.000182496 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.08E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 5.97E-07 | 3.37E-09 | 1.29E-06 | 5.99E-08 | 4.52E-08 | 1.69E-04 | 0.000159057 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 1.83E-05 | 2.61E-08 | 1.57E-08 | 2.61E-08 | 5.20E-07 | 2.93E-09 | 1.12E-06 | 5.22E-08 | 3.93E-08 | 1.48E-04 | 0.000138525 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 1.62E-05 | 2.29E-08 | 1.38E-08 | 2.29E-08 | 4.57E-07 | 2.58E-09 | 9.86E-07 | 4.59E-08 | 3.46E-08 | 1.30E-04 | 0.000121773 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 1.45E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 4.04E-07 | 2.28E-09 | 8.71E-07 | 4.06E-08 | 3.05E-08 | 1.15E-04 | 0.000107678 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 1.28E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 3.53E-07 | 2.00E-09 | 7.62E-07 | 3.55E-08 | 2.67E-08 | 1.00E-04 | 9.42564E-05 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 1.12E-05 | 1.54E-08 | 9.25E-09 | 1.54E-08 | 3.07E-07 | 1.74E-09 | 6.61E-07 | 3.08E-08 | 2.32E-08 | 8.71E-05 | 8.18088E-05 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 9.90E-06 | 1.34E-08 | 8.05E-09 | 1.34E-08 | 2.67E-07 | 1.51E-09 | 5.75E-07 | 2.68E-08 | 2.01E-08 | 7.57E-05 | 7.1149E-05 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 8.80E-06 | 1.18E-08 | 7.06E-09 | 1.18E-08 | 2.34E-07 | 1.33E-09 | 5.04E-07 | 2.35E-08 | 1.77E-08 | 6.64E-05 | 6.24323E-05 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 7.89E-06 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 2.07E-07 | 1.17E-09 | 4.46E-07 | 2.08E-08 | 1.56E-08 | 5.87E-05 | 5.52428E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 7.15E-06 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 1.85E-07 | 1.05E-09 | 3.99E-07 | 1.87E-08 | 1.40E-08 | 5.26E-05 | 4.94843E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 6.53E-06 | 8.43E-09 | 5.06E-09 | 8.43E-09 | 1.67E-07 | 9.51E-10 | 3.61E-07 | 1.69E-08 | 1.26E-08 | 4.75E-05 | 4.46991E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 6.00E-06 | 7.67E-09 | 4.60E-09 | 7.67E-09 | 1.52E-07 | 8.66E-10 | 3.28E-07 | 1.53E-08 | 1.15E-08 | 4.32E-05 | 4.0654E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 5.53E-06 | 7.00E-09 | 4.20E-09 | 7.00E-09 | 1.39E-07 | 7.90E-10 | 2.99E-07 | 1.40E-08 | 1.04E-08 | 3.94E-05 | 3.70903E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 5.12E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 1.27E-07 | 7.25E-10 | 2.74E-07 | 1.28E-08 | 9.57E-09 | 3.61E-05 | 3.39924E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 3.49E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 1.03E-06 | 5.78E-09 | 2.22E-06 | 1.03E-07 | 7.78E-08 | 2.92E-04 | 0.000273597 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 3.37E-05 | 4.99E-08 | 2.99E-08 | 4.99E-08 | 9.95E-07 | 5.60E-09 | 2.15E-06 | 9.98E-08 | 7.54E-08 | 2.83E-04 | 0.000265068 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 3.17E-05 | 4.68E-08 | 2.81E-08 | 4.68E-08 | 9.34E-07 | 5.26E-09 | 2.02E-06 | 9.36E-08 | 7.08E-08 | 2.65E-04 | 0.000248717 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 2.85E-05 | 4.17E-08 | 2.50E-08 | 4.17E-08 | 8.32E-07 | 4.68E-09 | 1.79E-06 | 8.34E-08 | 6.30E-08 | 2.36E-04 | 0.000221499 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 2.50E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 7.24E-07 | 4.08E-09 | 1.56E-06 | 7.27E-08 | 5.49E-08 | 2.06E-04 | 0.000192973 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 2.15E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 6.17E-07 | 3.48E-09 | 1.33E-06 | 6.19E-08 | 4.67E-08 | 1.75E-04 | 0.000164419 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 1.87E-05 | 2.68E-08 | 1.61E-08 | 2.68E-08 | 5.33E-07 | 3.01E-09 | 1.15E-06 | 5.35E-08 | 4.04E-08 | 1.51E-04 | 0.000142111 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 1.63E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.58E-07 | 2.58E-09 | 9.88E-07 | 4.60E-08 | 3.46E-08 | 1.30E-04 | 0.000122015 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 1.41E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 3.92E-07 | 2.22E-09 | 8.46E-07 | 3.94E-08 | 2.97E-08 | 1.11E-04 | 0.000104581 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 1.22E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.34E-07 | 1.89E-09 | 7.20E-07 | 3.35E-08 | 2.52E-08 | 9.48E-05 | 8.90323E-05 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 1.06E-05 | 1.44E-08 | 8.66E-09 | 1.44E-08 | 2.87E-07 | 1.63E-09 | 6.19E-07 | 2.89E-08 | 2.17E-08 | 8.15E-05 | 7.6598E-05 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 9.36E-06 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 2.50E-07 | 1.42E-09 | 5.39E-07 | 2.52E-08 | 1.89E-08 | 7.10E-05 | 6.6735E-05 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 8.34E-06 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 2.20E-07 | 1.25E-09 | 4.74E-07 | 2.21E-08 | 1.66E-08 | 6.25E-05 | 5.87433E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 7.50E-06 | 9.84E-09 | 5.91E-09 | 9.84E-09 | 1.96E-07 | 1.11E-09 | 4.21E-07 | 1.97E-08 | 1.47E-08 | 5.55E-05 | 5.21991E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 6.80E-06 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 1.75E-07 | 9.95E-10 | 3.78E-07 | 1.76E-08 | 1.32E-08 | 4.97E-05 | 4.678E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 6.17E-06 | 7.92E-09 | 4.75E-09 | 7.92E-09 | 1.57E-07 | 8.94E-10 | 3.39E-07 | 1.58E-08 | 1.18E-08 | 4.46E-05 | 4.19852E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 5.65E-06 | 7.17E-09 | 4.30E-09 | 7.17E-09 | 1.42E-07 | 8.09E-10 | 3.06E-07 | 1.43E-08 | 1.07E-08 | 4.03E-05 | 3.79933E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 5.19E-06 | 6.53E-09 | 3.92E-09 | 6.53E-09 | 1.29E-07 | 7.37E-10 | 2.79E-07 | 1.31E-08 | 9.73E-09 | 3.67E-05 | 3.45763E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 4.80E-06 | 5.97E-09 | 3.58E-09 | 5.97E-09 | 1.18E-07 | 6.74E-10 | 2.55E-07 | 1.19E-08 | 8.89E-09 | 3.35E-05 | 3.16043E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 4.39E-05 | 6.62E-08 | 3.97E-08 | 6.62E-08 | 1.32E-06 | 7.42E-09 | 2.85E-06 | 1.32E-07 | 1.00E-07 | 3.75E-04 | 0.000351582 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 4.06E-05 | 6.08E-08 | 3.65E-08 | 6.08E-08 | 1.21E-06 | 6.83E-09 | 2.62E-06 | 1.22E-07 | 9.21E-08 | 3.45E-04 | 0.000323395 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 3.48E-05 | 5.17E-08 | 3.10E-08 | 5.17E-08 | 1.03E-06 | 5.80E-09 | 2.23E-06 | 1.03E-07 | 7.82E-08 | 2.93E-04 | 0.000274656 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 3.07E-05 | 4.52E-08 | 2.71E-08 | 4.52E-08 | 9.02E-07 | 5.08E-09 | 1.95E-06 | 9.04E-08 | 6.84E-08 | 2.56E-04 | 0.000240329 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 2.60E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 7.59E-07 | 4.27E-09 | 1.64E-06 | 7.61E-08 | 5.75E-08 | 2.15E-04 | 0.000202145 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 2.22E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 6.41E-07 | 3.61E-09 | 1.38E-06 | 6.43E-08 | 4.85E-08 | 1.82E-04 | 0.000170689 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.89E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 5.39E-07 | 3.04E-09 | 1.16E-06 | 5.40E-08 | 4.08E-08 | 1.53E-04 | 0.000143507 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 1.59E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 4.46E-07 | 2.52E-09 | 9.62E-07 | 4.48E-08 | 3.37E-08 | 1.27E-04 | 0.000118914 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 1.34E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 3.72E-07 | 2.10E-09 | 8.02E-07 | 3.73E-08 | 2.81E-08 | 1.05E-04 | 9.90804E-05 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 1.15E-05 | 1.58E-08 | 9.48E-09 | 1.58E-08 | 3.14E-07 | 1.78E-09 | 6.78E-07 | 3.16E-08 | 2.37E-08 | 8.92E-05 | 8.38458E-05 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 1.01E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 2.71E-07 | 1.53E-09 | 5.84E-07 | 2.73E-08 | 2.05E-08 | 7.69E-05 | 7.22975E-05 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 8.90E-06 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 2.36E-07 | 1.34E-09 | 5.09E-07 | 2.38E-08 | 1.78E-08 | 6.70E-05 | 6.30381E-05 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 7.92E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 2.07E-07 | 1.18E-09 | 4.47E-07 | 2.09E-08 | 1.56E-08 | 5.88E-05 | 5.53109E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 7.11E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 1.83E-07 | 1.04E-09 | 3.95E-07 | 1.85E-08 | 1.38E-08 | 5.21E-05 | 4.89969E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 6.40E-06 | 8.22E-09 | 4.93E-09 | 8.22E-09 | 1.63E-07 | 9.28E-10 | 3.52E-07 | 1.64E-08 | 1.23E-08 | 4.63E-05 | 4.35804E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 5.81E-06 | 7.37E-09 | 4.42E-09 | 7.37E-09 | 1.46E-07 | 8.32E-10 | 3.15E-07 | 1.47E-08 | 1.10E-08 | 4.15E-05 | 3.90634E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 5.32E-06 | 6.68E-09 | 4.01E-09 | 6.68E-09 | 1.32E-07 | 7.54E-10 | 2.85E-07 | 1.34E-08 | 9.95E-09 | 3.76E-05 | 3.53696E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 4.90E-06 | 6.09E-09 | 3.65E-09 | 6.09E-09 | 1.21E-07 | 6.88E-10 | 2.60E-07 | 1.22E-08 | 9.07E-09 | 3.42E-05 | 3.22565E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 4.54E-06 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 1.11E-07 | 6.32E-10 | 2.38E-07 | 1.12E-08 | 8.31E-09 | 3.14E-05 | 2.95844E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 5.30E-05 | 8.13E-08 | 4.88E-08 | 8.13E-08 | 1.62E-06 | 9.12E-09 | 3.51E-06 | 1.63E-07 | 1.23E-07 | 4.61E-04 | 0.000432363 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 5.19E-05 | 7.93E-08 | 4.76E-08 | 7.93E-08 | 1.58E-06 | 8.89E-09 | 3.42E-06 | 1.59E-07 | 1.20E-07 | 4.50E-04 | 0.000421547 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 4.93E-05 | 7.49E-08 | 4.49E-08 | 7.49E-08 | 1.50E-06 | 8.40E-09 | 3.23E-06 | 1.50E-07 | 1.13E-07 | 4.25E-04 | 0.000398 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 4.70E-05 | 7.10E-08 | 4.26E-08 | 7.10E-08 | 1.42E-06 | 7.96E-09 | 3.06E-06 | 1.42E-07 | 1.08E-07 | 4.02E-04 | 0.00037732 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 4.06E-05 | 6.10E-08 | 3.66E-08 | 6.10E-08 | 1.22E-06 | 6.84E-09 | 2.63E-06 | 1.22E-07 | 9.24E-08 | 3.46E-04 | 0.000324213 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.30E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 9.82E-07 | 5.52E-09 | 2.12E-06 | 9.84E-08 | 7.45E-08 | 2.79E-04 | 0.000261471 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 2.70E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 7.94E-07 | 4.47E-09 | 1.71E-06 | 7.96E-08 | 6.02E-08 | 2.26E-04 | 0.000211541 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 2.23E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 6.49E-07 | 3.65E-09 | 1.40E-06 | 6.50E-08 | 4.91E-08 | 1.84E-04 | 0.000172777 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 1.81E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 5.19E-07 | 2.92E-09 | 1.12E-06 | 5.21E-08 | 3.93E-08 | 1.47E-04 | 0.000138252 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 1.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.19E-07 | 2.37E-09 | 9.05E-07 | 4.21E-08 | 3.17E-08 | 1.19E-04 | 0.000111782 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 1.26E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.51E-07 | 1.98E-09 | 7.57E-07 | 3.53E-08 | 2.65E-08 | 9.97E-05 | 9.36053E-05 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 1.08E-05 | 1.49E-08 | 8.91E-09 | 1.49E-08 | 2.96E-07 | 1.67E-09 | 6.37E-07 | 2.97E-08 | 2.23E-08 | 8.39E-05 | 7.88261E-05 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 9.41E-06 | 1.27E-08 | 7.62E-09 | 1.27E-08 | 2.53E-07 | 1.43E-09 | 5.45E-07 | 2.54E-08 | 1.91E-08 | 7.17E-05 | 6.7386E-05 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 8.28E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.71E-07 | 2.20E-08 | 1.65E-08 | 6.21E-05 | 5.83704E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 7.36E-06 | 9.64E-09 | 5.78E-09 | 9.64E-09 | 1.91E-07 | 1.09E-09 | 4.13E-07 | 1.93E-08 | 1.44E-08 | 5.43E-05 | 5.11072E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 6.63E-06 | 8.55E-09 | 5.13E-09 | 8.55E-09 | 1.70E-07 | 9.65E-10 | 3.66E-07 | 1.71E-08 | 1.28E-08 | 4.82E-05 | 4.53215E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 5.98E-06 | 7.60E-09 | 4.56E-09 | 7.60E-09 | 1.51E-07 | 8.58E-10 | 3.25E-07 | 1.52E-08 | 1.13E-08 | 4.28E-05 | 4.02816E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 5.46E-06 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 1.36E-07 | 7.74E-10 | 2.93E-07 | 1.37E-08 | 1.02E-08 | 3.85E-05 | 3.63068E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 5.03E-06 | 6.23E-09 | 3.74E-09 | 6.23E-09 | 1.23E-07 | 7.05E-10 | 2.66E-07 | 1.25E-08 | 9.28E-09 | 3.50E-05 | 3.30151E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 4.67E-06 | 5.72E-09 | 3.43E-09 | 5.72E-09 | 1.13E-07 | 6.47E-10 | 2.44E-07 | 1.14E-08 | 8.52E-09 | 3.22E-05 | 3.03128E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 4.36E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 1.05E-07 | 5.99E-10 | 2.26E-07 | 1.06E-08 | 7.87E-09 | 2.97E-05 | 2.80406E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 5.67E-05 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 1.73E-06 | 9.73E-09 | 3.74E-06 | 1.74E-07 | 1.32E-07 | 4.92E-04 | 0.000461367 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 5.48E-05 | 8.36E-08 | 5.02E-08 | 8.36E-08 | 1.67E-06 | 9.37E-09 | 3.61E-06 | 1.67E-07 | 1.27E-07 | 4.74E-04 | 0.000444514 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 5.45E-05 | 8.29E-08 | 4.98E-08 | 8.29E-08 | 1.66E-06 | 9.30E-09 | 3.58E-06 | 1.66E-07 | 1.26E-07 | 4.70E-04 | 0.000440996 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 4.53E-05 | 6.86E-08 | 4.12E-08 | 6.86E-08 | 1.37E-06 | 7.70E-09 | 2.96E-06 | 1.37E-07 | 1.04E-07 | 3.89E-04 | 0.000365074 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 3.46E-05 | 5.20E-08 | 3.12E-08 | 5.20E-08 | 1.04E-06 | 5.84E-09 | 2.24E-06 | 1.04E-07 | 7.89E-08 | 2.95E-04 | 0.00027673 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 2.71E-05 | 4.03E-08 | 2.42E-08 | 4.03E-08 | 8.05E-07 | 4.52E-09 | 1.74E-06 | 8.06E-08 | 6.10E-08 | 2.29E-04 | 0.000214298 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 2.12E-05 | 3.12E-08 | 1.87E-08 | 3.12E-08 | 6.23E-07 | 3.50E-09 | 1.34E-06 | 6.24E-08 | 4.72E-08 | 1.77E-04 | 0.000165935 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 1.69E-05 | 2.45E-08 | 1.47E-08 | 2.45E-08 | 4.88E-07 | 2.75E-09 | 1.05E-06 | 4.89E-08 | 3.70E-08 | 1.39E-04 | 0.000129997 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 1.37E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.90E-07 | 2.20E-09 | 8.42E-07 | 3.92E-08 | 2.95E-08 | 1.11E-04 | 0.000104028 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 1.15E-05 | 1.61E-08 | 9.65E-09 | 1.61E-08 | 3.20E-07 | 1.81E-09 | 6.91E-07 | 3.22E-08 | 2.42E-08 | 9.09E-05 | 8.54087E-05 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 9.81E-06 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 2.69E-07 | 1.52E-09 | 5.81E-07 | 2.71E-08 | 2.03E-08 | 7.64E-05 | 7.1819E-05 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 8.57E-06 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.31E-07 | 1.31E-09 | 4.98E-07 | 2.32E-08 | 1.74E-08 | 6.56E-05 | 6.1634E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 7.56E-06 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 2.00E-07 | 1.13E-09 | 4.31E-07 | 2.01E-08 | 1.51E-08 | 5.68E-05 | 5.33819E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 6.76E-06 | 8.85E-09 | 5.31E-09 | 8.85E-09 | 1.76E-07 | 9.98E-10 | 3.79E-07 | 1.77E-08 | 1.32E-08 | 4.99E-05 | 4.6913E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 6.13E-06 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 1.57E-07 | 8.90E-10 | 3.37E-07 | 1.58E-08 | 1.18E-08 | 4.44E-05 | 4.18145E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 5.61E-06 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 1.41E-07 | 8.05E-10 | 3.04E-07 | 1.42E-08 | 1.06E-08 | 4.01E-05 | 3.7747E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 5.19E-06 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 1.29E-07 | 7.34E-10 | 2.77E-07 | 1.30E-08 | 9.68E-09 | 3.65E-05 | 3.44107E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 4.84E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 1.19E-07 | 6.77E-10 | 2.56E-07 | 1.20E-08 | 8.92E-09 | 3.37E-05 | 3.17314E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 4.55E-06 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 1.10E-07 | 6.31E-10 | 2.38E-07 | 1.12E-08 | 8.30E-09 | 3.13E-05 | 2.9534E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 4.29E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 1.03E-07 | 5.90E-10 | 2.22E-07 | 1.04E-08 | 7.75E-09 | 2.93E-05 | 2.75929E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 8.03E-05 | 1.23E-07 | 7.39E-08 | 1.23E-07 | 2.46E-06 | 1.38E-08 | 5.32E-06 | 2.46E-07 | 1.87E-07 | 6.99E-04 | 0.000655353 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 6.86E-05 | 1.05E-07 | 6.30E-08 | 1.05E-07 | 2.10E-06 | 1.18E-08 | 4.53E-06 | 2.10E-07 | 1.59E-07 | 5.96E-04 | 0.000558316 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 5.06E-05 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 1.54E-06 | 8.64E-09 | 3.33E-06 | 1.54E-07 | 1.17E-07 | 4.38E-04 | 0.000410136 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 3.57E-05 | 5.41E-08 | 3.24E-08 | 5.41E-08 | 1.08E-06 | 6.06E-09 | 2.33E-06 | 1.08E-07 | 8.20E-08 | 3.07E-04 | 0.000287515 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 2.54E-05 | 3.82E-08 | 2.29E-08 | 3.82E-08 | 7.62E-07 | 4.28E-09 | 1.65E-06 | 7.63E-08 | 5.78E-08 | 2.16E-04 | 0.000202926 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.88E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 5.56E-07 | 3.13E-09 | 1.20E-06 | 5.57E-08 | 4.21E-08 | 1.58E-04 | 0.000147985 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 1.47E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 4.29E-07 | 2.41E-09 | 9.25E-07 | 4.30E-08 | 3.25E-08 | 1.22E-04 | 0.000114188 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 1.19E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.43E-07 | 1.93E-09 | 7.39E-07 | 3.44E-08 | 2.59E-08 | 9.73E-05 | 9.1279E-05 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 1.00E-05 | 1.42E-08 | 8.52E-09 | 1.42E-08 | 2.83E-07 | 1.60E-09 | 6.10E-07 | 2.84E-08 | 2.14E-08 | 8.03E-05 | 7.53837E-05 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 8.66E-06 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 2.40E-07 | 1.36E-09 | 5.17E-07 | 2.41E-08 | 1.81E-08 | 6.80E-05 | 6.39112E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 7.63E-06 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 2.08E-07 | 1.18E-09 | 4.48E-07 | 2.09E-08 | 1.57E-08 | 5.89E-05 | 5.53637E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 6.86E-06 | 9.23E-09 | 5.54E-09 | 9.23E-09 | 1.83E-07 | 1.04E-09 | 3.95E-07 | 1.85E-08 | 1.38E-08 | 5.21E-05 | 4.89438E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 6.26E-06 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 1.65E-07 | 9.35E-10 | 3.55E-07 | 1.66E-08 | 1.24E-08 | 4.67E-05 | 4.39582E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 5.79E-06 | 7.55E-09 | 4.53E-09 | 7.55E-09 | 1.50E-07 | 8.52E-10 | 3.23E-07 | 1.51E-08 | 1.13E-08 | 4.25E-05 | 4.00164E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 5.39E-06 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 1.38E-07 | 7.84E-10 | 2.97E-07 | 1.39E-08 | 1.04E-08 | 3.91E-05 | 3.67897E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 5.06E-06 | 6.43E-09 | 3.86E-09 | 6.43E-09 | 1.28E-07 | 7.27E-10 | 2.75E-07 | 1.29E-08 | 9.60E-09 | 3.62E-05 | 3.40922E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 4.77E-06 | 5.99E-09 | 3.60E-09 | 5.99E-09 | 1.19E-07 | 6.77E-10 | 2.56E-07 | 1.20E-08 | 8.94E-09 | 3.37E-05 | 3.1753E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 4.53E-06 | 5.63E-09 | 3.38E-09 | 5.63E-09 | 1.12E-07 | 6.37E-10 | 2.40E-07 | 1.13E-08 | 8.39E-09 | 3.17E-05 | 2.98283E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 4.30E-06 | 5.29E-09 | 3.17E-09 | 5.29E-09 | 1.05E-07 | 5.98E-10 | 2.26E-07 | 1.06E-08 | 7.87E-09 | 2.97E-05 | 2.80162E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 1.18E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 3.63E-06 | 2.03E-08 | 7.83E-06 | 3.63E-07 | 2.76E-07 | 1.03E-03 | 0.000965298 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 1.32E-04 | 2.04E-07 | 1.22E-07 | 2.04E-07 | 4.08E-06 | 2.28E-08 | 8.80E-06 | 4.08E-07 | 3.10E-07 | 1.16E-03 | 0.001084507 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 1.19E-04 | 1.83E-07 | 1.10E-07 | 1.83E-07 | 3.65E-06 | 2.05E-08 | 7.89E-06 | 3.65E-07 | 2.77E-07 | 1.04E-03 | 0.00097174 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 9.00E-05 | 1.38E-07 | 8.28E-08 | 1.38E-07 | 2.76E-06 | 1.55E-08 | 5.96E-06 | 2.76E-07 | 2.10E-07 | 7.84E-04 | 0.000734578 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 5.49E-05 | 8.39E-08 | 5.03E-08 | 8.39E-08 | 1.68E-06 | 9.40E-09 | 3.62E-06 | 1.68E-07 | 1.27E-07 | 4.76E-04 | 0.00044604 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 3.32E-05 | 5.03E-08 | 3.02E-08 | 5.03E-08 | 1.01E-06 | 5.64E-09 | 2.17E-06 | 1.01E-07 | 7.63E-08 | 2.85E-04 | 0.000267524 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 2.17E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 6.51E-07 | 3.66E-09 | 1.41E-06 | 6.52E-08 | 4.94E-08 | 1.85E-04 | 0.000173314 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 1.58E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 4.68E-07 | 2.63E-09 | 1.01E-06 | 4.69E-08 | 3.55E-08 | 1.33E-04 | 0.000124727 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 1.24E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 3.63E-07 | 2.04E-09 | 7.83E-07 | 3.64E-08 | 2.75E-08 | 1.03E-04 | 9.65923E-05 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 1.03E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 2.96E-07 | 1.67E-09 | 6.38E-07 | 2.97E-08 | 2.24E-08 | 8.40E-05 | 7.87866E-05 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 8.83E-06 | 1.26E-08 | 7.56E-09 | 1.26E-08 | 2.51E-07 | 1.42E-09 | 5.42E-07 | 2.52E-08 | 1.90E-08 | 7.13E-05 | 6.69181E-05 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 7.82E-06 | 1.10E-08 | 6.61E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.73E-07 | 2.20E-08 | 1.66E-08 | 6.23E-05 | 5.84666E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 7.06E-06 | 9.81E-09 | 5.88E-09 | 9.81E-09 | 1.95E-07 | 1.10E-09 | 4.21E-07 | 1.96E-08 | 1.47E-08 | 5.54E-05 | 5.20323E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 6.47E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 1.77E-07 | 1.00E-09 | 3.81E-07 | 1.78E-08 | 1.33E-08 | 5.01E-05 | 4.70918E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 5.98E-06 | 8.09E-09 | 4.86E-09 | 8.09E-09 | 1.61E-07 | 9.12E-10 | 3.47E-07 | 1.62E-08 | 1.21E-08 | 4.57E-05 | 4.29201E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 5.58E-06 | 7.45E-09 | 4.47E-09 | 7.45E-09 | 1.48E-07 | 8.40E-10 | 3.19E-07 | 1.49E-08 | 1.12E-08 | 4.20E-05 | 3.951E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 5.24E-06 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 1.37E-07 | 7.78E-10 | 2.95E-07 | 1.38E-08 | 1.03E-08 | 3.89E-05 | 3.65971E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 4.93E-06 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 1.27E-07 | 7.25E-10 | 2.75E-07 | 1.28E-08 | 9.61E-09 | 3.62E-05 | 3.40463E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 4.66E-06 | 5.98E-09 | 3.59E-09 | 5.98E-09 | 1.19E-07 | 6.75E-10 | 2.56E-07 | 1.20E-08 | 8.94E-09 | 3.37E-05 | 3.17093E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 4.41E-06 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 1.11E-07 | 6.33E-10 | 2.39E-07 | 1.12E-08 | 8.36E-09 | 3.15E-05 | 2.96839E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 4.20E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 1.04E-07 | 5.95E-10 | 2.25E-07 | 1.05E-08 | 7.85E-09 | 2.96E-05 | 2.78927E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 2.32E-04 | 3.58E-07 | 2.15E-07 | 3.58E-07 | 7.16E-06 | 4.01E-08 | 1.55E-05 | 7.16E-07 | 5.44E-07 | 2.03E-03 | 0.001905448 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 2.48E-04 | 3.82E-07 | 2.29E-07 | 3.82E-07 | 7.64E-06 | 4.28E-08 | 1.65E-05 | 7.64E-07 | 5.80E-07 | 2.17E-03 | 0.002031828 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 2.21E-04 | 3.40E-07 | 2.04E-07 | 3.40E-07 | 6.80E-06 | 3.81E-08 | 1.47E-05 | 6.80E-07 | 5.17E-07 | 1.93E-03 | 0.001809943 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 1.16E-04 | 1.79E-07 | 1.07E-07 | 1.79E-07 | 3.57E-06 | 2.00E-08 | 7.72E-06 | 3.58E-07 | 2.72E-07 | 1.02E-03 | 0.000951306 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 4.77E-05 | 7.28E-08 | 4.37E-08 | 7.28E-08 | 1.45E-06 | 8.16E-09 | 3.14E-06 | 1.46E-07 | 1.10E-07 | 4.13E-04 | 0.00038719 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 2.59E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 7.82E-07 | 4.39E-09 | 1.69E-06 | 7.83E-08 | 5.93E-08 | 2.22E-04 | 0.000208148 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 1.76E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 5.25E-07 | 2.95E-09 | 1.13E-06 | 5.26E-08 | 3.98E-08 | 1.49E-04 | 0.000139708 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 1.36E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 4.01E-07 | 2.26E-09 | 8.66E-07 | 4.02E-08 | 3.04E-08 | 1.14E-04 | 0.000106781 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 1.12E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 3.28E-07 | 1.84E-09 | 7.07E-07 | 3.29E-08 | 2.48E-08 | 9.30E-05 | 8.72586E-05 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 9.58E-06 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 2.78E-07 | 1.56E-09 | 5.99E-07 | 2.78E-08 | 2.10E-08 | 7.88E-05 | 7.39296E-05 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 8.38E-06 | 1.21E-08 | 7.24E-09 | 1.21E-08 | 2.40E-07 | 1.36E-09 | 5.18E-07 | 2.41E-08 | 1.82E-08 | 6.82E-05 | 6.40247E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 7.46E-06 | 1.06E-08 | 6.38E-09 | 1.06E-08 | 2.12E-07 | 1.20E-09 | 4.57E-07 | 2.13E-08 | 1.60E-08 | 6.01E-05 | 5.64458E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 6.73E-06 | 9.48E-09 | 5.69E-09 | 9.48E-09 | 1.89E-07 | 1.07E-09 | 4.07E-07 | 1.90E-08 | 1.43E-08 | 5.36E-05 | 5.03348E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 6.14E-06 | 8.56E-09 | 5.14E-09 | 8.56E-09 | 1.70E-07 | 9.63E-10 | 3.67E-07 | 1.71E-08 | 1.29E-08 | 4.84E-05 | 4.54246E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 5.65E-06 | 7.79E-09 | 4.67E-09 | 7.79E-09 | 1.55E-07 | 8.76E-10 | 3.34E-07 | 1.56E-08 | 1.17E-08 | 4.40E-05 | 4.13022E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 5.26E-06 | 7.15E-09 | 4.29E-09 | 7.15E-09 | 1.42E-07 | 8.06E-10 | 3.07E-07 | 1.43E-08 | 1.07E-08 | 4.04E-05 | 3.79359E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 4.92E-06 | 6.62E-09 | 3.97E-09 | 6.62E-09 | 1.32E-07 | 7.46E-10 | 2.84E-07 | 1.32E-08 | 9.92E-09 | 3.73E-05 | 3.50976E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 4.64E-06 | 6.16E-09 | 3.69E-09 | 6.16E-09 | 1.22E-07 | 6.94E-10 | 2.64E-07 | 1.23E-08 | 9.22E-09 | 3.47E-05 | 3.26387E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 4.38E-06 | 5.75E-09 | 3.45E-09 | 5.75E-09 | 1.14E-07 | 6.48E-10 | 2.46E-07 | 1.15E-08 | 8.60E-09 | 3.24E-05 | 3.04753E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 4.16E-06 | 5.38E-09 | 3.23E-09 | 5.38E-09 | 1.07E-07 | 6.07E-10 | 2.30E-07 | 1.08E-08 | 8.04E-09 | 3.03E-05 | 2.85112E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 3.96E-06 | 5.06E-09 | 3.04E-09 | 5.06E-09 | 1.00E-07 | 5.71E-10 | 2.16E-07 | 1.01E-08 | 7.56E-09 | 2.85E-05 | 2.6821E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 6.17E-04 | 9.51E-07 | 5.71E-07 | 9.51E-07 | 1.90E-05 | 1.07E-07 | 4.11E-05 | 1.90E-06 | 1.45E-06 | 5.40E-03 | 0.00506204 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 8.09E-04 | 1.25E-06 | 7.49E-07 | 1.25E-06 | 2.50E-05 | 1.40E-07 | 5.39E-05 | 2.50E-06 | 1.90E-06 | 7.09E-03 | 0.006641924 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 9.41E-04 | 1.45E-06 | 8.71E-07 | 1.45E-06 | 2.90E-05 | 1.63E-07 | 6.27E-05 | 2.90E-06 | 2.21E-06 | 8.24E-03 | 0.007725023 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 7.57E-05 | 1.16E-07 | 6.96E-08 | 1.16E-07 | 2.32E-06 | 1.30E-08 | 5.01E-06 | 2.32E-07 | 1.76E-07 | 6.58E-04 | 0.000617128 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 3.29E-05 | 4.99E-08 | 3.00E-08 | 4.99E-08 | 9.97E-07 | 5.60E-09 | 2.15E-06 | 9.99E-08 | 7.57E-08 | 2.83E-04 | 0.000265518 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 2.14E-05 | 3.22E-08 | 1.93E-08 | 3.22E-08 | 6.42E-07 | 3.61E-09 | 1.39E-06 | 6.43E-08 | 4.87E-08 | 1.82E-04 | 0.000170933 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 1.59E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.72E-07 | 2.66E-09 | 1.02E-06 | 4.73E-08 | 3.58E-08 | 1.34E-04 | 0.000125769 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 1.27E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 3.72E-07 | 2.09E-09 | 8.03E-07 | 3.73E-08 | 2.82E-08 | 1.06E-04 | 9.91415E-05 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 1.05E-05 | 1.53E-08 | 9.19E-09 | 1.53E-08 | 3.05E-07 | 1.72E-09 | 6.59E-07 | 3.06E-08 | 2.31E-08 | 8.67E-05 | 8.13723E-05 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 8.93E-06 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 2.58E-07 | 1.45E-09 | 5.57E-07 | 2.59E-08 | 1.95E-08 | 7.32E-05 | 6.87203E-05 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 7.78E-06 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 2.23E-07 | 1.26E-09 | 4.80E-07 | 2.23E-08 | 1.69E-08 | 6.32E-05 | 5.93293E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 6.89E-06 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 1.96E-07 | 1.10E-09 | 4.22E-07 | 1.96E-08 | 1.48E-08 | 5.55E-05 | 5.21364E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 6.19E-06 | 8.75E-09 | 5.25E-09 | 8.75E-09 | 1.74E-07 | 9.84E-10 | 3.76E-07 | 1.75E-08 | 1.32E-08 | 4.95E-05 | 4.6435E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 5.63E-06 | 7.88E-09 | 4.73E-09 | 7.88E-09 | 1.57E-07 | 8.87E-10 | 3.38E-07 | 1.58E-08 | 1.19E-08 | 4.45E-05 | 4.1817E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 5.17E-06 | 7.16E-09 | 4.30E-09 | 7.16E-09 | 1.42E-07 | 8.06E-10 | 3.07E-07 | 1.43E-08 | 1.08E-08 | 4.04E-05 | 3.79936E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 4.80E-06 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 1.31E-07 | 7.41E-10 | 2.82E-07 | 1.32E-08 | 9.88E-09 | 3.71E-05 | 3.49075E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 4.50E-06 | 6.11E-09 | 3.66E-09 | 6.11E-09 | 1.21E-07 | 6.88E-10 | 2.62E-07 | 1.22E-08 | 9.17E-09 | 3.45E-05 | 3.23985E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 4.23E-06 | 5.68E-09 | 3.41E-09 | 5.68E-09 | 1.13E-07 | 6.40E-10 | 2.43E-07 | 1.14E-08 | 8.52E-09 | 3.20E-05 | 3.01207E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 4.01E-06 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 1.06E-07 | 6.01E-10 | 2.28E-07 | 1.07E-08 | 7.98E-09 | 3.00E-05 | 2.82549E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 3.81E-06 | 5.01E-09 | 3.01E-09 | 5.01E-09 | 9.95E-08 | 5.65E-10 | 2.14E-07 | 1.00E-08 | 7.50E-09 | 2.82E-05 | 2.65523E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 3.63E-06 | 4.72E-09 | 2.83E-09 | 4.72E-09 | 9.37E-08 | 5.33E-10 | 2.02E-07 | 9.44E-09 | 7.06E-09 | 2.66E-05 | 2.50248E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 1.02E-04 | 1.56E-07 | 9.36E-08 | 1.56E-07 | 3.12E-06 | 1.75E-08 | 6.74E-06 | 3.12E-07 | 2.37E-07 | 8.86E-04 | 0.000830152 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 8.12E-05 | 1.24E-07 | 7.47E-08 | 1.24E-07 | 2.49E-06 | 1.39E-08 | 5.37E-06 | 2.49E-07 | 1.89E-07 | 7.06E-04 | 0.000661965 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 4.41E-05 | 6.71E-08 | 4.03E-08 | 6.71E-08 | 1.34E-06 | 7.52E-09 | 2.90E-06 | 1.34E-07 | 1.02E-07 | 3.81E-04 | 0.000356906 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 2.83E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 8.54E-07 | 4.80E-09 | 1.84E-06 | 8.56E-08 | 6.48E-08 | 2.43E-04 | 0.000227449 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 2.07E-05 | 3.10E-08 | 1.86E-08 | 3.10E-08 | 6.18E-07 | 3.47E-09 | 1.33E-06 | 6.19E-08 | 4.69E-08 | 1.76E-04 | 0.00016462 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 1.58E-05 | 2.34E-08 | 1.41E-08 | 2.34E-08 | 4.68E-07 | 2.63E-09 | 1.01E-06 | 4.69E-08 | 3.55E-08 | 1.33E-04 | 0.000124519 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 1.26E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.70E-07 | 2.08E-09 | 7.98E-07 | 3.71E-08 | 2.80E-08 | 1.05E-04 | 9.84515E-05 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 1.04E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 3.03E-07 | 1.71E-09 | 6.55E-07 | 3.04E-08 | 2.30E-08 | 8.61E-05 | 8.08178E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 8.86E-06 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 2.55E-07 | 1.44E-09 | 5.50E-07 | 2.56E-08 | 1.93E-08 | 7.24E-05 | 6.79589E-05 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 7.68E-06 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.73E-07 | 2.20E-08 | 1.66E-08 | 6.23E-05 | 5.84452E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 6.77E-06 | 9.62E-09 | 5.77E-09 | 9.62E-09 | 1.92E-07 | 1.08E-09 | 4.13E-07 | 1.92E-08 | 1.45E-08 | 5.44E-05 | 5.10824E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 6.05E-06 | 8.52E-09 | 5.11E-09 | 8.52E-09 | 1.70E-07 | 9.59E-10 | 3.66E-07 | 1.70E-08 | 1.28E-08 | 4.82E-05 | 4.52432E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 5.47E-06 | 7.65E-09 | 4.59E-09 | 7.65E-09 | 1.52E-07 | 8.61E-10 | 3.28E-07 | 1.53E-08 | 1.15E-08 | 4.32E-05 | 4.0595E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 4.99E-06 | 6.93E-09 | 4.16E-09 | 6.93E-09 | 1.38E-07 | 7.80E-10 | 2.97E-07 | 1.39E-08 | 1.04E-08 | 3.91E-05 | 3.67696E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 4.59E-06 | 6.33E-09 | 3.80E-09 | 6.33E-09 | 1.26E-07 | 7.12E-10 | 2.71E-07 | 1.27E-08 | 9.51E-09 | 3.57E-05 | 3.35686E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 4.25E-06 | 5.81E-09 | 3.48E-09 | 5.81E-09 | 1.15E-07 | 6.54E-10 | 2.49E-07 | 1.16E-08 | 8.72E-09 | 3.28E-05 | 3.08026E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 4.00E-06 | 5.43E-09 | 3.26E-09 | 5.43E-09 | 1.08E-07 | 6.11E-10 | 2.33E-07 | 1.09E-08 | 8.14E-09 | 3.06E-05 | 2.87784E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 3.77E-06 | 5.08E-09 | 3.05E-09 | 5.08E-09 | 1.01E-07 | 5.72E-10 | 2.18E-07 | 1.02E-08 | 7.62E-09 | 2.86E-05 | 2.69287E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 3.59E-06 | 4.80E-09 | 2.88E-09 | 4.80E-09 | 9.53E-08 | 5.41E-10 | 2.05E-07 | 9.59E-09 | 7.19E-09 | 2.70E-05 | 2.54338E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 3.43E-06 | 4.55E-09 | 2.73E-09 | 4.55E-09 | 9.03E-08 | 5.12E-10 | 1.95E-07 | 9.09E-09 | 6.81E-09 | 2.56E-05 | 2.41006E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 3.27E-06 | 4.28E-09 | 2.57E-09 | 4.28E-09 | 8.50E-08 | 4.83E-10 | 1.83E-07 | 8.56E-09 | 6.41E-09 | 2.41E-05 | 2.26966E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 1.07E-05 | 1.56E-08 | 9.36E-09 | 1.56E-08 | 3.11E-07 | 1.75E-09 | 6.72E-07 | 3.12E-08 | 2.36E-08 | 8.83E-05 | 8.28988E-05 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 6.54E-06 | 9.24E-09 | 5.55E-09 | 9.24E-09 | 1.84E-07 | 1.04E-09 | 3.97E-07 | 1.85E-08 | 1.39E-08 | 5.23E-05 | 4.9068E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 5.90E-06 | 8.28E-09 | 4.97E-09 | 8.28E-09 | 1.65E-07 | 9.31E-10 | 3.55E-07 | 1.66E-08 | 1.25E-08 | 4.68E-05 | 4.39276E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 5.34E-06 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 1.48E-07 | 8.36E-10 | 3.19E-07 | 1.49E-08 | 1.12E-08 | 4.20E-05 | 3.9421E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 4.87E-06 | 6.73E-09 | 4.04E-09 | 6.73E-09 | 1.34E-07 | 7.57E-10 | 2.89E-07 | 1.35E-08 | 1.01E-08 | 3.80E-05 | 3.56938E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 4.42E-06 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 1.21E-07 | 6.83E-10 | 2.60E-07 | 1.21E-08 | 9.11E-09 | 3.43E-05 | 3.21855E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 4.07E-06 | 5.54E-09 | 3.33E-09 | 5.54E-09 | 1.10E-07 | 6.24E-10 | 2.38E-07 | 1.11E-08 | 8.32E-09 | 3.13E-05 | 2.94021E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 3.76E-06 | 5.09E-09 | 3.06E-09 | 5.09E-09 | 1.01E-07 | 5.74E-10 | 2.18E-07 | 1.02E-08 | 7.64E-09 | 2.87E-05 | 2.70195E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 3.52E-06 | 4.73E-09 | 2.84E-09 | 4.73E-09 | 9.41E-08 | 5.33E-10 | 2.03E-07 | 9.47E-09 | 7.10E-09 | 2.67E-05 | 2.51029E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 3.31E-06 | 4.43E-09 | 2.66E-09 | 4.43E-09 | 8.80E-08 | 4.99E-10 | 1.90E-07 | 8.85E-09 | 6.63E-09 | 2.50E-05 | 2.34727E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 3.16E-06 | 4.20E-09 | 2.52E-09 | 4.20E-09 | 8.34E-08 | 4.73E-10 | 1.80E-07 | 8.40E-09 | 6.29E-09 | 2.37E-05 | 2.22655E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 3.02E-06 | 3.99E-09 | 2.39E-09 | 3.99E-09 | 7.92E-08 | 4.50E-10 | 1.71E-07 | 7.98E-09 | 5.97E-09 | 2.25E-05 | 2.11408E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 2.87E-06 | 3.76E-09 | 2.26E-09 | 3.76E-09 | 7.47E-08 | 4.24E-10 | 1.61E-07 | 7.52E-09 | 5.63E-09 | 2.12E-05 | 1.99394E-05 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2025

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2025_PAVED | 1.711E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 2.00E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 2.01E-06 | 1.13E-08 | 4.35E-06 | 2.02E-07 | 1.53E-07 | 5.72E-04 | 0.000562861 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.37E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 1.34E-06 | 7.52E-09 | 2.88E-06 | 1.34E-07 | 1.01E-07 | 3.79E-04 | 0.000374111 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.25E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 7.10E-08 | 4.28E-10 | 1.51E-07 | 7.38E-09 | 5.15E-09 | 2.01E-05 | 2.07994E-05 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.58E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 1.29E-07 | 7.41E-10 | 2.78E-07 | 1.31E-08 | 9.68E-09 | 3.66E-05 | 3.66295E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.34E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 6.46E-06 | 3.62E-08 | 1.39E-05 | 6.46E-07 | 4.91E-07 | 1.83E-03 | 0.001803105 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.28E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 1.31E-05 | 7.34E-08 | 2.83E-05 | 1.31E-06 | 9.95E-07 | 3.72E-03 | 0.003655914 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.84E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 5.95E-06 | 3.33E-08 | 1.28E-05 | 5.95E-07 | 4.52E-07 | 1.69E-03 | 0.00166085 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.55E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 1.59E-05 | 8.88E-08 | 3.43E-05 | 1.59E-06 | 1.21E-06 | 4.50E-03 | 0.004427427 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.07E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 1.00E-06 | 5.67E-09 | 2.16E-06 | 1.01E-07 | 7.59E-08 | 2.85E-04 | 0.000281652 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.09E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 3.12E-06 | 1.75E-08 | 6.74E-06 | 3.12E-07 | 2.37E-07 | 8.86E-04 | 0.000872258 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.29E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 7.16E-07 | 4.03E-09 | 1.55E-06 | 7.18E-08 | 5.43E-08 | 2.03E-04 | 0.000200416 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.79E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 3.06E-07 | 1.76E-09 | 6.57E-07 | 3.10E-08 | 2.29E-08 | 8.67E-05 | 8.67539E-05 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.55E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 2.85E-07 | 1.64E-09 | 6.14E-07 | 2.89E-08 | 2.13E-08 | 8.09E-05 | 8.09969E-05 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.33E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 2.67E-07 | 1.53E-09 | 5.74E-07 | 2.70E-08 | 2.00E-08 | 7.57E-05 | 7.57839E-05 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.14E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 2.50E-07 | 1.44E-09 | 5.38E-07 | 2.54E-08 | 1.87E-08 | 7.10E-05 | 7.10824E-05 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.96E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 2.36E-07 | 1.36E-09 | 5.08E-07 | 2.39E-08 | 1.76E-08 | 6.69E-05 | 6.70479E-05 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.79E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 2.22E-07 | 1.28E-09 | 4.77E-07 | 2.25E-08 | 1.66E-08 | 6.28E-05 | 6.29665E-05 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.61E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 2.06E-07 | 1.19E-09 | 4.43E-07 | 2.09E-08 | 1.54E-08 | 5.85E-05 | 5.8606E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.95E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 3.09E-07 | 1.78E-09 | 6.64E-07 | 3.14E-08 | 2.31E-08 | 8.76E-05 | 8.78876E-05 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.84E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 3.07E-07 | 1.77E-09 | 6.60E-07 | 3.11E-08 | 2.30E-08 | 8.71E-05 | 8.71879E-05 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.63E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 2.91E-07 | 1.67E-09 | 6.26E-07 | 2.95E-08 | 2.18E-08 | 8.26E-05 | 8.26903E-05 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.41E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 2.73E-07 | 1.57E-09 | 5.87E-07 | 2.77E-08 | 2.04E-08 | 7.74E-05 | 7.75121E-05 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.19E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 2.55E-07 | 1.47E-09 | 5.49E-07 | 2.59E-08 | 1.91E-08 | 7.24E-05 | 7.24555E-05 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.99E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 2.38E-07 | 1.37E-09 | 5.13E-07 | 2.42E-08 | 1.78E-08 | 6.76E-05 | 6.77076E-05 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.80E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 2.22E-07 | 1.28E-09 | 4.78E-07 | 2.26E-08 | 1.66E-08 | 6.31E-05 | 6.32098E-05 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.64E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 2.09E-07 | 1.20E-09 | 4.50E-07 | 2.12E-08 | 1.56E-08 | 5.93E-05 | 5.9436E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.49E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 1.96E-07 | 1.13E-09 | 4.22E-07 | 1.99E-08 | 1.47E-08 | 5.57E-05 | 5.5819E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.62E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 2.70E-07 | 1.56E-09 | 5.79E-07 | 2.75E-08 | 2.01E-08 | 7.64E-05 | 7.70155E-05 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.80E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 2.99E-07 | 1.72E-09 | 6.42E-07 | 3.03E-08 | 2.23E-08 | 8.47E-05 | 8.49699E-05 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.68E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 2.96E-07 | 1.70E-09 | 6.37E-07 | 3.00E-08 | 2.22E-08 | 8.40E-05 | 8.40786E-05 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.47E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 2.80E-07 | 1.61E-09 | 6.01E-07 | 2.83E-08 | 2.09E-08 | 7.93E-05 | 7.93599E-05 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.26E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 2.62E-07 | 1.51E-09 | 5.64E-07 | 2.66E-08 | 1.96E-08 | 7.43E-05 | 7.44057E-05 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.06E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 2.46E-07 | 1.41E-09 | 5.29E-07 | 2.49E-08 | 1.84E-08 | 6.98E-05 | 6.98425E-05 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.86E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.28E-07 | 1.31E-09 | 4.91E-07 | 2.32E-08 | 1.71E-08 | 6.48E-05 | 6.48679E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.68E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 2.13E-07 | 1.23E-09 | 4.58E-07 | 2.16E-08 | 1.59E-08 | 6.05E-05 | 6.0564E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.52E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 1.99E-07 | 1.15E-09 | 4.28E-07 | 2.02E-08 | 1.49E-08 | 5.65E-05 | 5.66283E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.36E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 1.86E-07 | 1.07E-09 | 3.99E-07 | 1.88E-08 | 1.39E-08 | 5.27E-05 | 5.28044E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.22E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 1.74E-07 | 1.00E-09 | 3.73E-07 | 1.76E-08 | 1.30E-08 | 4.92E-05 | 4.9372E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.07E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 1.60E-07 | 9.26E-10 | 3.45E-07 | 1.63E-08 | 1.20E-08 | 4.55E-05 | 4.5641E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.86E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 2.98E-07 | 1.72E-09 | 6.40E-07 | 3.03E-08 | 2.22E-08 | 8.44E-05 | 8.48269E-05 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.72E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 2.91E-07 | 1.68E-09 | 6.25E-07 | 2.95E-08 | 2.17E-08 | 8.24E-05 | 8.2707E-05 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.70E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 2.98E-07 | 1.71E-09 | 6.42E-07 | 3.02E-08 | 2.23E-08 | 8.46E-05 | 8.4673E-05 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.52E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 2.85E-07 | 1.64E-09 | 6.14E-07 | 2.89E-08 | 2.13E-08 | 8.09E-05 | 8.09141E-05 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.32E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 2.69E-07 | 1.54E-09 | 5.78E-07 | 2.72E-08 | 2.01E-08 | 7.63E-05 | 7.62938E-05 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.12E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 2.53E-07 | 1.45E-09 | 5.44E-07 | 2.56E-08 | 1.89E-08 | 7.17E-05 | 7.16882E-05 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.93E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 2.36E-07 | 1.36E-09 | 5.08E-07 | 2.39E-08 | 1.77E-08 | 6.70E-05 | 6.70531E-05 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.74E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 2.20E-07 | 1.27E-09 | 4.73E-07 | 2.23E-08 | 1.65E-08 | 6.24E-05 | 6.2486E-05 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.55E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 2.03E-07 | 1.17E-09 | 4.37E-07 | 2.06E-08 | 1.52E-08 | 5.76E-05 | 5.7687E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.36E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 1.86E-07 | 1.07E-09 | 4.00E-07 | 1.89E-08 | 1.39E-08 | 5.28E-05 | 5.29482E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.17E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 1.69E-07 | 9.74E-10 | 3.63E-07 | 1.71E-08 | 1.26E-08 | 4.79E-05 | 4.80575E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.78E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 2.89E-07 | 1.67E-09 | 6.22E-07 | 2.94E-08 | 2.16E-08 | 8.21E-05 | 8.24756E-05 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.74E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 2.95E-07 | 1.70E-09 | 6.35E-07 | 2.99E-08 | 2.21E-08 | 8.37E-05 | 8.39175E-05 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.66E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 2.94E-07 | 1.69E-09 | 6.33E-07 | 2.98E-08 | 2.20E-08 | 8.35E-05 | 8.35447E-05 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.53E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 2.87E-07 | 1.65E-09 | 6.18E-07 | 2.91E-08 | 2.15E-08 | 8.15E-05 | 8.15297E-05 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.36E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 2.74E-07 | 1.57E-09 | 5.91E-07 | 2.78E-08 | 2.06E-08 | 7.79E-05 | 7.78289E-05 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.15E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 2.57E-07 | 1.47E-09 | 5.53E-07 | 2.60E-08 | 1.92E-08 | 7.29E-05 | 7.28852E-05 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.94E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 2.39E-07 | 1.37E-09 | 5.14E-07 | 2.42E-08 | 1.79E-08 | 6.78E-05 | 6.77606E-05 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.71E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 2.18E-07 | 1.25E-09 | 4.68E-07 | 2.21E-08 | 1.63E-08 | 6.18E-05 | 6.18123E-05 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.49E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 1.99E-07 | 1.14E-09 | 4.27E-07 | 2.01E-08 | 1.49E-08 | 5.63E-05 | 5.64412E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.55E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 3.81E-07 | 2.18E-09 | 8.21E-07 | 3.85E-08 | 2.86E-08 | 1.08E-04 | 0.000107918 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.85E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.84E-07 | 2.21E-09 | 8.25E-07 | 3.89E-08 | 2.87E-08 | 1.09E-04 | 0.000109108 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.31E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 3.34E-07 | 1.93E-09 | 7.17E-07 | 3.39E-08 | 2.49E-08 | 9.46E-05 | 9.49771E-05 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.11E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.21E-07 | 1.85E-09 | 6.91E-07 | 3.26E-08 | 2.40E-08 | 9.11E-05 | 9.14318E-05 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.97E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 3.16E-07 | 1.82E-09 | 6.79E-07 | 3.20E-08 | 2.36E-08 | 8.95E-05 | 8.9677E-05 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.80E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 3.05E-07 | 1.76E-09 | 6.57E-07 | 3.09E-08 | 2.28E-08 | 8.66E-05 | 8.66775E-05 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.61E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 2.92E-07 | 1.68E-09 | 6.27E-07 | 2.95E-08 | 2.18E-08 | 8.27E-05 | 8.27653E-05 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 2.98E-07 | 1.70E-09 | 6.40E-07 | 3.01E-08 | 2.23E-08 | 8.44E-05 | 8.4289E-05 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.37E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 2.78E-07 | 1.60E-09 | 5.99E-07 | 2.82E-08 | 2.09E-08 | 7.90E-05 | 7.88859E-05 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.12E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 2.56E-07 | 1.47E-09 | 5.51E-07 | 2.59E-08 | 1.92E-08 | 7.26E-05 | 7.25093E-05 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.87E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 2.33E-07 | 1.34E-09 | 5.02E-07 | 2.36E-08 | 1.75E-08 | 6.62E-05 | 6.62045E-05 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.63E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 2.12E-07 | 1.22E-09 | 4.56E-07 | 2.15E-08 | 1.59E-08 | 6.02E-05 | 6.02105E-05 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.41E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 1.92E-07 | 1.11E-09 | 4.14E-07 | 1.95E-08 | 1.44E-08 | 5.45E-05 | 5.46395E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 5.00E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 4.01E-07 | 2.31E-09 | 8.62E-07 | 4.06E-08 | 3.00E-08 | 1.14E-04 | 0.000113835 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.79E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 3.77E-07 | 2.17E-09 | 8.10E-07 | 3.82E-08 | 2.82E-08 | 1.07E-04 | 0.000107159 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.86E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.91E-07 | 2.25E-09 | 8.40E-07 | 3.96E-08 | 2.92E-08 | 1.11E-04 | 0.000110907 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.77E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.91E-07 | 2.24E-09 | 8.42E-07 | 3.96E-08 | 2.93E-08 | 1.11E-04 | 0.00011092 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.69E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.92E-07 | 2.24E-09 | 8.44E-07 | 3.97E-08 | 2.94E-08 | 1.11E-04 | 0.000111024 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.26E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.53E-07 | 2.02E-09 | 7.61E-07 | 3.57E-08 | 2.65E-08 | 1.00E-04 | 0.000100098 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.16E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.50E-07 | 2.00E-09 | 7.53E-07 | 3.54E-08 | 2.63E-08 | 9.93E-05 | 9.90007E-05 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.92E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.31E-07 | 1.89E-09 | 7.12E-07 | 3.34E-08 | 2.48E-08 | 9.39E-05 | 9.35852E-05 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.63E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 3.05E-07 | 1.75E-09 | 6.57E-07 | 3.09E-08 | 2.29E-08 | 8.66E-05 | 8.64067E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.34E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 2.79E-07 | 1.60E-09 | 6.00E-07 | 2.82E-08 | 2.09E-08 | 7.91E-05 | 7.89552E-05 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.06E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 2.53E-07 | 1.45E-09 | 5.44E-07 | 2.56E-08 | 1.90E-08 | 7.18E-05 | 7.16507E-05 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.80E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.29E-07 | 1.31E-09 | 4.92E-07 | 2.32E-08 | 1.71E-08 | 6.49E-05 | 6.48741E-05 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.56E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 2.07E-07 | 1.19E-09 | 4.46E-07 | 2.10E-08 | 1.55E-08 | 5.88E-05 | 5.87864E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.34E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 1.87E-07 | 1.08E-09 | 4.03E-07 | 1.90E-08 | 1.40E-08 | 5.31E-05 | 5.31934E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.13E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 1.68E-07 | 9.67E-10 | 3.61E-07 | 1.70E-08 | 1.25E-08 | 4.76E-05 | 4.7719E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.90E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 1.47E-07 | 8.48E-10 | 3.15E-07 | 1.49E-08 | 1.09E-08 | 4.16E-05 | 4.18032E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.85E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 5.87E-07 | 3.35E-09 | 1.27E-06 | 5.93E-08 | 4.42E-08 | 1.67E-04 | 0.000165961 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.44E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 5.54E-07 | 3.16E-09 | 1.19E-06 | 5.59E-08 | 4.16E-08 | 1.57E-04 | 0.00015644 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.58E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.68E-07 | 2.68E-09 | 1.01E-06 | 4.73E-08 | 3.52E-08 | 1.33E-04 | 0.000132518 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 5.01E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 4.16E-07 | 2.38E-09 | 8.96E-07 | 4.21E-08 | 3.12E-08 | 1.18E-04 | 0.0001179 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.86E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 4.10E-07 | 2.34E-09 | 8.82E-07 | 4.14E-08 | 3.07E-08 | 1.16E-04 | 0.000115862 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.70E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 4.01E-07 | 2.29E-09 | 8.63E-07 | 4.05E-08 | 3.01E-08 | 1.14E-04 | 0.000113302 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.56E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 3.93E-07 | 2.24E-09 | 8.47E-07 | 3.97E-08 | 2.96E-08 | 1.12E-04 | 0.000111111 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.24E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.65E-07 | 2.08E-09 | 7.86E-07 | 3.68E-08 | 2.74E-08 | 1.04E-04 | 0.000103041 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.94E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.38E-07 | 1.93E-09 | 7.27E-07 | 3.41E-08 | 2.54E-08 | 9.58E-05 | 9.54113E-05 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.62E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 3.09E-07 | 1.76E-09 | 6.65E-07 | 3.12E-08 | 2.32E-08 | 8.76E-05 | 8.72524E-05 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.30E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 2.79E-07 | 1.59E-09 | 6.01E-07 | 2.82E-08 | 2.10E-08 | 7.92E-05 | 7.8917E-05 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 3.00E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 2.51E-07 | 1.43E-09 | 5.40E-07 | 2.53E-08 | 1.88E-08 | 7.11E-05 | 7.09428E-05 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.73E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 2.25E-07 | 1.29E-09 | 4.85E-07 | 2.28E-08 | 1.69E-08 | 6.39E-05 | 6.3824E-05 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.48E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 2.02E-07 | 1.16E-09 | 4.34E-07 | 2.04E-08 | 1.51E-08 | 5.73E-05 | 5.72384E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.26E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 1.81E-07 | 1.04E-09 | 3.90E-07 | 1.84E-08 | 1.36E-08 | 5.15E-05 | 5.15119E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.06E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 1.64E-07 | 9.42E-10 | 3.52E-07 | 1.66E-08 | 1.22E-08 | 4.64E-05 | 4.65101E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.89E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 1.48E-07 | 8.51E-10 | 3.17E-07 | 1.50E-08 | 1.10E-08 | 4.18E-05 | 4.19794E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.24E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 6.51E-07 | 3.70E-09 | 1.40E-06 | 6.56E-08 | 4.91E-08 | 1.85E-04 | 0.000183347 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.71E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 6.03E-07 | 3.42E-09 | 1.30E-06 | 6.07E-08 | 4.54E-08 | 1.71E-04 | 0.000169708 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.78E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 5.10E-07 | 2.90E-09 | 1.10E-06 | 5.14E-08 | 3.84E-08 | 1.45E-04 | 0.000143811 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.36E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 4.72E-07 | 2.68E-09 | 1.02E-06 | 4.76E-08 | 3.55E-08 | 1.34E-04 | 0.000133092 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.14E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.56E-07 | 2.59E-09 | 9.84E-07 | 4.60E-08 | 3.44E-08 | 1.30E-04 | 0.00012864 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.70E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 4.15E-07 | 2.36E-09 | 8.95E-07 | 4.19E-08 | 3.13E-08 | 1.18E-04 | 0.000117132 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.28E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 3.76E-07 | 2.14E-09 | 8.10E-07 | 3.79E-08 | 2.83E-08 | 1.07E-04 | 0.000105973 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.91E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.41E-07 | 1.94E-09 | 7.35E-07 | 3.44E-08 | 2.57E-08 | 9.68E-05 | 9.62608E-05 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.57E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 3.08E-07 | 1.76E-09 | 6.65E-07 | 3.11E-08 | 2.32E-08 | 8.75E-05 | 8.71055E-05 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.23E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 2.76E-07 | 1.58E-09 | 5.95E-07 | 2.79E-08 | 2.08E-08 | 7.84E-05 | 7.81252E-05 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.90E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 2.45E-07 | 1.40E-09 | 5.29E-07 | 2.48E-08 | 1.84E-08 | 6.97E-05 | 6.94313E-05 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.61E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.17E-07 | 1.24E-09 | 4.68E-07 | 2.20E-08 | 1.63E-08 | 6.17E-05 | 6.15612E-05 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.35E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 1.93E-07 | 1.11E-09 | 4.16E-07 | 1.96E-08 | 1.45E-08 | 5.48E-05 | 5.47926E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.14E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 1.73E-07 | 9.93E-10 | 3.72E-07 | 1.75E-08 | 1.29E-08 | 4.90E-05 | 4.90631E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.95E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 1.56E-07 | 8.97E-10 | 3.36E-07 | 1.58E-08 | 1.17E-08 | 4.42E-05 | 4.43086E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.80E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 1.42E-07 | 8.17E-10 | 3.05E-07 | 1.44E-08 | 1.06E-08 | 4.02E-05 | 4.03211E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.60E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 1.24E-07 | 7.15E-10 | 2.66E-07 | 1.26E-08 | 9.24E-09 | 3.51E-05 | 3.52756E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.35E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 6.67E-07 | 3.78E-09 | 1.44E-06 | 6.71E-08 | 5.03E-08 | 1.89E-04 | 0.00018759 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.98E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 6.36E-07 | 3.60E-09 | 1.37E-06 | 6.40E-08 | 4.80E-08 | 1.81E-04 | 0.000178914 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.48E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 5.91E-07 | 3.35E-09 | 1.27E-06 | 5.94E-08 | 4.46E-08 | 1.68E-04 | 0.000166218 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.85E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 5.31E-07 | 3.01E-09 | 1.14E-06 | 5.34E-08 | 4.00E-08 | 1.51E-04 | 0.000149325 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.24E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.72E-07 | 2.68E-09 | 1.02E-06 | 4.75E-08 | 3.56E-08 | 1.34E-04 | 0.000132813 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.70E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 4.21E-07 | 2.39E-09 | 9.06E-07 | 4.24E-08 | 3.17E-08 | 1.19E-04 | 0.000118457 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.25E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.77E-07 | 2.14E-09 | 8.13E-07 | 3.80E-08 | 2.84E-08 | 1.07E-04 | 0.000106296 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.85E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.39E-07 | 1.93E-09 | 7.31E-07 | 3.42E-08 | 2.55E-08 | 9.62E-05 | 9.56221E-05 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.46E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 3.01E-07 | 1.72E-09 | 6.49E-07 | 3.04E-08 | 2.27E-08 | 8.55E-05 | 8.50552E-05 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.08E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 2.65E-07 | 1.51E-09 | 5.70E-07 | 2.67E-08 | 1.99E-08 | 7.51E-05 | 7.47802E-05 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.74E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 2.32E-07 | 1.33E-09 | 5.01E-07 | 2.35E-08 | 1.75E-08 | 6.60E-05 | 6.57254E-05 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.45E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 2.05E-07 | 1.17E-09 | 4.41E-07 | 2.07E-08 | 1.54E-08 | 5.82E-05 | 5.80372E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.21E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 1.82E-07 | 1.04E-09 | 3.92E-07 | 1.84E-08 | 1.37E-08 | 5.17E-05 | 5.16169E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 2.01E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 1.64E-07 | 9.41E-10 | 3.53E-07 | 1.66E-08 | 1.23E-08 | 4.65E-05 | 4.64915E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.85E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 1.48E-07 | 8.53E-10 | 3.19E-07 | 1.50E-08 | 1.11E-08 | 4.21E-05 | 4.21265E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.71E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 1.36E-07 | 7.81E-10 | 2.92E-07 | 1.38E-08 | 1.01E-08 | 3.85E-05 | 3.85737E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.59E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 1.25E-07 | 7.21E-10 | 2.69E-07 | 1.27E-08 | 9.35E-09 | 3.55E-05 | 3.55988E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 6.88E-07 | 3.89E-09 | 1.48E-06 | 6.91E-08 | 5.19E-08 | 1.95E-04 | 0.000193276 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.89E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 6.37E-07 | 3.60E-09 | 1.37E-06 | 6.40E-08 | 4.81E-08 | 1.81E-04 | 0.000178897 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 6.06E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 5.55E-07 | 3.15E-09 | 1.20E-06 | 5.59E-08 | 4.19E-08 | 1.58E-04 | 0.000156176 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.33E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.84E-07 | 2.74E-09 | 1.04E-06 | 4.87E-08 | 3.65E-08 | 1.37E-04 | 0.000136122 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.73E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 4.25E-07 | 2.41E-09 | 9.17E-07 | 4.28E-08 | 3.21E-08 | 1.21E-04 | 0.000119775 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.22E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.76E-07 | 2.14E-09 | 8.11E-07 | 3.79E-08 | 2.84E-08 | 1.07E-04 | 0.000106031 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.73E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 3.29E-07 | 1.87E-09 | 7.10E-07 | 3.32E-08 | 2.48E-08 | 9.35E-05 | 9.28527E-05 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.28E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 2.86E-07 | 1.63E-09 | 6.15E-07 | 2.88E-08 | 2.15E-08 | 8.10E-05 | 8.05694E-05 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.89E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 2.48E-07 | 1.41E-09 | 5.34E-07 | 2.50E-08 | 1.86E-08 | 7.03E-05 | 7.00355E-05 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.57E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 2.17E-07 | 1.24E-09 | 4.68E-07 | 2.19E-08 | 1.63E-08 | 6.16E-05 | 6.14268E-05 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.30E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 1.92E-07 | 1.10E-09 | 4.13E-07 | 1.94E-08 | 1.44E-08 | 5.44E-05 | 5.43319E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.08E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 1.72E-07 | 9.84E-10 | 3.70E-07 | 1.74E-08 | 1.29E-08 | 4.87E-05 | 4.86575E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.90E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 1.55E-07 | 8.89E-10 | 3.33E-07 | 1.57E-08 | 1.16E-08 | 4.40E-05 | 4.39464E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.75E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 1.41E-07 | 8.09E-10 | 3.03E-07 | 1.43E-08 | 1.05E-08 | 3.99E-05 | 3.99606E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.61E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 1.28E-07 | 7.38E-10 | 2.76E-07 | 1.30E-08 | 9.59E-09 | 3.64E-05 | 3.64438E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.49E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 1.17E-07 | 6.76E-10 | 2.52E-07 | 1.19E-08 | 8.77E-09 | 3.33E-05 | 3.33813E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 1.01E-04 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 9.49E-07 | 5.36E-09 | 2.05E-06 | 9.53E-08 | 7.17E-08 | 2.69E-04 | 0.000266299 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.77E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 9.20E-07 | 5.20E-09 | 1.98E-06 | 9.24E-08 | 6.96E-08 | 2.61E-04 | 0.000258242 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.23E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 8.70E-07 | 4.91E-09 | 1.88E-06 | 8.73E-08 | 6.58E-08 | 2.47E-04 | 0.000244079 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.29E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 7.78E-07 | 4.40E-09 | 1.68E-06 | 7.82E-08 | 5.88E-08 | 2.21E-04 | 0.000218484 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.29E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 6.80E-07 | 3.84E-09 | 1.47E-06 | 6.83E-08 | 5.14E-08 | 1.93E-04 | 0.000190901 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.27E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 5.79E-07 | 3.28E-09 | 1.25E-06 | 5.82E-08 | 4.37E-08 | 1.64E-04 | 0.000162688 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.47E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 5.00E-07 | 2.83E-09 | 1.08E-06 | 5.03E-08 | 3.78E-08 | 1.42E-04 | 0.000140693 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.75E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.29E-07 | 2.43E-09 | 9.25E-07 | 4.32E-08 | 3.24E-08 | 1.22E-04 | 0.000120754 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.12E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.67E-07 | 2.09E-09 | 7.91E-07 | 3.70E-08 | 2.77E-08 | 1.04E-04 | 0.000103443 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.55E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 3.12E-07 | 1.77E-09 | 6.72E-07 | 3.14E-08 | 2.35E-08 | 8.85E-05 | 8.79541E-05 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.09E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 2.68E-07 | 1.53E-09 | 5.77E-07 | 2.70E-08 | 2.01E-08 | 7.60E-05 | 7.55875E-05 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.73E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 2.33E-07 | 1.33E-09 | 5.01E-07 | 2.35E-08 | 1.75E-08 | 6.60E-05 | 6.57798E-05 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.43E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 2.04E-07 | 1.17E-09 | 4.40E-07 | 2.07E-08 | 1.53E-08 | 5.80E-05 | 5.78374E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.19E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 1.81E-07 | 1.04E-09 | 3.90E-07 | 1.83E-08 | 1.36E-08 | 5.14E-05 | 5.13435E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.98E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 1.62E-07 | 9.30E-10 | 3.49E-07 | 1.64E-08 | 1.21E-08 | 4.60E-05 | 4.59627E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.80E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 1.45E-07 | 8.34E-10 | 3.12E-07 | 1.47E-08 | 1.09E-08 | 4.12E-05 | 4.12016E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.64E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 1.31E-07 | 7.54E-10 | 2.82E-07 | 1.33E-08 | 9.80E-09 | 3.72E-05 | 3.72342E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.51E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 1.19E-07 | 6.86E-10 | 2.56E-07 | 1.21E-08 | 8.89E-09 | 3.37E-05 | 3.38392E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.40E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 1.09E-07 | 6.26E-10 | 2.33E-07 | 1.10E-08 | 8.10E-09 | 3.08E-05 | 3.08876E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.28E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 1.24E-06 | 6.96E-09 | 2.67E-06 | 1.24E-07 | 9.36E-08 | 3.51E-04 | 0.000346365 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.19E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 1.14E-06 | 6.45E-09 | 2.47E-06 | 1.15E-07 | 8.67E-08 | 3.25E-04 | 0.000320727 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.02E-04 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 9.72E-07 | 5.48E-09 | 2.10E-06 | 9.75E-08 | 7.36E-08 | 2.76E-04 | 0.000272468 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.96E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 8.53E-07 | 4.81E-09 | 1.84E-06 | 8.56E-08 | 6.46E-08 | 2.42E-04 | 0.000239299 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.61E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 7.17E-07 | 4.05E-09 | 1.55E-06 | 7.21E-08 | 5.43E-08 | 2.04E-04 | 0.000201375 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.50E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 6.05E-07 | 3.42E-09 | 1.31E-06 | 6.08E-08 | 4.58E-08 | 1.72E-04 | 0.000170032 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.52E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 5.08E-07 | 2.88E-09 | 1.10E-06 | 5.11E-08 | 3.84E-08 | 1.44E-04 | 0.000142815 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.64E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.20E-07 | 2.38E-09 | 9.04E-07 | 4.22E-08 | 3.16E-08 | 1.19E-04 | 0.000118082 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.92E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.48E-07 | 1.98E-09 | 7.51E-07 | 3.51E-08 | 2.62E-08 | 9.89E-05 | 9.81609E-05 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.36E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 2.94E-07 | 1.67E-09 | 6.33E-07 | 2.96E-08 | 2.21E-08 | 8.34E-05 | 8.28779E-05 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.94E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 2.53E-07 | 1.44E-09 | 5.44E-07 | 2.55E-08 | 1.90E-08 | 7.16E-05 | 7.13315E-05 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.60E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 2.19E-07 | 1.25E-09 | 4.72E-07 | 2.22E-08 | 1.65E-08 | 6.23E-05 | 6.20621E-05 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.31E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 1.92E-07 | 1.10E-09 | 4.13E-07 | 1.94E-08 | 1.44E-08 | 5.45E-05 | 5.43505E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.07E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 1.69E-07 | 9.72E-10 | 3.65E-07 | 1.72E-08 | 1.27E-08 | 4.81E-05 | 4.80478E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.86E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 1.50E-07 | 8.63E-10 | 3.23E-07 | 1.52E-08 | 1.12E-08 | 4.26E-05 | 4.26529E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.69E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 1.34E-07 | 7.73E-10 | 2.89E-07 | 1.36E-08 | 1.00E-08 | 3.81E-05 | 3.81578E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.55E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 1.21E-07 | 6.99E-10 | 2.61E-07 | 1.23E-08 | 9.05E-09 | 3.44E-05 | 3.44852E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.43E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 1.10E-07 | 6.37E-10 | 2.37E-07 | 1.12E-08 | 8.22E-09 | 3.13E-05 | 3.13932E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.32E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 1.01E-07 | 5.83E-10 | 2.17E-07 | 1.03E-08 | 7.52E-09 | 2.86E-05 | 2.87445E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.54E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 1.51E-06 | 8.49E-09 | 3.26E-06 | 1.51E-07 | 1.14E-07 | 4.29E-04 | 0.00042266 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.51E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 1.49E-06 | 8.37E-09 | 3.21E-06 | 1.49E-07 | 1.13E-07 | 4.22E-04 | 0.000416397 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.44E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 1.41E-06 | 7.96E-09 | 3.05E-06 | 1.42E-07 | 1.07E-07 | 4.02E-04 | 0.000395975 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.38E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 1.35E-06 | 7.60E-09 | 2.92E-06 | 1.35E-07 | 1.02E-07 | 3.84E-04 | 0.000378139 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.19E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 1.16E-06 | 6.54E-09 | 2.51E-06 | 1.17E-07 | 8.81E-08 | 3.30E-04 | 0.000325486 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.68E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 9.36E-07 | 5.27E-09 | 2.02E-06 | 9.38E-08 | 7.09E-08 | 2.66E-04 | 0.000262133 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.91E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 7.55E-07 | 4.26E-09 | 1.63E-06 | 7.58E-08 | 5.71E-08 | 2.14E-04 | 0.000211729 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.53E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 6.15E-07 | 3.47E-09 | 1.33E-06 | 6.18E-08 | 4.65E-08 | 1.75E-04 | 0.00017261 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.29E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 4.90E-07 | 2.77E-09 | 1.06E-06 | 4.92E-08 | 3.70E-08 | 1.39E-04 | 0.000137624 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.34E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.94E-07 | 2.23E-09 | 8.49E-07 | 3.96E-08 | 2.97E-08 | 1.12E-04 | 0.000110848 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.69E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 3.29E-07 | 1.87E-09 | 7.08E-07 | 3.31E-08 | 2.48E-08 | 9.32E-05 | 9.25748E-05 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.16E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 2.75E-07 | 1.57E-09 | 5.93E-07 | 2.78E-08 | 2.07E-08 | 7.81E-05 | 7.77095E-05 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.74E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 2.34E-07 | 1.34E-09 | 5.05E-07 | 2.37E-08 | 1.76E-08 | 6.65E-05 | 6.62299E-05 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.41E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 2.02E-07 | 1.16E-09 | 4.35E-07 | 2.04E-08 | 1.52E-08 | 5.74E-05 | 5.72076E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.14E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 1.76E-07 | 1.01E-09 | 3.79E-07 | 1.78E-08 | 1.32E-08 | 5.00E-05 | 4.99617E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.93E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 1.56E-07 | 8.95E-10 | 3.35E-07 | 1.58E-08 | 1.17E-08 | 4.42E-05 | 4.41969E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.74E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 1.38E-07 | 7.94E-10 | 2.97E-07 | 1.40E-08 | 1.03E-08 | 3.91E-05 | 3.91984E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.59E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 1.24E-07 | 7.15E-10 | 2.66E-07 | 1.26E-08 | 9.25E-09 | 3.51E-05 | 3.52606E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.46E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 1.12E-07 | 6.49E-10 | 2.41E-07 | 1.14E-08 | 8.38E-09 | 3.19E-05 | 3.20098E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.36E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 1.03E-07 | 5.96E-10 | 2.21E-07 | 1.05E-08 | 7.67E-09 | 2.92E-05 | 2.93487E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.27E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 9.50E-08 | 5.51E-10 | 2.04E-07 | 9.67E-09 | 7.07E-09 | 2.69E-05 | 2.71195E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.66E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 1.64E-06 | 9.22E-09 | 3.54E-06 | 1.64E-07 | 1.24E-07 | 4.66E-04 | 0.000458922 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.60E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 1.59E-06 | 8.92E-09 | 3.43E-06 | 1.59E-07 | 1.20E-07 | 4.51E-04 | 0.000444188 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.60E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 1.59E-06 | 8.93E-09 | 3.43E-06 | 1.59E-07 | 1.21E-07 | 4.52E-04 | 0.0004449 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.33E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 1.32E-06 | 7.40E-09 | 2.84E-06 | 1.32E-07 | 9.98E-08 | 3.74E-04 | 0.000368326 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.02E-04 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 9.94E-07 | 5.59E-09 | 2.15E-06 | 9.96E-08 | 7.53E-08 | 2.82E-04 | 0.000278227 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.93E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 7.66E-07 | 4.32E-09 | 1.65E-06 | 7.69E-08 | 5.80E-08 | 2.18E-04 | 0.000214709 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.21E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 5.90E-07 | 3.33E-09 | 1.27E-06 | 5.92E-08 | 4.47E-08 | 1.68E-04 | 0.000165532 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.93E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 4.60E-07 | 2.60E-09 | 9.91E-07 | 4.62E-08 | 3.47E-08 | 1.30E-04 | 0.000129062 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 4.00E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.65E-07 | 2.07E-09 | 7.88E-07 | 3.68E-08 | 2.76E-08 | 1.04E-04 | 0.000102765 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.34E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 2.98E-07 | 1.69E-09 | 6.43E-07 | 3.00E-08 | 2.25E-08 | 8.46E-05 | 8.4011E-05 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.85E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 2.49E-07 | 1.42E-09 | 5.37E-07 | 2.52E-08 | 1.88E-08 | 7.08E-05 | 7.03674E-05 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.49E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 2.13E-07 | 1.22E-09 | 4.59E-07 | 2.15E-08 | 1.60E-08 | 6.04E-05 | 6.01785E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.20E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 1.84E-07 | 1.05E-09 | 3.95E-07 | 1.86E-08 | 1.38E-08 | 5.21E-05 | 5.19762E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.96E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 1.61E-07 | 9.22E-10 | 3.46E-07 | 1.63E-08 | 1.20E-08 | 4.56E-05 | 4.5565E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.78E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 1.43E-07 | 8.21E-10 | 3.07E-07 | 1.45E-08 | 1.07E-08 | 4.05E-05 | 4.05331E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.63E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 1.29E-07 | 7.40E-10 | 2.76E-07 | 1.30E-08 | 9.60E-09 | 3.64E-05 | 3.65378E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.51E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 1.17E-07 | 6.75E-10 | 2.51E-07 | 1.19E-08 | 8.72E-09 | 3.32E-05 | 3.32799E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.40E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 1.08E-07 | 6.22E-10 | 2.31E-07 | 1.09E-08 | 8.02E-09 | 3.05E-05 | 3.06731E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.32E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 1.00E-07 | 5.79E-10 | 2.15E-07 | 1.02E-08 | 7.45E-09 | 2.84E-05 | 2.85422E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.25E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 9.34E-08 | 5.42E-10 | 2.01E-07 | 9.51E-09 | 6.95E-09 | 2.65E-05 | 2.66691E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.37E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 2.38E-06 | 1.33E-08 | 5.14E-06 | 2.38E-07 | 1.81E-07 | 6.76E-04 | 0.000664939 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 2.02E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 2.03E-06 | 1.14E-08 | 4.38E-06 | 2.03E-07 | 1.54E-07 | 5.76E-04 | 0.000566779 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.49E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 1.48E-06 | 8.34E-09 | 3.21E-06 | 1.49E-07 | 1.13E-07 | 4.22E-04 | 0.000415108 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.05E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 1.03E-06 | 5.81E-09 | 2.23E-06 | 1.04E-07 | 7.84E-08 | 2.94E-04 | 0.000289451 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.45E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 7.25E-07 | 4.08E-09 | 1.56E-06 | 7.26E-08 | 5.49E-08 | 2.06E-04 | 0.00020292 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.49E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 5.24E-07 | 2.95E-09 | 1.13E-06 | 5.26E-08 | 3.97E-08 | 1.49E-04 | 0.000146905 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.28E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 4.01E-07 | 2.27E-09 | 8.65E-07 | 4.03E-08 | 3.03E-08 | 1.14E-04 | 0.000112629 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.47E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 3.18E-07 | 1.80E-09 | 6.86E-07 | 3.20E-08 | 2.40E-08 | 9.04E-05 | 8.9522E-05 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.91E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 2.61E-07 | 1.48E-09 | 5.63E-07 | 2.63E-08 | 1.97E-08 | 7.41E-05 | 7.35783E-05 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.51E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 2.20E-07 | 1.25E-09 | 4.75E-07 | 2.22E-08 | 1.66E-08 | 6.25E-05 | 6.21386E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.21E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 1.90E-07 | 1.08E-09 | 4.09E-07 | 1.92E-08 | 1.43E-08 | 5.39E-05 | 5.36795E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.99E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 1.67E-07 | 9.57E-10 | 3.60E-07 | 1.69E-08 | 1.26E-08 | 4.75E-05 | 4.73676E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.82E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 1.50E-07 | 8.60E-10 | 3.23E-07 | 1.52E-08 | 1.12E-08 | 4.26E-05 | 4.25029E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.68E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 1.36E-07 | 7.83E-10 | 2.93E-07 | 1.38E-08 | 1.02E-08 | 3.87E-05 | 3.86792E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.56E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 1.25E-07 | 7.20E-10 | 2.69E-07 | 1.27E-08 | 9.37E-09 | 3.55E-05 | 3.55642E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.47E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 1.16E-07 | 6.68E-10 | 2.49E-07 | 1.18E-08 | 8.66E-09 | 3.29E-05 | 3.29658E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.38E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 1.08E-07 | 6.23E-10 | 2.32E-07 | 1.10E-08 | 8.06E-09 | 3.06E-05 | 3.07181E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.31E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 1.01E-07 | 5.85E-10 | 2.18E-07 | 1.03E-08 | 7.56E-09 | 2.87E-05 | 2.88669E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.25E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 9.51E-08 | 5.50E-10 | 2.04E-07 | 9.67E-09 | 7.09E-09 | 2.70E-05 | 2.7126E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.47E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 3.51E-06 | 1.97E-08 | 7.58E-06 | 3.51E-07 | 2.66E-07 | 9.96E-04 | 0.000980109 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.91E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 3.96E-06 | 2.22E-08 | 8.56E-06 | 3.97E-07 | 3.01E-07 | 1.13E-03 | 0.001107168 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.51E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 3.55E-06 | 1.99E-08 | 7.68E-06 | 3.56E-07 | 2.70E-07 | 1.01E-03 | 0.000992822 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.66E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 2.68E-06 | 1.50E-08 | 5.79E-06 | 2.68E-07 | 2.04E-07 | 7.62E-04 | 0.00074953 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.62E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 1.62E-06 | 9.09E-09 | 3.50E-06 | 1.62E-07 | 1.23E-07 | 4.60E-04 | 0.000452577 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.73E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 9.62E-07 | 5.40E-09 | 2.08E-06 | 9.63E-08 | 7.29E-08 | 2.73E-04 | 0.000269082 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.34E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 6.16E-07 | 3.47E-09 | 1.33E-06 | 6.18E-08 | 4.67E-08 | 1.75E-04 | 0.00017254 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.61E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 4.39E-07 | 2.47E-09 | 9.47E-07 | 4.40E-08 | 3.32E-08 | 1.25E-04 | 0.000123047 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.60E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 3.37E-07 | 1.90E-09 | 7.27E-07 | 3.38E-08 | 2.55E-08 | 9.56E-05 | 9.45918E-05 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.97E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 2.73E-07 | 1.55E-09 | 5.88E-07 | 2.74E-08 | 2.06E-08 | 7.75E-05 | 7.67348E-05 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.56E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.31E-07 | 1.31E-09 | 4.97E-07 | 2.32E-08 | 1.74E-08 | 6.55E-05 | 6.49344E-05 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.27E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 2.01E-07 | 1.14E-09 | 4.33E-07 | 2.02E-08 | 1.51E-08 | 5.70E-05 | 5.66086E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.04E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 1.78E-07 | 1.02E-09 | 3.84E-07 | 1.80E-08 | 1.34E-08 | 5.06E-05 | 5.0322E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.88E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 1.61E-07 | 9.19E-10 | 3.47E-07 | 1.63E-08 | 1.21E-08 | 4.57E-05 | 4.55214E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.73E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 1.47E-07 | 8.38E-10 | 3.16E-07 | 1.48E-08 | 1.10E-08 | 4.16E-05 | 4.14888E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.62E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.35E-07 | 7.72E-10 | 2.90E-07 | 1.36E-08 | 1.01E-08 | 3.83E-05 | 3.82013E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.52E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 1.25E-07 | 7.16E-10 | 2.69E-07 | 1.26E-08 | 9.36E-09 | 3.54E-05 | 3.53979E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.43E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 1.16E-07 | 6.67E-10 | 2.50E-07 | 1.18E-08 | 8.69E-09 | 3.29E-05 | 3.29459E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.35E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 1.08E-07 | 6.22E-10 | 2.33E-07 | 1.10E-08 | 8.09E-09 | 3.07E-05 | 3.0702E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.28E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 1.01E-07 | 5.83E-10 | 2.17E-07 | 1.03E-08 | 7.56E-09 | 2.87E-05 | 2.87556E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.22E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 9.50E-08 | 5.48E-10 | 2.04E-07 | 9.64E-09 | 7.09E-09 | 2.69E-05 | 2.70332E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.87E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 7.00E-06 | 3.92E-08 | 1.51E-05 | 7.00E-07 | 5.32E-07 | 1.99E-03 | 0.00195483 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.34E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 7.48E-06 | 4.19E-08 | 1.62E-05 | 7.48E-07 | 5.68E-07 | 2.12E-03 | 0.002088157 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.54E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 6.66E-06 | 3.73E-08 | 1.44E-05 | 6.67E-07 | 5.06E-07 | 1.89E-03 | 0.001860672 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.44E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 3.49E-06 | 1.96E-08 | 7.54E-06 | 3.49E-07 | 2.65E-07 | 9.91E-04 | 0.000974608 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.40E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 1.40E-06 | 7.88E-09 | 3.03E-06 | 1.41E-07 | 1.07E-07 | 3.99E-04 | 0.000392601 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.59E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 7.45E-07 | 4.19E-09 | 1.61E-06 | 7.46E-08 | 5.65E-08 | 2.11E-04 | 0.000208465 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.13E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 4.94E-07 | 2.78E-09 | 1.07E-06 | 4.95E-08 | 3.74E-08 | 1.40E-04 | 0.000138435 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.95E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.74E-07 | 2.11E-09 | 8.08E-07 | 3.76E-08 | 2.83E-08 | 1.06E-04 | 0.000105038 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.25E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 3.04E-07 | 1.72E-09 | 6.56E-07 | 3.06E-08 | 2.30E-08 | 8.63E-05 | 8.53947E-05 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.78E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 2.56E-07 | 1.45E-09 | 5.53E-07 | 2.58E-08 | 1.94E-08 | 7.28E-05 | 7.20874E-05 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.43E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 2.21E-07 | 1.25E-09 | 4.77E-07 | 2.23E-08 | 1.67E-08 | 6.28E-05 | 6.22625E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.16E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 1.95E-07 | 1.10E-09 | 4.19E-07 | 1.96E-08 | 1.47E-08 | 5.52E-05 | 5.47837E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.95E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 1.73E-07 | 9.84E-10 | 3.73E-07 | 1.74E-08 | 1.30E-08 | 4.91E-05 | 4.87834E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.78E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 1.56E-07 | 8.87E-10 | 3.36E-07 | 1.57E-08 | 1.17E-08 | 4.42E-05 | 4.39826E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.64E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 1.42E-07 | 8.07E-10 | 3.05E-07 | 1.43E-08 | 1.06E-08 | 4.02E-05 | 3.99684E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.52E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 1.30E-07 | 7.41E-10 | 2.80E-07 | 1.31E-08 | 9.76E-09 | 3.68E-05 | 3.67017E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.43E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 1.20E-07 | 6.86E-10 | 2.58E-07 | 1.21E-08 | 9.01E-09 | 3.40E-05 | 3.39555E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.34E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 1.12E-07 | 6.39E-10 | 2.40E-07 | 1.13E-08 | 8.36E-09 | 3.16E-05 | 3.1582E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.27E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 1.04E-07 | 5.97E-10 | 2.24E-07 | 1.05E-08 | 7.79E-09 | 2.95E-05 | 2.94978E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.21E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 9.73E-08 | 5.59E-10 | 2.09E-07 | 9.86E-09 | 7.28E-09 | 2.76E-05 | 2.76089E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.15E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 9.15E-08 | 5.26E-10 | 1.97E-07 | 9.27E-09 | 6.84E-09 | 2.59E-05 | 2.59837E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.83E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 1.87E-05 | 1.05E-07 | 4.04E-05 | 1.87E-06 | 1.42E-06 | 5.31E-03 | 0.005220444 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.40E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 2.46E-05 | 1.38E-07 | 5.30E-05 | 2.46E-06 | 1.87E-06 | 6.97E-03 | 0.006855536 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.79E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 2.86E-05 | 1.60E-07 | 6.17E-05 | 2.86E-06 | 2.17E-06 | 8.11E-03 | 0.007976618 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.24E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 2.26E-06 | 1.27E-08 | 4.87E-06 | 2.26E-07 | 1.71E-07 | 6.41E-04 | 0.000630394 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.68E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 9.58E-07 | 5.38E-09 | 2.07E-06 | 9.59E-08 | 7.26E-08 | 2.72E-04 | 0.000267904 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.27E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 6.10E-07 | 3.43E-09 | 1.32E-06 | 6.12E-08 | 4.62E-08 | 1.73E-04 | 0.000170917 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.64E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 4.45E-07 | 2.51E-09 | 9.61E-07 | 4.47E-08 | 3.37E-08 | 1.26E-04 | 0.000124859 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.69E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.49E-07 | 1.97E-09 | 7.52E-07 | 3.50E-08 | 2.64E-08 | 9.90E-05 | 9.78568E-05 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.05E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 2.85E-07 | 1.61E-09 | 6.14E-07 | 2.86E-08 | 2.15E-08 | 8.08E-05 | 7.99383E-05 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.59E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 2.39E-07 | 1.35E-09 | 5.16E-07 | 2.41E-08 | 1.81E-08 | 6.79E-05 | 6.72485E-05 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.26E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 2.06E-07 | 1.17E-09 | 4.44E-07 | 2.07E-08 | 1.55E-08 | 5.84E-05 | 5.78773E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 2.00E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 1.80E-07 | 1.02E-09 | 3.88E-07 | 1.81E-08 | 1.36E-08 | 5.11E-05 | 5.07347E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.80E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 1.60E-07 | 9.09E-10 | 3.45E-07 | 1.61E-08 | 1.21E-08 | 4.54E-05 | 4.51005E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.63E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 1.44E-07 | 8.18E-10 | 3.10E-07 | 1.45E-08 | 1.08E-08 | 4.08E-05 | 4.05581E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.50E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 1.30E-07 | 7.43E-10 | 2.81E-07 | 1.32E-08 | 9.82E-09 | 3.70E-05 | 3.68139E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.39E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 1.20E-07 | 6.82E-10 | 2.58E-07 | 1.21E-08 | 9.00E-09 | 3.40E-05 | 3.38041E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.30E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 1.11E-07 | 6.34E-10 | 2.39E-07 | 1.12E-08 | 8.34E-09 | 3.15E-05 | 3.13662E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.23E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 1.03E-07 | 5.89E-10 | 2.22E-07 | 1.04E-08 | 7.74E-09 | 2.92E-05 | 2.91611E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.16E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 9.66E-08 | 5.53E-10 | 2.08E-07 | 9.77E-09 | 7.25E-09 | 2.74E-05 | 2.73603E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.11E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 9.07E-08 | 5.20E-10 | 1.95E-07 | 9.18E-09 | 6.80E-09 | 2.57E-05 | 2.57216E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.05E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 8.55E-08 | 4.91E-10 | 1.84E-07 | 8.66E-09 | 6.40E-09 | 2.42E-05 | 2.42553E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 3.00E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 3.04E-06 | 1.70E-08 | 6.56E-06 | 3.04E-07 | 2.31E-07 | 8.63E-04 | 0.000848614 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.40E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 2.42E-06 | 1.36E-08 | 5.22E-06 | 2.42E-07 | 1.84E-07 | 6.87E-04 | 0.000676005 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.30E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 1.29E-06 | 7.26E-09 | 2.79E-06 | 1.30E-07 | 9.81E-08 | 3.67E-04 | 0.000361674 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.31E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 8.17E-07 | 4.60E-09 | 1.76E-06 | 8.19E-08 | 6.20E-08 | 2.32E-04 | 0.000228737 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 6.05E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 5.87E-07 | 3.31E-09 | 1.27E-06 | 5.89E-08 | 4.45E-08 | 1.67E-04 | 0.000164491 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.61E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 4.41E-07 | 2.49E-09 | 9.52E-07 | 4.43E-08 | 3.34E-08 | 1.25E-04 | 0.000123663 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.67E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.47E-07 | 1.96E-09 | 7.48E-07 | 3.48E-08 | 2.62E-08 | 9.84E-05 | 9.72529E-05 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 3.04E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 2.83E-07 | 1.60E-09 | 6.10E-07 | 2.84E-08 | 2.14E-08 | 8.03E-05 | 7.94758E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.57E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 2.37E-07 | 1.34E-09 | 5.11E-07 | 2.38E-08 | 1.79E-08 | 6.72E-05 | 6.65754E-05 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.23E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 2.03E-07 | 1.15E-09 | 4.37E-07 | 2.04E-08 | 1.53E-08 | 5.76E-05 | 5.70755E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.97E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 1.77E-07 | 1.00E-09 | 3.81E-07 | 1.78E-08 | 1.33E-08 | 5.02E-05 | 4.97562E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 1.56E-07 | 8.87E-10 | 3.36E-07 | 1.57E-08 | 1.18E-08 | 4.43E-05 | 4.39774E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.58E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 1.40E-07 | 7.95E-10 | 3.01E-07 | 1.41E-08 | 1.05E-08 | 3.97E-05 | 3.93969E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.45E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 1.26E-07 | 7.19E-10 | 2.72E-07 | 1.27E-08 | 9.51E-09 | 3.58E-05 | 3.56428E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.33E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 1.15E-07 | 6.56E-10 | 2.48E-07 | 1.16E-08 | 8.66E-09 | 3.27E-05 | 3.25149E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.23E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 1.06E-07 | 6.02E-10 | 2.27E-07 | 1.07E-08 | 7.93E-09 | 3.00E-05 | 2.98223E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.16E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 9.86E-08 | 5.63E-10 | 2.12E-07 | 9.95E-09 | 7.40E-09 | 2.80E-05 | 2.78599E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.09E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 9.22E-08 | 5.27E-10 | 1.98E-07 | 9.31E-09 | 6.92E-09 | 2.62E-05 | 2.60728E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.04E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 8.70E-08 | 4.98E-10 | 1.87E-07 | 8.80E-09 | 6.53E-09 | 2.47E-05 | 2.46328E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.96E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 8.24E-08 | 4.72E-10 | 1.77E-07 | 8.34E-09 | 6.18E-09 | 2.34E-05 | 2.33524E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.48E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 7.76E-08 | 4.45E-10 | 1.67E-07 | 7.86E-09 | 5.82E-09 | 2.20E-05 | 2.20083E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.12E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 2.89E-07 | 1.64E-09 | 6.24E-07 | 2.91E-08 | 2.19E-08 | 8.21E-05 | 8.12939E-05 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.90E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 1.69E-07 | 9.60E-10 | 3.64E-07 | 1.70E-08 | 1.27E-08 | 4.80E-05 | 4.76317E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.71E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 1.51E-07 | 8.59E-10 | 3.25E-07 | 1.52E-08 | 1.14E-08 | 4.29E-05 | 4.25713E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.55E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.35E-07 | 7.70E-10 | 2.91E-07 | 1.36E-08 | 1.02E-08 | 3.84E-05 | 3.81435E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.41E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 1.22E-07 | 6.96E-10 | 2.63E-07 | 1.23E-08 | 9.19E-09 | 3.47E-05 | 3.44914E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.28E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 1.10E-07 | 6.27E-10 | 2.37E-07 | 1.11E-08 | 8.27E-09 | 3.12E-05 | 3.10651E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.18E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 1.00E-07 | 5.73E-10 | 2.16E-07 | 1.01E-08 | 7.54E-09 | 2.85E-05 | 2.83568E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.09E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 9.21E-08 | 5.26E-10 | 1.98E-07 | 9.31E-09 | 6.92E-09 | 2.61E-05 | 2.60479E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.02E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 8.55E-08 | 4.89E-10 | 1.84E-07 | 8.64E-09 | 6.42E-09 | 2.43E-05 | 2.41993E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.59E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 7.99E-08 | 4.58E-10 | 1.72E-07 | 8.08E-09 | 6.00E-09 | 2.27E-05 | 2.26332E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.15E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 7.58E-08 | 4.34E-10 | 1.63E-07 | 7.67E-09 | 5.69E-09 | 2.15E-05 | 2.14784E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.75E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 7.20E-08 | 4.13E-10 | 1.55E-07 | 7.29E-09 | 5.40E-09 | 2.04E-05 | 2.0406E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.32E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 6.79E-08 | 3.90E-10 | 1.46E-07 | 6.88E-09 | 5.09E-09 | 1.93E-05 | 1.9265E-05 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2026

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 1.698E-04 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2026_PAVED | 1.681E-04 | 8.77E-08 | 5.26E-08 | 8.77E-08 | 5.61E-08 | 1.75E-06 | 1.61E-07 | 9.82E-09 | 3.79E-06 | 1.75E-07 | 1.33E-07 | 4.98E-04 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.96E-04 | 1.01E-07 | 6.05E-08 | 1.01E-07 | 2.01E-06 | 1.13E-08 | 4.35E-06 | 2.02E-07 | 1.53E-07 | 5.72E-04 | 0.000562168 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.35E-04 | 6.70E-08 | 4.02E-08 | 6.70E-08 | 1.34E-06 | 7.52E-09 | 2.88E-06 | 1.34E-07 | 1.01E-07 | 3.79E-04 | 0.000373653 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.24E-05 | 3.69E-09 | 2.21E-09 | 3.69E-09 | 7.10E-08 | 4.28E-10 | 1.51E-07 | 7.38E-09 | 5.15E-09 | 2.01E-05 | 2.07762E-05 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.56E-05 | 6.54E-09 | 3.92E-09 | 6.54E-09 | 1.29E-07 | 7.41E-10 | 2.78E-07 | 1.31E-08 | 9.68E-09 | 3.66E-05 | 3.65857E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 6.23E-04 | 3.23E-07 | 1.94E-07 | 3.23E-07 | 6.46E-06 | 3.62E-08 | 1.39E-05 | 6.46E-07 | 4.91E-07 | 1.83E-03 | 0.001800882 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.26E-03 | 6.55E-07 | 3.93E-07 | 6.55E-07 | 1.31E-05 | 7.34E-08 | 2.83E-05 | 1.31E-06 | 9.95E-07 | 3.72E-03 | 0.003651404 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.74E-04 | 2.97E-07 | 1.78E-07 | 2.97E-07 | 5.95E-06 | 3.33E-08 | 1.28E-05 | 5.95E-07 | 4.52E-07 | 1.69E-03 | 0.001658802 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.52E-03 | 7.93E-07 | 4.76E-07 | 7.93E-07 | 1.59E-05 | 8.88E-08 | 3.43E-05 | 1.59E-06 | 1.21E-06 | 4.50E-03 | 0.004421965 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.05E-04 | 5.04E-08 | 3.02E-08 | 5.04E-08 | 1.00E-06 | 5.67E-09 | 2.16E-06 | 1.01E-07 | 7.59E-08 | 2.85E-04 | 0.000281308 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.04E-04 | 1.56E-07 | 9.37E-08 | 1.56E-07 | 3.12E-06 | 1.75E-08 | 6.74E-06 | 3.12E-07 | 2.37E-07 | 8.86E-04 | 0.000871184 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.16E-05 | 3.59E-08 | 2.15E-08 | 3.59E-08 | 7.16E-07 | 4.03E-09 | 1.55E-06 | 7.18E-08 | 5.43E-08 | 2.03E-04 | 0.00020017 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.74E-05 | 1.55E-08 | 9.29E-09 | 1.55E-08 | 3.06E-07 | 1.76E-09 | 6.57E-07 | 3.10E-08 | 2.29E-08 | 8.67E-05 | 8.66504E-05 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 3.50E-05 | 1.45E-08 | 8.67E-09 | 1.45E-08 | 2.85E-07 | 1.64E-09 | 6.14E-07 | 2.89E-08 | 2.13E-08 | 8.09E-05 | 8.09003E-05 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 3.29E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 2.67E-07 | 1.53E-09 | 5.74E-07 | 2.70E-08 | 2.00E-08 | 7.57E-05 | 7.56935E-05 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 3.09E-05 | 1.27E-08 | 7.61E-09 | 1.27E-08 | 2.50E-07 | 1.44E-09 | 5.38E-07 | 2.54E-08 | 1.87E-08 | 7.10E-05 | 7.09977E-05 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.92E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 2.36E-07 | 1.36E-09 | 5.08E-07 | 2.39E-08 | 1.76E-08 | 6.69E-05 | 6.69681E-05 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.75E-05 | 1.12E-08 | 6.74E-09 | 1.12E-08 | 2.22E-07 | 1.28E-09 | 4.77E-07 | 2.25E-08 | 1.66E-08 | 6.28E-05 | 6.28916E-05 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.58E-05 | 1.05E-08 | 6.27E-09 | 1.05E-08 | 2.06E-07 | 1.19E-09 | 4.43E-07 | 2.09E-08 | 1.54E-08 | 5.85E-05 | 5.85363E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.90E-05 | 1.57E-08 | 9.41E-09 | 1.57E-08 | 3.09E-07 | 1.78E-09 | 6.64E-07 | 3.14E-08 | 2.31E-08 | 8.76E-05 | 8.77832E-05 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 3.07E-07 | 1.77E-09 | 6.60E-07 | 3.11E-08 | 2.30E-08 | 8.71E-05 | 8.70841E-05 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 3.58E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 2.91E-07 | 1.67E-09 | 6.26E-07 | 2.95E-08 | 2.18E-08 | 8.26E-05 | 8.25917E-05 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 3.36E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 2.73E-07 | 1.57E-09 | 5.87E-07 | 2.77E-08 | 2.04E-08 | 7.74E-05 | 7.74196E-05 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 3.14E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 2.55E-07 | 1.47E-09 | 5.49E-07 | 2.59E-08 | 1.91E-08 | 7.24E-05 | 7.23692E-05 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.95E-05 | 1.21E-08 | 7.25E-09 | 1.21E-08 | 2.38E-07 | 1.37E-09 | 5.13E-07 | 2.42E-08 | 1.78E-08 | 6.76E-05 | 6.7627E-05 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.76E-05 | 1.13E-08 | 6.77E-09 | 1.13E-08 | 2.22E-07 | 1.28E-09 | 4.78E-07 | 2.26E-08 | 1.66E-08 | 6.31E-05 | 6.31346E-05 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.61E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 2.09E-07 | 1.20E-09 | 4.50E-07 | 2.12E-08 | 1.56E-08 | 5.93E-05 | 5.93652E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 2.46E-05 | 9.96E-09 | 5.98E-09 | 9.96E-09 | 1.96E-07 | 1.13E-09 | 4.22E-07 | 1.99E-08 | 1.47E-08 | 5.57E-05 | 5.57526E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 3.57E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 2.70E-07 | 1.56E-09 | 5.79E-07 | 2.75E-08 | 2.01E-08 | 7.64E-05 | 7.69247E-05 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.75E-05 | 1.52E-08 | 9.10E-09 | 1.52E-08 | 2.99E-07 | 1.72E-09 | 6.42E-07 | 3.03E-08 | 2.23E-08 | 8.47E-05 | 8.48689E-05 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 3.63E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 2.96E-07 | 1.70E-09 | 6.37E-07 | 3.00E-08 | 2.22E-08 | 8.40E-05 | 8.39783E-05 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 3.42E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 2.80E-07 | 1.61E-09 | 6.01E-07 | 2.83E-08 | 2.09E-08 | 7.93E-05 | 7.92652E-05 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 3.21E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 2.62E-07 | 1.51E-09 | 5.64E-07 | 2.66E-08 | 1.96E-08 | 7.43E-05 | 7.43169E-05 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 3.02E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 2.46E-07 | 1.41E-09 | 5.29E-07 | 2.49E-08 | 1.84E-08 | 6.98E-05 | 6.97592E-05 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.82E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.28E-07 | 1.31E-09 | 4.91E-07 | 2.32E-08 | 1.71E-08 | 6.48E-05 | 6.47906E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.64E-05 | 1.08E-08 | 6.48E-09 | 1.08E-08 | 2.13E-07 | 1.23E-09 | 4.58E-07 | 2.16E-08 | 1.59E-08 | 6.05E-05 | 6.04919E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.48E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 1.99E-07 | 1.15E-09 | 4.28E-07 | 2.02E-08 | 1.49E-08 | 5.65E-05 | 5.65609E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 2.33E-05 | 9.42E-09 | 5.65E-09 | 9.42E-09 | 1.86E-07 | 1.07E-09 | 3.99E-07 | 1.88E-08 | 1.39E-08 | 5.27E-05 | 5.27417E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 2.19E-05 | 8.81E-09 | 5.28E-09 | 8.81E-09 | 1.74E-07 | 1.00E-09 | 3.73E-07 | 1.76E-08 | 1.30E-08 | 4.92E-05 | 4.93134E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 2.04E-05 | 8.14E-09 | 4.88E-09 | 8.14E-09 | 1.60E-07 | 9.26E-10 | 3.45E-07 | 1.63E-08 | 1.20E-08 | 4.55E-05 | 4.55869E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.81E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 2.98E-07 | 1.72E-09 | 6.40E-07 | 3.03E-08 | 2.22E-08 | 8.44E-05 | 8.47264E-05 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 3.67E-05 | 1.48E-08 | 8.85E-09 | 1.48E-08 | 2.91E-07 | 1.68E-09 | 6.25E-07 | 2.95E-08 | 2.17E-08 | 8.24E-05 | 8.26088E-05 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 3.65E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 2.98E-07 | 1.71E-09 | 6.42E-07 | 3.02E-08 | 2.23E-08 | 8.46E-05 | 8.45719E-05 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 3.47E-05 | 1.44E-08 | 8.67E-09 | 1.44E-08 | 2.85E-07 | 1.64E-09 | 6.14E-07 | 2.89E-08 | 2.13E-08 | 8.09E-05 | 8.08174E-05 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 3.27E-05 | 1.36E-08 | 8.17E-09 | 1.36E-08 | 2.69E-07 | 1.54E-09 | 5.78E-07 | 2.72E-08 | 2.01E-08 | 7.63E-05 | 7.62027E-05 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 3.08E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 2.53E-07 | 1.45E-09 | 5.44E-07 | 2.56E-08 | 1.89E-08 | 7.17E-05 | 7.16026E-05 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.89E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 2.36E-07 | 1.36E-09 | 5.08E-07 | 2.39E-08 | 1.77E-08 | 6.70E-05 | 6.69731E-05 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.70E-05 | 1.12E-08 | 6.69E-09 | 1.12E-08 | 2.20E-07 | 1.27E-09 | 4.73E-07 | 2.23E-08 | 1.65E-08 | 6.24E-05 | 6.24115E-05 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.51E-05 | 1.03E-08 | 6.18E-09 | 1.03E-08 | 2.03E-07 | 1.17E-09 | 4.37E-07 | 2.06E-08 | 1.52E-08 | 5.76E-05 | 5.76183E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 2.33E-05 | 9.45E-09 | 5.67E-09 | 9.45E-09 | 1.86E-07 | 1.07E-09 | 4.00E-07 | 1.89E-08 | 1.39E-08 | 5.28E-05 | 5.28852E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 2.14E-05 | 8.57E-09 | 5.14E-09 | 8.57E-09 | 1.69E-07 | 9.74E-10 | 3.63E-07 | 1.71E-08 | 1.26E-08 | 4.79E-05 | 4.80005E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 3.73E-05 | 1.47E-08 | 8.82E-09 | 1.47E-08 | 2.89E-07 | 1.67E-09 | 6.22E-07 | 2.94E-08 | 2.16E-08 | 8.21E-05 | 8.2378E-05 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 3.69E-05 | 1.50E-08 | 8.98E-09 | 1.50E-08 | 2.95E-07 | 1.70E-09 | 6.35E-07 | 2.99E-08 | 2.21E-08 | 8.37E-05 | 8.38178E-05 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 3.61E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 2.94E-07 | 1.69E-09 | 6.33E-07 | 2.98E-08 | 2.20E-08 | 8.35E-05 | 8.34451E-05 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 3.48E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 2.87E-07 | 1.65E-09 | 6.18E-07 | 2.91E-08 | 2.15E-08 | 8.15E-05 | 8.14323E-05 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 3.31E-05 | 1.39E-08 | 8.34E-09 | 1.39E-08 | 2.74E-07 | 1.57E-09 | 5.91E-07 | 2.78E-08 | 2.06E-08 | 7.79E-05 | 7.77358E-05 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 3.11E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 2.57E-07 | 1.47E-09 | 5.53E-07 | 2.60E-08 | 1.92E-08 | 7.29E-05 | 7.27981E-05 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.90E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 2.39E-07 | 1.37E-09 | 5.14E-07 | 2.42E-08 | 1.79E-08 | 6.78E-05 | 6.76796E-05 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.67E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 2.18E-07 | 1.25E-09 | 4.68E-07 | 2.21E-08 | 1.63E-08 | 6.18E-05 | 6.17386E-05 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.46E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 1.99E-07 | 1.14E-09 | 4.27E-07 | 2.01E-08 | 1.49E-08 | 5.63E-05 | 5.6374E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 4.48E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 3.81E-07 | 2.18E-09 | 8.21E-07 | 3.85E-08 | 2.86E-08 | 1.08E-04 | 0.000107789 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 4.78E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.84E-07 | 2.21E-09 | 8.25E-07 | 3.89E-08 | 2.87E-08 | 1.09E-04 | 0.000108979 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 4.25E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 3.34E-07 | 1.93E-09 | 7.17E-07 | 3.39E-08 | 2.49E-08 | 9.46E-05 | 9.48645E-05 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 4.06E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.21E-07 | 1.85E-09 | 6.91E-07 | 3.26E-08 | 2.40E-08 | 9.11E-05 | 9.13232E-05 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.92E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 3.16E-07 | 1.82E-09 | 6.79E-07 | 3.20E-08 | 2.36E-08 | 8.95E-05 | 8.95702E-05 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.75E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 3.05E-07 | 1.76E-09 | 6.57E-07 | 3.09E-08 | 2.28E-08 | 8.66E-05 | 8.65741E-05 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 3.56E-05 | 1.48E-08 | 8.86E-09 | 1.48E-08 | 2.92E-07 | 1.68E-09 | 6.27E-07 | 2.95E-08 | 2.18E-08 | 8.27E-05 | 8.26665E-05 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 3.55E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 2.98E-07 | 1.70E-09 | 6.40E-07 | 3.01E-08 | 2.23E-08 | 8.44E-05 | 8.4188E-05 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 3.32E-05 | 1.41E-08 | 8.45E-09 | 1.41E-08 | 2.78E-07 | 1.60E-09 | 5.99E-07 | 2.82E-08 | 2.09E-08 | 7.90E-05 | 7.87914E-05 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 3.07E-05 | 1.29E-08 | 7.77E-09 | 1.29E-08 | 2.56E-07 | 1.47E-09 | 5.51E-07 | 2.59E-08 | 1.92E-08 | 7.26E-05 | 7.24225E-05 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.83E-05 | 1.18E-08 | 7.09E-09 | 1.18E-08 | 2.33E-07 | 1.34E-09 | 5.02E-07 | 2.36E-08 | 1.75E-08 | 6.62E-05 | 6.61254E-05 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.60E-05 | 1.07E-08 | 6.45E-09 | 1.07E-08 | 2.12E-07 | 1.22E-09 | 4.56E-07 | 2.15E-08 | 1.59E-08 | 6.02E-05 | 6.01387E-05 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.38E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 1.92E-07 | 1.11E-09 | 4.14E-07 | 1.95E-08 | 1.44E-08 | 5.45E-05 | 5.45744E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.94E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 4.01E-07 | 2.31E-09 | 8.62E-07 | 4.06E-08 | 3.00E-08 | 1.14E-04 | 0.000113699 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 4.72E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 3.77E-07 | 2.17E-09 | 8.10E-07 | 3.82E-08 | 2.82E-08 | 1.07E-04 | 0.000107032 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 4.79E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.91E-07 | 2.25E-09 | 8.40E-07 | 3.96E-08 | 2.92E-08 | 1.11E-04 | 0.000110774 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 4.70E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.91E-07 | 2.24E-09 | 8.42E-07 | 3.96E-08 | 2.93E-08 | 1.11E-04 | 0.000110788 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 4.62E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.92E-07 | 2.24E-09 | 8.44E-07 | 3.97E-08 | 2.94E-08 | 1.11E-04 | 0.00011089 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 4.20E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.53E-07 | 2.02E-09 | 7.61E-07 | 3.57E-08 | 2.65E-08 | 1.00E-04 | 9.99781E-05 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 4.10E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.50E-07 | 2.00E-09 | 7.53E-07 | 3.54E-08 | 2.63E-08 | 9.93E-05 | 9.88817E-05 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.86E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.31E-07 | 1.89E-09 | 7.12E-07 | 3.34E-08 | 2.48E-08 | 9.39E-05 | 9.34728E-05 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.58E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 3.05E-07 | 1.75E-09 | 6.57E-07 | 3.09E-08 | 2.29E-08 | 8.66E-05 | 8.63029E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 3.29E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 2.79E-07 | 1.60E-09 | 6.00E-07 | 2.82E-08 | 2.09E-08 | 7.91E-05 | 7.88605E-05 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 3.02E-05 | 1.28E-08 | 7.68E-09 | 1.28E-08 | 2.53E-07 | 1.45E-09 | 5.44E-07 | 2.56E-08 | 1.90E-08 | 7.18E-05 | 7.15648E-05 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.76E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.29E-07 | 1.31E-09 | 4.92E-07 | 2.32E-08 | 1.71E-08 | 6.49E-05 | 6.47965E-05 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.53E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 2.07E-07 | 1.19E-09 | 4.46E-07 | 2.10E-08 | 1.55E-08 | 5.88E-05 | 5.87162E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.31E-05 | 9.49E-09 | 5.70E-09 | 9.49E-09 | 1.87E-07 | 1.08E-09 | 4.03E-07 | 1.90E-08 | 1.40E-08 | 5.31E-05 | 5.313E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.10E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 1.68E-07 | 9.67E-10 | 3.61E-07 | 1.70E-08 | 1.25E-08 | 4.76E-05 | 4.76622E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.88E-05 | 7.46E-09 | 4.47E-09 | 7.46E-09 | 1.47E-07 | 8.48E-10 | 3.15E-07 | 1.49E-08 | 1.09E-08 | 4.16E-05 | 4.17537E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 6.75E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 5.87E-07 | 3.35E-09 | 1.27E-06 | 5.93E-08 | 4.42E-08 | 1.67E-04 | 0.000165761 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 6.35E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 5.54E-07 | 3.16E-09 | 1.19E-06 | 5.59E-08 | 4.16E-08 | 1.57E-04 | 0.000156252 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 5.50E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.68E-07 | 2.68E-09 | 1.01E-06 | 4.73E-08 | 3.52E-08 | 1.33E-04 | 0.000132358 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.94E-05 | 2.11E-08 | 1.26E-08 | 2.11E-08 | 4.16E-07 | 2.38E-09 | 8.96E-07 | 4.21E-08 | 3.12E-08 | 1.18E-04 | 0.000117759 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.79E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 4.10E-07 | 2.34E-09 | 8.82E-07 | 4.14E-08 | 3.07E-08 | 1.16E-04 | 0.000115723 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 4.64E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 4.01E-07 | 2.29E-09 | 8.63E-07 | 4.05E-08 | 3.01E-08 | 1.14E-04 | 0.000113165 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 4.50E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 3.93E-07 | 2.24E-09 | 8.47E-07 | 3.97E-08 | 2.96E-08 | 1.12E-04 | 0.000110977 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 4.18E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.65E-07 | 2.08E-09 | 7.86E-07 | 3.68E-08 | 2.74E-08 | 1.04E-04 | 0.000102917 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.88E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.38E-07 | 1.93E-09 | 7.27E-07 | 3.41E-08 | 2.54E-08 | 9.58E-05 | 9.52964E-05 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.57E-05 | 1.56E-08 | 9.35E-09 | 1.56E-08 | 3.09E-07 | 1.76E-09 | 6.65E-07 | 3.12E-08 | 2.32E-08 | 8.76E-05 | 8.71473E-05 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 3.25E-05 | 1.41E-08 | 8.46E-09 | 1.41E-08 | 2.79E-07 | 1.59E-09 | 6.01E-07 | 2.82E-08 | 2.10E-08 | 7.92E-05 | 7.88221E-05 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.96E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 2.51E-07 | 1.43E-09 | 5.40E-07 | 2.53E-08 | 1.88E-08 | 7.11E-05 | 7.08577E-05 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.69E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 2.25E-07 | 1.29E-09 | 4.85E-07 | 2.28E-08 | 1.69E-08 | 6.39E-05 | 6.37476E-05 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.44E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 2.02E-07 | 1.16E-09 | 4.34E-07 | 2.04E-08 | 1.51E-08 | 5.73E-05 | 5.717E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.23E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 1.81E-07 | 1.04E-09 | 3.90E-07 | 1.84E-08 | 1.36E-08 | 5.15E-05 | 5.14505E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.04E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 1.64E-07 | 9.42E-10 | 3.52E-07 | 1.66E-08 | 1.22E-08 | 4.64E-05 | 4.64548E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.86E-05 | 7.49E-09 | 4.49E-09 | 7.49E-09 | 1.48E-07 | 8.51E-10 | 3.17E-07 | 1.50E-08 | 1.10E-08 | 4.18E-05 | 4.19296E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 7.13E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 6.51E-07 | 3.70E-09 | 1.40E-06 | 6.56E-08 | 4.91E-08 | 1.85E-04 | 0.000183125 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 6.61E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 6.03E-07 | 3.42E-09 | 1.30E-06 | 6.07E-08 | 4.54E-08 | 1.71E-04 | 0.000169502 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 5.70E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 5.10E-07 | 2.90E-09 | 1.10E-06 | 5.14E-08 | 3.84E-08 | 1.45E-04 | 0.000143637 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 5.28E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 4.72E-07 | 2.68E-09 | 1.02E-06 | 4.76E-08 | 3.55E-08 | 1.34E-04 | 0.000132931 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 5.06E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.56E-07 | 2.59E-09 | 9.84E-07 | 4.60E-08 | 3.44E-08 | 1.30E-04 | 0.000128484 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.63E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 4.15E-07 | 2.36E-09 | 8.95E-07 | 4.19E-08 | 3.13E-08 | 1.18E-04 | 0.000116991 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 4.22E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 3.76E-07 | 2.14E-09 | 8.10E-07 | 3.79E-08 | 2.83E-08 | 1.07E-04 | 0.000105845 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.86E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.41E-07 | 1.94E-09 | 7.35E-07 | 3.44E-08 | 2.57E-08 | 9.68E-05 | 9.61445E-05 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.52E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 3.08E-07 | 1.76E-09 | 6.65E-07 | 3.11E-08 | 2.32E-08 | 8.75E-05 | 8.70005E-05 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 3.18E-05 | 1.40E-08 | 8.37E-09 | 1.40E-08 | 2.76E-07 | 1.58E-09 | 5.95E-07 | 2.79E-08 | 2.08E-08 | 7.84E-05 | 7.80312E-05 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.86E-05 | 1.24E-08 | 7.44E-09 | 1.24E-08 | 2.45E-07 | 1.40E-09 | 5.29E-07 | 2.48E-08 | 1.84E-08 | 6.97E-05 | 6.93479E-05 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.57E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.17E-07 | 1.24E-09 | 4.68E-07 | 2.20E-08 | 1.63E-08 | 6.17E-05 | 6.14873E-05 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.32E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 1.93E-07 | 1.11E-09 | 4.16E-07 | 1.96E-08 | 1.45E-08 | 5.48E-05 | 5.4727E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.11E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 1.73E-07 | 9.93E-10 | 3.72E-07 | 1.75E-08 | 1.29E-08 | 4.90E-05 | 4.90046E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.93E-05 | 7.91E-09 | 4.74E-09 | 7.91E-09 | 1.56E-07 | 8.97E-10 | 3.36E-07 | 1.58E-08 | 1.17E-08 | 4.42E-05 | 4.42558E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.77E-05 | 7.19E-09 | 4.32E-09 | 7.19E-09 | 1.42E-07 | 8.17E-10 | 3.05E-07 | 1.44E-08 | 1.06E-08 | 4.02E-05 | 4.02731E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.58E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 1.24E-07 | 7.15E-10 | 2.66E-07 | 1.26E-08 | 9.24E-09 | 3.51E-05 | 3.52338E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 7.23E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 6.67E-07 | 3.78E-09 | 1.44E-06 | 6.71E-08 | 5.03E-08 | 1.89E-04 | 0.000187363 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.87E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 6.36E-07 | 3.60E-09 | 1.37E-06 | 6.40E-08 | 4.80E-08 | 1.81E-04 | 0.000178697 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 6.38E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 5.91E-07 | 3.35E-09 | 1.27E-06 | 5.94E-08 | 4.46E-08 | 1.68E-04 | 0.000166016 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.76E-05 | 2.67E-08 | 1.60E-08 | 2.67E-08 | 5.31E-07 | 3.01E-09 | 1.14E-06 | 5.34E-08 | 4.00E-08 | 1.51E-04 | 0.000149144 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 5.16E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.72E-07 | 2.68E-09 | 1.02E-06 | 4.75E-08 | 3.56E-08 | 1.34E-04 | 0.000132652 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.63E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 4.21E-07 | 2.39E-09 | 9.06E-07 | 4.24E-08 | 3.17E-08 | 1.19E-04 | 0.000118314 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 4.19E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.77E-07 | 2.14E-09 | 8.13E-07 | 3.80E-08 | 2.84E-08 | 1.07E-04 | 0.000106167 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.79E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.39E-07 | 1.93E-09 | 7.31E-07 | 3.42E-08 | 2.55E-08 | 9.62E-05 | 9.55065E-05 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 3.41E-05 | 1.52E-08 | 9.12E-09 | 1.52E-08 | 3.01E-07 | 1.72E-09 | 6.49E-07 | 3.04E-08 | 2.27E-08 | 8.55E-05 | 8.49525E-05 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 3.03E-05 | 1.34E-08 | 8.02E-09 | 1.34E-08 | 2.65E-07 | 1.51E-09 | 5.70E-07 | 2.67E-08 | 1.99E-08 | 7.51E-05 | 7.46901E-05 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.70E-05 | 1.17E-08 | 7.04E-09 | 1.17E-08 | 2.32E-07 | 1.33E-09 | 5.01E-07 | 2.35E-08 | 1.75E-08 | 6.60E-05 | 6.56464E-05 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.42E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 2.05E-07 | 1.17E-09 | 4.41E-07 | 2.07E-08 | 1.54E-08 | 5.82E-05 | 5.79675E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.18E-05 | 9.22E-09 | 5.53E-09 | 9.22E-09 | 1.82E-07 | 1.04E-09 | 3.92E-07 | 1.84E-08 | 1.37E-08 | 5.17E-05 | 5.15551E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.99E-05 | 8.30E-09 | 4.98E-09 | 8.30E-09 | 1.64E-07 | 9.41E-10 | 3.53E-07 | 1.66E-08 | 1.23E-08 | 4.65E-05 | 4.64359E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.82E-05 | 7.52E-09 | 4.51E-09 | 7.52E-09 | 1.48E-07 | 8.53E-10 | 3.19E-07 | 1.50E-08 | 1.11E-08 | 4.21E-05 | 4.20762E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.69E-05 | 6.88E-09 | 4.13E-09 | 6.88E-09 | 1.36E-07 | 7.81E-10 | 2.92E-07 | 1.38E-08 | 1.01E-08 | 3.85E-05 | 3.85278E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.57E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 1.25E-07 | 7.21E-10 | 2.69E-07 | 1.27E-08 | 9.35E-09 | 3.55E-05 | 3.55565E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 7.33E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 6.88E-07 | 3.89E-09 | 1.48E-06 | 6.91E-08 | 5.19E-08 | 1.95E-04 | 0.000193041 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.78E-05 | 3.20E-08 | 1.92E-08 | 3.20E-08 | 6.37E-07 | 3.60E-09 | 1.37E-06 | 6.40E-08 | 4.81E-08 | 1.81E-04 | 0.00017868 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.97E-05 | 2.79E-08 | 1.68E-08 | 2.79E-08 | 5.55E-07 | 3.15E-09 | 1.20E-06 | 5.59E-08 | 4.19E-08 | 1.58E-04 | 0.000155986 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 5.24E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.84E-07 | 2.74E-09 | 1.04E-06 | 4.87E-08 | 3.65E-08 | 1.37E-04 | 0.000135957 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.65E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 4.25E-07 | 2.41E-09 | 9.17E-07 | 4.28E-08 | 3.21E-08 | 1.21E-04 | 0.00011963 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 4.15E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.76E-07 | 2.14E-09 | 8.11E-07 | 3.79E-08 | 2.84E-08 | 1.07E-04 | 0.000105902 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.67E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 3.29E-07 | 1.87E-09 | 7.10E-07 | 3.32E-08 | 2.48E-08 | 9.35E-05 | 9.27404E-05 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 3.23E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 2.86E-07 | 1.63E-09 | 6.15E-07 | 2.88E-08 | 2.15E-08 | 8.10E-05 | 8.04721E-05 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.84E-05 | 1.25E-08 | 7.51E-09 | 1.25E-08 | 2.48E-07 | 1.41E-09 | 5.34E-07 | 2.50E-08 | 1.86E-08 | 7.03E-05 | 6.99511E-05 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.53E-05 | 1.10E-08 | 6.58E-09 | 1.10E-08 | 2.17E-07 | 1.24E-09 | 4.68E-07 | 2.19E-08 | 1.63E-08 | 6.16E-05 | 6.13529E-05 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.27E-05 | 9.70E-09 | 5.82E-09 | 9.70E-09 | 1.92E-07 | 1.10E-09 | 4.13E-07 | 1.94E-08 | 1.44E-08 | 5.44E-05 | 5.42668E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.05E-05 | 8.69E-09 | 5.21E-09 | 8.69E-09 | 1.72E-07 | 9.84E-10 | 3.70E-07 | 1.74E-08 | 1.29E-08 | 4.87E-05 | 4.85992E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.88E-05 | 7.84E-09 | 4.71E-09 | 7.84E-09 | 1.55E-07 | 8.89E-10 | 3.33E-07 | 1.57E-08 | 1.16E-08 | 4.40E-05 | 4.38939E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.73E-05 | 7.13E-09 | 4.28E-09 | 7.13E-09 | 1.41E-07 | 8.09E-10 | 3.03E-07 | 1.43E-08 | 1.05E-08 | 3.99E-05 | 3.99129E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.59E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 1.28E-07 | 7.38E-10 | 2.76E-07 | 1.30E-08 | 9.59E-09 | 3.64E-05 | 3.64004E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.47E-05 | 5.96E-09 | 3.57E-09 | 5.96E-09 | 1.17E-07 | 6.76E-10 | 2.52E-07 | 1.19E-08 | 8.77E-09 | 3.33E-05 | 3.33416E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 9.95E-05 | 4.76E-08 | 2.86E-08 | 4.76E-08 | 9.49E-07 | 5.36E-09 | 2.05E-06 | 9.53E-08 | 7.17E-08 | 2.69E-04 | 0.000265974 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.62E-05 | 4.62E-08 | 2.77E-08 | 4.62E-08 | 9.20E-07 | 5.20E-09 | 1.98E-06 | 9.24E-08 | 6.96E-08 | 2.61E-04 | 0.000257927 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.08E-05 | 4.37E-08 | 2.62E-08 | 4.37E-08 | 8.70E-07 | 4.91E-09 | 1.88E-06 | 8.73E-08 | 6.58E-08 | 2.47E-04 | 0.000243781 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 8.16E-05 | 3.91E-08 | 2.35E-08 | 3.91E-08 | 7.78E-07 | 4.40E-09 | 1.68E-06 | 7.82E-08 | 5.88E-08 | 2.21E-04 | 0.000218217 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 7.17E-05 | 3.41E-08 | 2.05E-08 | 3.41E-08 | 6.80E-07 | 3.84E-09 | 1.47E-06 | 6.83E-08 | 5.14E-08 | 1.93E-04 | 0.000190668 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 6.17E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 5.79E-07 | 3.28E-09 | 1.25E-06 | 5.82E-08 | 4.37E-08 | 1.64E-04 | 0.00016249 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 5.39E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 5.00E-07 | 2.83E-09 | 1.08E-06 | 5.03E-08 | 3.78E-08 | 1.42E-04 | 0.000140522 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.67E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.29E-07 | 2.43E-09 | 9.25E-07 | 4.32E-08 | 3.24E-08 | 1.22E-04 | 0.000120607 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 4.05E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.67E-07 | 2.09E-09 | 7.91E-07 | 3.70E-08 | 2.77E-08 | 1.04E-04 | 0.000103317 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.50E-05 | 1.57E-08 | 9.43E-09 | 1.57E-08 | 3.12E-07 | 1.77E-09 | 6.72E-07 | 3.14E-08 | 2.35E-08 | 8.85E-05 | 8.78478E-05 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.05E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 2.68E-07 | 1.53E-09 | 5.77E-07 | 2.70E-08 | 2.01E-08 | 7.60E-05 | 7.54964E-05 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.69E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 2.33E-07 | 1.33E-09 | 5.01E-07 | 2.35E-08 | 1.75E-08 | 6.60E-05 | 6.57007E-05 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.40E-05 | 1.03E-08 | 6.20E-09 | 1.03E-08 | 2.04E-07 | 1.17E-09 | 4.40E-07 | 2.07E-08 | 1.53E-08 | 5.80E-05 | 5.77679E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.16E-05 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 1.81E-07 | 1.04E-09 | 3.90E-07 | 1.83E-08 | 1.36E-08 | 5.14E-05 | 5.1282E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.95E-05 | 8.21E-09 | 4.92E-09 | 8.21E-09 | 1.62E-07 | 9.30E-10 | 3.49E-07 | 1.64E-08 | 1.21E-08 | 4.60E-05 | 4.59078E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.77E-05 | 7.35E-09 | 4.41E-09 | 7.35E-09 | 1.45E-07 | 8.34E-10 | 3.12E-07 | 1.47E-08 | 1.09E-08 | 4.12E-05 | 4.11524E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.62E-05 | 6.64E-09 | 3.99E-09 | 6.64E-09 | 1.31E-07 | 7.54E-10 | 2.82E-07 | 1.33E-08 | 9.80E-09 | 3.72E-05 | 3.71899E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.49E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 1.19E-07 | 6.86E-10 | 2.56E-07 | 1.21E-08 | 8.89E-09 | 3.37E-05 | 3.3799E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.38E-05 | 5.51E-09 | 3.31E-09 | 5.51E-09 | 1.09E-07 | 6.26E-10 | 2.33E-07 | 1.10E-08 | 8.10E-09 | 3.08E-05 | 3.0851E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.26E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 1.24E-06 | 6.96E-09 | 2.67E-06 | 1.24E-07 | 9.36E-08 | 3.51E-04 | 0.000345941 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.17E-04 | 5.74E-08 | 3.44E-08 | 5.74E-08 | 1.14E-06 | 6.45E-09 | 2.47E-06 | 1.15E-07 | 8.67E-08 | 3.25E-04 | 0.000320334 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.99E-05 | 4.88E-08 | 2.93E-08 | 4.88E-08 | 9.72E-07 | 5.48E-09 | 2.10E-06 | 9.75E-08 | 7.36E-08 | 2.76E-04 | 0.000272135 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.82E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 8.53E-07 | 4.81E-09 | 1.84E-06 | 8.56E-08 | 6.46E-08 | 2.42E-04 | 0.000239007 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 7.49E-05 | 3.60E-08 | 2.16E-08 | 3.60E-08 | 7.17E-07 | 4.05E-09 | 1.55E-06 | 7.21E-08 | 5.43E-08 | 2.04E-04 | 0.000201129 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 6.39E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 6.05E-07 | 3.42E-09 | 1.31E-06 | 6.08E-08 | 4.58E-08 | 1.72E-04 | 0.000169824 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 5.43E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 5.08E-07 | 2.88E-09 | 1.10E-06 | 5.11E-08 | 3.84E-08 | 1.44E-04 | 0.000142641 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.56E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.20E-07 | 2.38E-09 | 9.04E-07 | 4.22E-08 | 3.16E-08 | 1.19E-04 | 0.000117939 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.86E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.48E-07 | 1.98E-09 | 7.51E-07 | 3.51E-08 | 2.62E-08 | 9.89E-05 | 9.8042E-05 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.31E-05 | 1.48E-08 | 8.89E-09 | 1.48E-08 | 2.94E-07 | 1.67E-09 | 6.33E-07 | 2.96E-08 | 2.21E-08 | 8.34E-05 | 8.27778E-05 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.90E-05 | 1.27E-08 | 7.65E-09 | 1.27E-08 | 2.53E-07 | 1.44E-09 | 5.44E-07 | 2.55E-08 | 1.90E-08 | 7.16E-05 | 7.12456E-05 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.56E-05 | 1.11E-08 | 6.65E-09 | 1.11E-08 | 2.19E-07 | 1.25E-09 | 4.72E-07 | 2.22E-08 | 1.65E-08 | 6.23E-05 | 6.19875E-05 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.27E-05 | 9.71E-09 | 5.82E-09 | 9.71E-09 | 1.92E-07 | 1.10E-09 | 4.13E-07 | 1.94E-08 | 1.44E-08 | 5.45E-05 | 5.42854E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.04E-05 | 8.58E-09 | 5.15E-09 | 8.58E-09 | 1.69E-07 | 9.72E-10 | 3.65E-07 | 1.72E-08 | 1.27E-08 | 4.81E-05 | 4.79903E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.84E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 1.50E-07 | 8.63E-10 | 3.23E-07 | 1.52E-08 | 1.12E-08 | 4.26E-05 | 4.2602E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.67E-05 | 6.81E-09 | 4.09E-09 | 6.81E-09 | 1.34E-07 | 7.73E-10 | 2.89E-07 | 1.36E-08 | 1.00E-08 | 3.81E-05 | 3.81123E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.53E-05 | 6.15E-09 | 3.69E-09 | 6.15E-09 | 1.21E-07 | 6.99E-10 | 2.61E-07 | 1.23E-08 | 9.05E-09 | 3.44E-05 | 3.44443E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.41E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 1.10E-07 | 6.37E-10 | 2.37E-07 | 1.12E-08 | 8.22E-09 | 3.13E-05 | 3.1356E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.30E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 1.01E-07 | 5.83E-10 | 2.17E-07 | 1.03E-08 | 7.52E-09 | 2.86E-05 | 2.87105E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.51E-04 | 7.57E-08 | 4.54E-08 | 7.57E-08 | 1.51E-06 | 8.49E-09 | 3.26E-06 | 1.51E-07 | 1.14E-07 | 4.29E-04 | 0.000422142 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.49E-04 | 7.45E-08 | 4.47E-08 | 7.45E-08 | 1.49E-06 | 8.37E-09 | 3.21E-06 | 1.49E-07 | 1.13E-07 | 4.22E-04 | 0.000415886 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.42E-04 | 7.09E-08 | 4.25E-08 | 7.09E-08 | 1.41E-06 | 7.96E-09 | 3.05E-06 | 1.42E-07 | 1.07E-07 | 4.02E-04 | 0.000395489 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.35E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 1.35E-06 | 7.60E-09 | 2.92E-06 | 1.35E-07 | 1.02E-07 | 3.84E-04 | 0.000377675 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.17E-04 | 5.83E-08 | 3.50E-08 | 5.83E-08 | 1.16E-06 | 6.54E-09 | 2.51E-06 | 1.17E-07 | 8.81E-08 | 3.30E-04 | 0.000325086 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 9.52E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 9.36E-07 | 5.27E-09 | 2.02E-06 | 9.38E-08 | 7.09E-08 | 2.66E-04 | 0.000261812 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.78E-05 | 3.79E-08 | 2.27E-08 | 3.79E-08 | 7.55E-07 | 4.26E-09 | 1.63E-06 | 7.58E-08 | 5.71E-08 | 2.14E-04 | 0.00021147 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 6.42E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 6.15E-07 | 3.47E-09 | 1.33E-06 | 6.18E-08 | 4.65E-08 | 1.75E-04 | 0.000172399 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 5.21E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 4.90E-07 | 2.77E-09 | 1.06E-06 | 4.92E-08 | 3.70E-08 | 1.39E-04 | 0.000137456 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 4.28E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.94E-07 | 2.23E-09 | 8.49E-07 | 3.96E-08 | 2.97E-08 | 1.12E-04 | 0.000110714 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.63E-05 | 1.65E-08 | 9.93E-09 | 1.65E-08 | 3.29E-07 | 1.87E-09 | 7.08E-07 | 3.31E-08 | 2.48E-08 | 9.32E-05 | 9.24627E-05 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.11E-05 | 1.39E-08 | 8.33E-09 | 1.39E-08 | 2.75E-07 | 1.57E-09 | 5.93E-07 | 2.78E-08 | 2.07E-08 | 7.81E-05 | 7.76157E-05 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.70E-05 | 1.18E-08 | 7.10E-09 | 1.18E-08 | 2.34E-07 | 1.34E-09 | 5.05E-07 | 2.37E-08 | 1.76E-08 | 6.65E-05 | 6.61502E-05 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.38E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 2.02E-07 | 1.16E-09 | 4.35E-07 | 2.04E-08 | 1.52E-08 | 5.74E-05 | 5.71389E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.11E-05 | 8.92E-09 | 5.35E-09 | 8.92E-09 | 1.76E-07 | 1.01E-09 | 3.79E-07 | 1.78E-08 | 1.32E-08 | 5.00E-05 | 4.99019E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.90E-05 | 7.89E-09 | 4.73E-09 | 7.89E-09 | 1.56E-07 | 8.95E-10 | 3.35E-07 | 1.58E-08 | 1.17E-08 | 4.42E-05 | 4.41441E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.72E-05 | 6.99E-09 | 4.20E-09 | 6.99E-09 | 1.38E-07 | 7.94E-10 | 2.97E-07 | 1.40E-08 | 1.03E-08 | 3.91E-05 | 3.91517E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.57E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 1.24E-07 | 7.15E-10 | 2.66E-07 | 1.26E-08 | 9.25E-09 | 3.51E-05 | 3.52187E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.44E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 1.12E-07 | 6.49E-10 | 2.41E-07 | 1.14E-08 | 8.38E-09 | 3.19E-05 | 3.19719E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.34E-05 | 5.23E-09 | 3.14E-09 | 5.23E-09 | 1.03E-07 | 5.96E-10 | 2.21E-07 | 1.05E-08 | 7.67E-09 | 2.92E-05 | 2.9314E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.25E-05 | 4.83E-09 | 2.90E-09 | 4.83E-09 | 9.50E-08 | 5.51E-10 | 2.04E-07 | 9.67E-09 | 7.07E-09 | 2.69E-05 | 2.70876E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.63E-04 | 8.22E-08 | 4.93E-08 | 8.22E-08 | 1.64E-06 | 9.22E-09 | 3.54E-06 | 1.64E-07 | 1.24E-07 | 4.66E-04 | 0.000458359 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.58E-04 | 7.95E-08 | 4.77E-08 | 7.95E-08 | 1.59E-06 | 8.92E-09 | 3.43E-06 | 1.59E-07 | 1.20E-07 | 4.51E-04 | 0.000443642 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.57E-04 | 7.97E-08 | 4.78E-08 | 7.97E-08 | 1.59E-06 | 8.93E-09 | 3.43E-06 | 1.59E-07 | 1.21E-07 | 4.52E-04 | 0.000444353 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.31E-04 | 6.59E-08 | 3.96E-08 | 6.59E-08 | 1.32E-06 | 7.40E-09 | 2.84E-06 | 1.32E-07 | 9.98E-08 | 3.74E-04 | 0.000367874 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.99E-05 | 4.98E-08 | 2.99E-08 | 4.98E-08 | 9.94E-07 | 5.59E-09 | 2.15E-06 | 9.96E-08 | 7.53E-08 | 2.82E-04 | 0.000277886 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.80E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 7.66E-07 | 4.32E-09 | 1.65E-06 | 7.69E-08 | 5.80E-08 | 2.18E-04 | 0.000214446 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 6.10E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 5.90E-07 | 3.33E-09 | 1.27E-06 | 5.92E-08 | 4.47E-08 | 1.68E-04 | 0.00016533 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.85E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 4.60E-07 | 2.60E-09 | 9.91E-07 | 4.62E-08 | 3.47E-08 | 1.30E-04 | 0.000128904 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.94E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.65E-07 | 2.07E-09 | 7.88E-07 | 3.68E-08 | 2.76E-08 | 1.04E-04 | 0.00010264 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.29E-05 | 1.50E-08 | 9.01E-09 | 1.50E-08 | 2.98E-07 | 1.69E-09 | 6.43E-07 | 3.00E-08 | 2.25E-08 | 8.46E-05 | 8.39092E-05 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.81E-05 | 1.26E-08 | 7.55E-09 | 1.26E-08 | 2.49E-07 | 1.42E-09 | 5.37E-07 | 2.52E-08 | 1.88E-08 | 7.08E-05 | 7.02824E-05 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.46E-05 | 1.08E-08 | 6.45E-09 | 1.08E-08 | 2.13E-07 | 1.22E-09 | 4.59E-07 | 2.15E-08 | 1.60E-08 | 6.04E-05 | 6.0106E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.16E-05 | 9.28E-09 | 5.57E-09 | 9.28E-09 | 1.84E-07 | 1.05E-09 | 3.95E-07 | 1.86E-08 | 1.38E-08 | 5.21E-05 | 5.19139E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.94E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 1.61E-07 | 9.22E-10 | 3.46E-07 | 1.63E-08 | 1.20E-08 | 4.56E-05 | 4.55105E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.75E-05 | 7.23E-09 | 4.34E-09 | 7.23E-09 | 1.43E-07 | 8.21E-10 | 3.07E-07 | 1.45E-08 | 1.07E-08 | 4.05E-05 | 4.04848E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.61E-05 | 6.52E-09 | 3.91E-09 | 6.52E-09 | 1.29E-07 | 7.40E-10 | 2.76E-07 | 1.30E-08 | 9.60E-09 | 3.64E-05 | 3.64943E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.49E-05 | 5.94E-09 | 3.56E-09 | 5.94E-09 | 1.17E-07 | 6.75E-10 | 2.51E-07 | 1.19E-08 | 8.72E-09 | 3.32E-05 | 3.32404E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.39E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 1.08E-07 | 6.22E-10 | 2.31E-07 | 1.09E-08 | 8.02E-09 | 3.05E-05 | 3.06368E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.30E-05 | 5.09E-09 | 3.05E-09 | 5.09E-09 | 1.00E-07 | 5.79E-10 | 2.15E-07 | 1.02E-08 | 7.45E-09 | 2.84E-05 | 2.85085E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.23E-05 | 4.75E-09 | 2.85E-09 | 4.75E-09 | 9.34E-08 | 5.42E-10 | 2.01E-07 | 9.51E-09 | 6.95E-09 | 2.65E-05 | 2.66377E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.32E-04 | 1.19E-07 | 7.14E-08 | 1.19E-07 | 2.38E-06 | 1.33E-08 | 5.14E-06 | 2.38E-07 | 1.81E-07 | 6.76E-04 | 0.00066412 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.99E-04 | 1.01E-07 | 6.09E-08 | 1.01E-07 | 2.03E-06 | 1.14E-08 | 4.38E-06 | 2.03E-07 | 1.54E-07 | 5.76E-04 | 0.000566082 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.46E-04 | 7.43E-08 | 4.46E-08 | 7.43E-08 | 1.48E-06 | 8.34E-09 | 3.21E-06 | 1.49E-07 | 1.13E-07 | 4.22E-04 | 0.000414598 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.03E-04 | 5.18E-08 | 3.11E-08 | 5.18E-08 | 1.03E-06 | 5.81E-09 | 2.23E-06 | 1.04E-07 | 7.84E-08 | 2.94E-04 | 0.000289096 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 7.33E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 7.25E-07 | 4.08E-09 | 1.56E-06 | 7.26E-08 | 5.49E-08 | 2.06E-04 | 0.000202671 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.40E-05 | 2.63E-08 | 1.58E-08 | 2.63E-08 | 5.24E-07 | 2.95E-09 | 1.13E-06 | 5.26E-08 | 3.97E-08 | 1.49E-04 | 0.000146725 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.22E-05 | 2.01E-08 | 1.21E-08 | 2.01E-08 | 4.01E-07 | 2.27E-09 | 8.65E-07 | 4.03E-08 | 3.03E-08 | 1.14E-04 | 0.000112492 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.42E-05 | 1.60E-08 | 9.61E-09 | 1.60E-08 | 3.18E-07 | 1.80E-09 | 6.86E-07 | 3.20E-08 | 2.40E-08 | 9.04E-05 | 8.94131E-05 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.87E-05 | 1.32E-08 | 7.89E-09 | 1.32E-08 | 2.61E-07 | 1.48E-09 | 5.63E-07 | 2.63E-08 | 1.97E-08 | 7.41E-05 | 7.34891E-05 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.47E-05 | 1.11E-08 | 6.66E-09 | 1.11E-08 | 2.20E-07 | 1.25E-09 | 4.75E-07 | 2.22E-08 | 1.66E-08 | 6.25E-05 | 6.20635E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.18E-05 | 9.59E-09 | 5.75E-09 | 9.59E-09 | 1.90E-07 | 1.08E-09 | 4.09E-07 | 1.92E-08 | 1.43E-08 | 5.39E-05 | 5.36148E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.96E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 1.67E-07 | 9.57E-10 | 3.60E-07 | 1.69E-08 | 1.26E-08 | 4.75E-05 | 4.73107E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.79E-05 | 7.59E-09 | 4.55E-09 | 7.59E-09 | 1.50E-07 | 8.60E-10 | 3.23E-07 | 1.52E-08 | 1.12E-08 | 4.26E-05 | 4.2452E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.65E-05 | 6.90E-09 | 4.14E-09 | 6.90E-09 | 1.36E-07 | 7.83E-10 | 2.93E-07 | 1.38E-08 | 1.02E-08 | 3.87E-05 | 3.8633E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.54E-05 | 6.35E-09 | 3.81E-09 | 6.35E-09 | 1.25E-07 | 7.20E-10 | 2.69E-07 | 1.27E-08 | 9.37E-09 | 3.55E-05 | 3.55218E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.45E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 1.16E-07 | 6.68E-10 | 2.49E-07 | 1.18E-08 | 8.66E-09 | 3.29E-05 | 3.29265E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.37E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 1.08E-07 | 6.23E-10 | 2.32E-07 | 1.10E-08 | 8.06E-09 | 3.06E-05 | 3.06816E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.30E-05 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 1.01E-07 | 5.85E-10 | 2.18E-07 | 1.03E-08 | 7.56E-09 | 2.87E-05 | 2.88327E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.23E-05 | 4.84E-09 | 2.90E-09 | 4.84E-09 | 9.51E-08 | 5.50E-10 | 2.04E-07 | 9.67E-09 | 7.09E-09 | 2.70E-05 | 2.70939E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.41E-04 | 1.76E-07 | 1.05E-07 | 1.76E-07 | 3.51E-06 | 1.97E-08 | 7.58E-06 | 3.51E-07 | 2.66E-07 | 9.96E-04 | 0.000978902 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.84E-04 | 1.98E-07 | 1.19E-07 | 1.98E-07 | 3.96E-06 | 2.22E-08 | 8.56E-06 | 3.97E-07 | 3.01E-07 | 1.13E-03 | 0.001105803 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.45E-04 | 1.78E-07 | 1.07E-07 | 1.78E-07 | 3.55E-06 | 1.99E-08 | 7.68E-06 | 3.56E-07 | 2.70E-07 | 1.01E-03 | 0.000991599 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.61E-04 | 1.34E-07 | 8.05E-08 | 1.34E-07 | 2.68E-06 | 1.50E-08 | 5.79E-06 | 2.68E-07 | 2.04E-07 | 7.62E-04 | 0.000748607 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.59E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 1.62E-06 | 9.09E-09 | 3.50E-06 | 1.62E-07 | 1.23E-07 | 4.60E-04 | 0.00045202 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.56E-05 | 4.82E-08 | 2.89E-08 | 4.82E-08 | 9.62E-07 | 5.40E-09 | 2.08E-06 | 9.63E-08 | 7.29E-08 | 2.73E-04 | 0.000268752 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 6.24E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 6.16E-07 | 3.47E-09 | 1.33E-06 | 6.18E-08 | 4.67E-08 | 1.75E-04 | 0.000172329 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.53E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 4.39E-07 | 2.47E-09 | 9.47E-07 | 4.40E-08 | 3.32E-08 | 1.25E-04 | 0.000122897 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.55E-05 | 1.69E-08 | 1.02E-08 | 1.69E-08 | 3.37E-07 | 1.90E-09 | 7.27E-07 | 3.38E-08 | 2.55E-08 | 9.56E-05 | 9.44764E-05 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.93E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 2.73E-07 | 1.55E-09 | 5.88E-07 | 2.74E-08 | 2.06E-08 | 7.75E-05 | 7.66415E-05 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.52E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.31E-07 | 1.31E-09 | 4.97E-07 | 2.32E-08 | 1.74E-08 | 6.55E-05 | 6.48556E-05 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.23E-05 | 1.01E-08 | 6.07E-09 | 1.01E-08 | 2.01E-07 | 1.14E-09 | 4.33E-07 | 2.02E-08 | 1.51E-08 | 5.70E-05 | 5.65401E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 2.01E-05 | 8.99E-09 | 5.40E-09 | 8.99E-09 | 1.78E-07 | 1.02E-09 | 3.84E-07 | 1.80E-08 | 1.34E-08 | 5.06E-05 | 5.02612E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.85E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 1.61E-07 | 9.19E-10 | 3.47E-07 | 1.63E-08 | 1.21E-08 | 4.57E-05 | 4.54665E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.71E-05 | 7.41E-09 | 4.45E-09 | 7.41E-09 | 1.47E-07 | 8.38E-10 | 3.16E-07 | 1.48E-08 | 1.10E-08 | 4.16E-05 | 4.14389E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.59E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.35E-07 | 7.72E-10 | 2.90E-07 | 1.36E-08 | 1.01E-08 | 3.83E-05 | 3.81555E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.50E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 1.25E-07 | 7.16E-10 | 2.69E-07 | 1.26E-08 | 9.36E-09 | 3.54E-05 | 3.53556E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.41E-05 | 5.88E-09 | 3.53E-09 | 5.88E-09 | 1.16E-07 | 6.67E-10 | 2.50E-07 | 1.18E-08 | 8.69E-09 | 3.29E-05 | 3.29065E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.33E-05 | 5.48E-09 | 3.29E-09 | 5.48E-09 | 1.08E-07 | 6.22E-10 | 2.33E-07 | 1.10E-08 | 8.09E-09 | 3.07E-05 | 3.06654E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.26E-05 | 5.13E-09 | 3.08E-09 | 5.13E-09 | 1.01E-07 | 5.83E-10 | 2.17E-07 | 1.03E-08 | 7.56E-09 | 2.87E-05 | 2.87214E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.20E-05 | 4.82E-09 | 2.89E-09 | 4.82E-09 | 9.50E-08 | 5.48E-10 | 2.04E-07 | 9.64E-09 | 7.09E-09 | 2.69E-05 | 2.70011E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.75E-04 | 3.50E-07 | 2.10E-07 | 3.50E-07 | 7.00E-06 | 3.92E-08 | 1.51E-05 | 7.00E-07 | 5.32E-07 | 1.99E-03 | 0.001952419 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 7.21E-04 | 3.74E-07 | 2.24E-07 | 3.74E-07 | 7.48E-06 | 4.19E-08 | 1.62E-05 | 7.48E-07 | 5.68E-07 | 2.12E-03 | 0.002085582 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.43E-04 | 3.33E-07 | 2.00E-07 | 3.33E-07 | 6.66E-06 | 3.73E-08 | 1.44E-05 | 6.67E-07 | 5.06E-07 | 1.89E-03 | 0.001858378 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.38E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 3.49E-06 | 1.96E-08 | 7.54E-06 | 3.49E-07 | 2.65E-07 | 9.91E-04 | 0.000973406 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.38E-04 | 7.03E-08 | 4.22E-08 | 7.03E-08 | 1.40E-06 | 7.88E-09 | 3.03E-06 | 1.41E-07 | 1.07E-07 | 3.99E-04 | 0.000392118 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.46E-05 | 3.73E-08 | 2.24E-08 | 3.73E-08 | 7.45E-07 | 4.19E-09 | 1.61E-06 | 7.46E-08 | 5.65E-08 | 2.11E-04 | 0.00020821 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 5.05E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 4.94E-07 | 2.78E-09 | 1.07E-06 | 4.95E-08 | 3.74E-08 | 1.40E-04 | 0.000138265 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.89E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.74E-07 | 2.11E-09 | 8.08E-07 | 3.76E-08 | 2.83E-08 | 1.06E-04 | 0.00010491 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 3.20E-05 | 1.53E-08 | 9.17E-09 | 1.53E-08 | 3.04E-07 | 1.72E-09 | 6.56E-07 | 3.06E-08 | 2.30E-08 | 8.63E-05 | 8.52906E-05 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.74E-05 | 1.29E-08 | 7.74E-09 | 1.29E-08 | 2.56E-07 | 1.45E-09 | 5.53E-07 | 2.58E-08 | 1.94E-08 | 7.28E-05 | 7.19997E-05 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.39E-05 | 1.11E-08 | 6.68E-09 | 1.11E-08 | 2.21E-07 | 1.25E-09 | 4.77E-07 | 2.23E-08 | 1.67E-08 | 6.28E-05 | 6.21869E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 2.13E-05 | 9.79E-09 | 5.88E-09 | 9.79E-09 | 1.95E-07 | 1.10E-09 | 4.19E-07 | 1.96E-08 | 1.47E-08 | 5.52E-05 | 5.47172E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.92E-05 | 8.72E-09 | 5.23E-09 | 8.72E-09 | 1.73E-07 | 9.84E-10 | 3.73E-07 | 1.74E-08 | 1.30E-08 | 4.91E-05 | 4.87243E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.75E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 1.56E-07 | 8.87E-10 | 3.36E-07 | 1.57E-08 | 1.17E-08 | 4.42E-05 | 4.39294E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.61E-05 | 7.14E-09 | 4.28E-09 | 7.14E-09 | 1.42E-07 | 8.07E-10 | 3.05E-07 | 1.43E-08 | 1.06E-08 | 4.02E-05 | 3.99202E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.50E-05 | 6.56E-09 | 3.93E-09 | 6.56E-09 | 1.30E-07 | 7.41E-10 | 2.80E-07 | 1.31E-08 | 9.76E-09 | 3.68E-05 | 3.66575E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.41E-05 | 6.06E-09 | 3.64E-09 | 6.06E-09 | 1.20E-07 | 6.86E-10 | 2.58E-07 | 1.21E-08 | 9.01E-09 | 3.40E-05 | 3.39148E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.33E-05 | 5.64E-09 | 3.38E-09 | 5.64E-09 | 1.12E-07 | 6.39E-10 | 2.40E-07 | 1.13E-08 | 8.36E-09 | 3.16E-05 | 3.15442E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.25E-05 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 1.04E-07 | 5.97E-10 | 2.24E-07 | 1.05E-08 | 7.79E-09 | 2.95E-05 | 2.94626E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.19E-05 | 4.93E-09 | 2.96E-09 | 4.93E-09 | 9.73E-08 | 5.59E-10 | 2.09E-07 | 9.86E-09 | 7.28E-09 | 2.76E-05 | 2.7576E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 1.13E-05 | 4.64E-09 | 2.78E-09 | 4.64E-09 | 9.15E-08 | 5.26E-10 | 1.97E-07 | 9.27E-09 | 6.84E-09 | 2.59E-05 | 2.59528E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.80E-03 | 9.35E-07 | 5.61E-07 | 9.35E-07 | 1.87E-05 | 1.05E-07 | 4.04E-05 | 1.87E-06 | 1.42E-06 | 5.31E-03 | 0.005214004 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.36E-03 | 1.23E-06 | 7.37E-07 | 1.23E-06 | 2.46E-05 | 1.38E-07 | 5.30E-05 | 2.46E-06 | 1.87E-06 | 6.97E-03 | 0.006847077 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.74E-03 | 1.43E-06 | 8.57E-07 | 1.43E-06 | 2.86E-05 | 1.60E-07 | 6.17E-05 | 2.86E-06 | 2.17E-06 | 8.11E-03 | 0.007966776 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.20E-04 | 1.13E-07 | 6.77E-08 | 1.13E-07 | 2.26E-06 | 1.27E-08 | 4.87E-06 | 2.26E-07 | 1.71E-07 | 6.41E-04 | 0.000629617 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 9.51E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 9.58E-07 | 5.38E-09 | 2.07E-06 | 9.59E-08 | 7.26E-08 | 2.72E-04 | 0.000267575 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 6.16E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 6.10E-07 | 3.43E-09 | 1.32E-06 | 6.12E-08 | 4.62E-08 | 1.73E-04 | 0.000170707 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.57E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 4.45E-07 | 2.51E-09 | 9.61E-07 | 4.47E-08 | 3.37E-08 | 1.26E-04 | 0.000124706 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.63E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.49E-07 | 1.97E-09 | 7.52E-07 | 3.50E-08 | 2.64E-08 | 9.90E-05 | 9.77373E-05 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 3.00E-05 | 1.43E-08 | 8.58E-09 | 1.43E-08 | 2.85E-07 | 1.61E-09 | 6.14E-07 | 2.86E-08 | 2.15E-08 | 8.08E-05 | 7.98408E-05 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.55E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 2.39E-07 | 1.35E-09 | 5.16E-07 | 2.41E-08 | 1.81E-08 | 6.79E-05 | 6.71667E-05 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.22E-05 | 1.03E-08 | 6.21E-09 | 1.03E-08 | 2.06E-07 | 1.17E-09 | 4.44E-07 | 2.07E-08 | 1.55E-08 | 5.84E-05 | 5.7807E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.97E-05 | 9.07E-09 | 5.44E-09 | 9.07E-09 | 1.80E-07 | 1.02E-09 | 3.88E-07 | 1.81E-08 | 1.36E-08 | 5.11E-05 | 5.06731E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.77E-05 | 8.06E-09 | 4.84E-09 | 8.06E-09 | 1.60E-07 | 9.09E-10 | 3.45E-07 | 1.61E-08 | 1.21E-08 | 4.54E-05 | 4.50459E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.61E-05 | 7.25E-09 | 4.35E-09 | 7.25E-09 | 1.44E-07 | 8.18E-10 | 3.10E-07 | 1.45E-08 | 1.08E-08 | 4.08E-05 | 4.05091E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.47E-05 | 6.58E-09 | 3.95E-09 | 6.58E-09 | 1.30E-07 | 7.43E-10 | 2.81E-07 | 1.32E-08 | 9.82E-09 | 3.70E-05 | 3.67694E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.37E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 1.20E-07 | 6.82E-10 | 2.58E-07 | 1.21E-08 | 9.00E-09 | 3.40E-05 | 3.37634E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.28E-05 | 5.60E-09 | 3.36E-09 | 5.60E-09 | 1.11E-07 | 6.34E-10 | 2.39E-07 | 1.12E-08 | 8.34E-09 | 3.15E-05 | 3.13284E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.21E-05 | 5.21E-09 | 3.12E-09 | 5.21E-09 | 1.03E-07 | 5.89E-10 | 2.22E-07 | 1.04E-08 | 7.74E-09 | 2.92E-05 | 2.91261E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.15E-05 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 9.66E-08 | 5.53E-10 | 2.08E-07 | 9.77E-09 | 7.25E-09 | 2.74E-05 | 2.73275E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 1.09E-05 | 4.59E-09 | 2.76E-09 | 4.59E-09 | 9.07E-08 | 5.20E-10 | 1.95E-07 | 9.18E-09 | 6.80E-09 | 2.57E-05 | 2.56908E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 1.04E-05 | 4.33E-09 | 2.60E-09 | 4.33E-09 | 8.55E-08 | 4.91E-10 | 1.84E-07 | 8.66E-09 | 6.40E-09 | 2.42E-05 | 2.42264E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.95E-04 | 1.52E-07 | 9.12E-08 | 1.52E-07 | 3.04E-06 | 1.70E-08 | 6.56E-06 | 3.04E-07 | 2.31E-07 | 8.63E-04 | 0.000847568 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.36E-04 | 1.21E-07 | 7.26E-08 | 1.21E-07 | 2.42E-06 | 1.36E-08 | 5.22E-06 | 2.42E-07 | 1.84E-07 | 6.87E-04 | 0.000675172 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.28E-04 | 6.48E-08 | 3.89E-08 | 6.48E-08 | 1.29E-06 | 7.26E-09 | 2.79E-06 | 1.30E-07 | 9.81E-08 | 3.67E-04 | 0.00036123 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 8.17E-05 | 4.09E-08 | 2.46E-08 | 4.09E-08 | 8.17E-07 | 4.60E-09 | 1.76E-06 | 8.19E-08 | 6.20E-08 | 2.32E-04 | 0.000228457 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.95E-05 | 2.94E-08 | 1.77E-08 | 2.94E-08 | 5.87E-07 | 3.31E-09 | 1.27E-06 | 5.89E-08 | 4.45E-08 | 1.67E-04 | 0.000164289 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.53E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 4.41E-07 | 2.49E-09 | 9.52E-07 | 4.43E-08 | 3.34E-08 | 1.25E-04 | 0.000123512 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.61E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.47E-07 | 1.96E-09 | 7.48E-07 | 3.48E-08 | 2.62E-08 | 9.84E-05 | 9.71342E-05 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.99E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 2.83E-07 | 1.60E-09 | 6.10E-07 | 2.84E-08 | 2.14E-08 | 8.03E-05 | 7.9379E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.53E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 2.37E-07 | 1.34E-09 | 5.11E-07 | 2.38E-08 | 1.79E-08 | 6.72E-05 | 6.64944E-05 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.20E-05 | 1.02E-08 | 6.12E-09 | 1.02E-08 | 2.03E-07 | 1.15E-09 | 4.37E-07 | 2.04E-08 | 1.53E-08 | 5.76E-05 | 5.70062E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.93E-05 | 8.90E-09 | 5.34E-09 | 8.90E-09 | 1.77E-07 | 1.00E-09 | 3.81E-07 | 1.78E-08 | 1.33E-08 | 5.02E-05 | 4.96959E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.73E-05 | 7.86E-09 | 4.72E-09 | 7.86E-09 | 1.56E-07 | 8.87E-10 | 3.36E-07 | 1.57E-08 | 1.18E-08 | 4.43E-05 | 4.39241E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.56E-05 | 7.04E-09 | 4.22E-09 | 7.04E-09 | 1.40E-07 | 7.95E-10 | 3.01E-07 | 1.41E-08 | 1.05E-08 | 3.97E-05 | 3.93493E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.42E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 1.26E-07 | 7.19E-10 | 2.72E-07 | 1.27E-08 | 9.51E-09 | 3.58E-05 | 3.55998E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.31E-05 | 5.81E-09 | 3.49E-09 | 5.81E-09 | 1.15E-07 | 6.56E-10 | 2.48E-07 | 1.16E-08 | 8.66E-09 | 3.27E-05 | 3.24757E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.21E-05 | 5.33E-09 | 3.20E-09 | 5.33E-09 | 1.06E-07 | 6.02E-10 | 2.27E-07 | 1.07E-08 | 7.93E-09 | 3.00E-05 | 2.97864E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.14E-05 | 4.98E-09 | 2.99E-09 | 4.98E-09 | 9.86E-08 | 5.63E-10 | 2.12E-07 | 9.95E-09 | 7.40E-09 | 2.80E-05 | 2.78264E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 1.08E-05 | 4.66E-09 | 2.79E-09 | 4.66E-09 | 9.22E-08 | 5.27E-10 | 1.98E-07 | 9.31E-09 | 6.92E-09 | 2.62E-05 | 2.60415E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 1.03E-05 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 8.70E-08 | 4.98E-10 | 1.87E-07 | 8.80E-09 | 6.53E-09 | 2.47E-05 | 2.46033E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 9.82E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 8.24E-08 | 4.72E-10 | 1.77E-07 | 8.34E-09 | 6.18E-09 | 2.34E-05 | 2.33244E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 9.35E-06 | 3.93E-09 | 2.36E-09 | 3.93E-09 | 7.76E-08 | 4.45E-10 | 1.67E-07 | 7.86E-09 | 5.82E-09 | 2.20E-05 | 2.1982E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 3.07E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 2.89E-07 | 1.64E-09 | 6.24E-07 | 2.91E-08 | 2.19E-08 | 8.21E-05 | 8.11949E-05 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.87E-05 | 8.51E-09 | 5.11E-09 | 8.51E-09 | 1.69E-07 | 9.60E-10 | 3.64E-07 | 1.70E-08 | 1.27E-08 | 4.80E-05 | 4.7574E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.68E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 1.51E-07 | 8.59E-10 | 3.25E-07 | 1.52E-08 | 1.14E-08 | 4.29E-05 | 4.25198E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.52E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.35E-07 | 7.70E-10 | 2.91E-07 | 1.36E-08 | 1.02E-08 | 3.84E-05 | 3.80974E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.39E-05 | 6.16E-09 | 3.70E-09 | 6.16E-09 | 1.22E-07 | 6.96E-10 | 2.63E-07 | 1.23E-08 | 9.19E-09 | 3.47E-05 | 3.44498E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.26E-05 | 5.55E-09 | 3.33E-09 | 5.55E-09 | 1.10E-07 | 6.27E-10 | 2.37E-07 | 1.11E-08 | 8.27E-09 | 3.12E-05 | 3.10276E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.16E-05 | 5.07E-09 | 3.04E-09 | 5.07E-09 | 1.00E-07 | 5.73E-10 | 2.16E-07 | 1.01E-08 | 7.54E-09 | 2.85E-05 | 2.83227E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 1.07E-05 | 4.65E-09 | 2.79E-09 | 4.65E-09 | 9.21E-08 | 5.26E-10 | 1.98E-07 | 9.31E-09 | 6.92E-09 | 2.61E-05 | 2.60166E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 1.00E-05 | 4.32E-09 | 2.59E-09 | 4.32E-09 | 8.55E-08 | 4.89E-10 | 1.84E-07 | 8.64E-09 | 6.42E-09 | 2.43E-05 | 2.41703E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 9.45E-06 | 4.04E-09 | 2.43E-09 | 4.04E-09 | 7.99E-08 | 4.58E-10 | 1.72E-07 | 8.08E-09 | 6.00E-09 | 2.27E-05 | 2.2606E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 9.02E-06 | 3.84E-09 | 2.30E-09 | 3.84E-09 | 7.58E-08 | 4.34E-10 | 1.63E-07 | 7.67E-09 | 5.69E-09 | 2.15E-05 | 2.14527E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 8.62E-06 | 3.64E-09 | 2.19E-09 | 3.64E-09 | 7.20E-08 | 4.13E-10 | 1.55E-07 | 7.29E-09 | 5.40E-09 | 2.04E-05 | 2.03815E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 8.20E-06 | 3.44E-09 | 2.06E-09 | 3.44E-09 | 6.79E-08 | 3.90E-10 | 1.46E-07 | 6.88E-09 | 5.09E-09 | 1.93E-05 | 1.9242E-05 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2027

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 5.566E-05 | 3.53E-08 | 2.12E-08 | 3.53E-08 | 1.81E-07 | 3.95E-07 | 3.53E-08 | 5.65E-09 | 6.49E-07 | 7.06E-08 | 2.82E-09 | 1.05E-04 |
| Paved road | 2027_PAVED | 1.614E-04 | 8.60E-08 | 5.16E-08 | 8.60E-08 | 5.50E-08 | 1.72E-06 | 1.58E-07 | 9.63E-09 | 3.71E-06 | 1.72E-07 | 1.31E-07 | 4.88E-04 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 9.94E-08 | 5.96E-08 | 9.94E-08 | 1.98E-06 | 1.12E-08 | 4.28E-06 | 1.99E-07 | 1.50E-07 | 5.62E-04 | 0.00055138 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 6.68E-08 | 4.01E-08 | 6.68E-08 | 1.32E-06 | 7.55E-09 | 2.85E-06 | 1.34E-07 | 9.93E-08 | 3.75E-04 | 0.000367763 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 8.15E-06 | 4.54E-09 | 2.72E-09 | 4.54E-09 | 7.99E-08 | 5.67E-10 | 1.65E-07 | 9.07E-09 | 5.12E-09 | 2.24E-05 | 2.18837E-05 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.28E-05 | 6.94E-09 | 4.17E-09 | 6.94E-09 | 1.33E-07 | 8.12E-10 | 2.82E-07 | 1.39E-08 | 9.53E-09 | 3.75E-05 | 3.67147E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.96E-04 | 3.17E-07 | 1.90E-07 | 3.17E-07 | 6.34E-06 | 3.56E-08 | 1.37E-05 | 6.35E-07 | 4.81E-07 | 1.80E-03 | 0.001764469 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.21E-03 | 6.43E-07 | 3.86E-07 | 6.43E-07 | 1.28E-05 | 7.20E-08 | 2.77E-05 | 1.29E-06 | 9.76E-07 | 3.65E-03 | 0.003576516 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.48E-04 | 2.92E-07 | 1.75E-07 | 2.92E-07 | 5.84E-06 | 3.28E-08 | 1.26E-05 | 5.85E-07 | 4.43E-07 | 1.66E-03 | 0.001625216 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.46E-03 | 7.78E-07 | 4.67E-07 | 7.78E-07 | 1.56E-05 | 8.72E-08 | 3.36E-05 | 1.56E-06 | 1.18E-06 | 4.42E-03 | 0.004330893 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.49E-05 | 5.09E-08 | 3.05E-08 | 5.09E-08 | 1.00E-06 | 5.79E-09 | 2.15E-06 | 1.02E-07 | 7.45E-08 | 2.84E-04 | 0.000277885 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.89E-04 | 1.54E-07 | 9.24E-08 | 1.54E-07 | 3.07E-06 | 1.73E-08 | 6.62E-06 | 3.08E-07 | 2.32E-07 | 8.72E-04 | 0.000854354 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.68E-05 | 3.57E-08 | 2.14E-08 | 3.57E-08 | 7.08E-07 | 4.03E-09 | 1.52E-06 | 7.13E-08 | 5.33E-08 | 2.01E-04 | 0.00019682 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.05E-05 | 1.65E-08 | 9.91E-09 | 1.65E-08 | 3.15E-07 | 1.94E-09 | 6.69E-07 | 3.30E-08 | 2.25E-08 | 8.90E-05 | 8.70881E-05 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.85E-05 | 1.54E-08 | 9.27E-09 | 1.54E-08 | 2.94E-07 | 1.81E-09 | 6.25E-07 | 3.09E-08 | 2.10E-08 | 8.31E-05 | 8.13394E-05 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.67E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 2.75E-07 | 1.70E-09 | 5.85E-07 | 2.89E-08 | 1.97E-08 | 7.78E-05 | 7.61347E-05 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.50E-05 | 1.36E-08 | 8.15E-09 | 1.36E-08 | 2.58E-07 | 1.59E-09 | 5.49E-07 | 2.72E-08 | 1.84E-08 | 7.30E-05 | 7.1436E-05 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.36E-05 | 1.28E-08 | 7.69E-09 | 1.28E-08 | 2.44E-07 | 1.51E-09 | 5.18E-07 | 2.56E-08 | 1.74E-08 | 6.89E-05 | 6.74019E-05 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 2.29E-07 | 1.42E-09 | 4.86E-07 | 2.41E-08 | 1.63E-08 | 6.47E-05 | 6.33198E-05 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.12E-08 | 6.75E-09 | 1.12E-08 | 2.13E-07 | 1.32E-09 | 4.53E-07 | 2.25E-08 | 1.52E-08 | 6.03E-05 | 5.89722E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.11E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 3.20E-07 | 1.99E-09 | 6.80E-07 | 3.38E-08 | 2.27E-08 | 9.05E-05 | 8.85352E-05 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.07E-05 | 1.67E-08 | 9.99E-09 | 1.67E-08 | 3.17E-07 | 1.96E-09 | 6.73E-07 | 3.33E-08 | 2.26E-08 | 8.95E-05 | 8.76145E-05 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.91E-05 | 1.58E-08 | 9.46E-09 | 1.58E-08 | 3.00E-07 | 1.85E-09 | 6.38E-07 | 3.15E-08 | 2.15E-08 | 8.48E-05 | 8.30411E-05 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.73E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 2.81E-07 | 1.74E-09 | 5.98E-07 | 2.96E-08 | 2.01E-08 | 7.96E-05 | 7.78593E-05 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.55E-05 | 1.38E-08 | 8.30E-09 | 1.38E-08 | 2.63E-07 | 1.62E-09 | 5.59E-07 | 2.77E-08 | 1.88E-08 | 7.44E-05 | 7.27846E-05 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.39E-05 | 1.29E-08 | 7.76E-09 | 1.29E-08 | 2.46E-07 | 1.52E-09 | 5.23E-07 | 2.59E-08 | 1.76E-08 | 6.95E-05 | 6.80462E-05 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.23E-05 | 1.21E-08 | 7.26E-09 | 1.21E-08 | 2.30E-07 | 1.42E-09 | 4.88E-07 | 2.42E-08 | 1.64E-08 | 6.49E-05 | 6.35603E-05 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.10E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 2.16E-07 | 1.34E-09 | 4.59E-07 | 2.28E-08 | 1.54E-08 | 6.11E-05 | 5.97936E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.07E-08 | 6.43E-09 | 1.07E-08 | 2.03E-07 | 1.26E-09 | 4.31E-07 | 2.14E-08 | 1.45E-08 | 5.74E-05 | 5.61842E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.77E-05 | 1.51E-08 | 9.05E-09 | 1.51E-08 | 2.83E-07 | 1.79E-09 | 5.98E-07 | 3.02E-08 | 1.98E-08 | 7.98E-05 | 7.80518E-05 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 3.01E-05 | 1.63E-08 | 9.79E-09 | 1.63E-08 | 3.09E-07 | 1.92E-09 | 6.57E-07 | 3.26E-08 | 2.20E-08 | 8.74E-05 | 8.55367E-05 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.96E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 3.05E-07 | 1.88E-09 | 6.49E-07 | 3.21E-08 | 2.18E-08 | 8.63E-05 | 8.4424E-05 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.79E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 2.88E-07 | 1.77E-09 | 6.12E-07 | 3.02E-08 | 2.06E-08 | 8.14E-05 | 7.96606E-05 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.61E-05 | 1.42E-08 | 8.50E-09 | 1.42E-08 | 2.70E-07 | 1.66E-09 | 5.74E-07 | 2.83E-08 | 1.93E-08 | 7.63E-05 | 7.4697E-05 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.46E-05 | 1.33E-08 | 7.99E-09 | 1.33E-08 | 2.53E-07 | 1.56E-09 | 5.39E-07 | 2.66E-08 | 1.81E-08 | 7.17E-05 | 7.01344E-05 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 2.36E-07 | 1.45E-09 | 5.01E-07 | 2.48E-08 | 1.68E-08 | 6.66E-05 | 6.5177E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.20E-07 | 1.36E-09 | 4.68E-07 | 2.32E-08 | 1.57E-08 | 6.22E-05 | 6.0887E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 2.06E-07 | 1.28E-09 | 4.37E-07 | 2.17E-08 | 1.47E-08 | 5.82E-05 | 5.69655E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 1.92E-07 | 1.19E-09 | 4.08E-07 | 2.03E-08 | 1.37E-08 | 5.43E-05 | 5.31604E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 9.51E-09 | 5.70E-09 | 9.51E-09 | 1.80E-07 | 1.12E-09 | 3.82E-07 | 1.90E-08 | 1.28E-08 | 5.08E-05 | 4.97457E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.62E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 1.67E-07 | 1.04E-09 | 3.53E-07 | 1.76E-08 | 1.18E-08 | 4.71E-05 | 4.6039E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 3.02E-05 | 1.64E-08 | 9.85E-09 | 1.64E-08 | 3.10E-07 | 1.94E-09 | 6.57E-07 | 3.28E-08 | 2.19E-08 | 8.75E-05 | 8.56098E-05 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.93E-05 | 1.59E-08 | 9.56E-09 | 1.59E-08 | 3.01E-07 | 1.88E-09 | 6.40E-07 | 3.19E-08 | 2.14E-08 | 8.52E-05 | 8.33378E-05 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.98E-05 | 1.61E-08 | 9.68E-09 | 1.61E-08 | 3.07E-07 | 1.89E-09 | 6.53E-07 | 3.23E-08 | 2.20E-08 | 8.69E-05 | 8.50031E-05 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.84E-05 | 1.54E-08 | 9.23E-09 | 1.54E-08 | 2.93E-07 | 1.80E-09 | 6.24E-07 | 3.08E-08 | 2.10E-08 | 8.29E-05 | 8.11747E-05 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.68E-05 | 1.45E-08 | 8.70E-09 | 1.45E-08 | 2.77E-07 | 1.70E-09 | 5.88E-07 | 2.90E-08 | 1.98E-08 | 7.82E-05 | 7.65386E-05 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.52E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 2.60E-07 | 1.60E-09 | 5.53E-07 | 2.73E-08 | 1.86E-08 | 7.35E-05 | 7.19243E-05 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 2.43E-07 | 1.50E-09 | 5.17E-07 | 2.55E-08 | 1.74E-08 | 6.88E-05 | 6.73002E-05 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.19E-08 | 7.15E-09 | 1.19E-08 | 2.27E-07 | 1.40E-09 | 4.82E-07 | 2.38E-08 | 1.62E-08 | 6.41E-05 | 6.27537E-05 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.10E-08 | 6.62E-09 | 1.10E-08 | 2.10E-07 | 1.30E-09 | 4.45E-07 | 2.21E-08 | 1.50E-08 | 5.93E-05 | 5.79867E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.93E-07 | 1.20E-09 | 4.09E-07 | 2.03E-08 | 1.37E-08 | 5.45E-05 | 5.32833E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.70E-05 | 9.26E-09 | 5.56E-09 | 9.26E-09 | 1.75E-07 | 1.09E-09 | 3.72E-07 | 1.85E-08 | 1.24E-08 | 4.95E-05 | 4.84314E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.94E-05 | 1.60E-08 | 9.59E-09 | 1.60E-08 | 3.01E-07 | 1.89E-09 | 6.39E-07 | 3.20E-08 | 2.13E-08 | 8.51E-05 | 8.32901E-05 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.97E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 3.05E-07 | 1.90E-09 | 6.49E-07 | 3.22E-08 | 2.17E-08 | 8.63E-05 | 8.44579E-05 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.94E-05 | 1.59E-08 | 9.55E-09 | 1.59E-08 | 3.03E-07 | 1.87E-09 | 6.45E-07 | 3.18E-08 | 2.17E-08 | 8.57E-05 | 8.38865E-05 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.86E-05 | 1.55E-08 | 9.28E-09 | 1.55E-08 | 2.95E-07 | 1.81E-09 | 6.29E-07 | 3.09E-08 | 2.12E-08 | 8.35E-05 | 8.17453E-05 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 2.82E-07 | 1.72E-09 | 6.00E-07 | 2.95E-08 | 2.03E-08 | 7.97E-05 | 7.79924E-05 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 2.64E-07 | 1.62E-09 | 5.62E-07 | 2.76E-08 | 1.90E-08 | 7.46E-05 | 7.30626E-05 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 2.46E-07 | 1.51E-09 | 5.22E-07 | 2.57E-08 | 1.76E-08 | 6.94E-05 | 6.79598E-05 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.17E-05 | 1.18E-08 | 7.07E-09 | 1.18E-08 | 2.24E-07 | 1.38E-09 | 4.77E-07 | 2.36E-08 | 1.61E-08 | 6.34E-05 | 6.20582E-05 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.99E-05 | 1.08E-08 | 6.47E-09 | 1.08E-08 | 2.05E-07 | 1.27E-09 | 4.36E-07 | 2.16E-08 | 1.46E-08 | 5.80E-05 | 5.6732E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.75E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 3.89E-07 | 2.36E-09 | 8.30E-07 | 4.05E-08 | 2.82E-08 | 1.10E-04 | 0.000107822 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.85E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 3.97E-07 | 2.46E-09 | 8.43E-07 | 4.18E-08 | 2.83E-08 | 1.12E-04 | 0.000109754 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.37E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 3.47E-07 | 2.17E-09 | 7.35E-07 | 3.67E-08 | 2.45E-08 | 9.79E-05 | 9.57978E-05 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.24E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.33E-07 | 2.07E-09 | 7.07E-07 | 3.52E-08 | 2.37E-08 | 9.41E-05 | 9.2116E-05 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.16E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.26E-07 | 2.02E-09 | 6.93E-07 | 3.43E-08 | 2.33E-08 | 9.21E-05 | 9.01726E-05 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.05E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 3.15E-07 | 1.94E-09 | 6.69E-07 | 3.31E-08 | 2.25E-08 | 8.89E-05 | 8.70493E-05 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.91E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 3.00E-07 | 1.85E-09 | 6.38E-07 | 3.15E-08 | 2.15E-08 | 8.49E-05 | 8.30622E-05 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 1.59E-08 | 9.54E-09 | 1.59E-08 | 3.05E-07 | 1.85E-09 | 6.49E-07 | 3.18E-08 | 2.20E-08 | 8.62E-05 | 8.43547E-05 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 2.85E-07 | 1.74E-09 | 6.07E-07 | 2.98E-08 | 2.06E-08 | 8.07E-05 | 7.89495E-05 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.53E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 2.62E-07 | 1.60E-09 | 5.59E-07 | 2.74E-08 | 1.89E-08 | 7.42E-05 | 7.26232E-05 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.32E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 2.40E-07 | 1.47E-09 | 5.10E-07 | 2.51E-08 | 1.72E-08 | 6.78E-05 | 6.63773E-05 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.12E-05 | 1.15E-08 | 6.88E-09 | 1.15E-08 | 2.18E-07 | 1.34E-09 | 4.65E-07 | 2.29E-08 | 1.56E-08 | 6.18E-05 | 6.04412E-05 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.93E-05 | 1.04E-08 | 6.27E-09 | 1.04E-08 | 1.99E-07 | 1.23E-09 | 4.22E-07 | 2.09E-08 | 1.42E-08 | 5.61E-05 | 5.4924E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 4.01E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 4.13E-07 | 2.55E-09 | 8.79E-07 | 4.34E-08 | 2.95E-08 | 1.17E-04 | 0.000114352 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.79E-05 | 2.06E-08 | 1.23E-08 | 2.06E-08 | 3.90E-07 | 2.42E-09 | 8.28E-07 | 4.12E-08 | 2.78E-08 | 1.10E-04 | 0.00010787 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.90E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.02E-07 | 2.48E-09 | 8.56E-07 | 4.23E-08 | 2.88E-08 | 1.14E-04 | 0.000111365 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.88E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.01E-07 | 2.45E-09 | 8.55E-07 | 4.20E-08 | 2.89E-08 | 1.14E-04 | 0.000111107 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.86E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 4.01E-07 | 2.43E-09 | 8.54E-07 | 4.17E-08 | 2.90E-08 | 1.13E-04 | 0.000110952 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.49E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 3.62E-07 | 2.20E-09 | 7.71E-07 | 3.77E-08 | 2.61E-08 | 1.02E-04 | 0.000100142 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.44E-05 | 1.86E-08 | 1.11E-08 | 1.86E-08 | 3.57E-07 | 2.16E-09 | 7.61E-07 | 3.71E-08 | 2.59E-08 | 1.01E-04 | 9.88694E-05 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.37E-07 | 2.04E-09 | 7.20E-07 | 3.51E-08 | 2.45E-08 | 9.54E-05 | 9.34348E-05 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 3.12E-07 | 1.88E-09 | 6.65E-07 | 3.24E-08 | 2.26E-08 | 8.82E-05 | 8.63097E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 1.48E-08 | 8.91E-09 | 1.48E-08 | 2.85E-07 | 1.73E-09 | 6.08E-07 | 2.97E-08 | 2.06E-08 | 8.06E-05 | 7.893E-05 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.50E-05 | 1.35E-08 | 8.11E-09 | 1.35E-08 | 2.59E-07 | 1.58E-09 | 5.52E-07 | 2.70E-08 | 1.87E-08 | 7.33E-05 | 7.17056E-05 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.27E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 2.35E-07 | 1.44E-09 | 5.00E-07 | 2.46E-08 | 1.69E-08 | 6.64E-05 | 6.50045E-05 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.06E-05 | 1.12E-08 | 6.71E-09 | 1.12E-08 | 2.13E-07 | 1.31E-09 | 4.53E-07 | 2.24E-08 | 1.53E-08 | 6.03E-05 | 5.89839E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.87E-05 | 1.02E-08 | 6.10E-09 | 1.02E-08 | 1.93E-07 | 1.19E-09 | 4.11E-07 | 2.03E-08 | 1.38E-08 | 5.46E-05 | 5.34509E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.69E-05 | 9.16E-09 | 5.50E-09 | 9.16E-09 | 1.74E-07 | 1.08E-09 | 3.69E-07 | 1.83E-08 | 1.24E-08 | 4.91E-05 | 4.80348E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.49E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 1.53E-07 | 9.55E-10 | 3.24E-07 | 1.62E-08 | 1.08E-08 | 4.31E-05 | 4.21827E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.73E-05 | 3.09E-08 | 1.85E-08 | 3.09E-08 | 5.97E-07 | 3.58E-09 | 1.27E-06 | 6.18E-08 | 4.34E-08 | 1.69E-04 | 0.000165384 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.40E-05 | 2.91E-08 | 1.75E-08 | 2.91E-08 | 5.62E-07 | 3.37E-09 | 1.20E-06 | 5.82E-08 | 4.10E-08 | 1.59E-04 | 0.000155856 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.60E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 4.78E-07 | 2.89E-09 | 1.02E-06 | 4.97E-08 | 3.46E-08 | 1.35E-04 | 0.00013238 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.11E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.26E-07 | 2.59E-09 | 9.08E-07 | 4.44E-08 | 3.07E-08 | 1.20E-04 | 0.000117935 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.02E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 4.18E-07 | 2.52E-09 | 8.91E-07 | 4.34E-08 | 3.03E-08 | 1.18E-04 | 0.000115705 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.92E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 4.08E-07 | 2.45E-09 | 8.70E-07 | 4.23E-08 | 2.96E-08 | 1.15E-04 | 0.000112995 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 3.99E-07 | 2.39E-09 | 8.53E-07 | 4.13E-08 | 2.91E-08 | 1.13E-04 | 0.000110663 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.55E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 3.70E-07 | 2.22E-09 | 7.91E-07 | 3.83E-08 | 2.70E-08 | 1.05E-04 | 0.000102651 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.29E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 3.43E-07 | 2.06E-09 | 7.33E-07 | 3.55E-08 | 2.50E-08 | 9.71E-05 | 9.50833E-05 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.02E-05 | 1.63E-08 | 9.77E-09 | 1.63E-08 | 3.14E-07 | 1.89E-09 | 6.70E-07 | 3.26E-08 | 2.28E-08 | 8.89E-05 | 8.70135E-05 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 2.84E-07 | 1.72E-09 | 6.07E-07 | 2.96E-08 | 2.06E-08 | 8.05E-05 | 7.87788E-05 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.47E-05 | 1.33E-08 | 8.00E-09 | 1.33E-08 | 2.56E-07 | 1.55E-09 | 5.46E-07 | 2.67E-08 | 1.85E-08 | 7.24E-05 | 7.09079E-05 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.23E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 2.31E-07 | 1.41E-09 | 4.91E-07 | 2.41E-08 | 1.66E-08 | 6.53E-05 | 6.38802E-05 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.00E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 2.07E-07 | 1.27E-09 | 4.41E-07 | 2.17E-08 | 1.49E-08 | 5.86E-05 | 5.73774E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.81E-05 | 9.82E-09 | 5.89E-09 | 9.82E-09 | 1.87E-07 | 1.15E-09 | 3.97E-07 | 1.96E-08 | 1.34E-08 | 5.28E-05 | 5.17206E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.64E-05 | 8.91E-09 | 5.34E-09 | 8.91E-09 | 1.69E-07 | 1.05E-09 | 3.59E-07 | 1.78E-08 | 1.21E-08 | 4.78E-05 | 4.67764E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.49E-05 | 8.08E-09 | 4.85E-09 | 8.08E-09 | 1.53E-07 | 9.53E-10 | 3.25E-07 | 1.62E-08 | 1.09E-08 | 4.32E-05 | 4.22938E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.25E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 6.55E-07 | 3.86E-09 | 1.40E-06 | 6.72E-08 | 4.83E-08 | 1.86E-04 | 0.000181764 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 6.06E-07 | 3.57E-09 | 1.30E-06 | 6.22E-08 | 4.47E-08 | 1.72E-04 | 0.000168264 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 2.65E-08 | 1.59E-08 | 2.65E-08 | 5.15E-07 | 3.06E-09 | 1.10E-06 | 5.31E-08 | 3.78E-08 | 1.46E-04 | 0.000142871 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 2.46E-08 | 1.47E-08 | 2.46E-08 | 4.77E-07 | 2.83E-09 | 1.02E-06 | 4.91E-08 | 3.50E-08 | 1.35E-04 | 0.000132237 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.40E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.60E-07 | 2.73E-09 | 9.85E-07 | 4.74E-08 | 3.38E-08 | 1.30E-04 | 0.000127709 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.01E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.19E-07 | 2.49E-09 | 8.98E-07 | 4.32E-08 | 3.08E-08 | 1.19E-04 | 0.000116346 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.64E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.80E-07 | 2.26E-09 | 8.12E-07 | 3.92E-08 | 2.78E-08 | 1.08E-04 | 0.000105342 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.31E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 3.45E-07 | 2.06E-09 | 7.38E-07 | 3.57E-08 | 2.52E-08 | 9.78E-05 | 9.57594E-05 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.00E-05 | 1.62E-08 | 9.71E-09 | 1.62E-08 | 3.13E-07 | 1.87E-09 | 6.69E-07 | 3.24E-08 | 2.28E-08 | 8.86E-05 | 8.67287E-05 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.70E-05 | 1.46E-08 | 8.74E-09 | 1.46E-08 | 2.81E-07 | 1.69E-09 | 6.00E-07 | 2.91E-08 | 2.04E-08 | 7.95E-05 | 7.78756E-05 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.41E-05 | 1.30E-08 | 7.80E-09 | 1.30E-08 | 2.50E-07 | 1.51E-09 | 5.34E-07 | 2.60E-08 | 1.81E-08 | 7.08E-05 | 6.93084E-05 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.14E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.22E-07 | 1.35E-09 | 4.74E-07 | 2.32E-08 | 1.61E-08 | 6.29E-05 | 6.15517E-05 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.91E-05 | 1.04E-08 | 6.22E-09 | 1.04E-08 | 1.98E-07 | 1.21E-09 | 4.22E-07 | 2.07E-08 | 1.43E-08 | 5.61E-05 | 5.48762E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.72E-05 | 9.33E-09 | 5.60E-09 | 9.33E-09 | 1.78E-07 | 1.09E-09 | 3.78E-07 | 1.87E-08 | 1.28E-08 | 5.03E-05 | 4.92218E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.56E-05 | 8.46E-09 | 5.08E-09 | 8.46E-09 | 1.61E-07 | 9.94E-10 | 3.42E-07 | 1.69E-08 | 1.15E-08 | 4.55E-05 | 4.45251E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.43E-05 | 7.74E-09 | 4.64E-09 | 7.74E-09 | 1.47E-07 | 9.11E-10 | 3.12E-07 | 1.55E-08 | 1.04E-08 | 4.15E-05 | 4.05813E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.25E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.29E-07 | 8.06E-10 | 2.73E-07 | 1.36E-08 | 9.11E-09 | 3.64E-05 | 3.55909E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 6.69E-07 | 3.93E-09 | 1.43E-06 | 6.86E-08 | 4.94E-08 | 1.90E-04 | 0.000185782 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.08E-05 | 3.26E-08 | 1.96E-08 | 3.26E-08 | 6.38E-07 | 3.74E-09 | 1.37E-06 | 6.53E-08 | 4.72E-08 | 1.81E-04 | 0.000177105 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 3.03E-08 | 1.82E-08 | 3.03E-08 | 5.93E-07 | 3.47E-09 | 1.27E-06 | 6.07E-08 | 4.38E-08 | 1.68E-04 | 0.000164533 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.08E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 5.33E-07 | 3.13E-09 | 1.14E-06 | 5.46E-08 | 3.93E-08 | 1.51E-04 | 0.000147892 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.53E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.74E-07 | 2.79E-09 | 1.02E-06 | 4.87E-08 | 3.50E-08 | 1.34E-04 | 0.000131639 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.04E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 4.23E-07 | 2.50E-09 | 9.07E-07 | 4.35E-08 | 3.12E-08 | 1.20E-04 | 0.000117506 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.64E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 3.80E-07 | 2.25E-09 | 8.14E-07 | 3.91E-08 | 2.79E-08 | 1.08E-04 | 0.000105528 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.28E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.43E-07 | 2.03E-09 | 7.33E-07 | 3.53E-08 | 2.51E-08 | 9.70E-05 | 9.50108E-05 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.92E-05 | 1.58E-08 | 9.45E-09 | 1.58E-08 | 3.05E-07 | 1.82E-09 | 6.52E-07 | 3.15E-08 | 2.23E-08 | 8.64E-05 | 8.46058E-05 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.58E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 2.69E-07 | 1.61E-09 | 5.74E-07 | 2.78E-08 | 1.96E-08 | 7.61E-05 | 7.44924E-05 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 2.37E-07 | 1.43E-09 | 5.05E-07 | 2.46E-08 | 1.72E-08 | 6.70E-05 | 6.55771E-05 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.02E-05 | 1.09E-08 | 6.54E-09 | 1.09E-08 | 2.09E-07 | 1.27E-09 | 4.46E-07 | 2.18E-08 | 1.51E-08 | 5.92E-05 | 5.80027E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.80E-05 | 9.75E-09 | 5.85E-09 | 9.75E-09 | 1.87E-07 | 1.14E-09 | 3.98E-07 | 1.95E-08 | 1.34E-08 | 5.28E-05 | 5.16723E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.63E-05 | 8.82E-09 | 5.29E-09 | 8.82E-09 | 1.68E-07 | 1.03E-09 | 3.58E-07 | 1.76E-08 | 1.21E-08 | 4.76E-05 | 4.66138E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.48E-05 | 8.03E-09 | 4.82E-09 | 8.03E-09 | 1.53E-07 | 9.42E-10 | 3.25E-07 | 1.61E-08 | 1.09E-08 | 4.32E-05 | 4.23004E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.36E-05 | 7.38E-09 | 4.43E-09 | 7.38E-09 | 1.40E-07 | 8.67E-10 | 2.98E-07 | 1.48E-08 | 1.00E-08 | 3.96E-05 | 3.87848E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.26E-05 | 6.84E-09 | 4.10E-09 | 6.84E-09 | 1.30E-07 | 8.05E-10 | 2.75E-07 | 1.37E-08 | 9.22E-09 | 3.66E-05 | 3.58383E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 6.88E-07 | 4.01E-09 | 1.48E-06 | 7.02E-08 | 5.10E-08 | 1.95E-04 | 0.000191054 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 3.25E-08 | 1.95E-08 | 3.25E-08 | 6.37E-07 | 3.71E-09 | 1.37E-06 | 6.50E-08 | 4.72E-08 | 1.81E-04 | 0.000176839 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.30E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 5.56E-07 | 3.25E-09 | 1.19E-06 | 5.69E-08 | 4.12E-08 | 1.58E-04 | 0.000154509 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.63E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 4.86E-07 | 2.85E-09 | 1.04E-06 | 4.97E-08 | 3.59E-08 | 1.38E-04 | 0.0001348 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.08E-05 | 2.19E-08 | 1.32E-08 | 2.19E-08 | 4.28E-07 | 2.52E-09 | 9.17E-07 | 4.39E-08 | 3.15E-08 | 1.21E-04 | 0.000118723 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.62E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.79E-07 | 2.24E-09 | 8.12E-07 | 3.90E-08 | 2.79E-08 | 1.07E-04 | 0.000105199 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.18E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.32E-07 | 1.97E-09 | 7.12E-07 | 3.43E-08 | 2.44E-08 | 9.42E-05 | 9.22348E-05 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.77E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 2.89E-07 | 1.72E-09 | 6.18E-07 | 2.99E-08 | 2.11E-08 | 8.18E-05 | 8.01525E-05 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 2.52E-07 | 1.51E-09 | 5.38E-07 | 2.61E-08 | 1.83E-08 | 7.13E-05 | 6.97864E-05 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.13E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 2.21E-07 | 1.33E-09 | 4.72E-07 | 2.30E-08 | 1.61E-08 | 6.26E-05 | 6.13077E-05 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.89E-05 | 1.02E-08 | 6.13E-09 | 1.02E-08 | 1.96E-07 | 1.19E-09 | 4.18E-07 | 2.04E-08 | 1.42E-08 | 5.55E-05 | 5.43145E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.70E-05 | 9.19E-09 | 5.52E-09 | 9.19E-09 | 1.76E-07 | 1.07E-09 | 3.75E-07 | 1.84E-08 | 1.27E-08 | 4.98E-05 | 4.87147E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.54E-05 | 8.34E-09 | 5.00E-09 | 8.34E-09 | 1.59E-07 | 9.75E-10 | 3.39E-07 | 1.67E-08 | 1.14E-08 | 4.50E-05 | 4.40602E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.40E-05 | 7.61E-09 | 4.57E-09 | 7.61E-09 | 1.45E-07 | 8.92E-10 | 3.08E-07 | 1.52E-08 | 1.04E-08 | 4.10E-05 | 4.01194E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.29E-05 | 6.97E-09 | 4.18E-09 | 6.97E-09 | 1.32E-07 | 8.19E-10 | 2.81E-07 | 1.39E-08 | 9.45E-09 | 3.74E-05 | 3.66403E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.18E-05 | 6.41E-09 | 3.85E-09 | 6.41E-09 | 1.22E-07 | 7.55E-10 | 2.58E-07 | 1.28E-08 | 8.64E-09 | 3.43E-05 | 3.36086E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.98E-05 | 4.81E-08 | 2.89E-08 | 4.81E-08 | 9.46E-07 | 5.48E-09 | 2.03E-06 | 9.62E-08 | 7.04E-08 | 2.68E-04 | 0.00026279 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 4.66E-08 | 2.80E-08 | 4.66E-08 | 9.17E-07 | 5.31E-09 | 1.97E-06 | 9.32E-08 | 6.83E-08 | 2.60E-04 | 0.000254747 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.22E-05 | 4.40E-08 | 2.64E-08 | 4.40E-08 | 8.66E-07 | 5.01E-09 | 1.86E-06 | 8.81E-08 | 6.46E-08 | 2.46E-04 | 0.000240745 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.37E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 7.76E-07 | 4.50E-09 | 1.67E-06 | 7.90E-08 | 5.78E-08 | 2.20E-04 | 0.000215594 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 6.79E-07 | 3.94E-09 | 1.46E-06 | 6.91E-08 | 5.05E-08 | 1.92E-04 | 0.000188509 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.51E-05 | 2.96E-08 | 1.77E-08 | 2.96E-08 | 5.79E-07 | 3.38E-09 | 1.24E-06 | 5.91E-08 | 4.30E-08 | 1.64E-04 | 0.000160824 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.78E-05 | 2.56E-08 | 1.54E-08 | 2.56E-08 | 5.01E-07 | 2.94E-09 | 1.08E-06 | 5.13E-08 | 3.71E-08 | 1.42E-04 | 0.000139227 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.11E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 4.31E-07 | 2.53E-09 | 9.24E-07 | 4.42E-08 | 3.18E-08 | 1.22E-04 | 0.000119646 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.53E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.70E-07 | 2.19E-09 | 7.92E-07 | 3.80E-08 | 2.72E-08 | 1.05E-04 | 0.000102639 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.02E-05 | 1.63E-08 | 9.75E-09 | 1.63E-08 | 3.15E-07 | 1.87E-09 | 6.74E-07 | 3.25E-08 | 2.31E-08 | 8.93E-05 | 8.74186E-05 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.60E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 2.71E-07 | 1.62E-09 | 5.80E-07 | 2.81E-08 | 1.98E-08 | 7.69E-05 | 7.52549E-05 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.28E-05 | 1.23E-08 | 7.37E-09 | 1.23E-08 | 2.37E-07 | 1.42E-09 | 5.05E-07 | 2.46E-08 | 1.72E-08 | 6.70E-05 | 6.56002E-05 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.01E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 2.09E-07 | 1.26E-09 | 4.45E-07 | 2.17E-08 | 1.51E-08 | 5.90E-05 | 5.77736E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.79E-05 | 9.68E-09 | 5.81E-09 | 9.68E-09 | 1.85E-07 | 1.13E-09 | 3.95E-07 | 1.94E-08 | 1.34E-08 | 5.25E-05 | 5.13672E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.61E-05 | 8.70E-09 | 5.22E-09 | 8.70E-09 | 1.66E-07 | 1.02E-09 | 3.54E-07 | 1.74E-08 | 1.20E-08 | 4.71E-05 | 4.60547E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.45E-05 | 7.84E-09 | 4.70E-09 | 7.84E-09 | 1.49E-07 | 9.19E-10 | 3.18E-07 | 1.57E-08 | 1.07E-08 | 4.22E-05 | 4.13503E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.31E-05 | 7.12E-09 | 4.27E-09 | 7.12E-09 | 1.35E-07 | 8.36E-10 | 2.88E-07 | 1.42E-08 | 9.66E-09 | 3.82E-05 | 3.74266E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.20E-05 | 6.50E-09 | 3.90E-09 | 6.50E-09 | 1.23E-07 | 7.65E-10 | 2.62E-07 | 1.30E-08 | 8.76E-09 | 3.48E-05 | 3.40662E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.10E-05 | 5.96E-09 | 3.58E-09 | 5.96E-09 | 1.13E-07 | 7.03E-10 | 2.39E-07 | 1.19E-08 | 7.99E-09 | 3.18E-05 | 3.11416E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 6.20E-08 | 3.72E-08 | 6.20E-08 | 1.23E-06 | 7.02E-09 | 2.64E-06 | 1.24E-07 | 9.19E-08 | 3.48E-04 | 0.000340697 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 5.74E-08 | 3.45E-08 | 5.74E-08 | 1.14E-06 | 6.50E-09 | 2.44E-06 | 1.15E-07 | 8.51E-08 | 3.22E-04 | 0.000315554 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.14E-05 | 4.89E-08 | 2.93E-08 | 4.89E-08 | 9.65E-07 | 5.55E-09 | 2.08E-06 | 9.78E-08 | 7.22E-08 | 2.74E-04 | 0.000268308 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.04E-05 | 4.30E-08 | 2.58E-08 | 4.30E-08 | 8.48E-07 | 4.89E-09 | 1.82E-06 | 8.61E-08 | 6.34E-08 | 2.41E-04 | 0.000235787 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.78E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 7.15E-07 | 4.13E-09 | 1.54E-06 | 7.27E-08 | 5.33E-08 | 2.03E-04 | 0.000198628 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.74E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 6.04E-07 | 3.51E-09 | 1.30E-06 | 6.16E-08 | 4.49E-08 | 1.71E-04 | 0.000167908 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.84E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 5.09E-07 | 2.97E-09 | 1.09E-06 | 5.20E-08 | 3.77E-08 | 1.44E-04 | 0.000141226 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.02E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.21E-07 | 2.48E-09 | 9.03E-07 | 4.32E-08 | 3.11E-08 | 1.19E-04 | 0.000116977 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.36E-05 | 1.81E-08 | 1.08E-08 | 1.81E-08 | 3.51E-07 | 2.08E-09 | 7.52E-07 | 3.61E-08 | 2.58E-08 | 9.95E-05 | 9.74312E-05 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.85E-05 | 1.53E-08 | 9.21E-09 | 1.53E-08 | 2.97E-07 | 1.77E-09 | 6.36E-07 | 3.07E-08 | 2.17E-08 | 8.42E-05 | 8.24238E-05 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.46E-05 | 1.33E-08 | 7.97E-09 | 1.33E-08 | 2.56E-07 | 1.54E-09 | 5.48E-07 | 2.66E-08 | 1.87E-08 | 7.26E-05 | 7.10719E-05 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.15E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.24E-07 | 1.35E-09 | 4.77E-07 | 2.32E-08 | 1.62E-08 | 6.33E-05 | 6.19512E-05 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.89E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 1.96E-07 | 1.19E-09 | 4.18E-07 | 2.05E-08 | 1.42E-08 | 5.55E-05 | 5.43548E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.68E-05 | 9.10E-09 | 5.46E-09 | 9.10E-09 | 1.74E-07 | 1.06E-09 | 3.70E-07 | 1.82E-08 | 1.25E-08 | 4.92E-05 | 4.81393E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.50E-05 | 8.12E-09 | 4.87E-09 | 8.12E-09 | 1.55E-07 | 9.52E-10 | 3.29E-07 | 1.62E-08 | 1.11E-08 | 4.37E-05 | 4.28134E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.35E-05 | 7.30E-09 | 4.38E-09 | 7.30E-09 | 1.39E-07 | 8.58E-10 | 2.95E-07 | 1.46E-08 | 9.89E-09 | 3.92E-05 | 3.83705E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.22E-05 | 6.64E-09 | 3.98E-09 | 6.64E-09 | 1.26E-07 | 7.82E-10 | 2.67E-07 | 1.33E-08 | 8.92E-09 | 3.55E-05 | 3.4736E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.12E-05 | 6.07E-09 | 3.64E-09 | 6.07E-09 | 1.15E-07 | 7.17E-10 | 2.43E-07 | 1.21E-08 | 8.11E-09 | 3.24E-05 | 3.16714E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.03E-05 | 5.58E-09 | 3.35E-09 | 5.58E-09 | 1.05E-07 | 6.61E-10 | 2.23E-07 | 1.12E-08 | 7.41E-09 | 2.97E-05 | 2.90427E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 7.52E-08 | 4.51E-08 | 7.52E-08 | 1.49E-06 | 8.49E-09 | 3.22E-06 | 1.50E-07 | 1.12E-07 | 4.24E-04 | 0.000415092 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 7.41E-08 | 4.45E-08 | 7.41E-08 | 1.47E-06 | 8.36E-09 | 3.17E-06 | 1.48E-07 | 1.11E-07 | 4.17E-04 | 0.000408912 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 7.05E-08 | 4.23E-08 | 7.05E-08 | 1.40E-06 | 7.96E-09 | 3.01E-06 | 1.41E-07 | 1.05E-07 | 3.97E-04 | 0.000388895 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 6.73E-08 | 4.04E-08 | 6.73E-08 | 1.34E-06 | 7.60E-09 | 2.88E-06 | 1.35E-07 | 1.01E-07 | 3.79E-04 | 0.000371392 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 5.81E-08 | 3.48E-08 | 5.81E-08 | 1.15E-06 | 6.56E-09 | 2.48E-06 | 1.16E-07 | 8.65E-08 | 3.26E-04 | 0.000319861 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.77E-05 | 4.69E-08 | 2.81E-08 | 4.69E-08 | 9.28E-07 | 5.31E-09 | 2.00E-06 | 9.38E-08 | 6.96E-08 | 2.63E-04 | 0.000257875 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.11E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 7.50E-07 | 4.32E-09 | 1.61E-06 | 7.61E-08 | 5.61E-08 | 2.13E-04 | 0.000208548 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.81E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 6.13E-07 | 3.54E-09 | 1.32E-06 | 6.23E-08 | 4.57E-08 | 1.74E-04 | 0.000170256 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.66E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 4.90E-07 | 2.85E-09 | 1.05E-06 | 5.00E-08 | 3.63E-08 | 1.39E-04 | 0.000136007 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.77E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 3.95E-07 | 2.32E-09 | 8.48E-07 | 4.05E-08 | 2.92E-08 | 1.12E-04 | 0.000109785 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.16E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.31E-07 | 1.96E-09 | 7.09E-07 | 3.41E-08 | 2.43E-08 | 9.38E-05 | 9.18722E-05 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.67E-05 | 1.44E-08 | 8.63E-09 | 1.44E-08 | 2.79E-07 | 1.66E-09 | 5.96E-07 | 2.88E-08 | 2.04E-08 | 7.89E-05 | 7.72937E-05 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.29E-05 | 1.24E-08 | 7.41E-09 | 1.24E-08 | 2.38E-07 | 1.43E-09 | 5.09E-07 | 2.47E-08 | 1.73E-08 | 6.74E-05 | 6.60248E-05 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 1.99E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 2.06E-07 | 1.25E-09 | 4.40E-07 | 2.15E-08 | 1.49E-08 | 5.84E-05 | 5.71591E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.75E-05 | 9.44E-09 | 5.67E-09 | 9.44E-09 | 1.81E-07 | 1.10E-09 | 3.85E-07 | 1.89E-08 | 1.30E-08 | 5.11E-05 | 5.003E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.55E-05 | 8.41E-09 | 5.05E-09 | 8.41E-09 | 1.60E-07 | 9.85E-10 | 3.41E-07 | 1.68E-08 | 1.15E-08 | 4.53E-05 | 4.43517E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.38E-05 | 7.51E-09 | 4.50E-09 | 7.51E-09 | 1.42E-07 | 8.82E-10 | 3.03E-07 | 1.50E-08 | 1.02E-08 | 4.03E-05 | 3.94209E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.25E-05 | 6.79E-09 | 4.08E-09 | 6.79E-09 | 1.28E-07 | 8.01E-10 | 2.73E-07 | 1.36E-08 | 9.12E-09 | 3.63E-05 | 3.55302E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.14E-05 | 6.20E-09 | 3.72E-09 | 6.20E-09 | 1.17E-07 | 7.33E-10 | 2.48E-07 | 1.24E-08 | 8.26E-09 | 3.30E-05 | 3.23126E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.05E-05 | 5.71E-09 | 3.43E-09 | 5.71E-09 | 1.07E-07 | 6.77E-10 | 2.27E-07 | 1.14E-08 | 7.56E-09 | 3.03E-05 | 2.96734E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 9.72E-06 | 5.30E-09 | 3.18E-09 | 5.30E-09 | 9.94E-08 | 6.29E-10 | 2.10E-07 | 1.06E-08 | 6.98E-09 | 2.81E-05 | 2.74576E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 8.15E-08 | 4.89E-08 | 8.15E-08 | 1.62E-06 | 9.19E-09 | 3.49E-06 | 1.63E-07 | 1.22E-07 | 4.59E-04 | 0.00045034 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 1.57E-06 | 8.89E-09 | 3.38E-06 | 1.58E-07 | 1.18E-07 | 4.45E-04 | 0.000435865 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 7.89E-08 | 4.73E-08 | 7.89E-08 | 1.57E-06 | 8.89E-09 | 3.38E-06 | 1.58E-07 | 1.18E-07 | 4.45E-04 | 0.000436411 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 6.54E-08 | 3.93E-08 | 6.54E-08 | 1.30E-06 | 7.38E-09 | 2.80E-06 | 1.31E-07 | 9.80E-08 | 3.69E-04 | 0.000361492 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.28E-05 | 4.96E-08 | 2.98E-08 | 4.96E-08 | 9.83E-07 | 5.60E-09 | 2.12E-06 | 9.92E-08 | 7.39E-08 | 2.79E-04 | 0.000273362 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.18E-05 | 3.84E-08 | 2.31E-08 | 3.84E-08 | 7.60E-07 | 4.35E-09 | 1.64E-06 | 7.69E-08 | 5.70E-08 | 2.16E-04 | 0.000211226 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.56E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 5.87E-07 | 3.38E-09 | 1.26E-06 | 5.96E-08 | 4.38E-08 | 1.66E-04 | 0.000163118 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.36E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 4.59E-07 | 2.66E-09 | 9.85E-07 | 4.67E-08 | 3.41E-08 | 1.30E-04 | 0.000127435 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.49E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 3.66E-07 | 2.14E-09 | 7.86E-07 | 3.75E-08 | 2.71E-08 | 1.04E-04 | 0.000101702 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.87E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 3.00E-07 | 1.77E-09 | 6.43E-07 | 3.09E-08 | 2.21E-08 | 8.51E-05 | 8.33428E-05 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.42E-05 | 1.30E-08 | 7.82E-09 | 1.30E-08 | 2.52E-07 | 1.50E-09 | 5.40E-07 | 2.61E-08 | 1.85E-08 | 7.15E-05 | 6.99802E-05 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.08E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 2.16E-07 | 1.30E-09 | 4.62E-07 | 2.24E-08 | 1.57E-08 | 6.13E-05 | 5.99953E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.81E-05 | 9.77E-09 | 5.86E-09 | 9.77E-09 | 1.88E-07 | 1.14E-09 | 4.00E-07 | 1.95E-08 | 1.36E-08 | 5.31E-05 | 5.19488E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.59E-05 | 8.63E-09 | 5.18E-09 | 8.63E-09 | 1.65E-07 | 1.01E-09 | 3.51E-07 | 1.73E-08 | 1.19E-08 | 4.66E-05 | 4.56533E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.43E-05 | 7.73E-09 | 4.64E-09 | 7.73E-09 | 1.47E-07 | 9.06E-10 | 3.13E-07 | 1.55E-08 | 1.05E-08 | 4.16E-05 | 4.07058E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.29E-05 | 7.01E-09 | 4.21E-09 | 7.01E-09 | 1.33E-07 | 8.25E-10 | 2.82E-07 | 1.40E-08 | 9.46E-09 | 3.76E-05 | 3.67712E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.18E-05 | 6.42E-09 | 3.85E-09 | 6.42E-09 | 1.21E-07 | 7.58E-10 | 2.57E-07 | 1.28E-08 | 8.60E-09 | 3.43E-05 | 3.35564E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.09E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 1.12E-07 | 7.04E-10 | 2.38E-07 | 1.19E-08 | 7.92E-09 | 3.17E-05 | 3.09783E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.02E-05 | 5.56E-09 | 3.34E-09 | 5.56E-09 | 1.04E-07 | 6.59E-10 | 2.21E-07 | 1.11E-08 | 7.35E-09 | 2.95E-05 | 2.88666E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 9.57E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 9.78E-08 | 6.19E-10 | 2.07E-07 | 1.04E-08 | 6.86E-09 | 2.76E-05 | 2.70056E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.17E-07 | 7.05E-08 | 1.17E-07 | 2.34E-06 | 1.32E-08 | 5.05E-06 | 2.35E-07 | 1.77E-07 | 6.65E-04 | 0.000651465 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.00E-07 | 6.01E-08 | 1.00E-07 | 2.00E-06 | 1.13E-08 | 4.31E-06 | 2.00E-07 | 1.51E-07 | 5.67E-04 | 0.000555415 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 7.35E-08 | 4.41E-08 | 7.35E-08 | 1.46E-06 | 8.28E-09 | 3.15E-06 | 1.47E-07 | 1.11E-07 | 4.15E-04 | 0.000407051 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.63E-05 | 5.15E-08 | 3.09E-08 | 5.15E-08 | 1.02E-06 | 5.80E-09 | 2.20E-06 | 1.03E-07 | 7.70E-08 | 2.90E-04 | 0.000284139 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.78E-05 | 3.62E-08 | 2.17E-08 | 3.62E-08 | 7.17E-07 | 4.10E-09 | 1.54E-06 | 7.25E-08 | 5.39E-08 | 2.04E-04 | 0.000199496 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.93E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 5.21E-07 | 3.00E-09 | 1.12E-06 | 5.28E-08 | 3.89E-08 | 1.48E-04 | 0.000144702 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.80E-05 | 2.04E-08 | 1.22E-08 | 2.04E-08 | 4.00E-07 | 2.32E-09 | 8.60E-07 | 4.07E-08 | 2.98E-08 | 1.13E-04 | 0.000111171 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.04E-05 | 1.63E-08 | 9.78E-09 | 1.63E-08 | 3.19E-07 | 1.86E-09 | 6.84E-07 | 3.26E-08 | 2.36E-08 | 9.04E-05 | 8.85634E-05 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.51E-05 | 1.35E-08 | 8.10E-09 | 1.35E-08 | 2.63E-07 | 1.55E-09 | 5.63E-07 | 2.70E-08 | 1.94E-08 | 7.45E-05 | 7.29635E-05 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.13E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 2.23E-07 | 1.32E-09 | 4.76E-07 | 2.30E-08 | 1.63E-08 | 6.31E-05 | 6.17687E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.85E-05 | 1.00E-08 | 6.00E-09 | 1.00E-08 | 1.93E-07 | 1.16E-09 | 4.12E-07 | 2.00E-08 | 1.41E-08 | 5.46E-05 | 5.34882E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.64E-05 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 1.71E-07 | 1.03E-09 | 3.64E-07 | 1.78E-08 | 1.24E-08 | 4.83E-05 | 4.73063E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.48E-05 | 8.02E-09 | 4.81E-09 | 8.02E-09 | 1.54E-07 | 9.36E-10 | 3.27E-07 | 1.60E-08 | 1.11E-08 | 4.35E-05 | 4.25383E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.36E-05 | 7.34E-09 | 4.41E-09 | 7.34E-09 | 1.40E-07 | 8.59E-10 | 2.98E-07 | 1.47E-08 | 1.01E-08 | 3.96E-05 | 3.8787E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.25E-05 | 6.79E-09 | 4.07E-09 | 6.79E-09 | 1.29E-07 | 7.97E-10 | 2.75E-07 | 1.36E-08 | 9.23E-09 | 3.65E-05 | 3.57279E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.16E-05 | 6.32E-09 | 3.79E-09 | 6.32E-09 | 1.20E-07 | 7.44E-10 | 2.55E-07 | 1.26E-08 | 8.54E-09 | 3.39E-05 | 3.31721E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.09E-05 | 5.92E-09 | 3.55E-09 | 5.92E-09 | 1.12E-07 | 6.98E-10 | 2.38E-07 | 1.18E-08 | 7.95E-09 | 3.16E-05 | 3.09581E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 1.05E-07 | 6.60E-10 | 2.23E-07 | 1.12E-08 | 7.46E-09 | 2.98E-05 | 2.91318E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 9.68E-06 | 5.27E-09 | 3.16E-09 | 5.27E-09 | 9.92E-08 | 6.24E-10 | 2.10E-07 | 1.05E-08 | 7.00E-09 | 2.80E-05 | 2.74116E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.24E-04 | 1.73E-07 | 1.04E-07 | 1.73E-07 | 3.45E-06 | 1.94E-08 | 7.44E-06 | 3.46E-07 | 2.61E-07 | 9.79E-04 | 0.000959752 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.66E-04 | 1.95E-07 | 1.17E-07 | 1.95E-07 | 3.89E-06 | 2.19E-08 | 8.41E-06 | 3.90E-07 | 2.95E-07 | 1.11E-03 | 0.001083912 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.28E-04 | 1.75E-07 | 1.05E-07 | 1.75E-07 | 3.49E-06 | 1.96E-08 | 7.54E-06 | 3.50E-07 | 2.65E-07 | 9.92E-04 | 0.000972024 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.32E-07 | 7.93E-08 | 1.32E-07 | 2.64E-06 | 1.49E-08 | 5.69E-06 | 2.64E-07 | 2.00E-07 | 7.49E-04 | 0.000734037 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.01E-08 | 4.80E-08 | 8.01E-08 | 1.59E-06 | 9.00E-09 | 3.44E-06 | 1.60E-07 | 1.21E-07 | 4.53E-04 | 0.000443587 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.95E-05 | 4.78E-08 | 2.87E-08 | 4.78E-08 | 9.49E-07 | 5.39E-09 | 2.05E-06 | 9.56E-08 | 7.16E-08 | 2.69E-04 | 0.0002641 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.77E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 6.10E-07 | 3.49E-09 | 1.31E-06 | 6.17E-08 | 4.58E-08 | 1.73E-04 | 0.000169657 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.13E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 4.36E-07 | 2.51E-09 | 9.38E-07 | 4.42E-08 | 3.26E-08 | 1.24E-04 | 0.00012123 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.19E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.36E-07 | 1.95E-09 | 7.22E-07 | 3.42E-08 | 2.50E-08 | 9.53E-05 | 9.33827E-05 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.60E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 2.73E-07 | 1.60E-09 | 5.86E-07 | 2.79E-08 | 2.02E-08 | 7.75E-05 | 7.59047E-05 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.21E-05 | 1.19E-08 | 7.14E-09 | 1.19E-08 | 2.32E-07 | 1.36E-09 | 4.97E-07 | 2.38E-08 | 1.71E-08 | 6.57E-05 | 6.43544E-05 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 1.94E-05 | 1.04E-08 | 6.26E-09 | 1.04E-08 | 2.03E-07 | 1.20E-09 | 4.34E-07 | 2.09E-08 | 1.49E-08 | 5.74E-05 | 5.62052E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.73E-05 | 9.32E-09 | 5.59E-09 | 9.32E-09 | 1.80E-07 | 1.08E-09 | 3.86E-07 | 1.86E-08 | 1.32E-08 | 5.11E-05 | 5.00524E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.57E-05 | 8.47E-09 | 5.08E-09 | 8.47E-09 | 1.64E-07 | 9.81E-10 | 3.50E-07 | 1.69E-08 | 1.19E-08 | 4.63E-05 | 4.53551E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.44E-05 | 7.76E-09 | 4.66E-09 | 7.76E-09 | 1.49E-07 | 9.02E-10 | 3.19E-07 | 1.55E-08 | 1.08E-08 | 4.23E-05 | 4.14083E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.33E-05 | 7.19E-09 | 4.31E-09 | 7.19E-09 | 1.38E-07 | 8.37E-10 | 2.94E-07 | 1.44E-08 | 9.97E-09 | 3.90E-05 | 3.81912E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.24E-05 | 6.69E-09 | 4.01E-09 | 6.69E-09 | 1.28E-07 | 7.81E-10 | 2.73E-07 | 1.34E-08 | 9.22E-09 | 3.62E-05 | 3.5447E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.16E-05 | 6.26E-09 | 3.76E-09 | 6.26E-09 | 1.19E-07 | 7.33E-10 | 2.54E-07 | 1.25E-08 | 8.57E-09 | 3.38E-05 | 3.30455E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.08E-05 | 5.86E-09 | 3.52E-09 | 5.86E-09 | 1.11E-07 | 6.88E-10 | 2.37E-07 | 1.17E-08 | 7.97E-09 | 3.15E-05 | 3.08458E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.02E-05 | 5.52E-09 | 3.31E-09 | 5.52E-09 | 1.05E-07 | 6.49E-10 | 2.22E-07 | 1.10E-08 | 7.45E-09 | 2.96E-05 | 2.89361E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 9.59E-06 | 5.21E-09 | 3.13E-09 | 5.21E-09 | 9.85E-08 | 6.14E-10 | 2.09E-07 | 1.04E-08 | 6.99E-09 | 2.78E-05 | 2.72447E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.46E-04 | 3.44E-07 | 2.06E-07 | 3.44E-07 | 6.87E-06 | 3.86E-08 | 1.48E-05 | 6.88E-07 | 5.22E-07 | 1.95E-03 | 0.001912889 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.89E-04 | 3.67E-07 | 2.20E-07 | 3.67E-07 | 7.34E-06 | 4.12E-08 | 1.58E-05 | 7.35E-07 | 5.57E-07 | 2.08E-03 | 0.002043203 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.14E-04 | 3.27E-07 | 1.96E-07 | 3.27E-07 | 6.54E-06 | 3.67E-08 | 1.41E-05 | 6.55E-07 | 4.96E-07 | 1.86E-03 | 0.001820674 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.22E-04 | 1.72E-07 | 1.03E-07 | 1.72E-07 | 3.43E-06 | 1.93E-08 | 7.40E-06 | 3.43E-07 | 2.60E-07 | 9.73E-04 | 0.0009541 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 6.95E-08 | 4.17E-08 | 6.95E-08 | 1.38E-06 | 7.82E-09 | 2.98E-06 | 1.39E-07 | 1.05E-07 | 3.93E-04 | 0.000384883 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.95E-05 | 3.71E-08 | 2.23E-08 | 3.71E-08 | 7.36E-07 | 4.19E-09 | 1.59E-06 | 7.43E-08 | 5.54E-08 | 2.09E-04 | 0.000204763 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.64E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 4.90E-07 | 2.81E-09 | 1.05E-06 | 4.96E-08 | 3.67E-08 | 1.39E-04 | 0.000136238 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.53E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 3.73E-07 | 2.15E-09 | 8.01E-07 | 3.78E-08 | 2.78E-08 | 1.06E-04 | 0.000103541 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.88E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 3.03E-07 | 1.76E-09 | 6.52E-07 | 3.09E-08 | 2.26E-08 | 8.60E-05 | 8.43013E-05 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.44E-05 | 1.31E-08 | 7.86E-09 | 1.31E-08 | 2.57E-07 | 1.50E-09 | 5.51E-07 | 2.62E-08 | 1.90E-08 | 7.27E-05 | 7.12628E-05 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.12E-05 | 1.14E-08 | 6.82E-09 | 1.14E-08 | 2.22E-07 | 1.30E-09 | 4.76E-07 | 2.27E-08 | 1.64E-08 | 6.29E-05 | 6.16352E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.87E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 1.96E-07 | 1.15E-09 | 4.19E-07 | 2.01E-08 | 1.44E-08 | 5.54E-05 | 5.43067E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.67E-05 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 1.75E-07 | 1.03E-09 | 3.74E-07 | 1.80E-08 | 1.28E-08 | 4.94E-05 | 4.84282E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.51E-05 | 8.13E-09 | 4.88E-09 | 8.13E-09 | 1.58E-07 | 9.38E-10 | 3.37E-07 | 1.63E-08 | 1.15E-08 | 4.46E-05 | 4.37267E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.38E-05 | 7.43E-09 | 4.46E-09 | 7.43E-09 | 1.44E-07 | 8.59E-10 | 3.07E-07 | 1.49E-08 | 1.05E-08 | 4.06E-05 | 3.97971E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.27E-05 | 6.85E-09 | 4.11E-09 | 6.85E-09 | 1.32E-07 | 7.94E-10 | 2.82E-07 | 1.37E-08 | 9.60E-09 | 3.74E-05 | 3.66011E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.18E-05 | 6.37E-09 | 3.82E-09 | 6.37E-09 | 1.22E-07 | 7.40E-10 | 2.61E-07 | 1.27E-08 | 8.87E-09 | 3.46E-05 | 3.39155E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.10E-05 | 5.95E-09 | 3.57E-09 | 5.95E-09 | 1.14E-07 | 6.94E-10 | 2.43E-07 | 1.19E-08 | 8.23E-09 | 3.23E-05 | 3.15948E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.03E-05 | 5.59E-09 | 3.35E-09 | 5.59E-09 | 1.07E-07 | 6.53E-10 | 2.27E-07 | 1.12E-08 | 7.68E-09 | 3.02E-05 | 2.95575E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 9.70E-06 | 5.26E-09 | 3.15E-09 | 5.26E-09 | 1.00E-07 | 6.16E-10 | 2.13E-07 | 1.05E-08 | 7.17E-09 | 2.83E-05 | 2.77107E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.16E-06 | 4.97E-09 | 2.98E-09 | 4.97E-09 | 9.44E-08 | 5.84E-10 | 2.01E-07 | 9.94E-09 | 6.74E-09 | 2.67E-05 | 2.61214E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.72E-03 | 9.18E-07 | 5.51E-07 | 9.18E-07 | 1.83E-05 | 1.03E-07 | 3.96E-05 | 1.84E-06 | 1.39E-06 | 5.21E-03 | 0.005106399 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.26E-03 | 1.20E-06 | 7.23E-07 | 1.20E-06 | 2.41E-05 | 1.35E-07 | 5.20E-05 | 2.41E-06 | 1.83E-06 | 6.84E-03 | 0.006705354 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.63E-03 | 1.40E-06 | 8.41E-07 | 1.40E-06 | 2.80E-05 | 1.57E-07 | 6.05E-05 | 2.80E-06 | 2.13E-06 | 7.96E-03 | 0.007801647 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.09E-04 | 1.11E-07 | 6.68E-08 | 1.11E-07 | 2.22E-06 | 1.25E-08 | 4.79E-06 | 2.23E-07 | 1.68E-07 | 6.30E-04 | 0.000617449 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.91E-05 | 4.76E-08 | 2.85E-08 | 4.76E-08 | 9.45E-07 | 5.36E-09 | 2.04E-06 | 9.52E-08 | 7.13E-08 | 2.68E-04 | 0.000262907 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.71E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.04E-07 | 3.45E-09 | 1.30E-06 | 6.10E-08 | 4.54E-08 | 1.71E-04 | 0.000168013 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.19E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 4.42E-07 | 2.54E-09 | 9.51E-07 | 4.48E-08 | 3.31E-08 | 1.25E-04 | 0.00012293 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.29E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.47E-07 | 2.01E-09 | 7.46E-07 | 3.53E-08 | 2.59E-08 | 9.85E-05 | 9.6484E-05 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.70E-05 | 1.45E-08 | 8.68E-09 | 1.45E-08 | 2.84E-07 | 1.65E-09 | 6.10E-07 | 2.89E-08 | 2.11E-08 | 8.06E-05 | 7.89245E-05 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.28E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 2.39E-07 | 1.40E-09 | 5.14E-07 | 2.44E-08 | 1.78E-08 | 6.79E-05 | 6.64828E-05 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 1.97E-05 | 1.06E-08 | 6.34E-09 | 1.06E-08 | 2.06E-07 | 1.21E-09 | 4.43E-07 | 2.11E-08 | 1.53E-08 | 5.85E-05 | 5.729E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.73E-05 | 9.29E-09 | 5.57E-09 | 9.29E-09 | 1.81E-07 | 1.07E-09 | 3.88E-07 | 1.86E-08 | 1.34E-08 | 5.13E-05 | 5.02815E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.54E-05 | 8.29E-09 | 4.97E-09 | 8.29E-09 | 1.61E-07 | 9.53E-10 | 3.45E-07 | 1.66E-08 | 1.19E-08 | 4.57E-05 | 4.47526E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.39E-05 | 7.48E-09 | 4.49E-09 | 7.48E-09 | 1.45E-07 | 8.62E-10 | 3.11E-07 | 1.50E-08 | 1.07E-08 | 4.11E-05 | 4.02954E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.27E-05 | 6.82E-09 | 4.09E-09 | 6.82E-09 | 1.32E-07 | 7.88E-10 | 2.82E-07 | 1.36E-08 | 9.65E-09 | 3.74E-05 | 3.66227E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.17E-05 | 6.29E-09 | 3.77E-09 | 6.29E-09 | 1.21E-07 | 7.28E-10 | 2.60E-07 | 1.26E-08 | 8.85E-09 | 3.44E-05 | 3.36722E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.09E-05 | 5.86E-09 | 3.51E-09 | 5.86E-09 | 1.13E-07 | 6.79E-10 | 2.41E-07 | 1.17E-08 | 8.20E-09 | 3.20E-05 | 3.1284E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.01E-05 | 5.47E-09 | 3.28E-09 | 5.47E-09 | 1.05E-07 | 6.36E-10 | 2.24E-07 | 1.09E-08 | 7.62E-09 | 2.97E-05 | 2.91259E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 9.53E-06 | 5.15E-09 | 3.09E-09 | 5.15E-09 | 9.88E-08 | 6.00E-10 | 2.11E-07 | 1.03E-08 | 7.13E-09 | 2.80E-05 | 2.73652E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 8.99E-06 | 4.87E-09 | 2.92E-09 | 4.87E-09 | 9.30E-08 | 5.68E-10 | 1.98E-07 | 9.73E-09 | 6.70E-09 | 2.63E-05 | 2.57635E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 8.51E-06 | 4.61E-09 | 2.77E-09 | 4.61E-09 | 8.79E-08 | 5.40E-10 | 1.87E-07 | 9.22E-09 | 6.31E-09 | 2.49E-05 | 2.43314E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.81E-04 | 1.50E-07 | 8.98E-08 | 1.50E-07 | 2.99E-06 | 1.68E-08 | 6.44E-06 | 2.99E-07 | 2.26E-07 | 8.48E-04 | 0.000830963 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.24E-04 | 1.19E-07 | 7.16E-08 | 1.19E-07 | 2.38E-06 | 1.34E-08 | 5.13E-06 | 2.39E-07 | 1.80E-07 | 6.75E-04 | 0.00066211 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 6.41E-08 | 3.84E-08 | 6.41E-08 | 1.27E-06 | 7.21E-09 | 2.75E-06 | 1.28E-07 | 9.63E-08 | 3.62E-04 | 0.000354666 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.62E-05 | 4.07E-08 | 2.44E-08 | 4.07E-08 | 8.08E-07 | 4.59E-09 | 1.74E-06 | 8.14E-08 | 6.08E-08 | 2.29E-04 | 0.000224615 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.50E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 5.82E-07 | 3.33E-09 | 1.25E-06 | 5.88E-08 | 4.37E-08 | 1.65E-04 | 0.000161745 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.15E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.38E-07 | 2.52E-09 | 9.42E-07 | 4.44E-08 | 3.28E-08 | 1.24E-04 | 0.000121777 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.27E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.45E-07 | 2.00E-09 | 7.42E-07 | 3.51E-08 | 2.57E-08 | 9.79E-05 | 9.59112E-05 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.68E-05 | 1.44E-08 | 8.64E-09 | 1.44E-08 | 2.83E-07 | 1.64E-09 | 6.07E-07 | 2.88E-08 | 2.10E-08 | 8.01E-05 | 7.84895E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.26E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 2.37E-07 | 1.38E-09 | 5.09E-07 | 2.42E-08 | 1.76E-08 | 6.72E-05 | 6.58378E-05 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 1.94E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 2.04E-07 | 1.19E-09 | 4.36E-07 | 2.08E-08 | 1.50E-08 | 5.77E-05 | 5.65143E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.70E-05 | 9.12E-09 | 5.47E-09 | 9.12E-09 | 1.78E-07 | 1.05E-09 | 3.81E-07 | 1.82E-08 | 1.31E-08 | 5.04E-05 | 4.93251E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.50E-05 | 8.09E-09 | 4.85E-09 | 8.09E-09 | 1.57E-07 | 9.30E-10 | 3.37E-07 | 1.62E-08 | 1.16E-08 | 4.46E-05 | 4.36449E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.35E-05 | 7.27E-09 | 4.36E-09 | 7.27E-09 | 1.41E-07 | 8.38E-10 | 3.02E-07 | 1.45E-08 | 1.03E-08 | 4.00E-05 | 3.91399E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.22E-05 | 6.60E-09 | 3.96E-09 | 6.60E-09 | 1.28E-07 | 7.61E-10 | 2.73E-07 | 1.32E-08 | 9.35E-09 | 3.62E-05 | 3.5446E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.12E-05 | 6.04E-09 | 3.62E-09 | 6.04E-09 | 1.17E-07 | 6.98E-10 | 2.50E-07 | 1.21E-08 | 8.52E-09 | 3.31E-05 | 3.23681E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.03E-05 | 5.56E-09 | 3.33E-09 | 5.56E-09 | 1.07E-07 | 6.43E-10 | 2.29E-07 | 1.11E-08 | 7.81E-09 | 3.04E-05 | 2.97194E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 9.64E-06 | 5.20E-09 | 3.12E-09 | 5.20E-09 | 1.00E-07 | 6.04E-10 | 2.14E-07 | 1.04E-08 | 7.29E-09 | 2.84E-05 | 2.77892E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.04E-06 | 4.89E-09 | 2.93E-09 | 4.89E-09 | 9.40E-08 | 5.68E-10 | 2.00E-07 | 9.77E-09 | 6.81E-09 | 2.66E-05 | 2.60335E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 8.57E-06 | 4.63E-09 | 2.78E-09 | 4.63E-09 | 8.89E-08 | 5.39E-10 | 1.90E-07 | 9.26E-09 | 6.43E-09 | 2.51E-05 | 2.46209E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.14E-06 | 4.40E-09 | 2.64E-09 | 4.40E-09 | 8.44E-08 | 5.14E-10 | 1.80E-07 | 8.81E-09 | 6.09E-09 | 2.39E-05 | 2.33665E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 7.70E-06 | 4.17E-09 | 2.50E-09 | 4.17E-09 | 7.96E-08 | 4.87E-10 | 1.70E-07 | 8.33E-09 | 5.73E-09 | 2.25E-05 | 2.20498E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.75E-05 | 1.47E-08 | 8.85E-09 | 1.47E-08 | 2.89E-07 | 1.68E-09 | 6.21E-07 | 2.95E-08 | 2.15E-08 | 8.20E-05 | 8.03149E-05 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.63E-05 | 8.76E-09 | 5.25E-09 | 8.76E-09 | 1.70E-07 | 1.01E-09 | 3.65E-07 | 1.75E-08 | 1.25E-08 | 4.83E-05 | 4.72664E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.46E-05 | 7.85E-09 | 4.71E-09 | 7.85E-09 | 1.52E-07 | 9.05E-10 | 3.26E-07 | 1.57E-08 | 1.12E-08 | 4.32E-05 | 4.2288E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.31E-05 | 7.06E-09 | 4.23E-09 | 7.06E-09 | 1.37E-07 | 8.14E-10 | 2.93E-07 | 1.41E-08 | 1.00E-08 | 3.87E-05 | 3.79291E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.19E-05 | 6.40E-09 | 3.84E-09 | 6.40E-09 | 1.24E-07 | 7.40E-10 | 2.65E-07 | 1.28E-08 | 9.04E-09 | 3.51E-05 | 3.43306E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.07E-05 | 5.78E-09 | 3.47E-09 | 5.78E-09 | 1.12E-07 | 6.70E-10 | 2.39E-07 | 1.16E-08 | 8.13E-09 | 3.16E-05 | 3.09533E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 9.81E-06 | 5.29E-09 | 3.18E-09 | 5.29E-09 | 1.02E-07 | 6.14E-10 | 2.18E-07 | 1.06E-08 | 7.42E-09 | 2.89E-05 | 2.82808E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.03E-06 | 4.88E-09 | 2.93E-09 | 4.88E-09 | 9.38E-08 | 5.66E-10 | 2.00E-07 | 9.75E-09 | 6.81E-09 | 2.66E-05 | 2.60012E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 8.40E-06 | 4.54E-09 | 2.73E-09 | 4.54E-09 | 8.73E-08 | 5.28E-10 | 1.86E-07 | 9.08E-09 | 6.32E-09 | 2.47E-05 | 2.41757E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 7.88E-06 | 4.26E-09 | 2.55E-09 | 4.26E-09 | 8.17E-08 | 4.96E-10 | 1.74E-07 | 8.52E-09 | 5.90E-09 | 2.31E-05 | 2.2629E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 7.49E-06 | 4.05E-09 | 2.43E-09 | 4.05E-09 | 7.76E-08 | 4.72E-10 | 1.65E-07 | 8.10E-09 | 5.60E-09 | 2.20E-05 | 2.14887E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.13E-06 | 3.86E-09 | 2.31E-09 | 3.86E-09 | 7.38E-08 | 4.50E-10 | 1.57E-07 | 7.71E-09 | 5.32E-09 | 2.09E-05 | 2.04319E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 6.74E-06 | 3.65E-09 | 2.19E-09 | 3.65E-09 | 6.97E-08 | 4.27E-10 | 1.48E-07 | 7.30E-09 | 5.01E-09 | 1.97E-05 | 1.93081E-05 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2028

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 3.324E-05 | 9.075E-09 | 5.445E-09 | 9.075E-09 | 4.647E-08 | 1.016E-07 | 9.075E-09 | 1.452E-09 | 1.670E-07 | 1.815E-08 | 7.260E-10 | 2.696E-05 |
| Paved road | 2028_PAVED | 1.603E-04 | 8.608E-08 | 5.165E-08 | 8.608E-08 | 5.509E-08 | 1.722E-06 | 1.584E-07 | 9.641E-09 | 3.719E-06 | 1.722E-07 | 1.308E-07 | 4.889E-04 |
| Unpaved road | 2028_UNPAVED | 9.795E-05 | 4.259E-07 | 2.555E-07 | 4.259E-07 | 2.726E-07 | 8.517E-06 | 7.836E-07 | 4.770E-08 | 1.840E-05 | 8.517E-07 | 6.473E-07 | 2.419E-03 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Chronic Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | Total HI | Receptor Type |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.87E-04 | 1.10E-07 | 6.58E-08 | 1.10E-07 | 2.19E-06 | 1.23E-08 | 4.73E-06 | 2.19E-07 | 1.66E-07 | 6.22E-04 | 0.000606251 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.92E-08 | 4.75E-08 | 7.92E-08 | 1.58E-06 | 8.87E-09 | 3.42E-06 | 1.58E-07 | 1.20E-07 | 4.49E-04 | 0.000435769 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.14E-08 | 1.29E-08 | 2.14E-08 | 4.26E-07 | 2.41E-09 | 9.20E-07 | 4.28E-08 | 3.22E-08 | 1.21E-04 | 0.000112855 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.49E-07 | 1.97E-09 | 7.53E-07 | 3.50E-08 | 2.64E-08 | 9.90E-05 | 9.34226E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.93E-04 | 3.26E-07 | 1.96E-07 | 3.26E-07 | 6.52E-06 | 3.65E-08 | 1.41E-05 | 6.52E-07 | 4.96E-07 | 1.85E-03 | 0.00181177 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.53E-07 | 3.92E-07 | 6.53E-07 | 1.30E-05 | 7.31E-08 | 2.82E-05 | 1.31E-06 | 9.92E-07 | 3.71E-03 | 0.00362792 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.46E-04 | 3.00E-07 | 1.80E-07 | 3.00E-07 | 6.01E-06 | 3.36E-08 | 1.30E-05 | 6.01E-07 | 4.56E-07 | 1.71E-03 | 0.001668443 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.88E-07 | 4.73E-07 | 7.88E-07 | 1.58E-05 | 8.82E-08 | 3.40E-05 | 1.58E-06 | 1.20E-06 | 4.47E-03 | 0.004379859 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.48E-05 | 6.23E-08 | 3.74E-08 | 6.23E-08 | 1.24E-06 | 6.99E-09 | 2.69E-06 | 1.25E-07 | 9.45E-08 | 3.53E-04 | 0.000342076 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.88E-04 | 1.64E-07 | 9.85E-08 | 1.64E-07 | 3.28E-06 | 1.84E-08 | 7.09E-06 | 3.28E-07 | 2.49E-07 | 9.32E-04 | 0.000909344 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.79E-05 | 4.44E-08 | 2.67E-08 | 4.44E-08 | 8.88E-07 | 4.98E-09 | 1.92E-06 | 8.89E-08 | 6.74E-08 | 2.52E-04 | 0.000243978 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 4.95E-07 | 2.78E-09 | 1.07E-06 | 4.96E-08 | 3.75E-08 | 1.40E-04 | 0.000134382 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.83E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 4.66E-07 | 2.62E-09 | 1.01E-06 | 4.67E-08 | 3.53E-08 | 1.32E-04 | 0.00012659 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.65E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 4.40E-07 | 2.48E-09 | 9.50E-07 | 4.41E-08 | 3.34E-08 | 1.25E-04 | 0.000119517 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.49E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 4.17E-07 | 2.34E-09 | 8.99E-07 | 4.18E-08 | 3.16E-08 | 1.18E-04 | 0.000113072 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 3.96E-07 | 2.23E-09 | 8.55E-07 | 3.97E-08 | 3.00E-08 | 1.12E-04 | 0.000107487 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.76E-07 | 2.11E-09 | 8.10E-07 | 3.77E-08 | 2.85E-08 | 1.07E-04 | 0.000101881 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.07E-05 | 1.78E-08 | 1.07E-08 | 1.78E-08 | 3.55E-07 | 2.00E-09 | 7.65E-07 | 3.56E-08 | 2.69E-08 | 1.01E-04 | 9.61485E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.05E-05 | 2.52E-08 | 1.51E-08 | 2.52E-08 | 5.02E-07 | 2.82E-09 | 1.08E-06 | 5.03E-08 | 3.80E-08 | 1.43E-04 | 0.000136381 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.03E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 4.91E-07 | 2.76E-09 | 1.06E-06 | 4.92E-08 | 3.72E-08 | 1.39E-04 | 0.000133416 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.88E-05 | 2.34E-08 | 1.40E-08 | 2.34E-08 | 4.67E-07 | 2.63E-09 | 1.01E-06 | 4.68E-08 | 3.54E-08 | 1.33E-04 | 0.000126948 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.70E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.42E-07 | 2.49E-09 | 9.54E-07 | 4.43E-08 | 3.35E-08 | 1.26E-04 | 0.000120123 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.53E-05 | 2.09E-08 | 1.26E-08 | 2.09E-08 | 4.17E-07 | 2.35E-09 | 9.01E-07 | 4.19E-08 | 3.16E-08 | 1.19E-04 | 0.000113409 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.37E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.95E-07 | 2.22E-09 | 8.53E-07 | 3.96E-08 | 2.99E-08 | 1.12E-04 | 0.00010729 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.22E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.74E-07 | 2.11E-09 | 8.07E-07 | 3.75E-08 | 2.83E-08 | 1.06E-04 | 0.000101517 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.56E-07 | 2.01E-09 | 7.69E-07 | 3.57E-08 | 2.70E-08 | 1.01E-04 | 9.66179E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.39E-07 | 1.91E-09 | 7.32E-07 | 3.40E-08 | 2.57E-08 | 9.63E-05 | 9.19568E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.69E-05 | 2.31E-08 | 1.39E-08 | 2.31E-08 | 4.61E-07 | 2.59E-09 | 9.94E-07 | 4.62E-08 | 3.49E-08 | 1.31E-04 | 0.000124939 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.95E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.81E-07 | 2.70E-09 | 1.04E-06 | 4.82E-08 | 3.64E-08 | 1.36E-04 | 0.000130602 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.92E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 4.70E-07 | 2.64E-09 | 1.01E-06 | 4.71E-08 | 3.56E-08 | 1.33E-04 | 0.000127811 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.76E-05 | 2.24E-08 | 1.34E-08 | 2.24E-08 | 4.47E-07 | 2.52E-09 | 9.65E-07 | 4.48E-08 | 3.39E-08 | 1.27E-04 | 0.00012154 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.60E-05 | 2.13E-08 | 1.28E-08 | 2.13E-08 | 4.24E-07 | 2.39E-09 | 9.15E-07 | 4.25E-08 | 3.21E-08 | 1.20E-04 | 0.000115225 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 4.03E-07 | 2.27E-09 | 8.70E-07 | 4.04E-08 | 3.05E-08 | 1.14E-04 | 0.000109448 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.28E-05 | 1.91E-08 | 1.15E-08 | 1.91E-08 | 3.81E-07 | 2.14E-09 | 8.22E-07 | 3.82E-08 | 2.88E-08 | 1.08E-04 | 0.000103349 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 3.61E-07 | 2.03E-09 | 7.80E-07 | 3.62E-08 | 2.74E-08 | 1.03E-04 | 9.80488E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.44E-07 | 1.94E-09 | 7.42E-07 | 3.45E-08 | 2.60E-08 | 9.76E-05 | 9.31875E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.64E-08 | 9.83E-09 | 1.64E-08 | 3.27E-07 | 1.84E-09 | 7.05E-07 | 3.28E-08 | 2.47E-08 | 9.27E-05 | 8.85161E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.76E-05 | 1.56E-08 | 9.37E-09 | 1.56E-08 | 3.11E-07 | 1.75E-09 | 6.72E-07 | 3.12E-08 | 2.36E-08 | 8.84E-05 | 8.43079E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.64E-05 | 1.48E-08 | 8.88E-09 | 1.48E-08 | 2.95E-07 | 1.66E-09 | 6.37E-07 | 2.96E-08 | 2.23E-08 | 8.38E-05 | 7.98307E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.95E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 4.87E-07 | 2.74E-09 | 1.05E-06 | 4.88E-08 | 3.69E-08 | 1.38E-04 | 0.000132284 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.88E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.73E-07 | 2.66E-09 | 1.02E-06 | 4.74E-08 | 3.59E-08 | 1.34E-04 | 0.000128529 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.73E-07 | 2.66E-09 | 1.02E-06 | 4.75E-08 | 3.59E-08 | 1.34E-04 | 0.000128733 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 4.55E-07 | 2.56E-09 | 9.81E-07 | 4.56E-08 | 3.44E-08 | 1.29E-04 | 0.000123584 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.66E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 4.33E-07 | 2.44E-09 | 9.35E-07 | 4.34E-08 | 3.28E-08 | 1.23E-04 | 0.000117728 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 4.12E-07 | 2.32E-09 | 8.89E-07 | 4.13E-08 | 3.12E-08 | 1.17E-04 | 0.000111966 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.91E-07 | 2.20E-09 | 8.45E-07 | 3.92E-08 | 2.97E-08 | 1.11E-04 | 0.000106286 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.20E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 3.71E-07 | 2.09E-09 | 8.01E-07 | 3.72E-08 | 2.81E-08 | 1.05E-04 | 0.000100772 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.04E-05 | 1.76E-08 | 1.05E-08 | 1.76E-08 | 3.51E-07 | 1.97E-09 | 7.57E-07 | 3.52E-08 | 2.66E-08 | 9.95E-05 | 9.50669E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.66E-08 | 9.94E-09 | 1.66E-08 | 3.30E-07 | 1.86E-09 | 7.13E-07 | 3.31E-08 | 2.50E-08 | 9.38E-05 | 8.94816E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.72E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 3.09E-07 | 1.74E-09 | 6.68E-07 | 3.10E-08 | 2.34E-08 | 8.78E-05 | 8.37255E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.87E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.82E-07 | 2.71E-09 | 1.04E-06 | 4.83E-08 | 3.65E-08 | 1.37E-04 | 0.000130745 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.92E-05 | 2.41E-08 | 1.44E-08 | 2.41E-08 | 4.80E-07 | 2.70E-09 | 1.04E-06 | 4.81E-08 | 3.64E-08 | 1.36E-04 | 0.000130462 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.73E-07 | 2.66E-09 | 1.02E-06 | 4.74E-08 | 3.58E-08 | 1.34E-04 | 0.00012856 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.84E-05 | 2.31E-08 | 1.38E-08 | 2.31E-08 | 4.60E-07 | 2.59E-09 | 9.93E-07 | 4.61E-08 | 3.49E-08 | 1.31E-04 | 0.000125095 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.72E-05 | 2.21E-08 | 1.33E-08 | 2.21E-08 | 4.42E-07 | 2.49E-09 | 9.54E-07 | 4.43E-08 | 3.35E-08 | 1.25E-04 | 0.00012009 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.55E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.20E-07 | 2.36E-09 | 9.06E-07 | 4.21E-08 | 3.18E-08 | 1.19E-04 | 0.000114046 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.38E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 3.97E-07 | 2.24E-09 | 8.57E-07 | 3.98E-08 | 3.01E-08 | 1.13E-04 | 0.000107842 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 3.72E-07 | 2.09E-09 | 8.03E-07 | 3.73E-08 | 2.82E-08 | 1.06E-04 | 0.000100891 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.49E-07 | 1.97E-09 | 7.53E-07 | 3.50E-08 | 2.64E-08 | 9.91E-05 | 9.4581E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.80E-05 | 3.17E-08 | 1.90E-08 | 3.17E-08 | 6.33E-07 | 3.56E-09 | 1.37E-06 | 6.34E-08 | 4.80E-08 | 1.80E-04 | 0.000171826 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.79E-05 | 3.11E-08 | 1.86E-08 | 3.11E-08 | 6.20E-07 | 3.49E-09 | 1.34E-06 | 6.21E-08 | 4.70E-08 | 1.76E-04 | 0.000168483 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.29E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 5.43E-07 | 3.05E-09 | 1.17E-06 | 5.44E-08 | 4.11E-08 | 1.54E-04 | 0.000147464 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.18E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 5.23E-07 | 2.94E-09 | 1.13E-06 | 5.24E-08 | 3.97E-08 | 1.49E-04 | 0.000142132 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.12E-05 | 2.56E-08 | 1.53E-08 | 2.56E-08 | 5.10E-07 | 2.87E-09 | 1.10E-06 | 5.11E-08 | 3.87E-08 | 1.45E-04 | 0.000138656 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.02E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 4.94E-07 | 2.78E-09 | 1.07E-06 | 4.95E-08 | 3.74E-08 | 1.40E-04 | 0.000134118 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.89E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.74E-07 | 2.67E-09 | 1.02E-06 | 4.75E-08 | 3.59E-08 | 1.35E-04 | 0.00012874 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.94E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.73E-07 | 2.66E-09 | 1.02E-06 | 4.74E-08 | 3.58E-08 | 1.34E-04 | 0.00012857 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 4.48E-07 | 2.52E-09 | 9.67E-07 | 4.49E-08 | 3.40E-08 | 1.27E-04 | 0.000121795 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.21E-07 | 2.37E-09 | 9.08E-07 | 4.22E-08 | 3.19E-08 | 1.19E-04 | 0.000114275 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 3.94E-07 | 2.22E-09 | 8.50E-07 | 3.95E-08 | 2.98E-08 | 1.12E-04 | 0.000106881 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.68E-07 | 2.07E-09 | 7.95E-07 | 3.69E-08 | 2.79E-08 | 1.05E-04 | 9.98504E-05 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.95E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 3.44E-07 | 1.94E-09 | 7.43E-07 | 3.45E-08 | 2.61E-08 | 9.78E-05 | 9.32499E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.95E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 6.41E-07 | 3.60E-09 | 1.38E-06 | 6.42E-08 | 4.86E-08 | 1.82E-04 | 0.000174181 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.71E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 6.07E-07 | 3.41E-09 | 1.31E-06 | 6.08E-08 | 4.60E-08 | 1.72E-04 | 0.000164964 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.83E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.10E-07 | 3.43E-09 | 1.32E-06 | 6.11E-08 | 4.62E-08 | 1.73E-04 | 0.000165905 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.83E-05 | 3.01E-08 | 1.81E-08 | 3.01E-08 | 6.02E-07 | 3.38E-09 | 1.30E-06 | 6.03E-08 | 4.56E-08 | 1.71E-04 | 0.000163791 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.83E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 5.94E-07 | 3.34E-09 | 1.28E-06 | 5.95E-08 | 4.51E-08 | 1.69E-04 | 0.000161901 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.47E-05 | 2.75E-08 | 1.65E-08 | 2.75E-08 | 5.49E-07 | 3.09E-09 | 1.19E-06 | 5.50E-08 | 4.16E-08 | 1.56E-04 | 0.000149503 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.43E-05 | 2.70E-08 | 1.62E-08 | 2.70E-08 | 5.38E-07 | 3.03E-09 | 1.16E-06 | 5.39E-08 | 4.08E-08 | 1.53E-04 | 0.000146569 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.25E-05 | 2.57E-08 | 1.54E-08 | 2.57E-08 | 5.13E-07 | 2.88E-09 | 1.11E-06 | 5.14E-08 | 3.89E-08 | 1.46E-04 | 0.000139558 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.01E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.81E-07 | 2.71E-09 | 1.04E-06 | 4.83E-08 | 3.65E-08 | 1.37E-04 | 0.000130981 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 4.50E-07 | 2.53E-09 | 9.71E-07 | 4.51E-08 | 3.41E-08 | 1.28E-04 | 0.000122234 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.52E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.19E-07 | 2.36E-09 | 9.04E-07 | 4.20E-08 | 3.17E-08 | 1.19E-04 | 0.000113705 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.90E-07 | 2.19E-09 | 8.42E-07 | 3.91E-08 | 2.95E-08 | 1.11E-04 | 0.000105774 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.09E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 3.64E-07 | 2.05E-09 | 7.85E-07 | 3.65E-08 | 2.76E-08 | 1.03E-04 | 9.85537E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.70E-08 | 1.02E-08 | 1.70E-08 | 3.39E-07 | 1.91E-09 | 7.33E-07 | 3.40E-08 | 2.57E-08 | 9.64E-05 | 9.19025E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.72E-05 | 1.58E-08 | 9.50E-09 | 1.58E-08 | 3.16E-07 | 1.78E-09 | 6.81E-07 | 3.17E-08 | 2.39E-08 | 8.96E-05 | 8.53436E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.46E-08 | 8.73E-09 | 1.46E-08 | 2.90E-07 | 1.63E-09 | 6.26E-07 | 2.91E-08 | 2.20E-08 | 8.24E-05 | 7.83358E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.66E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 8.31E-07 | 4.67E-09 | 1.79E-06 | 8.32E-08 | 6.30E-08 | 2.36E-04 | 0.000226994 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.35E-05 | 3.95E-08 | 2.37E-08 | 3.95E-08 | 7.88E-07 | 4.43E-09 | 1.70E-06 | 7.89E-08 | 5.98E-08 | 2.24E-04 | 0.000215236 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.55E-05 | 3.49E-08 | 2.09E-08 | 3.49E-08 | 6.96E-07 | 3.91E-09 | 1.50E-06 | 6.97E-08 | 5.28E-08 | 1.98E-04 | 0.00018975 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.07E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 6.37E-07 | 3.58E-09 | 1.37E-06 | 6.38E-08 | 4.83E-08 | 1.81E-04 | 0.000173345 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 4.00E-05 | 3.11E-08 | 1.87E-08 | 3.11E-08 | 6.21E-07 | 3.49E-09 | 1.34E-06 | 6.22E-08 | 4.71E-08 | 1.76E-04 | 0.000169114 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.91E-05 | 3.02E-08 | 1.81E-08 | 3.02E-08 | 6.04E-07 | 3.39E-09 | 1.30E-06 | 6.05E-08 | 4.58E-08 | 1.71E-04 | 0.000164489 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.84E-05 | 2.95E-08 | 1.77E-08 | 2.95E-08 | 5.88E-07 | 3.31E-09 | 1.27E-06 | 5.89E-08 | 4.46E-08 | 1.67E-04 | 0.000160294 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.57E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 5.53E-07 | 3.11E-09 | 1.19E-06 | 5.54E-08 | 4.19E-08 | 1.57E-04 | 0.000150551 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 5.19E-07 | 2.92E-09 | 1.12E-06 | 5.20E-08 | 3.94E-08 | 1.47E-04 | 0.000141377 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.04E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.84E-07 | 2.72E-09 | 1.05E-06 | 4.85E-08 | 3.67E-08 | 1.37E-04 | 0.000131756 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.76E-05 | 2.25E-08 | 1.35E-08 | 2.25E-08 | 4.49E-07 | 2.53E-09 | 9.69E-07 | 4.50E-08 | 3.40E-08 | 1.27E-04 | 0.000122065 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 4.15E-07 | 2.34E-09 | 8.97E-07 | 4.16E-08 | 3.15E-08 | 1.18E-04 | 0.000112804 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.26E-05 | 1.93E-08 | 1.16E-08 | 1.93E-08 | 3.85E-07 | 2.17E-09 | 8.31E-07 | 3.86E-08 | 2.92E-08 | 1.09E-04 | 0.000104483 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.57E-07 | 2.01E-09 | 7.70E-07 | 3.58E-08 | 2.70E-08 | 1.01E-04 | 9.67254E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.85E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 3.32E-07 | 1.87E-09 | 7.17E-07 | 3.33E-08 | 2.52E-08 | 9.43E-05 | 8.98683E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.55E-08 | 9.32E-09 | 1.55E-08 | 3.10E-07 | 1.75E-09 | 6.69E-07 | 3.11E-08 | 2.35E-08 | 8.80E-05 | 8.3783E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.53E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 2.90E-07 | 1.63E-09 | 6.25E-07 | 2.90E-08 | 2.19E-08 | 8.22E-05 | 7.82015E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.24E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 8.82E-07 | 4.95E-09 | 1.90E-06 | 8.83E-08 | 6.69E-08 | 2.50E-04 | 0.000241396 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.79E-05 | 4.13E-08 | 2.48E-08 | 4.13E-08 | 8.25E-07 | 4.63E-09 | 1.78E-06 | 8.26E-08 | 6.26E-08 | 2.34E-04 | 0.000225628 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.93E-05 | 3.63E-08 | 2.18E-08 | 3.63E-08 | 7.26E-07 | 4.08E-09 | 1.57E-06 | 7.27E-08 | 5.50E-08 | 2.06E-04 | 0.000198216 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.57E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 6.80E-07 | 3.82E-09 | 1.47E-06 | 6.81E-08 | 5.15E-08 | 1.93E-04 | 0.000185517 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.42E-05 | 3.28E-08 | 1.97E-08 | 3.28E-08 | 6.55E-07 | 3.68E-09 | 1.41E-06 | 6.56E-08 | 4.97E-08 | 1.86E-04 | 0.000178866 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.04E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 6.07E-07 | 3.41E-09 | 1.31E-06 | 6.08E-08 | 4.60E-08 | 1.72E-04 | 0.000165634 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.67E-05 | 2.81E-08 | 1.69E-08 | 2.81E-08 | 5.61E-07 | 3.15E-09 | 1.21E-06 | 5.62E-08 | 4.25E-08 | 1.59E-04 | 0.000152898 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.34E-05 | 2.61E-08 | 1.56E-08 | 2.61E-08 | 5.20E-07 | 2.92E-09 | 1.12E-06 | 5.21E-08 | 3.94E-08 | 1.48E-04 | 0.00014166 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.04E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.82E-07 | 2.71E-09 | 1.04E-06 | 4.83E-08 | 3.65E-08 | 1.37E-04 | 0.00013107 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.74E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 4.44E-07 | 2.50E-09 | 9.59E-07 | 4.45E-08 | 3.37E-08 | 1.26E-04 | 0.000120733 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.45E-05 | 2.04E-08 | 1.23E-08 | 2.04E-08 | 4.08E-07 | 2.29E-09 | 8.80E-07 | 4.09E-08 | 3.09E-08 | 1.16E-04 | 0.000110736 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.75E-07 | 2.11E-09 | 8.09E-07 | 3.76E-08 | 2.84E-08 | 1.06E-04 | 0.000101651 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.96E-05 | 1.73E-08 | 1.04E-08 | 1.73E-08 | 3.46E-07 | 1.95E-09 | 7.47E-07 | 3.47E-08 | 2.62E-08 | 9.82E-05 | 9.36839E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.77E-05 | 1.61E-08 | 9.66E-09 | 1.61E-08 | 3.21E-07 | 1.81E-09 | 6.93E-07 | 3.22E-08 | 2.43E-08 | 9.11E-05 | 8.68173E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.61E-05 | 1.50E-08 | 9.02E-09 | 1.50E-08 | 3.00E-07 | 1.69E-09 | 6.47E-07 | 3.01E-08 | 2.27E-08 | 8.51E-05 | 8.09889E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.41E-08 | 8.47E-09 | 1.41E-08 | 2.81E-07 | 1.59E-09 | 6.07E-07 | 2.82E-08 | 2.13E-08 | 7.99E-05 | 7.59528E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.30E-08 | 7.79E-09 | 1.30E-08 | 2.59E-07 | 1.46E-09 | 5.58E-07 | 2.60E-08 | 1.96E-08 | 7.35E-05 | 6.97613E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.38E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 8.95E-07 | 5.02E-09 | 1.93E-06 | 8.96E-08 | 6.79E-08 | 2.54E-04 | 0.000244948 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.09E-05 | 4.28E-08 | 2.57E-08 | 4.28E-08 | 8.54E-07 | 4.80E-09 | 1.84E-06 | 8.55E-08 | 6.48E-08 | 2.42E-04 | 0.000233852 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.67E-05 | 4.01E-08 | 2.40E-08 | 4.01E-08 | 8.00E-07 | 4.49E-09 | 1.73E-06 | 8.01E-08 | 6.07E-08 | 2.27E-04 | 0.000218999 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.11E-05 | 3.67E-08 | 2.20E-08 | 3.67E-08 | 7.32E-07 | 4.11E-09 | 1.58E-06 | 7.33E-08 | 5.55E-08 | 2.08E-04 | 0.000200244 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.56E-05 | 3.34E-08 | 2.00E-08 | 3.34E-08 | 6.66E-07 | 3.74E-09 | 1.44E-06 | 6.67E-08 | 5.05E-08 | 1.89E-04 | 0.00018204 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.08E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.08E-07 | 3.42E-09 | 1.31E-06 | 6.09E-08 | 4.61E-08 | 1.73E-04 | 0.000166069 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.68E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 5.59E-07 | 3.14E-09 | 1.21E-06 | 5.60E-08 | 4.24E-08 | 1.59E-04 | 0.000152368 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.32E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 5.15E-07 | 2.89E-09 | 1.11E-06 | 5.16E-08 | 3.90E-08 | 1.46E-04 | 0.000140204 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.97E-05 | 2.36E-08 | 1.42E-08 | 2.36E-08 | 4.71E-07 | 2.65E-09 | 1.02E-06 | 4.72E-08 | 3.57E-08 | 1.34E-04 | 0.000128248 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.63E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 4.29E-07 | 2.41E-09 | 9.26E-07 | 4.30E-08 | 3.25E-08 | 1.22E-04 | 0.000116659 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.92E-07 | 2.21E-09 | 8.46E-07 | 3.93E-08 | 2.97E-08 | 1.11E-04 | 0.000106348 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 3.60E-07 | 2.02E-09 | 7.76E-07 | 3.61E-08 | 2.72E-08 | 1.02E-04 | 9.74581E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.86E-05 | 1.66E-08 | 9.99E-09 | 1.66E-08 | 3.32E-07 | 1.87E-09 | 7.17E-07 | 3.33E-08 | 2.52E-08 | 9.43E-05 | 8.98714E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.55E-08 | 9.31E-09 | 1.55E-08 | 3.09E-07 | 1.74E-09 | 6.68E-07 | 3.10E-08 | 2.34E-08 | 8.78E-05 | 8.36341E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.54E-05 | 1.45E-08 | 8.71E-09 | 1.45E-08 | 2.89E-07 | 1.63E-09 | 6.25E-07 | 2.90E-08 | 2.19E-08 | 8.22E-05 | 7.81839E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.42E-05 | 1.37E-08 | 8.21E-09 | 1.37E-08 | 2.73E-07 | 1.54E-09 | 5.88E-07 | 2.74E-08 | 2.06E-08 | 7.74E-05 | 7.35917E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.32E-05 | 1.30E-08 | 7.77E-09 | 1.30E-08 | 2.58E-07 | 1.46E-09 | 5.57E-07 | 2.59E-08 | 1.95E-08 | 7.33E-05 | 6.96271E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.56E-05 | 4.50E-08 | 2.70E-08 | 4.50E-08 | 9.00E-07 | 5.05E-09 | 1.94E-06 | 9.01E-08 | 6.83E-08 | 2.55E-04 | 0.000246616 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.08E-05 | 4.20E-08 | 2.52E-08 | 4.20E-08 | 8.40E-07 | 4.72E-09 | 1.81E-06 | 8.41E-08 | 6.37E-08 | 2.38E-04 | 0.000230114 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.33E-05 | 3.76E-08 | 2.26E-08 | 3.76E-08 | 7.52E-07 | 4.22E-09 | 1.62E-06 | 7.53E-08 | 5.70E-08 | 2.13E-04 | 0.000205774 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.67E-05 | 3.37E-08 | 2.02E-08 | 3.37E-08 | 6.74E-07 | 3.78E-09 | 1.45E-06 | 6.75E-08 | 5.11E-08 | 1.91E-04 | 0.000184187 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.12E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.09E-07 | 3.42E-09 | 1.31E-06 | 6.10E-08 | 4.62E-08 | 1.73E-04 | 0.000166329 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.67E-05 | 2.78E-08 | 1.67E-08 | 2.78E-08 | 5.54E-07 | 3.11E-09 | 1.20E-06 | 5.55E-08 | 4.20E-08 | 1.57E-04 | 0.000151144 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.23E-05 | 2.51E-08 | 1.51E-08 | 2.51E-08 | 5.01E-07 | 2.82E-09 | 1.08E-06 | 5.02E-08 | 3.80E-08 | 1.42E-04 | 0.000136594 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.82E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 4.52E-07 | 2.54E-09 | 9.76E-07 | 4.53E-08 | 3.43E-08 | 1.28E-04 | 0.000123023 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 4.10E-07 | 2.30E-09 | 8.84E-07 | 4.11E-08 | 3.10E-08 | 1.16E-04 | 0.000111226 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.19E-05 | 1.87E-08 | 1.12E-08 | 1.87E-08 | 3.74E-07 | 2.10E-09 | 8.07E-07 | 3.75E-08 | 2.83E-08 | 1.06E-04 | 0.000101417 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.44E-07 | 1.94E-09 | 7.42E-07 | 3.45E-08 | 2.61E-08 | 9.76E-05 | 9.31521E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.76E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 3.19E-07 | 1.80E-09 | 6.89E-07 | 3.20E-08 | 2.42E-08 | 9.06E-05 | 8.63384E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.49E-08 | 8.97E-09 | 1.49E-08 | 2.98E-07 | 1.68E-09 | 6.43E-07 | 2.99E-08 | 2.26E-08 | 8.46E-05 | 8.05306E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.47E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 2.80E-07 | 1.58E-09 | 6.04E-07 | 2.81E-08 | 2.12E-08 | 7.94E-05 | 7.55165E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.35E-05 | 1.32E-08 | 7.92E-09 | 1.32E-08 | 2.63E-07 | 1.48E-09 | 5.68E-07 | 2.64E-08 | 1.99E-08 | 7.47E-05 | 7.10027E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.25E-08 | 7.48E-09 | 1.25E-08 | 2.49E-07 | 1.40E-09 | 5.36E-07 | 2.49E-08 | 1.88E-08 | 7.06E-05 | 6.69965E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.97E-05 | 5.91E-08 | 3.55E-08 | 5.91E-08 | 1.18E-06 | 6.63E-09 | 2.55E-06 | 1.18E-07 | 8.96E-08 | 3.35E-04 | 0.000324397 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.70E-05 | 5.71E-08 | 3.43E-08 | 5.71E-08 | 1.14E-06 | 6.41E-09 | 2.46E-06 | 1.14E-07 | 8.66E-08 | 3.24E-04 | 0.000313714 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.23E-05 | 5.41E-08 | 3.25E-08 | 5.41E-08 | 1.08E-06 | 6.07E-09 | 2.34E-06 | 1.08E-07 | 8.21E-08 | 3.07E-04 | 0.000297195 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.38E-05 | 4.92E-08 | 2.95E-08 | 4.92E-08 | 9.82E-07 | 5.51E-09 | 2.12E-06 | 9.84E-08 | 7.46E-08 | 2.79E-04 | 0.000269766 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.47E-05 | 4.39E-08 | 2.63E-08 | 4.39E-08 | 8.77E-07 | 4.92E-09 | 1.89E-06 | 8.78E-08 | 6.65E-08 | 2.49E-04 | 0.000240535 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.54E-05 | 3.86E-08 | 2.31E-08 | 3.86E-08 | 7.70E-07 | 4.32E-09 | 1.66E-06 | 7.71E-08 | 5.84E-08 | 2.19E-04 | 0.000210935 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.81E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 6.85E-07 | 3.85E-09 | 1.48E-06 | 6.87E-08 | 5.20E-08 | 1.95E-04 | 0.000187526 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.15E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.09E-07 | 3.42E-09 | 1.31E-06 | 6.10E-08 | 4.62E-08 | 1.73E-04 | 0.000166254 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.58E-05 | 2.71E-08 | 1.63E-08 | 2.71E-08 | 5.41E-07 | 3.04E-09 | 1.17E-06 | 5.42E-08 | 4.10E-08 | 1.54E-04 | 0.000147662 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.07E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.81E-07 | 2.70E-09 | 1.04E-06 | 4.82E-08 | 3.65E-08 | 1.37E-04 | 0.000130936 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.66E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.32E-07 | 2.43E-09 | 9.32E-07 | 4.33E-08 | 3.27E-08 | 1.23E-04 | 0.000117329 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.33E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.92E-07 | 2.20E-09 | 8.46E-07 | 3.93E-08 | 2.97E-08 | 1.11E-04 | 0.000106329 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.07E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 3.59E-07 | 2.02E-09 | 7.74E-07 | 3.60E-08 | 2.72E-08 | 1.02E-04 | 9.72397E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.85E-05 | 1.66E-08 | 9.96E-09 | 1.66E-08 | 3.31E-07 | 1.86E-09 | 7.15E-07 | 3.32E-08 | 2.51E-08 | 9.40E-05 | 8.96305E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.67E-05 | 1.54E-08 | 9.26E-09 | 1.54E-08 | 3.08E-07 | 1.73E-09 | 6.64E-07 | 3.09E-08 | 2.33E-08 | 8.73E-05 | 8.31715E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.51E-05 | 1.44E-08 | 8.62E-09 | 1.44E-08 | 2.86E-07 | 1.61E-09 | 6.18E-07 | 2.87E-08 | 2.17E-08 | 8.13E-05 | 7.73607E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.38E-05 | 1.35E-08 | 8.08E-09 | 1.35E-08 | 2.68E-07 | 1.51E-09 | 5.79E-07 | 2.69E-08 | 2.03E-08 | 7.62E-05 | 7.24107E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 2.53E-07 | 1.42E-09 | 5.45E-07 | 2.53E-08 | 1.91E-08 | 7.17E-05 | 6.80612E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.20E-08 | 7.18E-09 | 1.20E-08 | 2.39E-07 | 1.34E-09 | 5.15E-07 | 2.39E-08 | 1.81E-08 | 6.77E-05 | 6.42099E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.27E-08 | 4.36E-08 | 7.27E-08 | 1.45E-06 | 8.15E-09 | 3.14E-06 | 1.45E-07 | 1.10E-07 | 4.13E-04 | 0.000400505 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 1.35E-06 | 7.59E-09 | 2.92E-06 | 1.35E-07 | 1.03E-07 | 3.84E-04 | 0.000372836 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.15E-05 | 5.88E-08 | 3.53E-08 | 5.88E-08 | 1.18E-06 | 6.59E-09 | 2.54E-06 | 1.18E-07 | 8.92E-08 | 3.34E-04 | 0.000323366 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.06E-05 | 5.25E-08 | 3.15E-08 | 5.25E-08 | 1.05E-06 | 5.89E-09 | 2.27E-06 | 1.05E-07 | 7.97E-08 | 2.98E-04 | 0.00028859 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.81E-05 | 4.55E-08 | 2.73E-08 | 4.55E-08 | 9.08E-07 | 5.10E-09 | 1.96E-06 | 9.09E-08 | 6.89E-08 | 2.58E-04 | 0.000249391 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.78E-05 | 3.96E-08 | 2.38E-08 | 3.96E-08 | 7.91E-07 | 4.44E-09 | 1.71E-06 | 7.92E-08 | 6.00E-08 | 2.25E-04 | 0.000216786 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.88E-05 | 3.45E-08 | 2.07E-08 | 3.45E-08 | 6.88E-07 | 3.87E-09 | 1.49E-06 | 6.89E-08 | 5.22E-08 | 1.95E-04 | 0.000188371 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.06E-05 | 2.98E-08 | 1.79E-08 | 2.98E-08 | 5.95E-07 | 3.34E-09 | 1.28E-06 | 5.96E-08 | 4.51E-08 | 1.69E-04 | 0.000162498 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.40E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 5.19E-07 | 2.92E-09 | 1.12E-06 | 5.20E-08 | 3.93E-08 | 1.47E-04 | 0.000141422 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.90E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.59E-07 | 2.58E-09 | 9.91E-07 | 4.60E-08 | 3.48E-08 | 1.30E-04 | 0.000124973 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 4.13E-07 | 2.32E-09 | 8.92E-07 | 4.14E-08 | 3.13E-08 | 1.17E-04 | 0.000112268 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.21E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.76E-07 | 2.11E-09 | 8.11E-07 | 3.77E-08 | 2.85E-08 | 1.07E-04 | 0.000101876 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.95E-05 | 1.72E-08 | 1.03E-08 | 1.72E-08 | 3.44E-07 | 1.93E-09 | 7.41E-07 | 3.44E-08 | 2.60E-08 | 9.75E-05 | 9.30515E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.74E-05 | 1.59E-08 | 9.53E-09 | 1.59E-08 | 3.17E-07 | 1.78E-09 | 6.84E-07 | 3.18E-08 | 2.40E-08 | 8.99E-05 | 8.56919E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.56E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 2.93E-07 | 1.65E-09 | 6.33E-07 | 2.94E-08 | 2.22E-08 | 8.33E-05 | 7.92629E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.41E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 2.73E-07 | 1.54E-09 | 5.90E-07 | 2.74E-08 | 2.07E-08 | 7.76E-05 | 7.3778E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 2.57E-07 | 1.45E-09 | 5.54E-07 | 2.58E-08 | 1.94E-08 | 7.29E-05 | 6.91603E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.18E-05 | 1.21E-08 | 7.29E-09 | 1.21E-08 | 2.42E-07 | 1.37E-09 | 5.22E-07 | 2.43E-08 | 1.83E-08 | 6.87E-05 | 6.5175E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.09E-05 | 1.15E-08 | 6.90E-09 | 1.15E-08 | 2.29E-07 | 1.29E-09 | 4.95E-07 | 2.30E-08 | 1.73E-08 | 6.51E-05 | 6.16436E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.68E-08 | 5.21E-08 | 8.68E-08 | 1.73E-06 | 9.72E-09 | 3.74E-06 | 1.74E-07 | 1.32E-07 | 4.92E-04 | 0.000478349 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.51E-08 | 5.11E-08 | 8.51E-08 | 1.70E-06 | 9.54E-09 | 3.67E-06 | 1.70E-07 | 1.29E-07 | 4.83E-04 | 0.000469443 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.10E-08 | 4.86E-08 | 8.10E-08 | 1.62E-06 | 9.08E-09 | 3.50E-06 | 1.62E-07 | 1.23E-07 | 4.60E-04 | 0.00044687 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.74E-08 | 4.64E-08 | 7.74E-08 | 1.55E-06 | 8.68E-09 | 3.34E-06 | 1.55E-07 | 1.17E-07 | 4.39E-04 | 0.000426823 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.77E-08 | 4.06E-08 | 6.77E-08 | 1.35E-06 | 7.59E-09 | 2.92E-06 | 1.35E-07 | 1.03E-07 | 3.84E-04 | 0.000372992 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.81E-05 | 5.62E-08 | 3.37E-08 | 5.62E-08 | 1.12E-06 | 6.30E-09 | 2.42E-06 | 1.12E-07 | 8.52E-08 | 3.19E-04 | 0.000308948 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.15E-05 | 4.69E-08 | 2.82E-08 | 4.69E-08 | 9.38E-07 | 5.26E-09 | 2.02E-06 | 9.39E-08 | 7.12E-08 | 2.66E-04 | 0.000257669 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.86E-05 | 3.97E-08 | 2.38E-08 | 3.97E-08 | 7.93E-07 | 4.45E-09 | 1.71E-06 | 7.94E-08 | 6.02E-08 | 2.25E-04 | 0.000217594 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.70E-05 | 3.32E-08 | 1.99E-08 | 3.32E-08 | 6.64E-07 | 3.73E-09 | 1.43E-06 | 6.65E-08 | 5.04E-08 | 1.88E-04 | 0.000181695 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.82E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 5.64E-07 | 3.17E-09 | 1.22E-06 | 5.65E-08 | 4.27E-08 | 1.60E-04 | 0.000153903 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.22E-05 | 2.47E-08 | 1.48E-08 | 2.47E-08 | 4.93E-07 | 2.77E-09 | 1.07E-06 | 4.94E-08 | 3.74E-08 | 1.40E-04 | 0.000134502 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.72E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 4.36E-07 | 2.45E-09 | 9.41E-07 | 4.37E-08 | 3.30E-08 | 1.24E-04 | 0.000118548 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.34E-05 | 1.96E-08 | 1.17E-08 | 1.96E-08 | 3.90E-07 | 2.20E-09 | 8.42E-07 | 3.91E-08 | 2.96E-08 | 1.11E-04 | 0.000105976 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.54E-07 | 1.99E-09 | 7.63E-07 | 3.55E-08 | 2.68E-08 | 1.00E-04 | 9.58766E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.80E-05 | 1.62E-08 | 9.74E-09 | 1.62E-08 | 3.24E-07 | 1.82E-09 | 6.99E-07 | 3.25E-08 | 2.45E-08 | 9.19E-05 | 8.7605E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.61E-05 | 1.50E-08 | 9.00E-09 | 1.50E-08 | 2.99E-07 | 1.69E-09 | 6.46E-07 | 3.00E-08 | 2.27E-08 | 8.49E-05 | 8.08475E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.44E-05 | 1.39E-08 | 8.35E-09 | 1.39E-08 | 2.77E-07 | 1.56E-09 | 5.99E-07 | 2.78E-08 | 2.10E-08 | 7.88E-05 | 7.48644E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.31E-05 | 1.30E-08 | 7.81E-09 | 1.30E-08 | 2.60E-07 | 1.46E-09 | 5.60E-07 | 2.60E-08 | 1.97E-08 | 7.37E-05 | 6.99832E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.20E-05 | 1.23E-08 | 7.36E-09 | 1.23E-08 | 2.45E-07 | 1.38E-09 | 5.28E-07 | 2.45E-08 | 1.85E-08 | 6.94E-05 | 6.58402E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.11E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.32E-07 | 1.31E-09 | 5.00E-07 | 2.32E-08 | 1.75E-08 | 6.58E-05 | 6.23167E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 2.20E-07 | 1.24E-09 | 4.76E-07 | 2.21E-08 | 1.67E-08 | 6.26E-05 | 5.92596E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.53E-04 | 9.25E-08 | 5.55E-08 | 9.25E-08 | 1.85E-06 | 1.04E-08 | 3.99E-06 | 1.85E-07 | 1.40E-07 | 5.25E-04 | 0.000510599 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 8.94E-08 | 5.37E-08 | 8.94E-08 | 1.79E-06 | 1.00E-08 | 3.86E-06 | 1.79E-07 | 1.36E-07 | 5.08E-04 | 0.00049364 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.86E-08 | 5.31E-08 | 8.86E-08 | 1.77E-06 | 9.93E-09 | 3.82E-06 | 1.77E-07 | 1.34E-07 | 5.03E-04 | 0.000489235 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.23E-04 | 7.47E-08 | 4.48E-08 | 7.47E-08 | 1.49E-06 | 8.37E-09 | 3.22E-06 | 1.49E-07 | 1.13E-07 | 4.24E-04 | 0.000412146 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.33E-05 | 5.85E-08 | 3.51E-08 | 5.85E-08 | 1.17E-06 | 6.56E-09 | 2.52E-06 | 1.17E-07 | 8.87E-08 | 3.32E-04 | 0.000322093 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.24E-05 | 4.70E-08 | 2.82E-08 | 4.70E-08 | 9.39E-07 | 5.27E-09 | 2.03E-06 | 9.40E-08 | 7.12E-08 | 2.67E-04 | 0.000258142 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.62E-05 | 3.80E-08 | 2.28E-08 | 3.80E-08 | 7.59E-07 | 4.26E-09 | 1.64E-06 | 7.60E-08 | 5.76E-08 | 2.16E-04 | 0.000208333 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.42E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 6.25E-07 | 3.51E-09 | 1.35E-06 | 6.26E-08 | 4.74E-08 | 1.77E-04 | 0.000171049 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.55E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 5.27E-07 | 2.96E-09 | 1.14E-06 | 5.28E-08 | 4.00E-08 | 1.50E-04 | 0.000143831 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.93E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 4.55E-07 | 2.56E-09 | 9.83E-07 | 4.56E-08 | 3.45E-08 | 1.29E-04 | 0.000124068 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.48E-05 | 2.02E-08 | 1.21E-08 | 2.02E-08 | 4.02E-07 | 2.26E-09 | 8.69E-07 | 4.03E-08 | 3.05E-08 | 1.14E-04 | 0.000109395 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.14E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 3.62E-07 | 2.04E-09 | 7.81E-07 | 3.63E-08 | 2.74E-08 | 1.03E-04 | 9.81934E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.65E-08 | 9.88E-09 | 1.65E-08 | 3.28E-07 | 1.85E-09 | 7.09E-07 | 3.29E-08 | 2.49E-08 | 9.32E-05 | 8.89642E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.65E-05 | 1.51E-08 | 9.08E-09 | 1.51E-08 | 3.02E-07 | 1.70E-09 | 6.51E-07 | 3.03E-08 | 2.28E-08 | 8.56E-05 | 8.15775E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.40E-08 | 8.42E-09 | 1.40E-08 | 2.80E-07 | 1.58E-09 | 6.04E-07 | 2.81E-08 | 2.12E-08 | 7.95E-05 | 7.56093E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.35E-05 | 1.31E-08 | 7.89E-09 | 1.31E-08 | 2.62E-07 | 1.48E-09 | 5.66E-07 | 2.63E-08 | 1.98E-08 | 7.44E-05 | 7.07012E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.24E-05 | 1.24E-08 | 7.43E-09 | 1.24E-08 | 2.47E-07 | 1.39E-09 | 5.33E-07 | 2.48E-08 | 1.87E-08 | 7.01E-05 | 6.6539E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.15E-05 | 1.18E-08 | 7.05E-09 | 1.18E-08 | 2.34E-07 | 1.32E-09 | 5.06E-07 | 2.35E-08 | 1.77E-08 | 6.65E-05 | 6.31035E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.12E-08 | 6.73E-09 | 1.12E-08 | 2.24E-07 | 1.26E-09 | 4.82E-07 | 2.24E-08 | 1.69E-08 | 6.35E-05 | 6.01552E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.07E-08 | 6.44E-09 | 1.07E-08 | 2.14E-07 | 1.21E-09 | 4.61E-07 | 2.15E-08 | 1.62E-08 | 6.07E-05 | 5.75055E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.20E-04 | 1.27E-07 | 7.62E-08 | 1.27E-07 | 2.54E-06 | 1.42E-08 | 5.48E-06 | 2.54E-07 | 1.93E-07 | 7.21E-04 | 0.000702994 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.88E-04 | 1.09E-07 | 6.56E-08 | 1.09E-07 | 2.19E-06 | 1.22E-08 | 4.72E-06 | 2.19E-07 | 1.66E-07 | 6.20E-04 | 0.000604853 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.23E-08 | 4.94E-08 | 8.23E-08 | 1.64E-06 | 9.22E-09 | 3.55E-06 | 1.65E-07 | 1.25E-07 | 4.67E-04 | 0.000454527 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.69E-05 | 5.98E-08 | 3.59E-08 | 5.98E-08 | 1.20E-06 | 6.71E-09 | 2.58E-06 | 1.20E-07 | 9.08E-08 | 3.40E-04 | 0.000329844 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.85E-05 | 4.43E-08 | 2.66E-08 | 4.43E-08 | 8.85E-07 | 4.97E-09 | 1.91E-06 | 8.86E-08 | 6.72E-08 | 2.51E-04 | 0.00024353 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 5.00E-05 | 3.42E-08 | 2.05E-08 | 3.42E-08 | 6.83E-07 | 3.83E-09 | 1.47E-06 | 6.83E-08 | 5.18E-08 | 1.94E-04 | 0.000187164 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.87E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 5.56E-07 | 3.13E-09 | 1.20E-06 | 5.57E-08 | 4.22E-08 | 1.58E-04 | 0.000152179 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.11E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 4.70E-07 | 2.64E-09 | 1.01E-06 | 4.71E-08 | 3.56E-08 | 1.33E-04 | 0.000128187 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.58E-05 | 2.05E-08 | 1.23E-08 | 2.05E-08 | 4.09E-07 | 2.30E-09 | 8.83E-07 | 4.10E-08 | 3.10E-08 | 1.16E-04 | 0.000111293 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.20E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 3.64E-07 | 2.05E-09 | 7.86E-07 | 3.65E-08 | 2.76E-08 | 1.03E-04 | 9.88962E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.92E-05 | 1.65E-08 | 9.92E-09 | 1.65E-08 | 3.30E-07 | 1.86E-09 | 7.12E-07 | 3.31E-08 | 2.50E-08 | 9.36E-05 | 8.94389E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.71E-05 | 1.52E-08 | 9.13E-09 | 1.52E-08 | 3.03E-07 | 1.71E-09 | 6.55E-07 | 3.04E-08 | 2.30E-08 | 8.61E-05 | 8.21518E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.42E-08 | 8.49E-09 | 1.42E-08 | 2.82E-07 | 1.59E-09 | 6.09E-07 | 2.83E-08 | 2.14E-08 | 8.02E-05 | 7.63496E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 2.65E-07 | 1.49E-09 | 5.72E-07 | 2.66E-08 | 2.01E-08 | 7.53E-05 | 7.16352E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.31E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 2.51E-07 | 1.41E-09 | 5.41E-07 | 2.51E-08 | 1.90E-08 | 7.12E-05 | 6.766E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.22E-05 | 1.20E-08 | 7.17E-09 | 1.20E-08 | 2.38E-07 | 1.34E-09 | 5.14E-07 | 2.39E-08 | 1.80E-08 | 6.76E-05 | 6.42601E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.14E-08 | 6.84E-09 | 1.14E-08 | 2.27E-07 | 1.28E-09 | 4.90E-07 | 2.28E-08 | 1.72E-08 | 6.45E-05 | 6.12271E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.08E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 2.18E-07 | 1.23E-09 | 4.70E-07 | 2.18E-08 | 1.65E-08 | 6.18E-05 | 5.86274E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.02E-05 | 1.05E-08 | 6.28E-09 | 1.05E-08 | 2.09E-07 | 1.18E-09 | 4.50E-07 | 2.09E-08 | 1.58E-08 | 5.92E-05 | 5.61825E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.23E-04 | 1.82E-07 | 1.09E-07 | 1.82E-07 | 3.65E-06 | 2.04E-08 | 7.88E-06 | 3.65E-07 | 2.77E-07 | 1.04E-03 | 0.001011817 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.65E-04 | 2.04E-07 | 1.23E-07 | 2.04E-07 | 4.09E-06 | 2.29E-08 | 8.83E-06 | 4.09E-07 | 3.10E-07 | 1.16E-03 | 0.001133876 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.27E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 3.68E-06 | 2.06E-08 | 7.94E-06 | 3.68E-07 | 2.79E-07 | 1.04E-03 | 0.001020021 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.48E-04 | 1.41E-07 | 8.44E-08 | 1.41E-07 | 2.81E-06 | 1.58E-08 | 6.08E-06 | 2.81E-07 | 2.14E-07 | 7.99E-04 | 0.000780041 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.82E-08 | 5.29E-08 | 8.82E-08 | 1.76E-06 | 9.88E-09 | 3.81E-06 | 1.76E-07 | 1.34E-07 | 5.01E-04 | 0.000487754 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 9.01E-05 | 5.56E-08 | 3.34E-08 | 5.56E-08 | 1.11E-06 | 6.24E-09 | 2.40E-06 | 1.11E-07 | 8.44E-08 | 3.16E-04 | 0.000306623 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.84E-05 | 3.84E-08 | 2.30E-08 | 3.84E-08 | 7.67E-07 | 4.30E-09 | 1.66E-06 | 7.67E-08 | 5.82E-08 | 2.18E-04 | 0.000210661 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.21E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 5.87E-07 | 3.30E-09 | 1.27E-06 | 5.88E-08 | 4.45E-08 | 1.67E-04 | 0.000160825 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.27E-05 | 2.41E-08 | 1.45E-08 | 2.41E-08 | 4.82E-07 | 2.71E-09 | 1.04E-06 | 4.83E-08 | 3.66E-08 | 1.37E-04 | 0.000131635 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.68E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 4.14E-07 | 2.33E-09 | 8.94E-07 | 4.15E-08 | 3.14E-08 | 1.18E-04 | 0.0001129 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.29E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.68E-07 | 2.07E-09 | 7.95E-07 | 3.69E-08 | 2.79E-08 | 1.05E-04 | 0.000100154 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.35E-07 | 1.88E-09 | 7.22E-07 | 3.35E-08 | 2.54E-08 | 9.50E-05 | 9.08705E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.80E-05 | 1.55E-08 | 9.27E-09 | 1.55E-08 | 3.08E-07 | 1.74E-09 | 6.66E-07 | 3.09E-08 | 2.34E-08 | 8.75E-05 | 8.36252E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.64E-05 | 1.44E-08 | 8.65E-09 | 1.44E-08 | 2.88E-07 | 1.62E-09 | 6.21E-07 | 2.88E-08 | 2.18E-08 | 8.17E-05 | 7.79208E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.35E-08 | 8.12E-09 | 1.35E-08 | 2.70E-07 | 1.52E-09 | 5.82E-07 | 2.71E-08 | 2.04E-08 | 7.66E-05 | 7.30135E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.28E-08 | 7.67E-09 | 1.28E-08 | 2.55E-07 | 1.44E-09 | 5.50E-07 | 2.56E-08 | 1.93E-08 | 7.23E-05 | 6.89015E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.21E-08 | 7.27E-09 | 1.21E-08 | 2.42E-07 | 1.36E-09 | 5.21E-07 | 2.42E-08 | 1.83E-08 | 6.86E-05 | 6.5286E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.15E-08 | 6.92E-09 | 1.15E-08 | 2.30E-07 | 1.30E-09 | 4.96E-07 | 2.31E-08 | 1.74E-08 | 6.53E-05 | 6.20827E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.10E-08 | 6.59E-09 | 1.10E-08 | 2.19E-07 | 1.23E-09 | 4.73E-07 | 2.20E-08 | 1.66E-08 | 6.22E-05 | 5.91077E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.05E-08 | 6.31E-09 | 1.05E-08 | 2.10E-07 | 1.18E-09 | 4.52E-07 | 2.10E-08 | 1.59E-08 | 5.95E-05 | 5.64924E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.01E-05 | 1.01E-08 | 6.04E-09 | 1.01E-08 | 2.01E-07 | 1.13E-09 | 4.33E-07 | 2.01E-08 | 1.52E-08 | 5.70E-05 | 5.40971E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.42E-04 | 3.53E-07 | 2.12E-07 | 3.53E-07 | 7.06E-06 | 3.96E-08 | 1.53E-05 | 7.06E-07 | 5.37E-07 | 2.01E-03 | 0.001962073 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.86E-04 | 3.76E-07 | 2.26E-07 | 3.76E-07 | 7.52E-06 | 4.21E-08 | 1.63E-05 | 7.52E-07 | 5.72E-07 | 2.14E-03 | 0.00209062 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.11E-04 | 3.36E-07 | 2.02E-07 | 3.36E-07 | 6.72E-06 | 3.76E-08 | 1.45E-05 | 6.72E-07 | 5.10E-07 | 1.91E-03 | 0.00186622 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.21E-04 | 1.80E-07 | 1.08E-07 | 1.80E-07 | 3.59E-06 | 2.01E-08 | 7.76E-06 | 3.60E-07 | 2.73E-07 | 1.02E-03 | 0.000997397 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.71E-08 | 4.63E-08 | 7.71E-08 | 1.54E-06 | 8.64E-09 | 3.33E-06 | 1.54E-07 | 1.17E-07 | 4.38E-04 | 0.000426316 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 7.01E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 8.88E-07 | 4.98E-09 | 1.92E-06 | 8.89E-08 | 6.74E-08 | 2.52E-04 | 0.000244611 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.71E-05 | 3.19E-08 | 1.91E-08 | 3.19E-08 | 6.37E-07 | 3.58E-09 | 1.37E-06 | 6.38E-08 | 4.83E-08 | 1.81E-04 | 0.000174716 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.61E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 5.14E-07 | 2.89E-09 | 1.11E-06 | 5.15E-08 | 3.90E-08 | 1.46E-04 | 0.000140712 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.96E-05 | 2.21E-08 | 1.32E-08 | 2.21E-08 | 4.40E-07 | 2.48E-09 | 9.51E-07 | 4.41E-08 | 3.34E-08 | 1.25E-04 | 0.000120248 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.52E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.89E-07 | 2.19E-09 | 8.40E-07 | 3.90E-08 | 2.95E-08 | 1.10E-04 | 0.000106023 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.50E-07 | 1.97E-09 | 7.56E-07 | 3.51E-08 | 2.65E-08 | 9.94E-05 | 9.52665E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.60E-08 | 9.62E-09 | 1.60E-08 | 3.20E-07 | 1.80E-09 | 6.90E-07 | 3.21E-08 | 2.42E-08 | 9.08E-05 | 8.68893E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.48E-08 | 8.87E-09 | 1.48E-08 | 2.95E-07 | 1.66E-09 | 6.36E-07 | 2.96E-08 | 2.23E-08 | 8.37E-05 | 7.99985E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.37E-08 | 8.25E-09 | 1.37E-08 | 2.74E-07 | 1.54E-09 | 5.92E-07 | 2.75E-08 | 2.08E-08 | 7.78E-05 | 7.43219E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.45E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 2.57E-07 | 1.44E-09 | 5.54E-07 | 2.57E-08 | 1.94E-08 | 7.28E-05 | 6.94786E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 2.42E-07 | 1.36E-09 | 5.22E-07 | 2.43E-08 | 1.83E-08 | 6.87E-05 | 6.54307E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 2.29E-07 | 1.29E-09 | 4.94E-07 | 2.30E-08 | 1.73E-08 | 6.50E-05 | 6.19128E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.16E-05 | 1.09E-08 | 6.55E-09 | 1.09E-08 | 2.18E-07 | 1.23E-09 | 4.70E-07 | 2.18E-08 | 1.65E-08 | 6.18E-05 | 5.88263E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.09E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 2.08E-07 | 1.17E-09 | 4.48E-07 | 2.08E-08 | 1.57E-08 | 5.89E-05 | 5.6045E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 9.95E-09 | 5.97E-09 | 9.95E-09 | 1.98E-07 | 1.12E-09 | 4.28E-07 | 1.99E-08 | 1.50E-08 | 5.63E-05 | 5.34999E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.65E-06 | 9.53E-09 | 5.72E-09 | 9.53E-09 | 1.90E-07 | 1.07E-09 | 4.10E-07 | 1.91E-08 | 1.44E-08 | 5.39E-05 | 5.12361E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.27E-07 | 5.56E-07 | 9.27E-07 | 1.85E-05 | 1.04E-07 | 4.00E-05 | 1.85E-06 | 1.41E-06 | 5.26E-03 | 0.005155455 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.25E-03 | 1.21E-06 | 7.28E-07 | 1.21E-06 | 2.43E-05 | 1.36E-07 | 5.24E-05 | 2.43E-06 | 1.85E-06 | 6.90E-03 | 0.006753817 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.41E-06 | 8.47E-07 | 1.41E-06 | 2.82E-05 | 1.58E-07 | 6.10E-05 | 2.82E-06 | 2.14E-06 | 8.01E-03 | 0.007849274 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.19E-07 | 7.13E-08 | 1.19E-07 | 2.38E-06 | 1.33E-08 | 5.13E-06 | 2.38E-07 | 1.81E-07 | 6.75E-04 | 0.000658747 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.95E-05 | 5.49E-08 | 3.29E-08 | 5.49E-08 | 1.10E-06 | 6.15E-09 | 2.37E-06 | 1.10E-07 | 8.33E-08 | 3.11E-04 | 0.000302528 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.77E-05 | 3.75E-08 | 2.25E-08 | 3.75E-08 | 7.50E-07 | 4.21E-09 | 1.62E-06 | 7.51E-08 | 5.69E-08 | 2.13E-04 | 0.000206194 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.26E-05 | 2.92E-08 | 1.75E-08 | 2.92E-08 | 5.83E-07 | 3.27E-09 | 1.26E-06 | 5.84E-08 | 4.42E-08 | 1.65E-04 | 0.000159784 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.37E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 4.83E-07 | 2.71E-09 | 1.04E-06 | 4.84E-08 | 3.66E-08 | 1.37E-04 | 0.000132108 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.78E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 4.15E-07 | 2.33E-09 | 8.97E-07 | 4.16E-08 | 3.15E-08 | 1.18E-04 | 0.000113362 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.36E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.66E-07 | 2.06E-09 | 7.91E-07 | 3.67E-08 | 2.78E-08 | 1.04E-04 | 9.9795E-05 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.05E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 3.29E-07 | 1.85E-09 | 7.10E-07 | 3.30E-08 | 2.50E-08 | 9.35E-05 | 8.95159E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.81E-05 | 1.50E-08 | 9.03E-09 | 1.50E-08 | 3.00E-07 | 1.69E-09 | 6.48E-07 | 3.01E-08 | 2.27E-08 | 8.52E-05 | 8.15008E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.62E-05 | 1.39E-08 | 8.32E-09 | 1.39E-08 | 2.76E-07 | 1.56E-09 | 5.97E-07 | 2.77E-08 | 2.09E-08 | 7.85E-05 | 7.49792E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.47E-05 | 1.29E-08 | 7.73E-09 | 1.29E-08 | 2.57E-07 | 1.45E-09 | 5.54E-07 | 2.58E-08 | 1.95E-08 | 7.29E-05 | 6.95883E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.34E-05 | 1.20E-08 | 7.23E-09 | 1.20E-08 | 2.40E-07 | 1.35E-09 | 5.18E-07 | 2.41E-08 | 1.82E-08 | 6.82E-05 | 6.50181E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.24E-05 | 1.14E-08 | 6.81E-09 | 1.14E-08 | 2.26E-07 | 1.28E-09 | 4.89E-07 | 2.27E-08 | 1.71E-08 | 6.43E-05 | 6.12289E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.08E-08 | 6.46E-09 | 1.08E-08 | 2.15E-07 | 1.21E-09 | 4.64E-07 | 2.15E-08 | 1.63E-08 | 6.10E-05 | 5.80402E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.08E-05 | 1.02E-08 | 6.14E-09 | 1.02E-08 | 2.04E-07 | 1.15E-09 | 4.40E-07 | 2.05E-08 | 1.55E-08 | 5.80E-05 | 5.51213E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.78E-09 | 5.87E-09 | 9.78E-09 | 1.95E-07 | 1.10E-09 | 4.21E-07 | 1.96E-08 | 1.48E-08 | 5.54E-05 | 5.26181E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.56E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 1.87E-07 | 1.05E-09 | 4.03E-07 | 1.87E-08 | 1.41E-08 | 5.30E-05 | 5.03173E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.04E-06 | 8.98E-09 | 5.39E-09 | 8.98E-09 | 1.79E-07 | 1.01E-09 | 3.86E-07 | 1.80E-08 | 1.35E-08 | 5.08E-05 | 4.82291E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.80E-04 | 1.58E-07 | 9.47E-08 | 1.58E-07 | 3.16E-06 | 1.77E-08 | 6.82E-06 | 3.16E-07 | 2.40E-07 | 8.96E-04 | 0.000875576 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.27E-07 | 7.63E-08 | 1.27E-07 | 2.54E-06 | 1.43E-08 | 5.49E-06 | 2.54E-07 | 1.93E-07 | 7.22E-04 | 0.000705088 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.17E-08 | 4.30E-08 | 7.17E-08 | 1.43E-06 | 8.03E-09 | 3.09E-06 | 1.43E-07 | 1.09E-07 | 4.07E-04 | 0.000396017 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.67E-05 | 4.80E-08 | 2.88E-08 | 4.80E-08 | 9.60E-07 | 5.38E-09 | 2.07E-06 | 9.61E-08 | 7.29E-08 | 2.73E-04 | 0.000264502 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.56E-05 | 3.65E-08 | 2.19E-08 | 3.65E-08 | 7.29E-07 | 4.09E-09 | 1.57E-06 | 7.30E-08 | 5.53E-08 | 2.07E-04 | 0.00020029 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.22E-05 | 2.90E-08 | 1.74E-08 | 2.90E-08 | 5.80E-07 | 3.26E-09 | 1.25E-06 | 5.81E-08 | 4.40E-08 | 1.65E-04 | 0.000159017 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.35E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 4.82E-07 | 2.71E-09 | 1.04E-06 | 4.83E-08 | 3.66E-08 | 1.37E-04 | 0.000131919 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.76E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 4.15E-07 | 2.33E-09 | 8.97E-07 | 4.16E-08 | 3.15E-08 | 1.18E-04 | 0.000113334 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.34E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 3.66E-07 | 2.06E-09 | 7.89E-07 | 3.66E-08 | 2.77E-08 | 1.04E-04 | 9.95432E-05 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.02E-05 | 1.64E-08 | 9.86E-09 | 1.64E-08 | 3.28E-07 | 1.84E-09 | 7.08E-07 | 3.29E-08 | 2.48E-08 | 9.31E-05 | 8.91214E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.78E-05 | 1.49E-08 | 8.96E-09 | 1.49E-08 | 2.98E-07 | 1.68E-09 | 6.43E-07 | 2.99E-08 | 2.26E-08 | 8.46E-05 | 8.08985E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.37E-08 | 8.23E-09 | 1.37E-08 | 2.74E-07 | 1.54E-09 | 5.91E-07 | 2.74E-08 | 2.07E-08 | 7.77E-05 | 7.42024E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.43E-05 | 1.27E-08 | 7.64E-09 | 1.27E-08 | 2.54E-07 | 1.43E-09 | 5.48E-07 | 2.55E-08 | 1.92E-08 | 7.21E-05 | 6.87647E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.19E-08 | 7.13E-09 | 1.19E-08 | 2.37E-07 | 1.34E-09 | 5.12E-07 | 2.38E-08 | 1.80E-08 | 6.73E-05 | 6.4132E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.20E-05 | 1.12E-08 | 6.70E-09 | 1.12E-08 | 2.23E-07 | 1.25E-09 | 4.81E-07 | 2.23E-08 | 1.69E-08 | 6.32E-05 | 6.01746E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.05E-08 | 6.32E-09 | 1.05E-08 | 2.10E-07 | 1.18E-09 | 4.53E-07 | 2.11E-08 | 1.59E-08 | 5.96E-05 | 5.66837E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.04E-05 | 1.00E-08 | 6.02E-09 | 1.00E-08 | 2.00E-07 | 1.13E-09 | 4.31E-07 | 2.01E-08 | 1.51E-08 | 5.68E-05 | 5.3947E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.73E-06 | 9.56E-09 | 5.74E-09 | 9.56E-09 | 1.91E-07 | 1.07E-09 | 4.11E-07 | 1.91E-08 | 1.44E-08 | 5.41E-05 | 5.14003E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.23E-06 | 9.17E-09 | 5.50E-09 | 9.17E-09 | 1.83E-07 | 1.03E-09 | 3.94E-07 | 1.83E-08 | 1.38E-08 | 5.19E-05 | 4.92784E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.77E-06 | 8.81E-09 | 5.29E-09 | 8.81E-09 | 1.76E-07 | 9.90E-10 | 3.79E-07 | 1.76E-08 | 1.33E-08 | 4.99E-05 | 4.73324E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.30E-06 | 8.44E-09 | 5.07E-09 | 8.44E-09 | 1.68E-07 | 9.49E-10 | 3.63E-07 | 1.69E-08 | 1.27E-08 | 4.78E-05 | 4.53238E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.83E-05 | 2.15E-08 | 1.29E-08 | 2.15E-08 | 4.29E-07 | 2.41E-09 | 9.25E-07 | 4.30E-08 | 3.25E-08 | 1.22E-04 | 0.000116922 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.71E-05 | 1.47E-08 | 8.83E-09 | 1.47E-08 | 2.94E-07 | 1.65E-09 | 6.34E-07 | 2.94E-08 | 2.22E-08 | 8.33E-05 | 7.9604E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.54E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 2.72E-07 | 1.53E-09 | 5.87E-07 | 2.73E-08 | 2.06E-08 | 7.72E-05 | 7.36335E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 2.53E-07 | 1.42E-09 | 5.45E-07 | 2.53E-08 | 1.91E-08 | 7.17E-05 | 6.83262E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.27E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 2.36E-07 | 1.33E-09 | 5.10E-07 | 2.37E-08 | 1.79E-08 | 6.70E-05 | 6.38206E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 2.21E-07 | 1.24E-09 | 4.76E-07 | 2.21E-08 | 1.67E-08 | 6.26E-05 | 5.95354E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.04E-08 | 6.25E-09 | 1.04E-08 | 2.08E-07 | 1.17E-09 | 4.48E-07 | 2.08E-08 | 1.57E-08 | 5.89E-05 | 5.59945E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.80E-06 | 9.84E-09 | 5.90E-09 | 9.84E-09 | 1.96E-07 | 1.11E-09 | 4.23E-07 | 1.97E-08 | 1.49E-08 | 5.57E-05 | 5.28642E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.16E-06 | 9.36E-09 | 5.62E-09 | 9.36E-09 | 1.87E-07 | 1.05E-09 | 4.03E-07 | 1.87E-08 | 1.41E-08 | 5.30E-05 | 5.02467E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.61E-06 | 8.93E-09 | 5.36E-09 | 8.93E-09 | 1.78E-07 | 1.00E-09 | 3.84E-07 | 1.79E-08 | 1.35E-08 | 5.05E-05 | 4.79248E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.20E-06 | 8.59E-09 | 5.15E-09 | 8.59E-09 | 1.71E-07 | 9.65E-10 | 3.69E-07 | 1.72E-08 | 1.30E-08 | 4.86E-05 | 4.60457E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.82E-06 | 8.27E-09 | 4.96E-09 | 8.27E-09 | 1.65E-07 | 9.29E-10 | 3.55E-07 | 1.65E-08 | 1.25E-08 | 4.68E-05 | 4.43101E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.41E-06 | 7.93E-09 | 4.76E-09 | 7.93E-09 | 1.58E-07 | 8.91E-10 | 3.41E-07 | 1.59E-08 | 1.20E-08 | 4.49E-05 | 4.24852E-05 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2029

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 |
| Material Removal 2029 | 2029_MATRMVL | 3.324E-05 | 9.08E-09 | 5.45E-09 | 9.08E-09 | 4.65E-08 | 1.02E-07 | 9.08E-09 | 1.45E-09 | 1.67E-07 | 1.82E-08 | 7.26E-10 | 2.70E-05 |
| Paved road | 2029_PAVED | 1.598E-04 | 8.67E-08 | 5.20E-08 | 8.67E-08 | 5.55E-08 | 1.73E-06 | 1.60E-07 | 9.71E-09 | 3.75E-06 | 1.73E-07 | 1.32E-07 | 4.93E-04 |
| Unpaved road | 2029_UNPAVED | 9.761E-05 | 4.29E-07 | 2.57E-07 | 4.29E-07 | 2.75E-07 | 8.58E-06 | 7.89E-07 | 4.81E-08 | 1.85E-05 | 8.58E-07 | 6.52E-07 | 2.44E-03 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Chronic REL**

| TAC | UOM | |
|---|---|---|
| DPM | µg/m$^3$ | 5 |
| Arsenic | µg/m$^3$ | 0.015 |
| Beryllium | µg/m$^3$ | 0.007 |
| Cadmium | µg/m$^3$ | 0.02 |
| Copper | µg/m$^3$ | 100 |
| Mercury | µg/m$^3$ | 0.032 |
| Nickel | µg/m$^3$ | 0.014 |
| Selenium | µg/m$^3$ | 20 |
| Chromium VI | µg/m$^3$ | 0.2 |
| Crystalline Silica | µg/m$^3$ | 3 |

| | Max |
|---|---|
| CT House | 0.001 |
| Res | 0.008 |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| | | | 5 | 0.015 | 0.007 | 0.02 | 100 | 0.032 | 0.014 | 20 | 0.2 | 3 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.86E-04 | 1.10E-07 | 6.63E-08 | 1.10E-07 | 2.21E-06 | 1.24E-08 | 4.77E-06 | 2.21E-07 | 1.68E-07 | 6.27E-04 | 0.0006104 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.25E-04 | 7.98E-08 | 4.79E-08 | 7.98E-08 | 1.59E-06 | 8.94E-09 | 3.44E-06 | 1.60E-07 | 1.21E-07 | 4.53E-04 | 0.00043877 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 1.11E-05 | 2.16E-08 | 1.29E-08 | 2.16E-08 | 4.30E-07 | 2.43E-09 | 9.27E-07 | 4.32E-08 | 3.25E-08 | 1.22E-04 | 0.000113676 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.46E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.51E-07 | 1.98E-09 | 7.58E-07 | 3.52E-08 | 2.66E-08 | 9.97E-05 | 9.40912E-05 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 5.91E-04 | 3.29E-07 | 1.97E-07 | 3.29E-07 | 6.57E-06 | 3.68E-08 | 1.42E-05 | 6.57E-07 | 4.99E-07 | 1.87E-03 | 0.001824101 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.20E-03 | 6.57E-07 | 3.94E-07 | 6.57E-07 | 1.31E-05 | 7.36E-08 | 2.84E-05 | 1.31E-06 | 9.99E-07 | 3.73E-03 | 0.003652585 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 5.44E-04 | 3.03E-07 | 1.82E-07 | 3.03E-07 | 6.05E-06 | 3.39E-08 | 1.31E-05 | 6.05E-07 | 4.60E-07 | 1.72E-03 | 0.001679798 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-03 | 7.94E-07 | 4.76E-07 | 7.94E-07 | 1.59E-05 | 8.89E-08 | 3.43E-05 | 1.59E-06 | 1.21E-06 | 4.51E-03 | 0.004409628 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 9.45E-05 | 6.28E-08 | 3.77E-08 | 6.28E-08 | 1.25E-06 | 7.04E-09 | 2.71E-06 | 1.26E-07 | 9.52E-08 | 3.56E-04 | 0.000344439 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 2.87E-04 | 1.65E-07 | 9.92E-08 | 1.65E-07 | 3.31E-06 | 1.85E-08 | 7.14E-06 | 3.31E-07 | 2.51E-07 | 9.39E-04 | 0.000915552 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.77E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 8.94E-07 | 5.02E-09 | 1.93E-06 | 8.95E-08 | 6.79E-08 | 2.54E-04 | 0.000245663 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 3.01E-05 | 2.50E-08 | 1.50E-08 | 2.50E-08 | 4.98E-07 | 2.80E-09 | 1.08E-06 | 4.99E-08 | 3.78E-08 | 1.41E-04 | 0.000135325 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 2.82E-05 | 2.35E-08 | 1.41E-08 | 2.35E-08 | 4.69E-07 | 2.64E-09 | 1.01E-06 | 4.71E-08 | 3.56E-08 | 1.33E-04 | 0.000127479 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 2.64E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.43E-07 | 2.49E-09 | 9.57E-07 | 4.44E-08 | 3.36E-08 | 1.26E-04 | 0.000120356 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 2.48E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.20E-07 | 2.36E-09 | 9.06E-07 | 4.21E-08 | 3.18E-08 | 1.19E-04 | 0.000113866 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 2.35E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 3.99E-07 | 2.25E-09 | 8.61E-07 | 4.00E-08 | 3.02E-08 | 1.13E-04 | 0.000108242 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 2.21E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.78E-07 | 2.13E-09 | 8.17E-07 | 3.79E-08 | 2.87E-08 | 1.07E-04 | 0.000102597 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 2.06E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.57E-07 | 2.01E-09 | 7.71E-07 | 3.58E-08 | 2.71E-08 | 1.01E-04 | 9.68246E-05 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 3.04E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 5.06E-07 | 2.85E-09 | 1.09E-06 | 5.07E-08 | 3.83E-08 | 1.44E-04 | 0.000137338 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 3.02E-05 | 2.48E-08 | 1.49E-08 | 2.48E-08 | 4.94E-07 | 2.78E-09 | 1.07E-06 | 4.96E-08 | 3.75E-08 | 1.40E-04 | 0.000134351 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.87E-05 | 2.36E-08 | 1.41E-08 | 2.36E-08 | 4.70E-07 | 2.65E-09 | 1.02E-06 | 4.72E-08 | 3.57E-08 | 1.34E-04 | 0.000127838 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.69E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 4.45E-07 | 2.51E-09 | 9.61E-07 | 4.46E-08 | 3.38E-08 | 1.26E-04 | 0.000120965 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.52E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.21E-07 | 2.37E-09 | 9.08E-07 | 4.22E-08 | 3.19E-08 | 1.19E-04 | 0.000114205 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 2.36E-05 | 2.00E-08 | 1.20E-08 | 2.00E-08 | 3.98E-07 | 2.24E-09 | 8.59E-07 | 3.99E-08 | 3.02E-08 | 1.13E-04 | 0.000108043 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 2.21E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 3.77E-07 | 2.12E-09 | 8.13E-07 | 3.78E-08 | 2.86E-08 | 1.07E-04 | 0.00010223 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 2.09E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 3.59E-07 | 2.02E-09 | 7.74E-07 | 3.60E-08 | 2.72E-08 | 1.02E-04 | 9.7297E-05 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.97E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.42E-07 | 1.92E-09 | 7.37E-07 | 3.43E-08 | 2.59E-08 | 9.70E-05 | 9.26035E-05 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.68E-05 | 2.33E-08 | 1.40E-08 | 2.33E-08 | 4.64E-07 | 2.61E-09 | 1.00E-06 | 4.65E-08 | 3.52E-08 | 1.32E-04 | 0.000125818 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.94E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.84E-07 | 2.72E-09 | 1.04E-06 | 4.85E-08 | 3.67E-08 | 1.37E-04 | 0.000131518 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.91E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.74E-07 | 2.66E-09 | 1.02E-06 | 4.75E-08 | 3.59E-08 | 1.34E-04 | 0.000128707 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.75E-05 | 2.26E-08 | 1.35E-08 | 2.26E-08 | 4.50E-07 | 2.53E-09 | 9.72E-07 | 4.51E-08 | 3.41E-08 | 1.28E-04 | 0.000122392 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.59E-05 | 2.14E-08 | 1.28E-08 | 2.14E-08 | 4.27E-07 | 2.40E-09 | 9.22E-07 | 4.28E-08 | 3.24E-08 | 1.21E-04 | 0.000116033 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.44E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 4.06E-07 | 2.28E-09 | 8.76E-07 | 4.07E-08 | 3.08E-08 | 1.15E-04 | 0.000110216 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 2.27E-05 | 1.92E-08 | 1.15E-08 | 1.92E-08 | 3.84E-07 | 2.16E-09 | 8.28E-07 | 3.85E-08 | 2.91E-08 | 1.09E-04 | 0.000104075 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 3.64E-07 | 2.05E-09 | 7.86E-07 | 3.65E-08 | 2.76E-08 | 1.03E-04 | 9.87378E-05 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 2.00E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.46E-07 | 1.95E-09 | 7.47E-07 | 3.47E-08 | 2.62E-08 | 9.83E-05 | 9.38429E-05 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 1.65E-08 | 9.90E-09 | 1.65E-08 | 3.29E-07 | 1.85E-09 | 7.10E-07 | 3.30E-08 | 2.49E-08 | 9.34E-05 | 8.91392E-05 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.75E-05 | 1.57E-08 | 9.44E-09 | 1.57E-08 | 3.14E-07 | 1.77E-09 | 6.77E-07 | 3.15E-08 | 2.38E-08 | 8.90E-05 | 8.49018E-05 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.63E-05 | 1.49E-08 | 8.95E-09 | 1.49E-08 | 2.97E-07 | 1.67E-09 | 6.41E-07 | 2.98E-08 | 2.25E-08 | 8.44E-05 | 8.03937E-05 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.94E-05 | 2.46E-08 | 1.48E-08 | 2.46E-08 | 4.91E-07 | 2.76E-09 | 1.06E-06 | 4.92E-08 | 3.72E-08 | 1.39E-04 | 0.000133212 | Res |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.87E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 4.77E-07 | 2.68E-09 | 1.03E-06 | 4.78E-08 | 3.61E-08 | 1.35E-04 | 0.000129431 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 4.77E-07 | 2.68E-09 | 1.03E-06 | 4.78E-08 | 3.61E-08 | 1.35E-04 | 0.000129635 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.81E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.58E-07 | 2.58E-09 | 9.88E-07 | 4.59E-08 | 3.47E-08 | 1.30E-04 | 0.00012445 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.65E-05 | 2.19E-08 | 1.31E-08 | 2.19E-08 | 4.36E-07 | 2.46E-09 | 9.42E-07 | 4.37E-08 | 3.31E-08 | 1.24E-04 | 0.000118553 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.50E-05 | 2.08E-08 | 1.25E-08 | 2.08E-08 | 4.15E-07 | 2.34E-09 | 8.96E-07 | 4.16E-08 | 3.15E-08 | 1.18E-04 | 0.000112752 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.35E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.94E-07 | 2.22E-09 | 8.51E-07 | 3.95E-08 | 2.99E-08 | 1.12E-04 | 0.000107032 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.19E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.74E-07 | 2.11E-09 | 8.07E-07 | 3.75E-08 | 2.83E-08 | 1.06E-04 | 0.00010148 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 2.03E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.53E-07 | 1.99E-09 | 7.62E-07 | 3.54E-08 | 2.68E-08 | 1.00E-04 | 9.57355E-05 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.88E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.33E-07 | 1.87E-09 | 7.18E-07 | 3.34E-08 | 2.52E-08 | 9.45E-05 | 9.01117E-05 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.71E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 3.12E-07 | 1.76E-09 | 6.73E-07 | 3.13E-08 | 2.36E-08 | 8.85E-05 | 8.43159E-05 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.86E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.85E-07 | 2.73E-09 | 1.05E-06 | 4.86E-08 | 3.68E-08 | 1.38E-04 | 0.000131663 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.91E-05 | 2.42E-08 | 1.45E-08 | 2.42E-08 | 4.84E-07 | 2.72E-09 | 1.04E-06 | 4.85E-08 | 3.67E-08 | 1.37E-04 | 0.000131377 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.90E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 4.77E-07 | 2.68E-09 | 1.03E-06 | 4.78E-08 | 3.61E-08 | 1.35E-04 | 0.000129461 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.83E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 4.64E-07 | 2.61E-09 | 1.00E-06 | 4.65E-08 | 3.51E-08 | 1.32E-04 | 0.000125971 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.71E-05 | 2.23E-08 | 1.34E-08 | 2.23E-08 | 4.45E-07 | 2.50E-09 | 9.61E-07 | 4.46E-08 | 3.37E-08 | 1.26E-04 | 0.000120932 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 4.23E-07 | 2.38E-09 | 9.13E-07 | 4.24E-08 | 3.21E-08 | 1.20E-04 | 0.000114846 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.37E-05 | 2.01E-08 | 1.20E-08 | 2.01E-08 | 4.00E-07 | 2.25E-09 | 8.64E-07 | 4.01E-08 | 3.03E-08 | 1.14E-04 | 0.000108599 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.18E-05 | 1.88E-08 | 1.13E-08 | 1.88E-08 | 3.75E-07 | 2.11E-09 | 8.09E-07 | 3.76E-08 | 2.84E-08 | 1.06E-04 | 0.000101601 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 2.00E-05 | 1.76E-08 | 1.06E-08 | 1.76E-08 | 3.52E-07 | 1.98E-09 | 7.59E-07 | 3.53E-08 | 2.66E-08 | 9.98E-05 | 9.52468E-05 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 3.79E-05 | 3.19E-08 | 1.92E-08 | 3.19E-08 | 6.38E-07 | 3.59E-09 | 1.38E-06 | 6.39E-08 | 4.83E-08 | 1.81E-04 | 0.000173032 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.78E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 6.25E-07 | 3.51E-09 | 1.35E-06 | 6.26E-08 | 4.74E-08 | 1.77E-04 | 0.000169664 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 3.28E-05 | 2.74E-08 | 1.64E-08 | 2.74E-08 | 5.47E-07 | 3.08E-09 | 1.18E-06 | 5.48E-08 | 4.15E-08 | 1.55E-04 | 0.000148499 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 3.17E-05 | 2.64E-08 | 1.58E-08 | 2.64E-08 | 5.27E-07 | 2.97E-09 | 1.14E-06 | 5.28E-08 | 4.00E-08 | 1.50E-04 | 0.000143129 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 3.11E-05 | 2.58E-08 | 1.55E-08 | 2.58E-08 | 5.14E-07 | 2.89E-09 | 1.11E-06 | 5.15E-08 | 3.90E-08 | 1.46E-04 | 0.000139629 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 3.01E-05 | 2.49E-08 | 1.50E-08 | 2.49E-08 | 4.97E-07 | 2.80E-09 | 1.07E-06 | 4.98E-08 | 3.77E-08 | 1.41E-04 | 0.000135058 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.88E-05 | 2.39E-08 | 1.44E-08 | 2.39E-08 | 4.77E-07 | 2.69E-09 | 1.03E-06 | 4.78E-08 | 3.62E-08 | 1.36E-04 | 0.000129643 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.93E-05 | 2.39E-08 | 1.43E-08 | 2.39E-08 | 4.76E-07 | 2.68E-09 | 1.03E-06 | 4.77E-08 | 3.61E-08 | 1.35E-04 | 0.000129471 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.75E-05 | 2.26E-08 | 1.36E-08 | 2.26E-08 | 4.51E-07 | 2.54E-09 | 9.74E-07 | 4.52E-08 | 3.42E-08 | 1.28E-04 | 0.000122649 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.54E-05 | 2.12E-08 | 1.27E-08 | 2.12E-08 | 4.24E-07 | 2.39E-09 | 9.15E-07 | 4.25E-08 | 3.21E-08 | 1.20E-04 | 0.000115077 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.33E-05 | 1.99E-08 | 1.19E-08 | 1.99E-08 | 3.97E-07 | 2.23E-09 | 8.56E-07 | 3.98E-08 | 3.01E-08 | 1.13E-04 | 0.000107632 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.13E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 3.71E-07 | 2.09E-09 | 8.01E-07 | 3.72E-08 | 2.81E-08 | 1.05E-04 | 0.000100553 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.47E-07 | 1.95E-09 | 7.49E-07 | 3.48E-08 | 2.63E-08 | 9.85E-05 | 9.3907E-05 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.93E-05 | 3.23E-08 | 1.94E-08 | 3.23E-08 | 6.46E-07 | 3.63E-09 | 1.39E-06 | 6.47E-08 | 4.89E-08 | 1.83E-04 | 0.000175402 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.70E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 6.12E-07 | 3.44E-09 | 1.32E-06 | 6.13E-08 | 4.64E-08 | 1.74E-04 | 0.000166121 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.82E-05 | 3.08E-08 | 1.85E-08 | 3.08E-08 | 6.14E-07 | 3.45E-09 | 1.33E-06 | 6.16E-08 | 4.66E-08 | 1.74E-04 | 0.000167067 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 3.82E-05 | 3.04E-08 | 1.82E-08 | 3.04E-08 | 6.06E-07 | 3.41E-09 | 1.31E-06 | 6.07E-08 | 4.60E-08 | 1.72E-04 | 0.000164937 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 3.82E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 5.99E-07 | 3.37E-09 | 1.29E-06 | 6.00E-08 | 4.54E-08 | 1.70E-04 | 0.000163032 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 3.46E-05 | 2.77E-08 | 1.66E-08 | 2.77E-08 | 5.53E-07 | 3.11E-09 | 1.19E-06 | 5.55E-08 | 4.20E-08 | 1.57E-04 | 0.00015055 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 3.42E-05 | 2.72E-08 | 1.63E-08 | 2.72E-08 | 5.42E-07 | 3.05E-09 | 1.17E-06 | 5.43E-08 | 4.11E-08 | 1.54E-04 | 0.000147595 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 3.24E-05 | 2.59E-08 | 1.55E-08 | 2.59E-08 | 5.17E-07 | 2.90E-09 | 1.11E-06 | 5.18E-08 | 3.92E-08 | 1.47E-04 | 0.000140535 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 3.00E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.85E-07 | 2.73E-09 | 1.05E-06 | 4.86E-08 | 3.68E-08 | 1.38E-04 | 0.000131899 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 4.53E-07 | 2.55E-09 | 9.78E-07 | 4.54E-08 | 3.43E-08 | 1.29E-04 | 0.000123091 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.51E-05 | 2.11E-08 | 1.27E-08 | 2.11E-08 | 4.22E-07 | 2.37E-09 | 9.11E-07 | 4.23E-08 | 3.20E-08 | 1.20E-04 | 0.000114503 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.29E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 3.93E-07 | 2.21E-09 | 8.48E-07 | 3.94E-08 | 2.98E-08 | 1.12E-04 | 0.000106517 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.08E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.66E-07 | 2.06E-09 | 7.91E-07 | 3.67E-08 | 2.78E-08 | 1.04E-04 | 9.92475E-05 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.90E-05 | 1.71E-08 | 1.03E-08 | 1.71E-08 | 3.42E-07 | 1.93E-09 | 7.38E-07 | 3.43E-08 | 2.59E-08 | 9.71E-05 | 9.25504E-05 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.71E-05 | 1.59E-08 | 9.57E-09 | 1.59E-08 | 3.18E-07 | 1.79E-09 | 6.86E-07 | 3.19E-08 | 2.41E-08 | 9.03E-05 | 8.59462E-05 | Res |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.52E-05 | 1.47E-08 | 8.80E-09 | 1.47E-08 | 2.92E-07 | 1.65E-09 | 6.31E-07 | 2.93E-08 | 2.21E-08 | 8.30E-05 | 7.88901E-05 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 5.64E-05 | 4.19E-08 | 2.52E-08 | 4.19E-08 | 8.37E-07 | 4.70E-09 | 1.81E-06 | 8.39E-08 | 6.35E-08 | 2.38E-04 | 0.000228575 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 5.33E-05 | 3.98E-08 | 2.39E-08 | 3.98E-08 | 7.94E-07 | 4.46E-09 | 1.71E-06 | 7.95E-08 | 6.02E-08 | 2.25E-04 | 0.000216736 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 4.54E-05 | 3.51E-08 | 2.11E-08 | 3.51E-08 | 7.01E-07 | 3.94E-09 | 1.51E-06 | 7.02E-08 | 5.32E-08 | 1.99E-04 | 0.000191076 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 4.06E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 6.41E-07 | 3.61E-09 | 1.38E-06 | 6.43E-08 | 4.86E-08 | 1.82E-04 | 0.000174558 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 3.99E-05 | 3.13E-08 | 1.88E-08 | 3.13E-08 | 6.25E-07 | 3.52E-09 | 1.35E-06 | 6.27E-08 | 4.74E-08 | 1.78E-04 | 0.000170296 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 3.90E-05 | 3.05E-08 | 1.83E-08 | 3.05E-08 | 6.08E-07 | 3.42E-09 | 1.31E-06 | 6.09E-08 | 4.61E-08 | 1.73E-04 | 0.000165639 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 3.83E-05 | 2.97E-08 | 1.78E-08 | 2.97E-08 | 5.92E-07 | 3.33E-09 | 1.28E-06 | 5.94E-08 | 4.49E-08 | 1.68E-04 | 0.000161413 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 3.56E-05 | 2.79E-08 | 1.67E-08 | 2.79E-08 | 5.57E-07 | 3.13E-09 | 1.20E-06 | 5.58E-08 | 4.22E-08 | 1.58E-04 | 0.000151603 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 3.30E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 5.23E-07 | 2.94E-09 | 1.13E-06 | 5.24E-08 | 3.97E-08 | 1.49E-04 | 0.000142366 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 3.03E-05 | 2.44E-08 | 1.47E-08 | 2.44E-08 | 4.88E-07 | 2.74E-09 | 1.05E-06 | 4.89E-08 | 3.70E-08 | 1.39E-04 | 0.000132679 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.75E-05 | 2.27E-08 | 1.36E-08 | 2.27E-08 | 4.52E-07 | 2.54E-09 | 9.77E-07 | 4.53E-08 | 3.43E-08 | 1.28E-04 | 0.000122921 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.49E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.19E-07 | 2.35E-09 | 9.03E-07 | 4.20E-08 | 3.17E-08 | 1.19E-04 | 0.000113596 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.25E-05 | 1.95E-08 | 1.17E-08 | 1.95E-08 | 3.88E-07 | 2.18E-09 | 8.38E-07 | 3.89E-08 | 2.94E-08 | 1.10E-04 | 0.000105218 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.03E-05 | 1.80E-08 | 1.08E-08 | 1.80E-08 | 3.60E-07 | 2.02E-09 | 7.76E-07 | 3.61E-08 | 2.73E-08 | 1.02E-04 | 9.74066E-05 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.84E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.35E-07 | 1.88E-09 | 7.22E-07 | 3.35E-08 | 2.53E-08 | 9.50E-05 | 9.05022E-05 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.68E-05 | 1.57E-08 | 9.39E-09 | 1.57E-08 | 3.12E-07 | 1.76E-09 | 6.74E-07 | 3.13E-08 | 2.37E-08 | 8.86E-05 | 8.43748E-05 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.52E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 2.92E-07 | 1.64E-09 | 6.30E-07 | 2.93E-08 | 2.21E-08 | 8.28E-05 | 7.87547E-05 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 6.22E-05 | 4.45E-08 | 2.67E-08 | 4.45E-08 | 8.89E-07 | 4.99E-09 | 1.92E-06 | 8.90E-08 | 6.74E-08 | 2.52E-04 | 0.000243073 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 5.77E-05 | 4.16E-08 | 2.50E-08 | 4.16E-08 | 8.31E-07 | 4.67E-09 | 1.79E-06 | 8.32E-08 | 6.30E-08 | 2.36E-04 | 0.000227196 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 4.91E-05 | 3.66E-08 | 2.20E-08 | 3.66E-08 | 7.31E-07 | 4.11E-09 | 1.58E-06 | 7.32E-08 | 5.55E-08 | 2.08E-04 | 0.000199597 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 4.56E-05 | 3.43E-08 | 2.06E-08 | 3.43E-08 | 6.85E-07 | 3.85E-09 | 1.48E-06 | 6.86E-08 | 5.19E-08 | 1.94E-04 | 0.00018681 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 4.41E-05 | 3.31E-08 | 1.98E-08 | 3.31E-08 | 6.60E-07 | 3.71E-09 | 1.42E-06 | 6.61E-08 | 5.01E-08 | 1.87E-04 | 0.000180112 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 4.03E-05 | 3.06E-08 | 1.84E-08 | 3.06E-08 | 6.12E-07 | 3.44E-09 | 1.32E-06 | 6.13E-08 | 4.64E-08 | 1.74E-04 | 0.000166789 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 3.66E-05 | 2.83E-08 | 1.70E-08 | 2.83E-08 | 5.65E-07 | 3.18E-09 | 1.22E-06 | 5.66E-08 | 4.28E-08 | 1.60E-04 | 0.000153966 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 3.33E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 5.24E-07 | 2.95E-09 | 1.13E-06 | 5.25E-08 | 3.97E-08 | 1.49E-04 | 0.00014265 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 3.03E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.85E-07 | 2.73E-09 | 1.05E-06 | 4.86E-08 | 3.68E-08 | 1.38E-04 | 0.000131987 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.73E-05 | 2.24E-08 | 1.35E-08 | 2.24E-08 | 4.47E-07 | 2.52E-09 | 9.66E-07 | 4.48E-08 | 3.39E-08 | 1.27E-04 | 0.000121579 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.44E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 4.11E-07 | 2.31E-09 | 8.87E-07 | 4.12E-08 | 3.11E-08 | 1.17E-04 | 0.000111514 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.18E-05 | 1.89E-08 | 1.14E-08 | 1.89E-08 | 3.78E-07 | 2.13E-09 | 8.15E-07 | 3.79E-08 | 2.86E-08 | 1.07E-04 | 0.000102366 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.95E-05 | 1.75E-08 | 1.05E-08 | 1.75E-08 | 3.48E-07 | 1.96E-09 | 7.52E-07 | 3.49E-08 | 2.64E-08 | 9.89E-05 | 9.4344E-05 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.76E-05 | 1.62E-08 | 9.73E-09 | 1.62E-08 | 3.23E-07 | 1.82E-09 | 6.98E-07 | 3.24E-08 | 2.45E-08 | 9.18E-05 | 8.74299E-05 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.60E-05 | 1.51E-08 | 9.09E-09 | 1.51E-08 | 3.02E-07 | 1.70E-09 | 6.52E-07 | 3.03E-08 | 2.29E-08 | 8.57E-05 | 8.15613E-05 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.47E-05 | 1.42E-08 | 8.53E-09 | 1.42E-08 | 2.83E-07 | 1.60E-09 | 6.12E-07 | 2.84E-08 | 2.15E-08 | 8.05E-05 | 7.64903E-05 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.30E-05 | 1.31E-08 | 7.85E-09 | 1.31E-08 | 2.61E-07 | 1.47E-09 | 5.63E-07 | 2.62E-08 | 1.97E-08 | 7.40E-05 | 7.02559E-05 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 6.36E-05 | 4.51E-08 | 2.71E-08 | 4.51E-08 | 9.01E-07 | 5.06E-09 | 1.95E-06 | 9.03E-08 | 6.84E-08 | 2.56E-04 | 0.000246649 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 6.07E-05 | 4.31E-08 | 2.58E-08 | 4.31E-08 | 8.60E-07 | 4.83E-09 | 1.86E-06 | 8.62E-08 | 6.53E-08 | 2.44E-04 | 0.000235475 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 5.65E-05 | 4.04E-08 | 2.42E-08 | 4.04E-08 | 8.06E-07 | 4.53E-09 | 1.74E-06 | 8.07E-08 | 6.12E-08 | 2.29E-04 | 0.00022052 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 5.09E-05 | 3.69E-08 | 2.22E-08 | 3.69E-08 | 7.38E-07 | 4.14E-09 | 1.59E-06 | 7.39E-08 | 5.60E-08 | 2.09E-04 | 0.000201636 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 4.54E-05 | 3.36E-08 | 2.02E-08 | 3.36E-08 | 6.71E-07 | 3.77E-09 | 1.45E-06 | 6.72E-08 | 5.09E-08 | 1.91E-04 | 0.000183307 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 4.07E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 6.13E-07 | 3.44E-09 | 1.32E-06 | 6.14E-08 | 4.65E-08 | 1.74E-04 | 0.000167227 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 3.67E-05 | 2.82E-08 | 1.69E-08 | 2.82E-08 | 5.63E-07 | 3.16E-09 | 1.22E-06 | 5.64E-08 | 4.27E-08 | 1.60E-04 | 0.000153432 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 3.31E-05 | 2.60E-08 | 1.56E-08 | 2.60E-08 | 5.18E-07 | 2.91E-09 | 1.12E-06 | 5.19E-08 | 3.93E-08 | 1.47E-04 | 0.000141184 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.96E-05 | 2.38E-08 | 1.43E-08 | 2.38E-08 | 4.75E-07 | 2.67E-09 | 1.02E-06 | 4.76E-08 | 3.60E-08 | 1.35E-04 | 0.000129146 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.62E-05 | 2.17E-08 | 1.30E-08 | 2.17E-08 | 4.32E-07 | 2.43E-09 | 9.33E-07 | 4.33E-08 | 3.28E-08 | 1.23E-04 | 0.000117477 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.95E-07 | 2.22E-09 | 8.52E-07 | 3.96E-08 | 2.99E-08 | 1.12E-04 | 0.000107095 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.07E-05 | 1.82E-08 | 1.09E-08 | 1.82E-08 | 3.62E-07 | 2.04E-09 | 7.82E-07 | 3.63E-08 | 2.74E-08 | 1.03E-04 | 9.81441E-05 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 1.85E-05 | 1.68E-08 | 1.01E-08 | 1.68E-08 | 3.34E-07 | 1.88E-09 | 7.22E-07 | 3.35E-08 | 2.53E-08 | 9.50E-05 | 9.05051E-05 | Res |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.68E-05 | 1.56E-08 | 9.38E-09 | 1.56E-08 | 3.12E-07 | 1.76E-09 | 6.73E-07 | 3.13E-08 | 2.36E-08 | 8.85E-05 | 8.42247E-05 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.53E-05 | 1.46E-08 | 8.78E-09 | 1.46E-08 | 2.92E-07 | 1.64E-09 | 6.29E-07 | 2.93E-08 | 2.21E-08 | 8.28E-05 | 7.87367E-05 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.41E-05 | 1.38E-08 | 8.27E-09 | 1.38E-08 | 2.75E-07 | 1.55E-09 | 5.93E-07 | 2.76E-08 | 2.08E-08 | 7.80E-05 | 7.41126E-05 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.31E-05 | 1.30E-08 | 7.83E-09 | 1.30E-08 | 2.60E-07 | 1.47E-09 | 5.61E-07 | 2.61E-08 | 1.97E-08 | 7.38E-05 | 7.01205E-05 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 6.54E-05 | 4.54E-08 | 2.72E-08 | 4.54E-08 | 9.06E-07 | 5.09E-09 | 1.96E-06 | 9.08E-08 | 6.88E-08 | 2.57E-04 | 0.000248325 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 6.06E-05 | 4.24E-08 | 2.54E-08 | 4.24E-08 | 8.46E-07 | 4.75E-09 | 1.83E-06 | 8.47E-08 | 6.42E-08 | 2.40E-04 | 0.00023171 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 5.31E-05 | 3.79E-08 | 2.28E-08 | 3.79E-08 | 7.57E-07 | 4.25E-09 | 1.64E-06 | 7.59E-08 | 5.75E-08 | 2.15E-04 | 0.000207203 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 4.65E-05 | 3.40E-08 | 2.04E-08 | 3.40E-08 | 6.79E-07 | 3.81E-09 | 1.47E-06 | 6.80E-08 | 5.15E-08 | 1.93E-04 | 0.000185469 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 4.11E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 6.14E-07 | 3.45E-09 | 1.32E-06 | 6.15E-08 | 4.65E-08 | 1.74E-04 | 0.000167488 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.66E-05 | 2.80E-08 | 1.68E-08 | 2.80E-08 | 5.58E-07 | 3.14E-09 | 1.21E-06 | 5.59E-08 | 4.23E-08 | 1.58E-04 | 0.000152198 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.22E-05 | 2.53E-08 | 1.52E-08 | 2.53E-08 | 5.05E-07 | 2.84E-09 | 1.09E-06 | 5.06E-08 | 3.83E-08 | 1.43E-04 | 0.000137549 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.81E-05 | 2.28E-08 | 1.37E-08 | 2.28E-08 | 4.56E-07 | 2.56E-09 | 9.84E-07 | 4.57E-08 | 3.45E-08 | 1.29E-04 | 0.000123885 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.47E-05 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 4.13E-07 | 2.32E-09 | 8.91E-07 | 4.14E-08 | 3.13E-08 | 1.17E-04 | 0.000112006 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.18E-05 | 1.89E-08 | 1.13E-08 | 1.89E-08 | 3.77E-07 | 2.12E-09 | 8.13E-07 | 3.78E-08 | 2.85E-08 | 1.07E-04 | 0.000102131 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.47E-07 | 1.95E-09 | 7.48E-07 | 3.47E-08 | 2.63E-08 | 9.84E-05 | 9.38084E-05 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.75E-05 | 1.61E-08 | 9.67E-09 | 1.61E-08 | 3.22E-07 | 1.81E-09 | 6.94E-07 | 3.22E-08 | 2.44E-08 | 9.13E-05 | 8.69477E-05 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 1.60E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 3.00E-07 | 1.69E-09 | 6.48E-07 | 3.01E-08 | 2.27E-08 | 8.52E-05 | 8.10997E-05 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 1.46E-05 | 1.41E-08 | 8.48E-09 | 1.41E-08 | 2.82E-07 | 1.59E-09 | 6.08E-07 | 2.83E-08 | 2.13E-08 | 8.00E-05 | 7.60508E-05 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 1.34E-05 | 1.33E-08 | 7.98E-09 | 1.33E-08 | 2.65E-07 | 1.49E-09 | 5.72E-07 | 2.66E-08 | 2.01E-08 | 7.53E-05 | 7.15057E-05 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.24E-05 | 1.26E-08 | 7.54E-09 | 1.26E-08 | 2.50E-07 | 1.41E-09 | 5.40E-07 | 2.51E-08 | 1.90E-08 | 7.11E-05 | 6.74717E-05 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 8.94E-05 | 5.95E-08 | 3.57E-08 | 5.95E-08 | 1.19E-06 | 6.68E-09 | 2.57E-06 | 1.19E-07 | 9.03E-08 | 3.38E-04 | 0.000326638 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 8.67E-05 | 5.76E-08 | 3.45E-08 | 5.76E-08 | 1.15E-06 | 6.45E-09 | 2.48E-06 | 1.15E-07 | 8.73E-08 | 3.27E-04 | 0.000315881 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 8.20E-05 | 5.45E-08 | 3.27E-08 | 5.45E-08 | 1.09E-06 | 6.12E-09 | 2.35E-06 | 1.09E-07 | 8.27E-08 | 3.09E-04 | 0.000299249 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 7.35E-05 | 4.95E-08 | 2.97E-08 | 4.95E-08 | 9.90E-07 | 5.56E-09 | 2.14E-06 | 9.91E-08 | 7.51E-08 | 2.81E-04 | 0.000271632 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 6.45E-05 | 4.42E-08 | 2.65E-08 | 4.42E-08 | 8.83E-07 | 4.96E-09 | 1.91E-06 | 8.85E-08 | 6.70E-08 | 2.51E-04 | 0.000242201 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 5.52E-05 | 3.88E-08 | 2.33E-08 | 3.88E-08 | 7.76E-07 | 4.36E-09 | 1.67E-06 | 7.77E-08 | 5.89E-08 | 2.20E-04 | 0.000212399 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 4.80E-05 | 3.46E-08 | 2.07E-08 | 3.46E-08 | 6.91E-07 | 3.88E-09 | 1.49E-06 | 6.92E-08 | 5.24E-08 | 1.96E-04 | 0.00018883 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 4.14E-05 | 3.07E-08 | 1.84E-08 | 3.07E-08 | 6.13E-07 | 3.45E-09 | 1.32E-06 | 6.14E-08 | 4.65E-08 | 1.74E-04 | 0.000167412 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.57E-05 | 2.73E-08 | 1.64E-08 | 2.73E-08 | 5.45E-07 | 3.07E-09 | 1.18E-06 | 5.46E-08 | 4.14E-08 | 1.55E-04 | 0.000148692 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.06E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.84E-07 | 2.72E-09 | 1.05E-06 | 4.85E-08 | 3.67E-08 | 1.38E-04 | 0.000131852 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.65E-05 | 2.18E-08 | 1.31E-08 | 2.18E-08 | 4.35E-07 | 2.45E-09 | 9.39E-07 | 4.36E-08 | 3.30E-08 | 1.23E-04 | 0.000118151 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.32E-05 | 1.98E-08 | 1.19E-08 | 1.98E-08 | 3.95E-07 | 2.22E-09 | 8.52E-07 | 3.96E-08 | 2.99E-08 | 1.12E-04 | 0.000107076 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.06E-05 | 1.81E-08 | 1.09E-08 | 1.81E-08 | 3.61E-07 | 2.03E-09 | 7.80E-07 | 3.62E-08 | 2.74E-08 | 1.03E-04 | 9.79241E-05 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 1.84E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.34E-07 | 1.88E-09 | 7.20E-07 | 3.35E-08 | 2.53E-08 | 9.47E-05 | 9.02625E-05 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 1.66E-05 | 1.55E-08 | 9.33E-09 | 1.55E-08 | 3.10E-07 | 1.75E-09 | 6.69E-07 | 3.11E-08 | 2.35E-08 | 8.80E-05 | 8.37589E-05 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 1.50E-05 | 1.45E-08 | 8.69E-09 | 1.45E-08 | 2.89E-07 | 1.63E-09 | 6.23E-07 | 2.90E-08 | 2.19E-08 | 8.19E-05 | 7.79079E-05 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.37E-05 | 1.36E-08 | 8.14E-09 | 1.36E-08 | 2.70E-07 | 1.52E-09 | 5.84E-07 | 2.71E-08 | 2.05E-08 | 7.68E-05 | 7.29236E-05 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.26E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 2.54E-07 | 1.43E-09 | 5.49E-07 | 2.55E-08 | 1.93E-08 | 7.22E-05 | 6.8544E-05 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.16E-05 | 1.21E-08 | 7.23E-09 | 1.21E-08 | 2.40E-07 | 1.35E-09 | 5.19E-07 | 2.41E-08 | 1.82E-08 | 6.82E-05 | 6.46659E-05 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.16E-04 | 7.33E-08 | 4.40E-08 | 7.33E-08 | 1.46E-06 | 8.21E-09 | 3.16E-06 | 1.47E-07 | 1.11E-07 | 4.16E-04 | 0.000403261 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.07E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 1.36E-06 | 7.65E-09 | 2.94E-06 | 1.36E-07 | 1.04E-07 | 3.87E-04 | 0.000375403 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 9.12E-05 | 5.93E-08 | 3.56E-08 | 5.93E-08 | 1.18E-06 | 6.64E-09 | 2.56E-06 | 1.19E-07 | 8.99E-08 | 3.36E-04 | 0.000325596 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 8.03E-05 | 5.29E-08 | 3.18E-08 | 5.29E-08 | 1.06E-06 | 5.94E-09 | 2.28E-06 | 1.06E-07 | 8.03E-08 | 3.00E-04 | 0.000290583 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 6.79E-05 | 4.58E-08 | 2.75E-08 | 4.58E-08 | 9.15E-07 | 5.14E-09 | 1.98E-06 | 9.16E-08 | 6.94E-08 | 2.60E-04 | 0.000251116 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 5.76E-05 | 3.99E-08 | 2.39E-08 | 3.99E-08 | 7.97E-07 | 4.47E-09 | 1.72E-06 | 7.98E-08 | 6.04E-08 | 2.26E-04 | 0.000218288 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 4.86E-05 | 3.47E-08 | 2.08E-08 | 3.47E-08 | 6.93E-07 | 3.89E-09 | 1.50E-06 | 6.94E-08 | 5.26E-08 | 1.97E-04 | 0.00018968 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 4.05E-05 | 3.00E-08 | 1.80E-08 | 3.00E-08 | 5.99E-07 | 3.37E-09 | 1.29E-06 | 6.00E-08 | 4.54E-08 | 1.70E-04 | 0.000163629 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.39E-05 | 2.62E-08 | 1.57E-08 | 2.62E-08 | 5.23E-07 | 2.94E-09 | 1.13E-06 | 5.24E-08 | 3.96E-08 | 1.48E-04 | 0.00014241 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.89E-05 | 2.32E-08 | 1.39E-08 | 2.32E-08 | 4.63E-07 | 2.60E-09 | 9.99E-07 | 4.64E-08 | 3.51E-08 | 1.31E-04 | 0.000125848 | Res |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.51E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 4.16E-07 | 2.34E-09 | 8.99E-07 | 4.17E-08 | 3.16E-08 | 1.18E-04 | 0.000113056 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.20E-05 | 1.90E-08 | 1.14E-08 | 1.90E-08 | 3.78E-07 | 2.13E-09 | 8.17E-07 | 3.79E-08 | 2.87E-08 | 1.07E-04 | 0.000102592 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 1.94E-05 | 1.74E-08 | 1.04E-08 | 1.74E-08 | 3.46E-07 | 1.95E-09 | 7.47E-07 | 3.47E-08 | 2.62E-08 | 9.83E-05 | 9.37071E-05 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 1.73E-05 | 1.60E-08 | 9.60E-09 | 1.60E-08 | 3.19E-07 | 1.80E-09 | 6.89E-07 | 3.20E-08 | 2.42E-08 | 9.06E-05 | 8.62967E-05 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.55E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 2.96E-07 | 1.67E-09 | 6.38E-07 | 2.97E-08 | 2.24E-08 | 8.39E-05 | 7.98233E-05 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.40E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 2.76E-07 | 1.55E-09 | 5.95E-07 | 2.76E-08 | 2.09E-08 | 7.82E-05 | 7.43005E-05 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.28E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 2.59E-07 | 1.46E-09 | 5.58E-07 | 2.59E-08 | 1.96E-08 | 7.34E-05 | 6.96508E-05 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.17E-05 | 1.22E-08 | 7.34E-09 | 1.22E-08 | 2.44E-07 | 1.38E-09 | 5.26E-07 | 2.45E-08 | 1.85E-08 | 6.92E-05 | 6.5638E-05 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.08E-05 | 1.16E-08 | 6.95E-09 | 1.16E-08 | 2.31E-07 | 1.30E-09 | 4.98E-07 | 2.32E-08 | 1.75E-08 | 6.56E-05 | 6.20819E-05 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.41E-04 | 8.74E-08 | 5.24E-08 | 8.74E-08 | 1.75E-06 | 9.80E-09 | 3.77E-06 | 1.75E-07 | 1.33E-07 | 4.96E-04 | 0.000481637 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.39E-04 | 8.58E-08 | 5.15E-08 | 8.58E-08 | 1.71E-06 | 9.61E-09 | 3.70E-06 | 1.72E-07 | 1.30E-07 | 4.87E-04 | 0.000472668 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.32E-04 | 8.16E-08 | 4.90E-08 | 8.16E-08 | 1.63E-06 | 9.15E-09 | 3.52E-06 | 1.63E-07 | 1.24E-07 | 4.63E-04 | 0.00044994 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.26E-04 | 7.80E-08 | 4.68E-08 | 7.80E-08 | 1.56E-06 | 8.74E-09 | 3.37E-06 | 1.56E-07 | 1.18E-07 | 4.43E-04 | 0.000429755 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.09E-04 | 6.82E-08 | 4.09E-08 | 6.82E-08 | 1.36E-06 | 7.65E-09 | 2.94E-06 | 1.36E-07 | 1.03E-07 | 3.87E-04 | 0.000375557 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 8.78E-05 | 5.66E-08 | 3.40E-08 | 5.66E-08 | 1.13E-06 | 6.34E-09 | 2.44E-06 | 1.13E-07 | 8.58E-08 | 3.21E-04 | 0.000311077 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 7.12E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 9.45E-07 | 5.30E-09 | 2.04E-06 | 9.46E-08 | 7.17E-08 | 2.68E-04 | 0.000259449 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 5.84E-05 | 4.00E-08 | 2.40E-08 | 4.00E-08 | 7.99E-07 | 4.49E-09 | 1.73E-06 | 8.00E-08 | 6.06E-08 | 2.27E-04 | 0.0002191 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.69E-05 | 3.35E-08 | 2.01E-08 | 3.35E-08 | 6.69E-07 | 3.76E-09 | 1.44E-06 | 6.70E-08 | 5.07E-08 | 1.90E-04 | 0.000182957 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.81E-05 | 2.84E-08 | 1.71E-08 | 2.84E-08 | 5.68E-07 | 3.19E-09 | 1.23E-06 | 5.69E-08 | 4.31E-08 | 1.61E-04 | 0.000154975 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.21E-05 | 2.49E-08 | 1.49E-08 | 2.49E-08 | 4.97E-07 | 2.80E-09 | 1.07E-06 | 4.98E-08 | 3.77E-08 | 1.41E-04 | 0.000135442 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 2.71E-05 | 2.20E-08 | 1.32E-08 | 2.20E-08 | 4.39E-07 | 2.47E-09 | 9.48E-07 | 4.40E-08 | 3.33E-08 | 1.25E-04 | 0.000119379 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 2.33E-05 | 1.97E-08 | 1.18E-08 | 1.97E-08 | 3.93E-07 | 2.21E-09 | 8.49E-07 | 3.94E-08 | 2.98E-08 | 1.12E-04 | 0.000106721 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.04E-05 | 1.79E-08 | 1.07E-08 | 1.79E-08 | 3.56E-07 | 2.01E-09 | 7.69E-07 | 3.57E-08 | 2.70E-08 | 1.01E-04 | 9.65514E-05 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 1.79E-05 | 1.64E-08 | 9.81E-09 | 1.64E-08 | 3.26E-07 | 1.84E-09 | 7.04E-07 | 3.27E-08 | 2.47E-08 | 9.26E-05 | 8.82229E-05 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 1.60E-05 | 1.51E-08 | 9.07E-09 | 1.51E-08 | 3.01E-07 | 1.70E-09 | 6.50E-07 | 3.02E-08 | 2.28E-08 | 8.56E-05 | 8.14188E-05 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 1.43E-05 | 1.40E-08 | 8.41E-09 | 1.40E-08 | 2.79E-07 | 1.57E-09 | 6.03E-07 | 2.80E-08 | 2.12E-08 | 7.93E-05 | 7.53944E-05 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 1.30E-05 | 1.31E-08 | 7.87E-09 | 1.31E-08 | 2.62E-07 | 1.47E-09 | 5.64E-07 | 2.62E-08 | 1.98E-08 | 7.43E-05 | 7.04794E-05 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.19E-05 | 1.24E-08 | 7.42E-09 | 1.24E-08 | 2.46E-07 | 1.39E-09 | 5.32E-07 | 2.47E-08 | 1.86E-08 | 6.99E-05 | 6.63077E-05 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.10E-05 | 1.17E-08 | 7.03E-09 | 1.17E-08 | 2.33E-07 | 1.32E-09 | 5.04E-07 | 2.34E-08 | 1.77E-08 | 6.63E-05 | 6.27597E-05 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.03E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 2.22E-07 | 1.25E-09 | 4.79E-07 | 2.23E-08 | 1.68E-08 | 6.31E-05 | 5.96813E-05 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.52E-04 | 9.32E-08 | 5.59E-08 | 9.32E-08 | 1.86E-06 | 1.04E-08 | 4.02E-06 | 1.86E-07 | 1.41E-07 | 5.29E-04 | 0.000514103 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.48E-04 | 9.01E-08 | 5.41E-08 | 9.01E-08 | 1.80E-06 | 1.01E-08 | 3.89E-06 | 1.80E-07 | 1.37E-07 | 5.11E-04 | 0.000497027 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.48E-04 | 8.92E-08 | 5.35E-08 | 8.92E-08 | 1.78E-06 | 1.00E-08 | 3.85E-06 | 1.78E-07 | 1.35E-07 | 5.07E-04 | 0.00049259 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.22E-04 | 7.53E-08 | 4.52E-08 | 7.53E-08 | 1.50E-06 | 8.44E-09 | 3.25E-06 | 1.51E-07 | 1.14E-07 | 4.27E-04 | 0.000414976 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 9.30E-05 | 5.89E-08 | 3.54E-08 | 5.89E-08 | 1.18E-06 | 6.61E-09 | 2.54E-06 | 1.18E-07 | 8.94E-08 | 3.34E-04 | 0.00032431 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 7.22E-05 | 4.73E-08 | 2.84E-08 | 4.73E-08 | 9.46E-07 | 5.31E-09 | 2.04E-06 | 9.47E-08 | 7.18E-08 | 2.69E-04 | 0.000259923 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 5.60E-05 | 3.83E-08 | 2.30E-08 | 3.83E-08 | 7.65E-07 | 4.30E-09 | 1.65E-06 | 7.66E-08 | 5.81E-08 | 2.17E-04 | 0.000209775 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.40E-05 | 3.15E-08 | 1.89E-08 | 3.15E-08 | 6.30E-07 | 3.54E-09 | 1.36E-06 | 6.31E-08 | 4.78E-08 | 1.79E-04 | 0.000172237 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.54E-05 | 2.66E-08 | 1.60E-08 | 2.66E-08 | 5.31E-07 | 2.98E-09 | 1.15E-06 | 5.32E-08 | 4.03E-08 | 1.51E-04 | 0.000144834 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 2.92E-05 | 2.30E-08 | 1.38E-08 | 2.30E-08 | 4.59E-07 | 2.58E-09 | 9.91E-07 | 4.60E-08 | 3.48E-08 | 1.30E-04 | 0.000124935 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.47E-05 | 2.03E-08 | 1.22E-08 | 2.03E-08 | 4.05E-07 | 2.28E-09 | 8.75E-07 | 4.06E-08 | 3.07E-08 | 1.15E-04 | 0.000110162 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.13E-05 | 1.83E-08 | 1.10E-08 | 1.83E-08 | 3.65E-07 | 2.05E-09 | 7.87E-07 | 3.66E-08 | 2.76E-08 | 1.04E-04 | 9.88835E-05 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 1.86E-05 | 1.66E-08 | 9.95E-09 | 1.66E-08 | 3.31E-07 | 1.86E-09 | 7.14E-07 | 3.32E-08 | 2.51E-08 | 9.39E-05 | 8.95909E-05 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 1.64E-05 | 1.52E-08 | 9.14E-09 | 1.52E-08 | 3.04E-07 | 1.71E-09 | 6.56E-07 | 3.05E-08 | 2.30E-08 | 8.63E-05 | 8.21534E-05 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 1.48E-05 | 1.41E-08 | 8.49E-09 | 1.41E-08 | 2.82E-07 | 1.59E-09 | 6.09E-07 | 2.83E-08 | 2.14E-08 | 8.01E-05 | 7.6144E-05 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.34E-05 | 1.32E-08 | 7.95E-09 | 1.32E-08 | 2.64E-07 | 1.49E-09 | 5.70E-07 | 2.65E-08 | 2.00E-08 | 7.50E-05 | 7.1202E-05 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.23E-05 | 1.25E-08 | 7.49E-09 | 1.25E-08 | 2.49E-07 | 1.40E-09 | 5.37E-07 | 2.50E-08 | 1.88E-08 | 7.06E-05 | 6.7011E-05 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.14E-05 | 1.18E-08 | 7.11E-09 | 1.18E-08 | 2.36E-07 | 1.33E-09 | 5.09E-07 | 2.37E-08 | 1.79E-08 | 6.70E-05 | 6.35516E-05 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.07E-05 | 1.13E-08 | 6.78E-09 | 1.13E-08 | 2.25E-07 | 1.27E-09 | 4.86E-07 | 2.26E-08 | 1.70E-08 | 6.39E-05 | 6.05828E-05 | Res |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.01E-05 | 1.08E-08 | 6.49E-09 | 1.08E-08 | 2.15E-07 | 1.22E-09 | 4.65E-07 | 2.16E-08 | 1.63E-08 | 6.12E-05 | 5.79145E-05 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 2.19E-04 | 1.28E-07 | 7.68E-08 | 1.28E-07 | 2.56E-06 | 1.43E-08 | 5.52E-06 | 2.56E-07 | 1.94E-07 | 7.26E-04 | 0.000707799 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.87E-04 | 1.10E-07 | 6.61E-08 | 1.10E-07 | 2.20E-06 | 1.23E-08 | 4.75E-06 | 2.20E-07 | 1.67E-07 | 6.25E-04 | 0.00060899 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.38E-04 | 8.29E-08 | 4.97E-08 | 8.29E-08 | 1.66E-06 | 9.29E-09 | 3.58E-06 | 1.66E-07 | 1.26E-07 | 4.70E-04 | 0.000457642 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 9.65E-05 | 6.03E-08 | 3.62E-08 | 6.03E-08 | 1.20E-06 | 6.76E-09 | 2.60E-06 | 1.21E-07 | 9.15E-08 | 3.42E-04 | 0.000332112 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 6.82E-05 | 4.47E-08 | 2.68E-08 | 4.47E-08 | 8.92E-07 | 5.01E-09 | 1.93E-06 | 8.93E-08 | 6.77E-08 | 2.53E-04 | 0.000245211 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.99E-05 | 3.44E-08 | 2.07E-08 | 3.44E-08 | 6.88E-07 | 3.86E-09 | 1.48E-06 | 6.89E-08 | 5.22E-08 | 1.95E-04 | 0.000188461 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.86E-05 | 2.81E-08 | 1.68E-08 | 2.81E-08 | 5.61E-07 | 3.15E-09 | 1.21E-06 | 5.62E-08 | 4.25E-08 | 1.59E-04 | 0.000153237 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.10E-05 | 2.37E-08 | 1.42E-08 | 2.37E-08 | 4.73E-07 | 2.66E-09 | 1.02E-06 | 4.74E-08 | 3.59E-08 | 1.34E-04 | 0.000129081 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 2.57E-05 | 2.06E-08 | 1.24E-08 | 2.06E-08 | 4.12E-07 | 2.32E-09 | 8.89E-07 | 4.13E-08 | 3.12E-08 | 1.17E-04 | 0.000112072 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 2.19E-05 | 1.84E-08 | 1.10E-08 | 1.84E-08 | 3.67E-07 | 2.06E-09 | 7.92E-07 | 3.68E-08 | 2.78E-08 | 1.04E-04 | 9.95904E-05 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 1.91E-05 | 1.67E-08 | 1.00E-08 | 1.67E-08 | 3.32E-07 | 1.87E-09 | 7.17E-07 | 3.33E-08 | 2.52E-08 | 9.43E-05 | 9.00681E-05 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 1.70E-05 | 1.53E-08 | 9.20E-09 | 1.53E-08 | 3.06E-07 | 1.72E-09 | 6.60E-07 | 3.07E-08 | 2.32E-08 | 8.68E-05 | 8.27309E-05 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 1.54E-05 | 1.43E-08 | 8.56E-09 | 1.43E-08 | 2.84E-07 | 1.60E-09 | 6.14E-07 | 2.85E-08 | 2.15E-08 | 8.08E-05 | 7.68886E-05 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 1.41E-05 | 1.34E-08 | 8.04E-09 | 1.34E-08 | 2.67E-07 | 1.50E-09 | 5.77E-07 | 2.68E-08 | 2.02E-08 | 7.58E-05 | 7.21416E-05 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 1.30E-05 | 1.27E-08 | 7.60E-09 | 1.27E-08 | 2.53E-07 | 1.42E-09 | 5.45E-07 | 2.53E-08 | 1.91E-08 | 7.17E-05 | 6.81389E-05 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 1.21E-05 | 1.20E-08 | 7.22E-09 | 1.20E-08 | 2.40E-07 | 1.35E-09 | 5.18E-07 | 2.41E-08 | 1.82E-08 | 6.81E-05 | 6.47154E-05 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 1.14E-05 | 1.15E-08 | 6.89E-09 | 1.15E-08 | 2.29E-07 | 1.29E-09 | 4.94E-07 | 2.30E-08 | 1.73E-08 | 6.50E-05 | 6.16613E-05 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 1.07E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.73E-07 | 2.20E-08 | 1.66E-08 | 6.23E-05 | 5.90435E-05 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.01E-05 | 1.05E-08 | 6.33E-09 | 1.05E-08 | 2.10E-07 | 1.19E-09 | 4.54E-07 | 2.11E-08 | 1.59E-08 | 5.97E-05 | 5.65815E-05 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 3.22E-04 | 1.84E-07 | 1.10E-07 | 1.84E-07 | 3.68E-06 | 2.06E-08 | 7.94E-06 | 3.68E-07 | 2.79E-07 | 1.04E-03 | 0.001018719 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 3.64E-04 | 2.06E-07 | 1.24E-07 | 2.06E-07 | 4.12E-06 | 2.31E-08 | 8.89E-06 | 4.12E-07 | 3.13E-07 | 1.17E-03 | 0.001141606 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 3.26E-04 | 1.85E-07 | 1.11E-07 | 1.85E-07 | 3.70E-06 | 2.08E-08 | 8.00E-06 | 3.71E-07 | 2.81E-07 | 1.05E-03 | 0.001026976 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 2.47E-04 | 1.42E-07 | 8.51E-08 | 1.42E-07 | 2.84E-06 | 1.59E-08 | 6.12E-06 | 2.84E-07 | 2.15E-07 | 8.05E-04 | 0.000785365 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.50E-04 | 8.89E-08 | 5.33E-08 | 8.89E-08 | 1.78E-06 | 9.96E-09 | 3.84E-06 | 1.78E-07 | 1.35E-07 | 5.04E-04 | 0.000491093 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 8.98E-05 | 5.61E-08 | 3.36E-08 | 5.61E-08 | 1.12E-06 | 6.28E-09 | 2.42E-06 | 1.12E-07 | 8.50E-08 | 3.18E-04 | 0.00030873 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.82E-05 | 3.87E-08 | 2.32E-08 | 3.87E-08 | 7.72E-07 | 4.34E-09 | 1.67E-06 | 7.73E-08 | 5.86E-08 | 2.19E-04 | 0.000212117 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.20E-05 | 2.96E-08 | 1.78E-08 | 2.96E-08 | 5.92E-07 | 3.32E-09 | 1.28E-06 | 5.92E-08 | 4.49E-08 | 1.68E-04 | 0.000161941 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 3.26E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.86E-07 | 2.73E-09 | 1.05E-06 | 4.86E-08 | 3.68E-08 | 1.38E-04 | 0.000132552 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 2.67E-05 | 2.09E-08 | 1.25E-08 | 2.09E-08 | 4.17E-07 | 2.35E-09 | 9.01E-07 | 4.18E-08 | 3.17E-08 | 1.19E-04 | 0.000113689 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 2.28E-05 | 1.86E-08 | 1.12E-08 | 1.86E-08 | 3.71E-07 | 2.09E-09 | 8.01E-07 | 3.72E-08 | 2.81E-08 | 1.05E-04 | 0.000100855 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 2.01E-05 | 1.69E-08 | 1.01E-08 | 1.69E-08 | 3.37E-07 | 1.90E-09 | 7.28E-07 | 3.38E-08 | 2.56E-08 | 9.57E-05 | 9.15085E-05 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 1.79E-05 | 1.56E-08 | 9.34E-09 | 1.56E-08 | 3.11E-07 | 1.75E-09 | 6.71E-07 | 3.11E-08 | 2.35E-08 | 8.82E-05 | 8.42133E-05 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 1.63E-05 | 1.45E-08 | 8.72E-09 | 1.45E-08 | 2.90E-07 | 1.63E-09 | 6.25E-07 | 2.91E-08 | 2.20E-08 | 8.23E-05 | 7.84696E-05 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 1.50E-05 | 1.36E-08 | 8.18E-09 | 1.36E-08 | 2.72E-07 | 1.53E-09 | 5.87E-07 | 2.73E-08 | 2.06E-08 | 7.72E-05 | 7.35284E-05 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 1.39E-05 | 1.29E-08 | 7.72E-09 | 1.29E-08 | 2.57E-07 | 1.45E-09 | 5.54E-07 | 2.57E-08 | 1.94E-08 | 7.29E-05 | 6.93879E-05 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 1.29E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 2.43E-07 | 1.37E-09 | 5.25E-07 | 2.44E-08 | 1.84E-08 | 6.91E-05 | 6.57474E-05 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 1.21E-05 | 1.16E-08 | 6.97E-09 | 1.16E-08 | 2.32E-07 | 1.31E-09 | 5.00E-07 | 2.32E-08 | 1.75E-08 | 6.58E-05 | 6.25219E-05 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 1.13E-05 | 1.11E-08 | 6.64E-09 | 1.11E-08 | 2.21E-07 | 1.24E-09 | 4.76E-07 | 2.21E-08 | 1.67E-08 | 6.27E-05 | 5.95262E-05 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 1.06E-05 | 1.06E-08 | 6.35E-09 | 1.06E-08 | 2.11E-07 | 1.19E-09 | 4.55E-07 | 2.12E-08 | 1.60E-08 | 5.99E-05 | 5.68927E-05 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 1.00E-05 | 1.01E-08 | 6.09E-09 | 1.01E-08 | 2.02E-07 | 1.14E-09 | 4.36E-07 | 2.03E-08 | 1.53E-08 | 5.74E-05 | 5.44808E-05 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 6.40E-04 | 3.56E-07 | 2.13E-07 | 3.56E-07 | 7.12E-06 | 3.99E-08 | 1.54E-05 | 7.12E-07 | 5.41E-07 | 2.02E-03 | 0.001975425 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 6.84E-04 | 3.79E-07 | 2.27E-07 | 3.79E-07 | 7.58E-06 | 4.25E-08 | 1.64E-05 | 7.58E-07 | 5.76E-07 | 2.15E-03 | 0.002104844 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 6.09E-04 | 3.38E-07 | 2.03E-07 | 3.38E-07 | 6.77E-06 | 3.79E-08 | 1.46E-05 | 6.77E-07 | 5.14E-07 | 1.92E-03 | 0.001878919 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 3.20E-04 | 1.81E-07 | 1.09E-07 | 1.81E-07 | 3.62E-06 | 2.03E-08 | 7.82E-06 | 3.62E-07 | 2.75E-07 | 1.03E-03 | 0.001004195 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.30E-04 | 7.77E-08 | 4.66E-08 | 7.77E-08 | 1.55E-06 | 8.71E-09 | 3.35E-06 | 1.55E-07 | 1.18E-07 | 4.41E-04 | 0.000429236 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.99E-05 | 4.48E-08 | 2.69E-08 | 4.48E-08 | 8.95E-07 | 5.02E-09 | 1.93E-06 | 8.96E-08 | 6.79E-08 | 2.54E-04 | 0.000246296 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 4.69E-05 | 3.21E-08 | 1.93E-08 | 3.21E-08 | 6.42E-07 | 3.60E-09 | 1.39E-06 | 6.42E-08 | 4.87E-08 | 1.82E-04 | 0.000175926 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 3.60E-05 | 2.59E-08 | 1.56E-08 | 2.59E-08 | 5.18E-07 | 2.91E-09 | 1.12E-06 | 5.19E-08 | 3.93E-08 | 1.47E-04 | 0.000141689 | Res |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 2.95E-05 | 2.22E-08 | 1.33E-08 | 2.22E-08 | 4.44E-07 | 2.49E-09 | 9.58E-07 | 4.45E-08 | 3.37E-08 | 1.26E-04 | 0.000121086 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 2.51E-05 | 1.96E-08 | 1.18E-08 | 1.96E-08 | 3.92E-07 | 2.20E-09 | 8.46E-07 | 3.93E-08 | 2.97E-08 | 1.11E-04 | 0.000106764 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 2.19E-05 | 1.77E-08 | 1.06E-08 | 1.77E-08 | 3.53E-07 | 1.98E-09 | 7.62E-07 | 3.54E-08 | 2.67E-08 | 1.00E-04 | 9.59336E-05 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 1.94E-05 | 1.61E-08 | 9.69E-09 | 1.61E-08 | 3.22E-07 | 1.81E-09 | 6.95E-07 | 3.23E-08 | 2.44E-08 | 9.15E-05 | 8.74989E-05 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 1.74E-05 | 1.49E-08 | 8.93E-09 | 1.49E-08 | 2.97E-07 | 1.67E-09 | 6.41E-07 | 2.98E-08 | 2.25E-08 | 8.43E-05 | 8.05608E-05 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 1.58E-05 | 1.39E-08 | 8.31E-09 | 1.39E-08 | 2.76E-07 | 1.56E-09 | 5.96E-07 | 2.77E-08 | 2.09E-08 | 7.84E-05 | 7.4845E-05 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 1.44E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 2.59E-07 | 1.46E-09 | 5.58E-07 | 2.59E-08 | 1.96E-08 | 7.34E-05 | 6.99682E-05 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 1.33E-05 | 1.22E-08 | 7.33E-09 | 1.22E-08 | 2.44E-07 | 1.37E-09 | 5.26E-07 | 2.44E-08 | 1.85E-08 | 6.92E-05 | 6.58923E-05 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 1.24E-05 | 1.16E-08 | 6.94E-09 | 1.16E-08 | 2.31E-07 | 1.30E-09 | 4.98E-07 | 2.31E-08 | 1.75E-08 | 6.55E-05 | 6.23501E-05 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 1.15E-05 | 1.10E-08 | 6.60E-09 | 1.10E-08 | 2.19E-07 | 1.24E-09 | 4.73E-07 | 2.20E-08 | 1.66E-08 | 6.23E-05 | 5.92421E-05 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 1.08E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 2.09E-07 | 1.18E-09 | 4.51E-07 | 2.10E-08 | 1.58E-08 | 5.94E-05 | 5.64415E-05 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 1.02E-05 | 1.00E-08 | 6.01E-09 | 1.00E-08 | 2.00E-07 | 1.13E-09 | 4.31E-07 | 2.00E-08 | 1.51E-08 | 5.67E-05 | 5.38787E-05 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 9.61E-06 | 9.60E-09 | 5.76E-09 | 9.60E-09 | 1.91E-07 | 1.08E-09 | 4.13E-07 | 1.92E-08 | 1.45E-08 | 5.43E-05 | 5.15992E-05 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.71E-03 | 9.34E-07 | 5.60E-07 | 9.34E-07 | 1.87E-05 | 1.05E-07 | 4.03E-05 | 1.87E-06 | 1.42E-06 | 5.30E-03 | 0.00519049 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.24E-03 | 1.22E-06 | 7.34E-07 | 1.22E-06 | 2.45E-05 | 1.37E-07 | 5.28E-05 | 2.45E-06 | 1.86E-06 | 6.95E-03 | 0.006799704 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.61E-03 | 1.42E-06 | 8.53E-07 | 1.42E-06 | 2.84E-05 | 1.59E-07 | 6.14E-05 | 2.84E-06 | 2.16E-06 | 8.07E-03 | 0.007902599 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.08E-04 | 1.20E-07 | 7.19E-08 | 1.20E-07 | 2.39E-06 | 1.34E-08 | 5.17E-06 | 2.40E-07 | 1.82E-07 | 6.80E-04 | 0.000663245 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 8.92E-05 | 5.53E-08 | 3.32E-08 | 5.53E-08 | 1.10E-06 | 6.20E-09 | 2.39E-06 | 1.11E-07 | 8.39E-08 | 3.14E-04 | 0.000304606 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 5.75E-05 | 3.78E-08 | 2.27E-08 | 3.78E-08 | 7.55E-07 | 4.24E-09 | 1.63E-06 | 7.56E-08 | 5.73E-08 | 2.15E-04 | 0.000207618 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 4.24E-05 | 2.94E-08 | 1.76E-08 | 2.94E-08 | 5.87E-07 | 3.30E-09 | 1.27E-06 | 5.88E-08 | 4.46E-08 | 1.67E-04 | 0.000160892 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 3.36E-05 | 2.44E-08 | 1.46E-08 | 2.44E-08 | 4.87E-07 | 2.73E-09 | 1.05E-06 | 4.87E-08 | 3.69E-08 | 1.38E-04 | 0.000133026 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 2.77E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.18E-07 | 2.35E-09 | 9.03E-07 | 4.19E-08 | 3.17E-08 | 1.19E-04 | 0.000114153 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 2.35E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.69E-07 | 2.08E-09 | 7.97E-07 | 3.70E-08 | 2.80E-08 | 1.05E-04 | 0.000100493 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 2.04E-05 | 1.66E-08 | 9.97E-09 | 1.66E-08 | 3.32E-07 | 1.87E-09 | 7.16E-07 | 3.32E-08 | 2.51E-08 | 9.42E-05 | 9.01431E-05 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 1.80E-05 | 1.52E-08 | 9.09E-09 | 1.52E-08 | 3.02E-07 | 1.70E-09 | 6.53E-07 | 3.03E-08 | 2.29E-08 | 8.58E-05 | 8.2073E-05 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 1.61E-05 | 1.40E-08 | 8.38E-09 | 1.40E-08 | 2.79E-07 | 1.57E-09 | 6.01E-07 | 2.79E-08 | 2.11E-08 | 7.91E-05 | 7.55065E-05 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 1.46E-05 | 1.30E-08 | 7.78E-09 | 1.30E-08 | 2.59E-07 | 1.46E-09 | 5.59E-07 | 2.59E-08 | 1.96E-08 | 7.35E-05 | 7.00784E-05 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 1.33E-05 | 1.21E-08 | 7.28E-09 | 1.21E-08 | 2.42E-07 | 1.36E-09 | 5.22E-07 | 2.43E-08 | 1.83E-08 | 6.87E-05 | 6.54766E-05 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 1.23E-05 | 1.14E-08 | 6.86E-09 | 1.14E-08 | 2.28E-07 | 1.29E-09 | 4.92E-07 | 2.29E-08 | 1.73E-08 | 6.48E-05 | 6.16611E-05 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 1.15E-05 | 1.09E-08 | 6.51E-09 | 1.09E-08 | 2.16E-07 | 1.22E-09 | 4.67E-07 | 2.17E-08 | 1.64E-08 | 6.14E-05 | 5.84504E-05 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 1.07E-05 | 1.03E-08 | 6.19E-09 | 1.03E-08 | 2.06E-07 | 1.16E-09 | 4.44E-07 | 2.06E-08 | 1.56E-08 | 5.84E-05 | 5.55112E-05 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 1.01E-05 | 9.85E-09 | 5.91E-09 | 9.85E-09 | 1.96E-07 | 1.11E-09 | 4.24E-07 | 1.97E-08 | 1.49E-08 | 5.58E-05 | 5.29906E-05 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 9.53E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 1.88E-07 | 1.06E-09 | 4.06E-07 | 1.89E-08 | 1.42E-08 | 5.34E-05 | 5.06738E-05 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 9.01E-06 | 9.04E-09 | 5.43E-09 | 9.04E-09 | 1.80E-07 | 1.02E-09 | 3.89E-07 | 1.81E-08 | 1.36E-08 | 5.12E-05 | 4.8571E-05 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 2.79E-04 | 1.59E-07 | 9.54E-08 | 1.59E-07 | 3.18E-06 | 1.78E-08 | 6.87E-06 | 3.18E-07 | 2.42E-07 | 9.03E-04 | 0.000881549 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 2.23E-04 | 1.28E-07 | 7.69E-08 | 1.28E-07 | 2.56E-06 | 1.44E-08 | 5.54E-06 | 2.56E-07 | 1.95E-07 | 7.28E-04 | 0.000709901 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.20E-04 | 7.22E-08 | 4.33E-08 | 7.22E-08 | 1.44E-06 | 8.09E-09 | 3.12E-06 | 1.44E-07 | 1.10E-07 | 4.10E-04 | 0.000398731 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.65E-05 | 4.84E-08 | 2.90E-08 | 4.84E-08 | 9.67E-07 | 5.42E-09 | 2.09E-06 | 9.68E-08 | 7.34E-08 | 2.75E-04 | 0.000266322 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 5.54E-05 | 3.68E-08 | 2.21E-08 | 3.68E-08 | 7.34E-07 | 4.12E-09 | 1.59E-06 | 7.35E-08 | 5.57E-08 | 2.08E-04 | 0.000201673 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 4.21E-05 | 2.93E-08 | 1.76E-08 | 2.93E-08 | 5.84E-07 | 3.28E-09 | 1.26E-06 | 5.85E-08 | 4.43E-08 | 1.66E-04 | 0.000160119 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 3.34E-05 | 2.43E-08 | 1.46E-08 | 2.43E-08 | 4.86E-07 | 2.73E-09 | 1.05E-06 | 4.87E-08 | 3.69E-08 | 1.38E-04 | 0.000132837 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 2.75E-05 | 2.10E-08 | 1.26E-08 | 2.10E-08 | 4.18E-07 | 2.35E-09 | 9.03E-07 | 4.19E-08 | 3.17E-08 | 1.19E-04 | 0.000114125 | Res |

Chronic Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | | | | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | DPM | Arsenic | Beryllium | Cadmium | Copper | Mercury | Nickel | Selenium | Chromium VI | Crystalline Silica | | |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 2.33E-05 | 1.85E-08 | 1.11E-08 | 1.85E-08 | 3.68E-07 | 2.07E-09 | 7.95E-07 | 3.69E-08 | 2.79E-08 | 1.05E-04 | 0.000100239 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 2.01E-05 | 1.66E-08 | 9.93E-09 | 1.66E-08 | 3.30E-07 | 1.86E-09 | 7.13E-07 | 3.31E-08 | 2.50E-08 | 9.38E-05 | 8.97462E-05 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 1.77E-05 | 1.51E-08 | 9.03E-09 | 1.51E-08 | 3.00E-07 | 1.69E-09 | 6.48E-07 | 3.01E-08 | 2.28E-08 | 8.52E-05 | 8.14668E-05 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 1.58E-05 | 1.38E-08 | 8.29E-09 | 1.38E-08 | 2.76E-07 | 1.55E-09 | 5.95E-07 | 2.76E-08 | 2.09E-08 | 7.83E-05 | 7.47246E-05 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 1.42E-05 | 1.28E-08 | 7.70E-09 | 1.28E-08 | 2.56E-07 | 1.44E-09 | 5.52E-07 | 2.57E-08 | 1.94E-08 | 7.26E-05 | 6.92494E-05 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 1.30E-05 | 1.20E-08 | 7.19E-09 | 1.20E-08 | 2.39E-07 | 1.35E-09 | 5.16E-07 | 2.40E-08 | 1.81E-08 | 6.78E-05 | 6.45846E-05 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 1.19E-05 | 1.13E-08 | 6.75E-09 | 1.13E-08 | 2.24E-07 | 1.26E-09 | 4.84E-07 | 2.25E-08 | 1.70E-08 | 6.37E-05 | 6.05999E-05 | Res |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 1.10E-05 | 1.06E-08 | 6.36E-09 | 1.06E-08 | 2.12E-07 | 1.19E-09 | 4.56E-07 | 2.12E-08 | 1.60E-08 | 6.00E-05 | 5.70847E-05 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 1.03E-05 | 1.01E-08 | 6.06E-09 | 1.01E-08 | 2.01E-07 | 1.14E-09 | 4.35E-07 | 2.02E-08 | 1.53E-08 | 5.72E-05 | 5.43289E-05 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 9.70E-06 | 9.63E-09 | 5.78E-09 | 9.63E-09 | 1.92E-07 | 1.08E-09 | 4.14E-07 | 1.93E-08 | 1.45E-08 | 5.45E-05 | 5.17644E-05 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 9.20E-06 | 9.24E-09 | 5.54E-09 | 9.24E-09 | 1.84E-07 | 1.04E-09 | 3.97E-07 | 1.85E-08 | 1.39E-08 | 5.23E-05 | 4.96277E-05 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 8.74E-06 | 8.88E-09 | 5.33E-09 | 8.88E-09 | 1.77E-07 | 9.98E-10 | 3.82E-07 | 1.78E-08 | 1.34E-08 | 5.02E-05 | 4.76681E-05 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 8.27E-06 | 8.51E-09 | 5.10E-09 | 8.51E-09 | 1.70E-07 | 9.56E-10 | 3.66E-07 | 1.70E-08 | 1.28E-08 | 4.81E-05 | 4.56454E-05 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 2.82E-05 | 2.16E-08 | 1.30E-08 | 2.16E-08 | 4.32E-07 | 2.43E-09 | 9.32E-07 | 4.33E-08 | 3.28E-08 | 1.23E-04 | 0.000117738 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 1.70E-05 | 1.48E-08 | 8.90E-09 | 1.48E-08 | 2.96E-07 | 1.66E-09 | 6.38E-07 | 2.97E-08 | 2.24E-08 | 8.40E-05 | 8.0164E-05 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 1.53E-05 | 1.37E-08 | 8.24E-09 | 1.37E-08 | 2.74E-07 | 1.54E-09 | 5.91E-07 | 2.75E-08 | 2.08E-08 | 7.78E-05 | 7.41523E-05 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 1.39E-05 | 1.28E-08 | 7.66E-09 | 1.28E-08 | 2.54E-07 | 1.43E-09 | 5.49E-07 | 2.55E-08 | 1.93E-08 | 7.22E-05 | 6.88084E-05 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 1.26E-05 | 1.19E-08 | 7.16E-09 | 1.19E-08 | 2.38E-07 | 1.34E-09 | 5.13E-07 | 2.39E-08 | 1.80E-08 | 6.76E-05 | 6.42716E-05 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 1.15E-05 | 1.11E-08 | 6.69E-09 | 1.11E-08 | 2.22E-07 | 1.25E-09 | 4.80E-07 | 2.23E-08 | 1.68E-08 | 6.31E-05 | 5.99568E-05 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 1.06E-05 | 1.05E-08 | 6.30E-09 | 1.05E-08 | 2.09E-07 | 1.18E-09 | 4.51E-07 | 2.10E-08 | 1.58E-08 | 5.94E-05 | 5.63913E-05 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 9.77E-06 | 9.91E-09 | 5.95E-09 | 9.91E-09 | 1.98E-07 | 1.11E-09 | 4.26E-07 | 1.98E-08 | 1.50E-08 | 5.61E-05 | 5.32392E-05 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 9.13E-06 | 9.43E-09 | 5.66E-09 | 9.43E-09 | 1.88E-07 | 1.06E-09 | 4.06E-07 | 1.89E-08 | 1.42E-08 | 5.34E-05 | 5.06034E-05 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 8.58E-06 | 9.00E-09 | 5.40E-09 | 9.00E-09 | 1.79E-07 | 1.01E-09 | 3.87E-07 | 1.80E-08 | 1.36E-08 | 5.09E-05 | 4.82653E-05 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 8.17E-06 | 8.65E-09 | 5.19E-09 | 8.65E-09 | 1.72E-07 | 9.72E-10 | 3.72E-07 | 1.73E-08 | 1.31E-08 | 4.89E-05 | 4.6373E-05 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.79E-06 | 8.33E-09 | 5.00E-09 | 8.33E-09 | 1.66E-07 | 9.36E-10 | 3.58E-07 | 1.67E-08 | 1.26E-08 | 4.71E-05 | 4.46252E-05 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 7.39E-06 | 7.99E-09 | 4.79E-09 | 7.99E-09 | 1.59E-07 | 8.98E-10 | 3.44E-07 | 1.60E-08 | 1.20E-08 | 4.52E-05 | 4.27875E-05 | Res |

# B-5 Acute Hazard Index Calculations

# HRA Permanente Creek Restoration Project

Construction Year 2024

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 8.077E-07 | 2.35E-13 | 1.41E-13 | 2.35E-13 | 1.20E-12 | 2.63E-12 | 2.35E-13 | 3.76E-14 | 4.32E-12 | 4.70E-13 | 1.88E-14 | 6.97E-10 | 3.57E-12 | 130.00 |
| Paved road | 2024_PAVED | 1.670E-05 | 8.43E-09 | 5.06E-09 | 8.43E-09 | 5.40E-09 | 1.69E-07 | 1.55E-08 | 9.44E-10 | 3.64E-07 | 1.69E-08 | 1.28E-08 | 4.79E-05 | 1.28E-07 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 5.060E-06 | 2.07E-08 | 1.24E-08 | 2.07E-08 | 1.32E-08 | 4.14E-07 | 3.81E-08 | 2.32E-09 | 8.94E-07 | 4.14E-08 | 3.15E-08 | 1.18E-04 | 3.15E-07 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 1.563E-04 | 1.653E-08 | 9.920E-09 | 1.653E-08 | 8.465E-08 | 1.852E-07 | 1.653E-08 | 2.645E-09 | 3.042E-07 | 3.307E-08 | 1.323E-09 | 4.911E-05 | 2.513E-07 | 130.00 |
| Paved road | 2024_PAVED | 1.452E-04 | 2.414E-07 | 1.448E-07 | 2.414E-07 | 1.545E-07 | 4.828E-06 | 4.442E-07 | 2.704E-08 | 1.043E-05 | 4.828E-07 | 3.669E-07 | 1.371E-03 | 3.669E-06 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | µg/m$^3$ | 0.2 |
| Mercury | µg/m$^3$ | 0.61 |
| Nickel | µg/m$^3$ | 0.2 |
| Vanadium | µg/m$^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.019 |
| Res | 0.041 |
| Acute | 0.016 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 8.63E-05 | 9.72E-06 | 3.70E-03 | 1.31E-03 | 0.019 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 2.09E-05 | 2.48E-06 | 8.31E-04 | 3.18E-04 | 0.004 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 2.89E-06 | 3.41E-07 | 1.16E-04 | 4.39E-05 | 0.001 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 7.37E-06 | 8.64E-07 | 2.98E-04 | 1.12E-04 | 0.002 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 1.03E-04 | 1.16E-05 | 4.40E-03 | 1.56E-03 | 0.023 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.31E-04 | 1.48E-05 | 5.64E-03 | 2.00E-03 | 0.029 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.35E-04 | 1.52E-05 | 5.82E-03 | 2.06E-03 | 0.030 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.51E-04 | 1.70E-05 | 6.50E-03 | 2.30E-03 | 0.033 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 3.02E-05 | 3.51E-06 | 1.24E-03 | 4.59E-04 | 0.006 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 4.85E-05 | 5.53E-06 | 2.05E-03 | 7.37E-04 | 0.011 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 7.15E-05 | 8.07E-06 | 3.06E-03 | 1.09E-03 | 0.016 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.62E-05 | 1.89E-06 | 6.57E-04 | 2.46E-04 | 0.003 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.60E-05 | 1.87E-06 | 6.51E-04 | 2.43E-04 | 0.003 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.65E-05 | 1.93E-06 | 6.77E-04 | 2.51E-04 | 0.003 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.60E-05 | 1.86E-06 | 6.54E-04 | 2.43E-04 | 0.003 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.62E-05 | 1.88E-06 | 6.65E-04 | 2.46E-04 | 0.003 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 1.54E-05 | 1.79E-06 | 6.33E-04 | 2.34E-04 | 0.003 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 1.53E-05 | 1.77E-06 | 6.29E-04 | 2.32E-04 | 0.003 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 2.00E-05 | 2.34E-06 | 8.19E-04 | 3.05E-04 | 0.004 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 2.08E-05 | 2.41E-06 | 8.56E-04 | 3.16E-04 | 0.004 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.96E-05 | 2.27E-06 | 8.05E-04 | 2.97E-04 | 0.004 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.88E-05 | 2.18E-06 | 7.74E-04 | 2.86E-04 | 0.004 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.76E-05 | 2.04E-06 | 7.24E-04 | 2.68E-04 | 0.004 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.66E-05 | 1.93E-06 | 6.82E-04 | 2.53E-04 | 0.004 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 1.60E-05 | 1.86E-06 | 6.56E-04 | 2.43E-04 | 0.003 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 1.53E-05 | 1.77E-06 | 6.25E-04 | 2.32E-04 | 0.003 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.45E-05 | 1.68E-06 | 5.93E-04 | 2.20E-04 | 0.003 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.03E-05 | 2.38E-06 | 8.20E-04 | 3.08E-04 | 0.004 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.11E-05 | 2.45E-06 | 8.63E-04 | 3.20E-04 | 0.004 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.90E-05 | 2.21E-06 | 7.79E-04 | 2.89E-04 | 0.004 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.80E-05 | 2.09E-06 | 7.39E-04 | 2.74E-04 | 0.004 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.74E-05 | 2.02E-06 | 7.14E-04 | 2.65E-04 | 0.004 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.72E-05 | 2.00E-06 | 7.07E-04 | 2.62E-04 | 0.004 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 1.63E-05 | 1.89E-06 | 6.69E-04 | 2.48E-04 | 0.003 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 1.57E-05 | 1.82E-06 | 6.45E-04 | 2.39E-04 | 0.003 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 1.58E-05 | 1.83E-06 | 6.51E-04 | 2.40E-04 | 0.003 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.57E-05 | 1.82E-06 | 6.47E-04 | 2.39E-04 | 0.003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.54E-05 | 1.78E-06 | 6.33E-04 | 2.33E-04 | 0.003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.60E-05 | 1.84E-06 | 6.60E-04 | 2.43E-04 | 0.003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.12E-05 | 2.48E-06 | 8.63E-04 | 3.22E-04 | 0.004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.23E-05 | 2.59E-06 | 9.15E-04 | 3.39E-04 | 0.005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.17E-05 | 2.51E-06 | 8.95E-04 | 3.29E-04 | 0.005 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.05E-05 | 2.37E-06 | 8.46E-04 | 3.11E-04 | 0.004 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.91E-05 | 2.21E-06 | 7.90E-04 | 2.90E-04 | 0.004 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.75E-05 | 2.03E-06 | 7.23E-04 | 2.66E-04 | 0.004 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.73E-05 | 2.00E-06 | 7.14E-04 | 2.63E-04 | 0.004 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 1.79E-05 | 2.06E-06 | 7.44E-04 | 2.72E-04 | 0.004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 1.73E-05 | 2.00E-06 | 7.20E-04 | 2.64E-04 | 0.004 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.65E-05 | 1.91E-06 | 6.87E-04 | 2.51E-04 | 0.004 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.65E-05 | 1.89E-06 | 6.84E-04 | 2.50E-04 | 0.004 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.19E-05 | 2.55E-06 | 8.98E-04 | 3.33E-04 | 0.005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.30E-05 | 2.67E-06 | 9.51E-04 | 3.50E-04 | 0.005 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.34E-05 | 2.70E-06 | 9.72E-04 | 3.56E-04 | 0.005 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.08E-05 | 2.40E-06 | 8.61E-04 | 3.16E-04 | 0.004 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.84E-05 | 2.13E-06 | 7.62E-04 | 2.80E-04 | 0.004 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.90E-05 | 2.19E-06 | 7.87E-04 | 2.88E-04 | 0.004 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.91E-05 | 2.20E-06 | 7.94E-04 | 2.90E-04 | 0.004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 1.82E-05 | 2.10E-06 | 7.57E-04 | 2.77E-04 | 0.004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.79E-05 | 2.06E-06 | 7.42E-04 | 2.71E-04 | 0.004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.38E-05 | 1.61E-06 | 5.64E-04 | 2.10E-04 | 0.003 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.77E-05 | 2.14E-06 | 6.88E-04 | 2.70E-04 | 0.004 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.95E-05 | 2.30E-06 | 7.82E-04 | 2.97E-04 | 0.004 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.96E-05 | 2.31E-06 | 7.92E-04 | 2.99E-04 | 0.004 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.96E-05 | 2.29E-06 | 7.95E-04 | 2.98E-04 | 0.004 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 2.09E-05 | 2.43E-06 | 8.57E-04 | 3.18E-04 | 0.004 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.02E-05 | 2.35E-06 | 8.30E-04 | 3.07E-04 | 0.004 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.97E-05 | 2.28E-06 | 8.10E-04 | 2.99E-04 | 0.004 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.05E-05 | 2.36E-06 | 8.47E-04 | 3.11E-04 | 0.004 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.01E-05 | 2.32E-06 | 8.32E-04 | 3.06E-04 | 0.004 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 1.88E-05 | 2.17E-06 | 7.77E-04 | 2.86E-04 | 0.004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 1.89E-05 | 2.18E-06 | 7.81E-04 | 2.87E-04 | 0.004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.85E-05 | 2.14E-06 | 7.66E-04 | 2.81E-04 | 0.004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 1.98E-05 | 2.41E-06 | 7.57E-04 | 3.01E-04 | 0.004 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 2.02E-05 | 2.46E-06 | 7.69E-04 | 3.07E-04 | 0.004 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 2.31E-05 | 2.72E-06 | 9.33E-04 | 3.52E-04 | 0.005 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 2.23E-05 | 2.60E-06 | 9.04E-04 | 3.38E-04 | 0.005 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 2.48E-05 | 2.88E-06 | 1.02E-03 | 3.77E-04 | 0.005 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 2.30E-05 | 2.68E-06 | 9.47E-04 | 3.50E-04 | 0.005 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 2.10E-05 | 2.44E-06 | 8.64E-04 | 3.19E-04 | 0.004 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 2.12E-05 | 2.45E-06 | 8.73E-04 | 3.22E-04 | 0.004 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 2.21E-05 | 2.55E-06 | 9.14E-04 | 3.36E-04 | 0.005 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.09E-05 | 2.41E-06 | 8.64E-04 | 3.17E-04 | 0.004 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.00E-05 | 2.31E-06 | 8.28E-04 | 3.04E-04 | 0.004 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.05E-05 | 2.37E-06 | 8.51E-04 | 3.12E-04 | 0.004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.01E-05 | 2.31E-06 | 8.32E-04 | 3.05E-04 | 0.004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.06E-05 | 2.37E-06 | 8.55E-04 | 3.13E-04 | 0.004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.90E-05 | 2.20E-06 | 7.91E-04 | 2.90E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.61E-05 | 1.86E-06 | 6.63E-04 | 2.44E-04 | 0.003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.81E-05 | 3.27E-06 | 1.15E-03 | 4.27E-04 | 0.006 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.77E-05 | 3.22E-06 | 1.14E-03 | 4.21E-04 | 0.006 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 2.65E-05 | 3.09E-06 | 1.08E-03 | 4.04E-04 | 0.006 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 2.55E-05 | 2.98E-06 | 1.04E-03 | 3.88E-04 | 0.005 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 2.53E-05 | 2.94E-06 | 1.04E-03 | 3.85E-04 | 0.005 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 2.66E-05 | 3.07E-06 | 1.10E-03 | 4.04E-04 | 0.006 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 2.44E-05 | 2.81E-06 | 1.01E-03 | 3.70E-04 | 0.005 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 2.31E-05 | 2.67E-06 | 9.56E-04 | 3.51E-04 | 0.005 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 2.32E-05 | 2.68E-06 | 9.62E-04 | 3.53E-04 | 0.005 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 2.16E-05 | 2.49E-06 | 8.94E-04 | 3.28E-04 | 0.005 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.26E-05 | 2.60E-06 | 9.38E-04 | 3.43E-04 | 0.005 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.22E-05 | 2.55E-06 | 9.21E-04 | 3.37E-04 | 0.005 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.24E-05 | 2.57E-06 | 9.31E-04 | 3.40E-04 | 0.005 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.15E-05 | 2.47E-06 | 8.95E-04 | 3.27E-04 | 0.005 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.96E-05 | 2.25E-06 | 8.12E-04 | 2.97E-04 | 0.004 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.85E-05 | 2.13E-06 | 7.68E-04 | 2.81E-04 | 0.004 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.83E-05 | 2.11E-06 | 7.61E-04 | 2.79E-04 | 0.004 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 3.13E-05 | 3.59E-06 | 1.31E-03 | 4.75E-04 | 0.007 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.90E-05 | 3.33E-06 | 1.21E-03 | 4.41E-04 | 0.006 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.81E-05 | 3.23E-06 | 1.17E-03 | 4.27E-04 | 0.006 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 2.76E-05 | 3.17E-06 | 1.15E-03 | 4.19E-04 | 0.006 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 2.46E-05 | 2.83E-06 | 1.02E-03 | 3.74E-04 | 0.005 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 2.45E-05 | 2.82E-06 | 1.02E-03 | 3.73E-04 | 0.005 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 2.44E-05 | 2.80E-06 | 1.02E-03 | 3.71E-04 | 0.005 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 2.39E-05 | 2.74E-06 | 9.96E-04 | 3.63E-04 | 0.005 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 2.42E-05 | 2.77E-06 | 1.01E-03 | 3.67E-04 | 0.005 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.36E-05 | 2.71E-06 | 9.89E-04 | 3.59E-04 | 0.005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.35E-05 | 2.69E-06 | 9.84E-04 | 3.57E-04 | 0.005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.17E-05 | 2.48E-06 | 9.05E-04 | 3.29E-04 | 0.005 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.01E-05 | 2.31E-06 | 8.39E-04 | 3.06E-04 | 0.004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.01E-05 | 2.31E-06 | 8.39E-04 | 3.05E-04 | 0.004 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 2.09E-05 | 2.39E-06 | 8.74E-04 | 3.18E-04 | 0.004 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 2.00E-05 | 2.30E-06 | 8.38E-04 | 3.04E-04 | 0.004 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.62E-05 | 1.86E-06 | 6.72E-04 | 2.46E-04 | 0.003 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.72E-05 | 3.15E-06 | 1.12E-03 | 4.14E-04 | 0.006 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 2.68E-05 | 3.09E-06 | 1.11E-03 | 4.07E-04 | 0.006 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 2.62E-05 | 3.02E-06 | 1.09E-03 | 3.98E-04 | 0.006 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 2.54E-05 | 2.93E-06 | 1.06E-03 | 3.86E-04 | 0.005 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 2.70E-05 | 3.10E-06 | 1.13E-03 | 4.10E-04 | 0.006 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 2.60E-05 | 2.98E-06 | 1.09E-03 | 3.95E-04 | 0.006 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 2.62E-05 | 3.00E-06 | 1.10E-03 | 3.98E-04 | 0.006 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 2.48E-05 | 2.83E-06 | 1.04E-03 | 3.77E-04 | 0.005 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.53E-05 | 2.89E-06 | 1.06E-03 | 3.84E-04 | 0.005 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.38E-05 | 2.72E-06 | 1.00E-03 | 3.62E-04 | 0.005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.21E-05 | 2.53E-06 | 9.31E-04 | 3.37E-04 | 0.005 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.22E-05 | 2.53E-06 | 9.34E-04 | 3.37E-04 | 0.005 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.30E-05 | 2.63E-06 | 9.70E-04 | 3.50E-04 | 0.005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 2.22E-05 | 2.54E-06 | 9.37E-04 | 3.38E-04 | 0.005 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.99E-05 | 2.28E-06 | 8.38E-04 | 3.03E-04 | 0.004 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 2.01E-05 | 2.29E-06 | 8.43E-04 | 3.05E-04 | 0.004 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 2.11E-05 | 2.41E-06 | 8.89E-04 | 3.21E-04 | 0.005 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 2.66E-05 | 3.08E-06 | 1.10E-03 | 4.04E-04 | 0.006 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.82E-05 | 3.25E-06 | 1.17E-03 | 4.28E-04 | 0.006 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.95E-05 | 3.39E-06 | 1.23E-03 | 4.48E-04 | 0.006 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 2.76E-05 | 3.17E-06 | 1.15E-03 | 4.19E-04 | 0.006 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 2.78E-05 | 3.20E-06 | 1.16E-03 | 4.23E-04 | 0.006 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 2.77E-05 | 3.18E-06 | 1.16E-03 | 4.21E-04 | 0.006 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 2.72E-05 | 3.12E-06 | 1.14E-03 | 4.13E-04 | 0.006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.50E-05 | 2.87E-06 | 1.05E-03 | 3.80E-04 | 0.005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.49E-05 | 2.85E-06 | 1.04E-03 | 3.78E-04 | 0.005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.62E-05 | 3.00E-06 | 1.10E-03 | 3.99E-04 | 0.006 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.49E-05 | 2.85E-06 | 1.05E-03 | 3.79E-04 | 0.005 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.23E-05 | 2.55E-06 | 9.34E-04 | 3.39E-04 | 0.005 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 2.31E-05 | 2.63E-06 | 9.69E-04 | 3.50E-04 | 0.005 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 2.34E-05 | 2.68E-06 | 9.87E-04 | 3.56E-04 | 0.005 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 2.19E-05 | 2.50E-06 | 9.22E-04 | 3.33E-04 | 0.005 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.95E-05 | 2.23E-06 | 8.21E-04 | 2.97E-04 | 0.004 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 3.11E-05 | 3.60E-06 | 1.28E-03 | 4.73E-04 | 0.007 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 3.19E-05 | 3.68E-06 | 1.32E-03 | 4.85E-04 | 0.007 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 3.03E-05 | 3.49E-06 | 1.25E-03 | 4.60E-04 | 0.006 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 3.11E-05 | 3.58E-06 | 1.29E-03 | 4.72E-04 | 0.007 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 3.12E-05 | 3.59E-06 | 1.30E-03 | 4.74E-04 | 0.007 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 3.03E-05 | 3.48E-06 | 1.26E-03 | 4.60E-04 | 0.006 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 2.97E-05 | 3.41E-06 | 1.24E-03 | 4.52E-04 | 0.006 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 3.06E-05 | 3.50E-06 | 1.28E-03 | 4.64E-04 | 0.007 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 2.81E-05 | 3.22E-06 | 1.18E-03 | 4.27E-04 | 0.006 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 2.74E-05 | 3.14E-06 | 1.15E-03 | 4.17E-04 | 0.006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.90E-05 | 3.32E-06 | 1.22E-03 | 4.41E-04 | 0.006 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.78E-05 | 3.19E-06 | 1.17E-03 | 4.23E-04 | 0.006 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.48E-05 | 2.84E-06 | 1.04E-03 | 3.76E-04 | 0.005 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.66E-05 | 3.04E-06 | 1.12E-03 | 4.05E-04 | 0.006 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 2.67E-05 | 3.05E-06 | 1.12E-03 | 4.06E-04 | 0.006 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 2.44E-05 | 2.79E-06 | 1.02E-03 | 3.71E-04 | 0.005 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 2.12E-05 | 2.43E-06 | 8.86E-04 | 3.22E-04 | 0.005 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.84E-05 | 2.11E-06 | 7.66E-04 | 2.79E-04 | 0.004 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.87E-05 | 2.15E-06 | 7.81E-04 | 2.84E-04 | 0.004 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 3.40E-05 | 3.91E-06 | 1.41E-03 | 5.16E-04 | 0.007 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 3.30E-05 | 3.80E-06 | 1.37E-03 | 5.01E-04 | 0.007 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 3.32E-05 | 3.82E-06 | 1.38E-03 | 5.04E-04 | 0.007 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 3.28E-05 | 3.77E-06 | 1.37E-03 | 4.99E-04 | 0.007 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 3.36E-05 | 3.85E-06 | 1.40E-03 | 5.11E-04 | 0.007 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 3.45E-05 | 3.94E-06 | 1.44E-03 | 5.24E-04 | 0.007 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 3.24E-05 | 3.71E-06 | 1.36E-03 | 4.92E-04 | 0.007 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 3.06E-05 | 3.51E-06 | 1.28E-03 | 4.65E-04 | 0.007 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.20E-05 | 3.66E-06 | 1.34E-03 | 4.86E-04 | 0.007 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.06E-05 | 3.50E-06 | 1.28E-03 | 4.65E-04 | 0.007 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.94E-05 | 3.36E-06 | 1.23E-03 | 4.46E-04 | 0.006 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 3.19E-05 | 3.65E-06 | 1.34E-03 | 4.86E-04 | 0.007 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 3.05E-05 | 3.48E-06 | 1.28E-03 | 4.63E-04 | 0.007 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.71E-05 | 3.10E-06 | 1.14E-03 | 4.12E-04 | 0.006 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 2.25E-05 | 2.58E-06 | 9.44E-04 | 3.43E-04 | 0.005 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 2.17E-05 | 2.48E-06 | 9.06E-04 | 3.29E-04 | 0.005 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 2.13E-05 | 2.45E-06 | 8.94E-04 | 3.24E-04 | 0.005 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 2.02E-05 | 2.32E-06 | 8.45E-04 | 3.07E-04 | 0.004 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.98E-05 | 2.28E-06 | 8.30E-04 | 3.02E-04 | 0.004 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 3.44E-05 | 3.94E-06 | 1.45E-03 | 5.23E-04 | 0.007 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 3.25E-05 | 3.73E-06 | 1.36E-03 | 4.94E-04 | 0.007 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 3.29E-05 | 3.78E-06 | 1.38E-03 | 5.01E-04 | 0.007 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 3.78E-05 | 4.33E-06 | 1.59E-03 | 5.75E-04 | 0.008 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 3.70E-05 | 4.23E-06 | 1.55E-03 | 5.62E-04 | 0.008 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.76E-05 | 4.30E-06 | 1.58E-03 | 5.71E-04 | 0.008 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 3.74E-05 | 4.28E-06 | 1.57E-03 | 5.69E-04 | 0.008 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 3.44E-05 | 3.94E-06 | 1.44E-03 | 5.24E-04 | 0.007 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 3.71E-05 | 4.23E-06 | 1.56E-03 | 5.63E-04 | 0.008 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.52E-05 | 4.03E-06 | 1.48E-03 | 5.36E-04 | 0.008 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.59E-05 | 4.10E-06 | 1.51E-03 | 5.46E-04 | 0.008 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.68E-05 | 4.20E-06 | 1.55E-03 | 5.60E-04 | 0.008 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 3.39E-05 | 3.87E-06 | 1.43E-03 | 5.15E-04 | 0.007 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.91E-05 | 3.33E-06 | 1.22E-03 | 4.43E-04 | 0.006 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.57E-05 | 2.95E-06 | 1.08E-03 | 3.91E-04 | 0.006 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 2.55E-05 | 2.92E-06 | 1.07E-03 | 3.87E-04 | 0.005 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 2.39E-05 | 2.74E-06 | 1.00E-03 | 3.63E-04 | 0.005 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 2.32E-05 | 2.67E-06 | 9.72E-04 | 3.53E-04 | 0.005 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 2.16E-05 | 2.48E-06 | 9.03E-04 | 3.29E-04 | 0.005 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.94E-05 | 2.23E-06 | 8.09E-04 | 2.95E-04 | 0.004 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.69E-05 | 1.95E-06 | 7.02E-04 | 2.57E-04 | 0.004 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 2.67E-05 | 3.06E-06 | 1.12E-03 | 4.06E-04 | 0.006 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 2.74E-05 | 3.12E-06 | 1.16E-03 | 4.17E-04 | 0.006 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 4.23E-05 | 4.80E-06 | 1.79E-03 | 6.43E-04 | 0.009 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 4.40E-05 | 5.00E-06 | 1.87E-03 | 6.69E-04 | 0.010 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 4.08E-05 | 4.64E-06 | 1.72E-03 | 6.20E-04 | 0.009 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 4.32E-05 | 4.92E-06 | 1.83E-03 | 6.57E-04 | 0.009 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 4.09E-05 | 4.66E-06 | 1.73E-03 | 6.22E-04 | 0.009 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.31E-05 | 4.91E-06 | 1.82E-03 | 6.55E-04 | 0.009 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 4.24E-05 | 4.82E-06 | 1.79E-03 | 6.44E-04 | 0.009 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.75E-05 | 4.28E-06 | 1.58E-03 | 5.70E-04 | 0.008 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 3.16E-05 | 3.61E-06 | 1.33E-03 | 4.80E-04 | 0.007 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 3.15E-05 | 3.60E-06 | 1.32E-03 | 4.79E-04 | 0.007 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.96E-05 | 3.38E-06 | 1.24E-03 | 4.50E-04 | 0.006 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 2.80E-05 | 3.20E-06 | 1.18E-03 | 4.26E-04 | 0.006 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 2.53E-05 | 2.89E-06 | 1.06E-03 | 3.84E-04 | 0.005 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 2.18E-05 | 2.50E-06 | 9.09E-04 | 3.31E-04 | 0.005 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.98E-05 | 2.28E-06 | 8.25E-04 | 3.01E-04 | 0.004 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 2.06E-05 | 2.37E-06 | 8.61E-04 | 3.14E-04 | 0.004 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 2.13E-05 | 2.44E-06 | 8.89E-04 | 3.23E-04 | 0.005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 2.15E-05 | 2.46E-06 | 8.98E-04 | 3.26E-04 | 0.005 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 5.18E-05 | 5.86E-06 | 2.21E-03 | 7.88E-04 | 0.011 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 4.91E-05 | 5.55E-06 | 2.10E-03 | 7.47E-04 | 0.011 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 5.10E-05 | 5.76E-06 | 2.18E-03 | 7.76E-04 | 0.011 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 4.84E-05 | 5.47E-06 | 2.07E-03 | 7.36E-04 | 0.011 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 5.30E-05 | 5.98E-06 | 2.26E-03 | 8.05E-04 | 0.012 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.79E-05 | 5.42E-06 | 2.04E-03 | 7.28E-04 | 0.010 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.23E-05 | 4.80E-06 | 1.80E-03 | 6.44E-04 | 0.009 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.96E-05 | 4.50E-06 | 1.68E-03 | 6.02E-04 | 0.009 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 3.76E-05 | 4.28E-06 | 1.59E-03 | 5.72E-04 | 0.008 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 3.48E-05 | 3.97E-06 | 1.47E-03 | 5.29E-04 | 0.008 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.99E-05 | 3.41E-06 | 1.26E-03 | 4.54E-04 | 0.006 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 2.53E-05 | 2.90E-06 | 1.06E-03 | 3.85E-04 | 0.005 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 2.64E-05 | 3.02E-06 | 1.11E-03 | 4.01E-04 | 0.006 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 2.69E-05 | 3.07E-06 | 1.13E-03 | 4.09E-04 | 0.006 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 2.68E-05 | 3.06E-06 | 1.12E-03 | 4.07E-04 | 0.006 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 2.61E-05 | 2.99E-06 | 1.10E-03 | 3.97E-04 | 0.006 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 2.49E-05 | 2.85E-06 | 1.04E-03 | 3.78E-04 | 0.005 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 2.35E-05 | 2.69E-06 | 9.86E-04 | 3.57E-04 | 0.005 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 2.18E-05 | 2.49E-06 | 9.12E-04 | 3.31E-04 | 0.005 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 5.44E-05 | 6.18E-06 | 2.31E-03 | 8.27E-04 | 0.012 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 6.30E-05 | 7.13E-06 | 2.68E-03 | 9.57E-04 | 0.014 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 6.64E-05 | 7.52E-06 | 2.83E-03 | 1.01E-03 | 0.015 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 6.49E-05 | 7.34E-06 | 2.77E-03 | 9.86E-04 | 0.014 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 6.41E-05 | 7.23E-06 | 2.74E-03 | 9.74E-04 | 0.014 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 5.62E-05 | 6.35E-06 | 2.40E-03 | 8.54E-04 | 0.012 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.27E-05 | 5.94E-06 | 2.25E-03 | 8.01E-04 | 0.012 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 5.04E-05 | 5.68E-06 | 2.16E-03 | 7.66E-04 | 0.011 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 4.46E-05 | 5.04E-06 | 1.91E-03 | 6.78E-04 | 0.010 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 3.59E-05 | 4.06E-06 | 1.53E-03 | 5.45E-04 | 0.008 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 3.79E-05 | 4.29E-06 | 1.62E-03 | 5.77E-04 | 0.008 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 3.82E-05 | 4.32E-06 | 1.62E-03 | 5.80E-04 | 0.008 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 3.65E-05 | 4.14E-06 | 1.55E-03 | 5.55E-04 | 0.008 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 3.40E-05 | 3.86E-06 | 1.44E-03 | 5.16E-04 | 0.007 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 3.05E-05 | 3.47E-06 | 1.29E-03 | 4.63E-04 | 0.007 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 2.92E-05 | 3.33E-06 | 1.23E-03 | 4.44E-04 | 0.006 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 2.86E-05 | 3.26E-06 | 1.20E-03 | 4.34E-04 | 0.006 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 2.76E-05 | 3.15E-06 | 1.16E-03 | 4.19E-04 | 0.006 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 2.62E-05 | 2.99E-06 | 1.10E-03 | 3.98E-04 | 0.006 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 2.50E-05 | 2.85E-06 | 1.05E-03 | 3.80E-04 | 0.005 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 2.44E-05 | 2.79E-06 | 1.03E-03 | 3.71E-04 | 0.005 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 9.02E-05 | 1.02E-05 | 3.86E-03 | 1.37E-03 | 0.020 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 1.00E-04 | 1.13E-05 | 4.28E-03 | 1.52E-03 | 0.022 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 8.67E-05 | 9.79E-06 | 3.70E-03 | 1.32E-03 | 0.019 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 7.87E-05 | 8.89E-06 | 3.36E-03 | 1.20E-03 | 0.017 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 7.66E-05 | 8.64E-06 | 3.27E-03 | 1.16E-03 | 0.017 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.53E-05 | 7.37E-06 | 2.79E-03 | 9.92E-04 | 0.014 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 6.72E-05 | 7.58E-06 | 2.87E-03 | 1.02E-03 | 0.015 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 6.34E-05 | 7.15E-06 | 2.71E-03 | 9.64E-04 | 0.014 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 5.53E-05 | 6.24E-06 | 2.37E-03 | 8.41E-04 | 0.012 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 4.92E-05 | 5.54E-06 | 2.11E-03 | 7.47E-04 | 0.011 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 4.54E-05 | 5.12E-06 | 1.95E-03 | 6.91E-04 | 0.010 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 4.14E-05 | 4.67E-06 | 1.77E-03 | 6.29E-04 | 0.009 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 3.81E-05 | 4.30E-06 | 1.63E-03 | 5.78E-04 | 0.008 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 3.56E-05 | 4.02E-06 | 1.52E-03 | 5.41E-04 | 0.008 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 3.30E-05 | 3.74E-06 | 1.40E-03 | 5.01E-04 | 0.007 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 3.07E-05 | 3.48E-06 | 1.30E-03 | 4.66E-04 | 0.007 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 2.85E-05 | 3.23E-06 | 1.21E-03 | 4.33E-04 | 0.006 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 2.63E-05 | 3.00E-06 | 1.11E-03 | 4.00E-04 | 0.006 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 2.45E-05 | 2.80E-06 | 1.03E-03 | 3.73E-04 | 0.005 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 2.37E-05 | 2.71E-06 | 9.99E-04 | 3.61E-04 | 0.005 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 2.30E-05 | 2.63E-06 | 9.69E-04 | 3.50E-04 | 0.005 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.75E-04 | 1.97E-05 | 7.54E-03 | 2.66E-03 | 0.039 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 1.82E-04 | 2.05E-05 | 7.85E-03 | 2.77E-03 | 0.040 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 1.86E-04 | 2.10E-05 | 8.02E-03 | 2.83E-03 | 0.041 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 1.69E-04 | 1.89E-05 | 7.24E-03 | 2.56E-03 | 0.037 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.21E-04 | 1.36E-05 | 5.19E-03 | 1.84E-03 | 0.027 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 8.93E-05 | 1.01E-05 | 3.82E-03 | 1.36E-03 | 0.020 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 7.03E-05 | 7.94E-06 | 3.00E-03 | 1.07E-03 | 0.015 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 5.91E-05 | 6.67E-06 | 2.52E-03 | 8.98E-04 | 0.013 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 5.27E-05 | 5.96E-06 | 2.25E-03 | 8.01E-04 | 0.012 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 4.76E-05 | 5.38E-06 | 2.03E-03 | 7.23E-04 | 0.010 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 4.34E-05 | 4.90E-06 | 1.85E-03 | 6.60E-04 | 0.010 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 4.00E-05 | 4.51E-06 | 1.71E-03 | 6.08E-04 | 0.009 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 3.70E-05 | 4.18E-06 | 1.58E-03 | 5.63E-04 | 0.008 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 3.45E-05 | 3.89E-06 | 1.48E-03 | 5.24E-04 | 0.008 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 3.24E-05 | 3.65E-06 | 1.38E-03 | 4.92E-04 | 0.007 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 3.07E-05 | 3.47E-06 | 1.31E-03 | 4.67E-04 | 0.007 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 2.95E-05 | 3.34E-06 | 1.26E-03 | 4.49E-04 | 0.006 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 2.82E-05 | 3.19E-06 | 1.20E-03 | 4.28E-04 | 0.006 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 2.72E-05 | 3.09E-06 | 1.16E-03 | 4.14E-04 | 0.006 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 2.62E-05 | 2.98E-06 | 1.11E-03 | 3.98E-04 | 0.006 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 2.52E-05 | 2.87E-06 | 1.07E-03 | 3.84E-04 | 0.005 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 6.95E-05 | 7.84E-06 | 2.97E-03 | 1.06E-03 | 0.015 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 6.95E-05 | 7.84E-06 | 2.98E-03 | 1.06E-03 | 0.015 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 7.38E-05 | 8.33E-06 | 3.16E-03 | 1.12E-03 | 0.016 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 7.19E-05 | 8.11E-06 | 3.07E-03 | 1.09E-03 | 0.016 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 7.36E-05 | 8.31E-06 | 3.15E-03 | 1.12E-03 | 0.016 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 6.47E-05 | 7.31E-06 | 2.76E-03 | 9.84E-04 | 0.014 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 5.60E-05 | 6.33E-06 | 2.38E-03 | 8.50E-04 | 0.012 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 5.06E-05 | 5.73E-06 | 2.15E-03 | 7.70E-04 | 0.011 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 4.71E-05 | 5.34E-06 | 2.01E-03 | 7.16E-04 | 0.010 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 4.43E-05 | 5.02E-06 | 1.89E-03 | 6.74E-04 | 0.010 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 4.16E-05 | 4.71E-06 | 1.77E-03 | 6.33E-04 | 0.009 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 3.90E-05 | 4.41E-06 | 1.66E-03 | 5.93E-04 | 0.009 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 3.66E-05 | 4.14E-06 | 1.56E-03 | 5.56E-04 | 0.008 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 3.43E-05 | 3.87E-06 | 1.46E-03 | 5.21E-04 | 0.008 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 3.20E-05 | 3.62E-06 | 1.37E-03 | 4.87E-04 | 0.007 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 2.98E-05 | 3.37E-06 | 1.28E-03 | 4.53E-04 | 0.007 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 2.88E-05 | 3.24E-06 | 1.23E-03 | 4.37E-04 | 0.006 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 2.76E-05 | 3.12E-06 | 1.18E-03 | 4.20E-04 | 0.006 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 2.69E-05 | 3.04E-06 | 1.15E-03 | 4.09E-04 | 0.006 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 2.61E-05 | 2.96E-06 | 1.11E-03 | 3.97E-04 | 0.006 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 2.49E-05 | 2.82E-06 | 1.06E-03 | 3.78E-04 | 0.005 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 4.60E-05 | 5.20E-06 | 1.96E-03 | 6.98E-04 | 0.010 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 3.89E-05 | 4.42E-06 | 1.65E-03 | 5.92E-04 | 0.008 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 3.70E-05 | 4.19E-06 | 1.57E-03 | 5.62E-04 | 0.008 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 3.46E-05 | 3.92E-06 | 1.47E-03 | 5.26E-04 | 0.008 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 3.22E-05 | 3.66E-06 | 1.37E-03 | 4.90E-04 | 0.007 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 2.91E-05 | 3.30E-06 | 1.23E-03 | 4.42E-04 | 0.006 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 2.64E-05 | 3.00E-06 | 1.12E-03 | 4.02E-04 | 0.006 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 2.46E-05 | 2.78E-06 | 1.04E-03 | 3.73E-04 | 0.005 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 2.38E-05 | 2.70E-06 | 1.01E-03 | 3.62E-04 | 0.005 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 2.31E-05 | 2.61E-06 | 9.83E-04 | 3.51E-04 | 0.005 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 2.28E-05 | 2.57E-06 | 9.73E-04 | 3.46E-04 | 0.005 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 2.23E-05 | 2.52E-06 | 9.54E-04 | 3.39E-04 | 0.005 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 2.13E-05 | 2.41E-06 | 9.12E-04 | 3.24E-04 | 0.005 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2025

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 4.767E-04 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.31E-07 | 2.86E-07 | 2.55E-08 | 4.08E-09 | 4.69E-07 | 5.10E-08 | 2.04E-09 | 7.57E-05 | 3.87E-07 | 130.00 |
| Paved road | 2025_PAVED | 4.805E-04 | 2.46E-07 | 1.48E-07 | 2.46E-07 | 1.58E-07 | 4.92E-06 | 4.53E-07 | 2.76E-08 | 1.06E-05 | 4.92E-07 | 3.74E-07 | 1.40E-03 | 3.74E-06 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | µg/m$^3$ | 0.2 |
| Mercury | µg/m$^3$ | 0.61 |
| Nickel | µg/m$^3$ | 0.2 |
| Vanadium | µg/m$^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.016 |
| Res | 0.039 |
| Acute | 0.013 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 7.36E-05 | 8.33E-06 | 3.13E-03 | 1.12E-03 | 0.016 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 2.02E-05 | 2.48E-06 | 7.63E-04 | 3.08E-04 | 0.004 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 2.44E-06 | 3.00E-07 | 9.17E-05 | 3.71E-05 | 0.000 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 6.73E-06 | 8.14E-07 | 2.59E-04 | 1.02E-04 | 0.001 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 9.18E-05 | 1.04E-05 | 3.91E-03 | 1.40E-03 | 0.020 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.19E-04 | 1.34E-05 | 5.08E-03 | 1.81E-03 | 0.026 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.27E-04 | 1.43E-05 | 5.42E-03 | 1.92E-03 | 0.028 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.41E-04 | 1.59E-05 | 6.06E-03 | 2.15E-03 | 0.031 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 2.60E-05 | 3.11E-06 | 1.02E-03 | 3.95E-04 | 0.005 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.85E-05 | 4.45E-06 | 1.59E-03 | 5.85E-04 | 0.008 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.13E-05 | 6.95E-06 | 2.60E-03 | 9.32E-04 | 0.013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.24E-05 | 1.51E-06 | 4.71E-04 | 1.88E-04 | 0.002 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.21E-05 | 1.48E-06 | 4.62E-04 | 1.84E-04 | 0.002 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.30E-05 | 1.57E-06 | 5.03E-04 | 1.98E-04 | 0.003 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.30E-05 | 1.56E-06 | 5.05E-04 | 1.97E-04 | 0.003 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.30E-05 | 1.56E-06 | 5.10E-04 | 1.98E-04 | 0.003 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 1.25E-05 | 1.49E-06 | 4.90E-04 | 1.90E-04 | 0.003 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 1.25E-05 | 1.49E-06 | 4.93E-04 | 1.90E-04 | 0.003 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 1.65E-05 | 1.99E-06 | 6.43E-04 | 2.51E-04 | 0.003 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 1.60E-05 | 1.92E-06 | 6.27E-04 | 2.43E-04 | 0.003 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.55E-05 | 1.85E-06 | 6.08E-04 | 2.35E-04 | 0.003 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.51E-05 | 1.81E-06 | 5.94E-04 | 2.30E-04 | 0.003 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.44E-05 | 1.72E-06 | 5.64E-04 | 2.18E-04 | 0.003 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.37E-05 | 1.64E-06 | 5.37E-04 | 2.08E-04 | 0.003 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 1.30E-05 | 1.56E-06 | 5.07E-04 | 1.97E-04 | 0.003 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 1.23E-05 | 1.48E-06 | 4.79E-04 | 1.87E-04 | 0.002 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.18E-05 | 1.42E-06 | 4.60E-04 | 1.79E-04 | 0.002 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 1.92E-05 | 2.32E-06 | 7.44E-04 | 2.92E-04 | 0.004 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 1.67E-05 | 2.02E-06 | 6.51E-04 | 2.54E-04 | 0.003 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.45E-05 | 1.75E-06 | 5.64E-04 | 2.21E-04 | 0.003 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.42E-05 | 1.71E-06 | 5.53E-04 | 2.16E-04 | 0.003 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.40E-05 | 1.68E-06 | 5.45E-04 | 2.12E-04 | 0.003 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.38E-05 | 1.66E-06 | 5.42E-04 | 2.10E-04 | 0.003 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 1.33E-05 | 1.59E-06 | 5.18E-04 | 2.01E-04 | 0.003 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 1.31E-05 | 1.57E-06 | 5.16E-04 | 2.00E-04 | 0.003 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 1.35E-05 | 1.61E-06 | 5.32E-04 | 2.05E-04 | 0.003 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.32E-05 | 1.58E-06 | 5.24E-04 | 2.01E-04 | 0.003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.27E-05 | 1.51E-06 | 5.02E-04 | 1.93E-04 | 0.003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.33E-05 | 1.58E-06 | 5.29E-04 | 2.02E-04 | 0.003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 1.93E-05 | 2.32E-06 | 7.50E-04 | 2.93E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 1.87E-05 | 2.23E-06 | 7.32E-04 | 2.84E-04 | 0.004 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 1.70E-05 | 2.02E-06 | 6.71E-04 | 2.58E-04 | 0.003 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 1.59E-05 | 1.89E-06 | 6.29E-04 | 2.42E-04 | 0.003 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.50E-05 | 1.79E-06 | 5.95E-04 | 2.29E-04 | 0.003 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.43E-05 | 1.70E-06 | 5.64E-04 | 2.17E-04 | 0.003 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.45E-05 | 1.72E-06 | 5.77E-04 | 2.20E-04 | 0.003 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 1.50E-05 | 1.77E-06 | 6.02E-04 | 2.28E-04 | 0.003 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 1.43E-05 | 1.69E-06 | 5.73E-04 | 2.17E-04 | 0.003 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.36E-05 | 1.60E-06 | 5.43E-04 | 2.06E-04 | 0.003 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.37E-05 | 1.62E-06 | 5.51E-04 | 2.09E-04 | 0.003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.03E-05 | 2.42E-06 | 8.00E-04 | 3.08E-04 | 0.004 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 1.89E-05 | 2.25E-06 | 7.49E-04 | 2.88E-04 | 0.004 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 1.76E-05 | 2.09E-06 | 6.97E-04 | 2.67E-04 | 0.004 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 1.62E-05 | 1.92E-06 | 6.44E-04 | 2.46E-04 | 0.003 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.51E-05 | 1.79E-06 | 5.98E-04 | 2.29E-04 | 0.003 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.56E-05 | 1.84E-06 | 6.23E-04 | 2.37E-04 | 0.003 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.57E-05 | 1.85E-06 | 6.28E-04 | 2.38E-04 | 0.003 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 1.49E-05 | 1.76E-06 | 5.99E-04 | 2.27E-04 | 0.003 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.49E-05 | 1.75E-06 | 5.97E-04 | 2.26E-04 | 0.003 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.32E-05 | 1.58E-06 | 5.20E-04 | 2.01E-04 | 0.003 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.79E-05 | 2.24E-06 | 6.52E-04 | 2.72E-04 | 0.003 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.87E-05 | 2.27E-06 | 7.13E-04 | 2.84E-04 | 0.004 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.82E-05 | 2.21E-06 | 7.00E-04 | 2.77E-04 | 0.004 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.66E-05 | 2.01E-06 | 6.39E-04 | 2.52E-04 | 0.003 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 1.60E-05 | 1.93E-06 | 6.20E-04 | 2.43E-04 | 0.003 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 1.54E-05 | 1.86E-06 | 5.99E-04 | 2.34E-04 | 0.003 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.58E-05 | 1.89E-06 | 6.22E-04 | 2.40E-04 | 0.003 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 1.68E-05 | 2.00E-06 | 6.69E-04 | 2.56E-04 | 0.003 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 1.66E-05 | 1.97E-06 | 6.61E-04 | 2.52E-04 | 0.003 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 1.56E-05 | 1.85E-06 | 6.21E-04 | 2.38E-04 | 0.003 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 1.62E-05 | 1.91E-06 | 6.46E-04 | 2.46E-04 | 0.003 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.56E-05 | 1.85E-06 | 6.24E-04 | 2.37E-04 | 0.003 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 2.04E-05 | 2.57E-06 | 7.27E-04 | 3.09E-04 | 0.004 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 2.09E-05 | 2.65E-06 | 7.43E-04 | 3.18E-04 | 0.004 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 2.21E-05 | 2.67E-06 | 8.52E-04 | 3.35E-04 | 0.004 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 1.97E-05 | 2.38E-06 | 7.62E-04 | 3.00E-04 | 0.004 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 1.84E-05 | 2.22E-06 | 7.19E-04 | 2.80E-04 | 0.004 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 1.77E-05 | 2.13E-06 | 6.91E-04 | 2.69E-04 | 0.004 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 1.64E-05 | 1.97E-06 | 6.41E-04 | 2.49E-04 | 0.003 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 1.69E-05 | 2.02E-06 | 6.68E-04 | 2.57E-04 | 0.003 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 1.81E-05 | 2.15E-06 | 7.22E-04 | 2.76E-04 | 0.004 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 1.74E-05 | 2.06E-06 | 6.93E-04 | 2.65E-04 | 0.004 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 1.70E-05 | 2.01E-06 | 6.76E-04 | 2.58E-04 | 0.003 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 1.72E-05 | 2.03E-06 | 6.89E-04 | 2.62E-04 | 0.004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 1.67E-05 | 1.97E-06 | 6.69E-04 | 2.54E-04 | 0.003 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.73E-05 | 2.04E-06 | 6.98E-04 | 2.64E-04 | 0.004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.62E-05 | 1.91E-06 | 6.49E-04 | 2.46E-04 | 0.003 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.37E-05 | 1.62E-06 | 5.42E-04 | 2.08E-04 | 0.003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.57E-05 | 3.07E-06 | 1.01E-03 | 3.90E-04 | 0.005 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.47E-05 | 2.95E-06 | 9.74E-04 | 3.76E-04 | 0.005 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 2.50E-05 | 2.98E-06 | 9.82E-04 | 3.79E-04 | 0.005 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 2.43E-05 | 2.90E-06 | 9.55E-04 | 3.69E-04 | 0.005 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 2.21E-05 | 2.64E-06 | 8.73E-04 | 3.36E-04 | 0.004 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 2.07E-05 | 2.46E-06 | 8.18E-04 | 3.14E-04 | 0.004 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 1.88E-05 | 2.24E-06 | 7.46E-04 | 2.86E-04 | 0.004 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 1.81E-05 | 2.16E-06 | 7.19E-04 | 2.76E-04 | 0.004 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 1.91E-05 | 2.25E-06 | 7.61E-04 | 2.90E-04 | 0.004 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 1.79E-05 | 2.12E-06 | 7.13E-04 | 2.72E-04 | 0.004 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 1.87E-05 | 2.21E-06 | 7.52E-04 | 2.85E-04 | 0.004 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 1.84E-05 | 2.17E-06 | 7.40E-04 | 2.80E-04 | 0.004 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 1.89E-05 | 2.22E-06 | 7.62E-04 | 2.87E-04 | 0.004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 1.84E-05 | 2.17E-06 | 7.44E-04 | 2.80E-04 | 0.004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.70E-05 | 2.01E-06 | 6.85E-04 | 2.59E-04 | 0.004 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.64E-05 | 1.93E-06 | 6.59E-04 | 2.49E-04 | 0.003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.63E-05 | 1.92E-06 | 6.57E-04 | 2.48E-04 | 0.003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 2.27E-05 | 2.67E-06 | 9.10E-04 | 3.45E-04 | 0.005 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.16E-05 | 2.55E-06 | 8.66E-04 | 3.28E-04 | 0.004 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.17E-05 | 2.57E-06 | 8.71E-04 | 3.30E-04 | 0.004 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 2.06E-05 | 2.43E-06 | 8.27E-04 | 3.14E-04 | 0.004 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.88E-05 | 2.22E-06 | 7.52E-04 | 2.85E-04 | 0.004 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 1.97E-05 | 2.32E-06 | 7.95E-04 | 3.00E-04 | 0.004 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 1.97E-05 | 2.32E-06 | 7.98E-04 | 3.00E-04 | 0.004 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 1.92E-05 | 2.26E-06 | 7.78E-04 | 2.92E-04 | 0.004 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 1.98E-05 | 2.32E-06 | 8.05E-04 | 3.01E-04 | 0.004 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 1.98E-05 | 2.31E-06 | 8.04E-04 | 3.01E-04 | 0.004 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.02E-05 | 2.36E-06 | 8.26E-04 | 3.08E-04 | 0.004 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 1.91E-05 | 2.23E-06 | 7.76E-04 | 2.90E-04 | 0.004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.77E-05 | 2.07E-06 | 7.17E-04 | 2.68E-04 | 0.004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.76E-05 | 2.06E-06 | 7.18E-04 | 2.68E-04 | 0.004 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.85E-05 | 2.16E-06 | 7.56E-04 | 2.81E-04 | 0.004 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.78E-05 | 2.07E-06 | 7.25E-04 | 2.70E-04 | 0.004 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.42E-05 | 1.67E-06 | 5.72E-04 | 2.16E-04 | 0.003 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.06E-05 | 2.47E-06 | 8.09E-04 | 3.14E-04 | 0.004 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 1.94E-05 | 2.31E-06 | 7.63E-04 | 2.95E-04 | 0.004 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 1.94E-05 | 2.31E-06 | 7.72E-04 | 2.96E-04 | 0.004 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 1.98E-05 | 2.34E-06 | 7.93E-04 | 3.01E-04 | 0.004 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 2.14E-05 | 2.51E-06 | 8.67E-04 | 3.26E-04 | 0.004 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 2.06E-05 | 2.42E-06 | 8.37E-04 | 3.14E-04 | 0.004 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 2.13E-05 | 2.48E-06 | 8.68E-04 | 3.23E-04 | 0.004 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 2.05E-05 | 2.39E-06 | 8.40E-04 | 3.12E-04 | 0.004 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.18E-05 | 2.53E-06 | 8.99E-04 | 3.32E-04 | 0.005 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.07E-05 | 2.39E-06 | 8.52E-04 | 3.14E-04 | 0.004 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 1.91E-05 | 2.21E-06 | 7.85E-04 | 2.90E-04 | 0.004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 1.93E-05 | 2.23E-06 | 7.94E-04 | 2.93E-04 | 0.004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.03E-05 | 2.34E-06 | 8.38E-04 | 3.08E-04 | 0.004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.96E-05 | 2.27E-06 | 8.09E-04 | 2.98E-04 | 0.004 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.75E-05 | 2.03E-06 | 7.17E-04 | 2.65E-04 | 0.004 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.78E-05 | 2.06E-06 | 7.31E-04 | 2.70E-04 | 0.004 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.90E-05 | 2.19E-06 | 7.84E-04 | 2.88E-04 | 0.004 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 1.95E-05 | 2.34E-06 | 7.67E-04 | 2.97E-04 | 0.004 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.20E-05 | 2.60E-06 | 8.77E-04 | 3.34E-04 | 0.005 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.37E-05 | 2.79E-06 | 9.55E-04 | 3.60E-04 | 0.005 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 2.25E-05 | 2.65E-06 | 9.04E-04 | 3.42E-04 | 0.005 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 2.36E-05 | 2.76E-06 | 9.56E-04 | 3.59E-04 | 0.005 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 2.41E-05 | 2.82E-06 | 9.83E-04 | 3.67E-04 | 0.005 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 2.37E-05 | 2.76E-06 | 9.66E-04 | 3.60E-04 | 0.005 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.17E-05 | 2.54E-06 | 8.84E-04 | 3.30E-04 | 0.005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.18E-05 | 2.54E-06 | 8.88E-04 | 3.31E-04 | 0.005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.32E-05 | 2.70E-06 | 9.55E-04 | 3.53E-04 | 0.005 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.21E-05 | 2.57E-06 | 9.10E-04 | 3.36E-04 | 0.005 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.97E-05 | 2.30E-06 | 8.09E-04 | 3.00E-04 | 0.004 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 2.08E-05 | 2.41E-06 | 8.56E-04 | 3.16E-04 | 0.004 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 2.14E-05 | 2.48E-06 | 8.86E-04 | 3.26E-04 | 0.005 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 2.02E-05 | 2.33E-06 | 8.34E-04 | 3.06E-04 | 0.004 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.78E-05 | 2.06E-06 | 7.32E-04 | 2.70E-04 | 0.004 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 2.44E-05 | 2.91E-06 | 9.59E-04 | 3.70E-04 | 0.005 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 2.31E-05 | 2.76E-06 | 9.09E-04 | 3.51E-04 | 0.005 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 2.23E-05 | 2.66E-06 | 8.82E-04 | 3.39E-04 | 0.005 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 2.44E-05 | 2.89E-06 | 9.77E-04 | 3.71E-04 | 0.005 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 2.59E-05 | 3.05E-06 | 1.05E-03 | 3.94E-04 | 0.005 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 2.60E-05 | 3.05E-06 | 1.06E-03 | 3.96E-04 | 0.005 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 2.56E-05 | 3.00E-06 | 1.04E-03 | 3.89E-04 | 0.005 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 2.66E-05 | 3.10E-06 | 1.09E-03 | 4.04E-04 | 0.006 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 2.44E-05 | 2.84E-06 | 9.95E-04 | 3.70E-04 | 0.005 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 2.39E-05 | 2.79E-06 | 9.77E-04 | 3.64E-04 | 0.005 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.58E-05 | 3.00E-06 | 1.06E-03 | 3.93E-04 | 0.005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.50E-05 | 2.91E-06 | 1.03E-03 | 3.81E-04 | 0.005 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.24E-05 | 2.61E-06 | 9.15E-04 | 3.40E-04 | 0.005 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.45E-05 | 2.84E-06 | 1.01E-03 | 3.73E-04 | 0.005 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 2.45E-05 | 2.84E-06 | 1.01E-03 | 3.72E-04 | 0.005 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 2.21E-05 | 2.57E-06 | 9.09E-04 | 3.36E-04 | 0.005 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.89E-05 | 2.20E-06 | 7.72E-04 | 2.87E-04 | 0.004 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.61E-05 | 1.89E-06 | 6.53E-04 | 2.45E-04 | 0.003 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.64E-05 | 1.92E-06 | 6.68E-04 | 2.50E-04 | 0.003 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 2.53E-05 | 3.00E-06 | 1.01E-03 | 3.84E-04 | 0.005 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 2.58E-05 | 3.05E-06 | 1.03E-03 | 3.92E-04 | 0.005 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 2.68E-05 | 3.16E-06 | 1.08E-03 | 4.08E-04 | 0.006 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 2.77E-05 | 3.25E-06 | 1.12E-03 | 4.21E-04 | 0.006 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 2.90E-05 | 3.39E-06 | 1.18E-03 | 4.41E-04 | 0.006 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 3.01E-05 | 3.51E-06 | 1.23E-03 | 4.58E-04 | 0.006 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 2.84E-05 | 3.32E-06 | 1.16E-03 | 4.32E-04 | 0.006 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 2.71E-05 | 3.16E-06 | 1.10E-03 | 4.12E-04 | 0.006 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 2.89E-05 | 3.36E-06 | 1.19E-03 | 4.40E-04 | 0.006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.78E-05 | 3.23E-06 | 1.14E-03 | 4.22E-04 | 0.006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.65E-05 | 3.08E-06 | 1.09E-03 | 4.02E-04 | 0.006 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.89E-05 | 3.35E-06 | 1.19E-03 | 4.40E-04 | 0.006 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.75E-05 | 3.18E-06 | 1.14E-03 | 4.18E-04 | 0.006 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.42E-05 | 2.80E-06 | 9.95E-04 | 3.67E-04 | 0.005 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.98E-05 | 2.30E-06 | 8.07E-04 | 3.00E-04 | 0.004 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.90E-05 | 2.21E-06 | 7.75E-04 | 2.89E-04 | 0.004 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.88E-05 | 2.19E-06 | 7.69E-04 | 2.86E-04 | 0.004 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.78E-05 | 2.08E-06 | 7.27E-04 | 2.71E-04 | 0.004 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.76E-05 | 2.06E-06 | 7.19E-04 | 2.68E-04 | 0.004 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 2.33E-05 | 2.74E-06 | 9.42E-04 | 3.55E-04 | 0.005 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 2.29E-05 | 2.70E-06 | 9.19E-04 | 3.48E-04 | 0.005 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 2.56E-05 | 3.00E-06 | 1.03E-03 | 3.88E-04 | 0.005 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 3.18E-05 | 3.70E-06 | 1.30E-03 | 4.83E-04 | 0.007 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 3.17E-05 | 3.69E-06 | 1.30E-03 | 4.82E-04 | 0.007 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.29E-05 | 3.82E-06 | 1.35E-03 | 4.99E-04 | 0.007 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 3.34E-05 | 3.88E-06 | 1.37E-03 | 5.08E-04 | 0.007 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 3.06E-05 | 3.56E-06 | 1.25E-03 | 4.65E-04 | 0.006 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 3.31E-05 | 3.83E-06 | 1.36E-03 | 5.03E-04 | 0.007 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.13E-05 | 3.63E-06 | 1.29E-03 | 4.76E-04 | 0.007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.21E-05 | 3.72E-06 | 1.33E-03 | 4.88E-04 | 0.007 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.31E-05 | 3.83E-06 | 1.37E-03 | 5.04E-04 | 0.007 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 3.04E-05 | 3.51E-06 | 1.26E-03 | 4.62E-04 | 0.006 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.59E-05 | 3.01E-06 | 1.07E-03 | 3.94E-04 | 0.005 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.28E-05 | 2.66E-06 | 9.32E-04 | 3.47E-04 | 0.005 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 2.27E-05 | 2.65E-06 | 9.29E-04 | 3.45E-04 | 0.005 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 2.12E-05 | 2.48E-06 | 8.67E-04 | 3.23E-04 | 0.004 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 2.06E-05 | 2.41E-06 | 8.42E-04 | 3.14E-04 | 0.004 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.91E-05 | 2.23E-06 | 7.77E-04 | 2.90E-04 | 0.004 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.70E-05 | 1.99E-06 | 6.88E-04 | 2.58E-04 | 0.004 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.46E-05 | 1.71E-06 | 5.85E-04 | 2.21E-04 | 0.003 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 2.03E-05 | 2.38E-06 | 8.23E-04 | 3.09E-04 | 0.004 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 2.01E-05 | 2.34E-06 | 8.24E-04 | 3.05E-04 | 0.004 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 3.60E-05 | 4.13E-06 | 1.50E-03 | 5.47E-04 | 0.008 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 3.83E-05 | 4.40E-06 | 1.60E-03 | 5.82E-04 | 0.008 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 3.54E-05 | 4.07E-06 | 1.47E-03 | 5.38E-04 | 0.008 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 3.82E-05 | 4.39E-06 | 1.59E-03 | 5.80E-04 | 0.008 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 3.63E-05 | 4.18E-06 | 1.51E-03 | 5.51E-04 | 0.008 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 3.89E-05 | 4.47E-06 | 1.62E-03 | 5.91E-04 | 0.008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.83E-05 | 4.41E-06 | 1.59E-03 | 5.82E-04 | 0.008 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.36E-05 | 3.88E-06 | 1.39E-03 | 5.11E-04 | 0.007 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.79E-05 | 3.24E-06 | 1.15E-03 | 4.25E-04 | 0.006 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.80E-05 | 3.24E-06 | 1.15E-03 | 4.25E-04 | 0.006 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.63E-05 | 3.05E-06 | 1.08E-03 | 4.00E-04 | 0.006 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 2.49E-05 | 2.90E-06 | 1.02E-03 | 3.79E-04 | 0.005 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 2.23E-05 | 2.60E-06 | 9.12E-04 | 3.39E-04 | 0.005 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.90E-05 | 2.22E-06 | 7.70E-04 | 2.88E-04 | 0.004 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.71E-05 | 2.01E-06 | 6.93E-04 | 2.60E-04 | 0.004 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.81E-05 | 2.11E-06 | 7.33E-04 | 2.74E-04 | 0.004 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.88E-05 | 2.19E-06 | 7.66E-04 | 2.86E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.91E-05 | 2.23E-06 | 7.80E-04 | 2.90E-04 | 0.004 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 4.44E-05 | 5.07E-06 | 1.87E-03 | 6.75E-04 | 0.010 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 4.25E-05 | 4.84E-06 | 1.80E-03 | 6.46E-04 | 0.009 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 4.47E-05 | 5.07E-06 | 1.90E-03 | 6.80E-04 | 0.010 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 4.26E-05 | 4.84E-06 | 1.80E-03 | 6.47E-04 | 0.009 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 4.74E-05 | 5.39E-06 | 2.01E-03 | 7.21E-04 | 0.010 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.28E-05 | 4.87E-06 | 1.80E-03 | 6.50E-04 | 0.009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.76E-05 | 4.30E-06 | 1.58E-03 | 5.72E-04 | 0.008 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.52E-05 | 4.04E-06 | 1.47E-03 | 5.35E-04 | 0.008 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 3.36E-05 | 3.86E-06 | 1.40E-03 | 5.11E-04 | 0.007 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 3.11E-05 | 3.59E-06 | 1.29E-03 | 4.73E-04 | 0.007 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.65E-05 | 3.07E-06 | 1.09E-03 | 4.03E-04 | 0.006 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 2.23E-05 | 2.60E-06 | 9.10E-04 | 3.39E-04 | 0.005 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 2.36E-05 | 2.74E-06 | 9.66E-04 | 3.58E-04 | 0.005 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 2.42E-05 | 2.81E-06 | 9.97E-04 | 3.69E-04 | 0.005 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 2.42E-05 | 2.81E-06 | 9.98E-04 | 3.68E-04 | 0.005 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 2.37E-05 | 2.74E-06 | 9.75E-04 | 3.60E-04 | 0.005 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 2.25E-05 | 2.61E-06 | 9.27E-04 | 3.42E-04 | 0.005 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 2.12E-05 | 2.46E-06 | 8.70E-04 | 3.22E-04 | 0.004 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.96E-05 | 2.28E-06 | 8.01E-04 | 2.97E-04 | 0.004 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 4.46E-05 | 5.13E-06 | 1.86E-03 | 6.78E-04 | 0.010 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 5.51E-05 | 6.30E-06 | 2.32E-03 | 8.38E-04 | 0.012 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 5.93E-05 | 6.76E-06 | 2.50E-03 | 9.02E-04 | 0.013 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 5.86E-05 | 6.67E-06 | 2.48E-03 | 8.91E-04 | 0.013 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 5.82E-05 | 6.61E-06 | 2.47E-03 | 8.85E-04 | 0.013 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 5.07E-05 | 5.75E-06 | 2.15E-03 | 7.71E-04 | 0.011 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 4.74E-05 | 5.37E-06 | 2.02E-03 | 7.21E-04 | 0.010 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.54E-05 | 5.13E-06 | 1.93E-03 | 6.90E-04 | 0.010 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 4.00E-05 | 4.54E-06 | 1.70E-03 | 6.08E-04 | 0.009 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 3.17E-05 | 3.62E-06 | 1.34E-03 | 4.82E-04 | 0.007 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 3.40E-05 | 3.88E-06 | 1.43E-03 | 5.17E-04 | 0.007 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 3.44E-05 | 3.93E-06 | 1.45E-03 | 5.23E-04 | 0.007 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 3.30E-05 | 3.77E-06 | 1.38E-03 | 5.01E-04 | 0.007 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 3.06E-05 | 3.52E-06 | 1.28E-03 | 4.66E-04 | 0.007 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 2.74E-05 | 3.15E-06 | 1.14E-03 | 4.16E-04 | 0.006 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 2.63E-05 | 3.03E-06 | 1.09E-03 | 3.99E-04 | 0.006 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 2.58E-05 | 2.97E-06 | 1.07E-03 | 3.91E-04 | 0.005 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 2.49E-05 | 2.88E-06 | 1.03E-03 | 3.78E-04 | 0.005 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 2.36E-05 | 2.73E-06 | 9.75E-04 | 3.59E-04 | 0.005 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 2.25E-05 | 2.61E-06 | 9.26E-04 | 3.42E-04 | 0.005 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 2.19E-05 | 2.54E-06 | 9.04E-04 | 3.34E-04 | 0.005 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 8.08E-05 | 9.17E-06 | 3.43E-03 | 1.23E-03 | 0.018 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 9.15E-05 | 1.04E-05 | 3.89E-03 | 1.39E-03 | 0.020 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 7.90E-05 | 8.97E-06 | 3.35E-03 | 1.20E-03 | 0.017 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 7.17E-05 | 8.15E-06 | 3.04E-03 | 1.09E-03 | 0.016 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 7.00E-05 | 7.94E-06 | 2.97E-03 | 1.06E-03 | 0.015 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 5.92E-05 | 6.73E-06 | 2.51E-03 | 9.00E-04 | 0.013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 6.13E-05 | 6.96E-06 | 2.61E-03 | 9.32E-04 | 0.013 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 5.79E-05 | 6.55E-06 | 2.46E-03 | 8.79E-04 | 0.013 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 5.01E-05 | 5.67E-06 | 2.13E-03 | 7.62E-04 | 0.011 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 4.42E-05 | 5.01E-06 | 1.88E-03 | 6.72E-04 | 0.010 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 4.07E-05 | 4.61E-06 | 1.74E-03 | 6.19E-04 | 0.009 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 3.70E-05 | 4.20E-06 | 1.58E-03 | 5.63E-04 | 0.008 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 3.40E-05 | 3.86E-06 | 1.44E-03 | 5.17E-04 | 0.007 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 3.18E-05 | 3.62E-06 | 1.34E-03 | 4.83E-04 | 0.007 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 2.94E-05 | 3.36E-06 | 1.24E-03 | 4.47E-04 | 0.006 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 2.73E-05 | 3.13E-06 | 1.15E-03 | 4.16E-04 | 0.006 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 2.53E-05 | 2.91E-06 | 1.06E-03 | 3.85E-04 | 0.005 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 2.34E-05 | 2.69E-06 | 9.72E-04 | 3.55E-04 | 0.005 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 2.17E-05 | 2.51E-06 | 8.99E-04 | 3.30E-04 | 0.005 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 2.11E-05 | 2.44E-06 | 8.69E-04 | 3.20E-04 | 0.004 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 2.05E-05 | 2.37E-06 | 8.44E-04 | 3.11E-04 | 0.004 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.65E-04 | 1.86E-05 | 7.08E-03 | 2.51E-03 | 0.036 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 1.73E-04 | 1.95E-05 | 7.43E-03 | 2.63E-03 | 0.038 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 1.78E-04 | 2.01E-05 | 7.64E-03 | 2.71E-03 | 0.039 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 1.61E-04 | 1.82E-05 | 6.91E-03 | 2.45E-03 | 0.035 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.15E-04 | 1.29E-05 | 4.89E-03 | 1.74E-03 | 0.025 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 8.38E-05 | 9.48E-06 | 3.56E-03 | 1.27E-03 | 0.018 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 6.53E-05 | 7.41E-06 | 2.77E-03 | 9.92E-04 | 0.014 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 5.43E-05 | 6.18E-06 | 2.30E-03 | 8.26E-04 | 0.012 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 4.83E-05 | 5.49E-06 | 2.04E-03 | 7.33E-04 | 0.010 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 4.33E-05 | 4.93E-06 | 1.83E-03 | 6.59E-04 | 0.009 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 3.94E-05 | 4.47E-06 | 1.67E-03 | 5.98E-04 | 0.009 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 3.61E-05 | 4.10E-06 | 1.53E-03 | 5.49E-04 | 0.008 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 3.33E-05 | 3.77E-06 | 1.41E-03 | 5.06E-04 | 0.007 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 3.09E-05 | 3.50E-06 | 1.31E-03 | 4.70E-04 | 0.007 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 2.90E-05 | 3.29E-06 | 1.23E-03 | 4.40E-04 | 0.006 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 2.75E-05 | 3.13E-06 | 1.17E-03 | 4.19E-04 | 0.006 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 2.65E-05 | 3.02E-06 | 1.12E-03 | 4.02E-04 | 0.006 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 2.53E-05 | 2.89E-06 | 1.06E-03 | 3.85E-04 | 0.005 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 2.45E-05 | 2.80E-06 | 1.03E-03 | 3.72E-04 | 0.005 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 2.36E-05 | 2.70E-06 | 9.87E-04 | 3.59E-04 | 0.005 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 2.27E-05 | 2.61E-06 | 9.49E-04 | 3.46E-04 | 0.005 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 6.00E-05 | 6.81E-06 | 2.54E-03 | 9.11E-04 | 0.013 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 6.08E-05 | 6.88E-06 | 2.58E-03 | 9.24E-04 | 0.013 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 6.59E-05 | 7.47E-06 | 2.80E-03 | 1.00E-03 | 0.014 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 6.50E-05 | 7.37E-06 | 2.76E-03 | 9.88E-04 | 0.014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 6.71E-05 | 7.61E-06 | 2.85E-03 | 1.02E-03 | 0.015 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 5.87E-05 | 6.68E-06 | 2.49E-03 | 8.93E-04 | 0.013 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 5.05E-05 | 5.76E-06 | 2.13E-03 | 7.68E-04 | 0.011 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 4.56E-05 | 5.21E-06 | 1.92E-03 | 6.94E-04 | 0.010 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 4.25E-05 | 4.86E-06 | 1.79E-03 | 6.47E-04 | 0.009 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 4.01E-05 | 4.58E-06 | 1.69E-03 | 6.09E-04 | 0.009 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 3.78E-05 | 4.31E-06 | 1.59E-03 | 5.74E-04 | 0.008 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 3.54E-05 | 4.04E-06 | 1.49E-03 | 5.38E-04 | 0.008 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 3.33E-05 | 3.79E-06 | 1.41E-03 | 5.06E-04 | 0.007 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 3.12E-05 | 3.55E-06 | 1.32E-03 | 4.75E-04 | 0.007 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 2.93E-05 | 3.32E-06 | 1.24E-03 | 4.45E-04 | 0.006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 2.73E-05 | 3.10E-06 | 1.16E-03 | 4.15E-04 | 0.006 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 2.62E-05 | 2.97E-06 | 1.12E-03 | 3.99E-04 | 0.006 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 2.52E-05 | 2.85E-06 | 1.07E-03 | 3.83E-04 | 0.005 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 2.45E-05 | 2.78E-06 | 1.04E-03 | 3.72E-04 | 0.005 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 2.38E-05 | 2.71E-06 | 1.01E-03 | 3.62E-04 | 0.005 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 2.27E-05 | 2.59E-06 | 9.55E-04 | 3.45E-04 | 0.005 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 4.00E-05 | 4.56E-06 | 1.68E-03 | 6.08E-04 | 0.009 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 3.46E-05 | 3.97E-06 | 1.45E-03 | 5.26E-04 | 0.007 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 3.30E-05 | 3.78E-06 | 1.38E-03 | 5.01E-04 | 0.007 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 3.07E-05 | 3.52E-06 | 1.29E-03 | 4.67E-04 | 0.007 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 2.85E-05 | 3.27E-06 | 1.19E-03 | 4.33E-04 | 0.006 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 2.56E-05 | 2.93E-06 | 1.07E-03 | 3.88E-04 | 0.005 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 2.31E-05 | 2.65E-06 | 9.67E-04 | 3.51E-04 | 0.005 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 2.14E-05 | 2.45E-06 | 8.96E-04 | 3.25E-04 | 0.005 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 2.08E-05 | 2.38E-06 | 8.74E-04 | 3.16E-04 | 0.004 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 2.02E-05 | 2.30E-06 | 8.52E-04 | 3.07E-04 | 0.004 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 2.00E-05 | 2.28E-06 | 8.46E-04 | 3.04E-04 | 0.004 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 1.96E-05 | 2.23E-06 | 8.33E-04 | 2.98E-04 | 0.004 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 1.89E-05 | 2.15E-06 | 8.01E-04 | 2.87E-04 | 0.004 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2026

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 4.767E-04 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.31E-07 | 2.86E-07 | 2.55E-08 | 4.08E-09 | 4.69E-07 | 5.10E-08 | 2.04E-09 | 7.57E-05 | 3.87E-07 | 130.00 |
| Paved road | 2026_PAVED | 4.720E-04 | 2.46E-07 | 1.48E-07 | 2.46E-07 | 1.58E-07 | 4.92E-06 | 4.53E-07 | 2.76E-08 | 1.06E-05 | 4.92E-07 | 3.74E-07 | 1.40E-03 | 3.74E-06 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | µg/m$^3$ | 0.2 |
| Mercury | µg/m$^3$ | 0.61 |
| Nickel | µg/m$^3$ | 0.2 |
| Vanadium | µg/m$^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.016 |
| Res | 0.039 |
| Acute | 0.013 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ (µg/m$^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 7.36E-05 | 8.33E-06 | 3.13E-03 | 1.12E-03 | 0.016 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 2.02E-05 | 2.48E-06 | 7.63E-04 | 3.08E-04 | 0.004 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 2.44E-06 | 3.00E-07 | 9.17E-05 | 3.71E-05 | 0.000 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 6.73E-06 | 8.14E-07 | 2.59E-04 | 1.02E-04 | 0.001 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 9.18E-05 | 1.04E-05 | 3.91E-03 | 1.40E-03 | 0.020 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.19E-04 | 1.34E-05 | 5.08E-03 | 1.81E-03 | 0.026 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.27E-04 | 1.43E-05 | 5.42E-03 | 1.92E-03 | 0.028 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.41E-04 | 1.59E-05 | 6.06E-03 | 2.15E-03 | 0.031 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 2.60E-05 | 3.11E-06 | 1.02E-03 | 3.95E-04 | 0.005 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 3.85E-05 | 4.45E-06 | 1.59E-03 | 5.85E-04 | 0.008 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.13E-05 | 6.95E-06 | 2.60E-03 | 9.32E-04 | 0.013 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.24E-05 | 1.51E-06 | 4.71E-04 | 1.88E-04 | 0.002 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.21E-05 | 1.48E-06 | 4.62E-04 | 1.84E-04 | 0.002 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.30E-05 | 1.57E-06 | 5.03E-04 | 1.98E-04 | 0.003 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.30E-05 | 1.56E-06 | 5.05E-04 | 1.97E-04 | 0.003 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.30E-05 | 1.56E-06 | 5.10E-04 | 1.98E-04 | 0.003 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 1.25E-05 | 1.49E-06 | 4.90E-04 | 1.90E-04 | 0.003 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 1.25E-05 | 1.49E-06 | 4.93E-04 | 1.90E-04 | 0.003 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 1.65E-05 | 1.99E-06 | 6.43E-04 | 2.51E-04 | 0.003 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 1.60E-05 | 1.92E-06 | 6.27E-04 | 2.43E-04 | 0.003 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 1.55E-05 | 1.85E-06 | 6.08E-04 | 2.35E-04 | 0.003 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 1.51E-05 | 1.81E-06 | 5.94E-04 | 2.30E-04 | 0.003 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 1.44E-05 | 1.72E-06 | 5.64E-04 | 2.18E-04 | 0.003 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.37E-05 | 1.64E-06 | 5.37E-04 | 2.08E-04 | 0.003 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 1.30E-05 | 1.56E-06 | 5.07E-04 | 1.97E-04 | 0.003 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 1.23E-05 | 1.48E-06 | 4.79E-04 | 1.87E-04 | 0.002 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.18E-05 | 1.42E-06 | 4.60E-04 | 1.79E-04 | 0.002 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 1.92E-05 | 2.32E-06 | 7.44E-04 | 2.92E-04 | 0.004 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 1.67E-05 | 2.02E-06 | 6.51E-04 | 2.54E-04 | 0.003 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 1.45E-05 | 1.75E-06 | 5.64E-04 | 2.21E-04 | 0.003 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 1.42E-05 | 1.71E-06 | 5.53E-04 | 2.16E-04 | 0.003 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 1.40E-05 | 1.68E-06 | 5.45E-04 | 2.12E-04 | 0.003 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 1.38E-05 | 1.66E-06 | 5.42E-04 | 2.10E-04 | 0.003 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 1.33E-05 | 1.59E-06 | 5.18E-04 | 2.01E-04 | 0.003 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 1.31E-05 | 1.57E-06 | 5.16E-04 | 2.00E-04 | 0.003 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 1.35E-05 | 1.61E-06 | 5.32E-04 | 2.05E-04 | 0.003 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.32E-05 | 1.58E-06 | 5.24E-04 | 2.01E-04 | 0.003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.27E-05 | 1.51E-06 | 5.02E-04 | 1.93E-04 | 0.003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.33E-05 | 1.58E-06 | 5.29E-04 | 2.02E-04 | 0.003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 1.93E-05 | 2.32E-06 | 7.50E-04 | 2.93E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 1.87E-05 | 2.23E-06 | 7.32E-04 | 2.84E-04 | 0.004 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 1.70E-05 | 2.02E-06 | 6.71E-04 | 2.58E-04 | 0.003 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 1.59E-05 | 1.89E-06 | 6.29E-04 | 2.42E-04 | 0.003 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 1.50E-05 | 1.79E-06 | 5.95E-04 | 2.29E-04 | 0.003 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 1.43E-05 | 1.70E-06 | 5.64E-04 | 2.17E-04 | 0.003 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 1.45E-05 | 1.72E-06 | 5.77E-04 | 2.20E-04 | 0.003 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 1.50E-05 | 1.77E-06 | 6.02E-04 | 2.28E-04 | 0.003 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 1.43E-05 | 1.69E-06 | 5.73E-04 | 2.17E-04 | 0.003 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.36E-05 | 1.60E-06 | 5.43E-04 | 2.06E-04 | 0.003 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.37E-05 | 1.62E-06 | 5.51E-04 | 2.09E-04 | 0.003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.03E-05 | 2.42E-06 | 8.00E-04 | 3.08E-04 | 0.004 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 1.89E-05 | 2.25E-06 | 7.49E-04 | 2.88E-04 | 0.004 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 1.76E-05 | 2.09E-06 | 6.97E-04 | 2.67E-04 | 0.004 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 1.62E-05 | 1.92E-06 | 6.44E-04 | 2.46E-04 | 0.003 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 1.51E-05 | 1.79E-06 | 5.98E-04 | 2.29E-04 | 0.003 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 1.56E-05 | 1.84E-06 | 6.23E-04 | 2.37E-04 | 0.003 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 1.57E-05 | 1.85E-06 | 6.28E-04 | 2.38E-04 | 0.003 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 1.49E-05 | 1.76E-06 | 5.99E-04 | 2.27E-04 | 0.003 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.49E-05 | 1.75E-06 | 5.97E-04 | 2.26E-04 | 0.003 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.32E-05 | 1.58E-06 | 5.20E-04 | 2.01E-04 | 0.003 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 1.79E-05 | 2.24E-06 | 6.52E-04 | 2.72E-04 | 0.003 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 1.87E-05 | 2.27E-06 | 7.13E-04 | 2.84E-04 | 0.004 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 1.82E-05 | 2.21E-06 | 7.00E-04 | 2.77E-04 | 0.004 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 1.66E-05 | 2.01E-06 | 6.39E-04 | 2.52E-04 | 0.003 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 1.60E-05 | 1.93E-06 | 6.20E-04 | 2.43E-04 | 0.003 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 1.54E-05 | 1.86E-06 | 5.99E-04 | 2.34E-04 | 0.003 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 1.58E-05 | 1.89E-06 | 6.22E-04 | 2.40E-04 | 0.003 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 1.68E-05 | 2.00E-06 | 6.69E-04 | 2.56E-04 | 0.003 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 1.66E-05 | 1.97E-06 | 6.61E-04 | 2.52E-04 | 0.003 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 1.56E-05 | 1.85E-06 | 6.21E-04 | 2.38E-04 | 0.003 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 1.62E-05 | 1.91E-06 | 6.46E-04 | 2.46E-04 | 0.003 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 1.56E-05 | 1.85E-06 | 6.24E-04 | 2.37E-04 | 0.003 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 2.04E-05 | 2.57E-06 | 7.27E-04 | 3.09E-04 | 0.004 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 2.09E-05 | 2.65E-06 | 7.43E-04 | 3.18E-04 | 0.004 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 2.21E-05 | 2.67E-06 | 8.52E-04 | 3.35E-04 | 0.004 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 1.97E-05 | 2.38E-06 | 7.62E-04 | 3.00E-04 | 0.004 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 1.84E-05 | 2.22E-06 | 7.19E-04 | 2.80E-04 | 0.004 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 1.77E-05 | 2.13E-06 | 6.91E-04 | 2.69E-04 | 0.004 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 1.64E-05 | 1.97E-06 | 6.41E-04 | 2.49E-04 | 0.003 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 1.69E-05 | 2.02E-06 | 6.68E-04 | 2.57E-04 | 0.003 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 1.81E-05 | 2.15E-06 | 7.22E-04 | 2.76E-04 | 0.004 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 1.74E-05 | 2.06E-06 | 6.93E-04 | 2.65E-04 | 0.004 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 1.70E-05 | 2.01E-06 | 6.76E-04 | 2.58E-04 | 0.003 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 1.72E-05 | 2.03E-06 | 6.89E-04 | 2.62E-04 | 0.004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 1.67E-05 | 1.97E-06 | 6.69E-04 | 2.54E-04 | 0.003 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 1.73E-05 | 2.04E-06 | 6.98E-04 | 2.64E-04 | 0.004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 1.62E-05 | 1.91E-06 | 6.49E-04 | 2.46E-04 | 0.003 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.37E-05 | 1.62E-06 | 5.42E-04 | 2.08E-04 | 0.003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 2.57E-05 | 3.07E-06 | 1.01E-03 | 3.90E-04 | 0.005 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 2.47E-05 | 2.95E-06 | 9.74E-04 | 3.76E-04 | 0.005 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 2.50E-05 | 2.98E-06 | 9.82E-04 | 3.79E-04 | 0.005 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 2.43E-05 | 2.90E-06 | 9.55E-04 | 3.69E-04 | 0.005 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 2.21E-05 | 2.64E-06 | 8.73E-04 | 3.36E-04 | 0.004 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 2.07E-05 | 2.46E-06 | 8.18E-04 | 3.14E-04 | 0.004 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 1.88E-05 | 2.24E-06 | 7.46E-04 | 2.86E-04 | 0.004 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 1.81E-05 | 2.16E-06 | 7.19E-04 | 2.76E-04 | 0.004 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 1.91E-05 | 2.25E-06 | 7.61E-04 | 2.90E-04 | 0.004 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 1.79E-05 | 2.12E-06 | 7.13E-04 | 2.72E-04 | 0.004 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 1.87E-05 | 2.21E-06 | 7.52E-04 | 2.85E-04 | 0.004 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 1.84E-05 | 2.17E-06 | 7.40E-04 | 2.80E-04 | 0.004 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 1.89E-05 | 2.22E-06 | 7.62E-04 | 2.87E-04 | 0.004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 1.84E-05 | 2.17E-06 | 7.44E-04 | 2.80E-04 | 0.004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 1.70E-05 | 2.01E-06 | 6.85E-04 | 2.59E-04 | 0.004 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 1.64E-05 | 1.93E-06 | 6.59E-04 | 2.49E-04 | 0.003 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 1.63E-05 | 1.92E-06 | 6.57E-04 | 2.48E-04 | 0.003 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 2.27E-05 | 2.67E-06 | 9.10E-04 | 3.45E-04 | 0.005 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.16E-05 | 2.55E-06 | 8.66E-04 | 3.28E-04 | 0.004 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.17E-05 | 2.57E-06 | 8.71E-04 | 3.30E-04 | 0.004 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 2.06E-05 | 2.43E-06 | 8.27E-04 | 3.14E-04 | 0.004 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 1.88E-05 | 2.22E-06 | 7.52E-04 | 2.85E-04 | 0.004 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 1.97E-05 | 2.32E-06 | 7.95E-04 | 3.00E-04 | 0.004 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 1.97E-05 | 2.32E-06 | 7.98E-04 | 3.00E-04 | 0.004 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 1.92E-05 | 2.26E-06 | 7.78E-04 | 2.92E-04 | 0.004 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 1.98E-05 | 2.32E-06 | 8.05E-04 | 3.01E-04 | 0.004 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 1.98E-05 | 2.31E-06 | 8.04E-04 | 3.01E-04 | 0.004 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.02E-05 | 2.36E-06 | 8.26E-04 | 3.08E-04 | 0.004 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 1.91E-05 | 2.23E-06 | 7.76E-04 | 2.90E-04 | 0.004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 1.77E-05 | 2.07E-06 | 7.17E-04 | 2.68E-04 | 0.004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 1.76E-05 | 2.06E-06 | 7.18E-04 | 2.68E-04 | 0.004 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 1.85E-05 | 2.16E-06 | 7.56E-04 | 2.81E-04 | 0.004 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 1.78E-05 | 2.07E-06 | 7.25E-04 | 2.70E-04 | 0.004 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.42E-05 | 1.67E-06 | 5.72E-04 | 2.16E-04 | 0.003 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.06E-05 | 2.47E-06 | 8.09E-04 | 3.14E-04 | 0.004 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 1.94E-05 | 2.31E-06 | 7.63E-04 | 2.95E-04 | 0.004 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 1.94E-05 | 2.31E-06 | 7.72E-04 | 2.96E-04 | 0.004 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 1.98E-05 | 2.34E-06 | 7.93E-04 | 3.01E-04 | 0.004 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 2.14E-05 | 2.51E-06 | 8.67E-04 | 3.26E-04 | 0.004 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 2.06E-05 | 2.42E-06 | 8.37E-04 | 3.14E-04 | 0.004 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 2.13E-05 | 2.48E-06 | 8.68E-04 | 3.23E-04 | 0.004 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 2.05E-05 | 2.39E-06 | 8.40E-04 | 3.12E-04 | 0.004 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.18E-05 | 2.53E-06 | 8.99E-04 | 3.32E-04 | 0.005 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.07E-05 | 2.39E-06 | 8.52E-04 | 3.14E-04 | 0.004 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 1.91E-05 | 2.21E-06 | 7.85E-04 | 2.90E-04 | 0.004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 1.93E-05 | 2.23E-06 | 7.94E-04 | 2.93E-04 | 0.004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.03E-05 | 2.34E-06 | 8.38E-04 | 3.08E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 1.96E-05 | 2.27E-06 | 8.09E-04 | 2.98E-04 | 0.004 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 1.75E-05 | 2.03E-06 | 7.17E-04 | 2.65E-04 | 0.004 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 1.78E-05 | 2.06E-06 | 7.31E-04 | 2.70E-04 | 0.004 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 1.90E-05 | 2.19E-06 | 7.84E-04 | 2.88E-04 | 0.004 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 1.95E-05 | 2.34E-06 | 7.67E-04 | 2.97E-04 | 0.004 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 2.20E-05 | 2.60E-06 | 8.77E-04 | 3.34E-04 | 0.005 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 2.37E-05 | 2.79E-06 | 9.55E-04 | 3.60E-04 | 0.005 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 2.25E-05 | 2.65E-06 | 9.04E-04 | 3.42E-04 | 0.005 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 2.36E-05 | 2.76E-06 | 9.56E-04 | 3.59E-04 | 0.005 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 2.41E-05 | 2.82E-06 | 9.83E-04 | 3.67E-04 | 0.005 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 2.37E-05 | 2.76E-06 | 9.66E-04 | 3.60E-04 | 0.005 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.17E-05 | 2.54E-06 | 8.84E-04 | 3.30E-04 | 0.005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.18E-05 | 2.54E-06 | 8.88E-04 | 3.31E-04 | 0.005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.32E-05 | 2.70E-06 | 9.55E-04 | 3.53E-04 | 0.005 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.21E-05 | 2.57E-06 | 9.10E-04 | 3.36E-04 | 0.005 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 1.97E-05 | 2.30E-06 | 8.09E-04 | 3.00E-04 | 0.004 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 2.08E-05 | 2.41E-06 | 8.56E-04 | 3.16E-04 | 0.004 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 2.14E-05 | 2.48E-06 | 8.86E-04 | 3.26E-04 | 0.005 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 2.02E-05 | 2.33E-06 | 8.34E-04 | 3.06E-04 | 0.004 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 1.78E-05 | 2.06E-06 | 7.32E-04 | 2.70E-04 | 0.004 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 2.44E-05 | 2.91E-06 | 9.59E-04 | 3.70E-04 | 0.005 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 2.31E-05 | 2.76E-06 | 9.09E-04 | 3.51E-04 | 0.005 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 2.23E-05 | 2.66E-06 | 8.82E-04 | 3.39E-04 | 0.005 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 2.44E-05 | 2.89E-06 | 9.77E-04 | 3.71E-04 | 0.005 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 2.59E-05 | 3.05E-06 | 1.05E-03 | 3.94E-04 | 0.005 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 2.60E-05 | 3.05E-06 | 1.06E-03 | 3.96E-04 | 0.005 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 2.56E-05 | 3.00E-06 | 1.04E-03 | 3.89E-04 | 0.005 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 2.66E-05 | 3.10E-06 | 1.09E-03 | 4.04E-04 | 0.006 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 2.44E-05 | 2.84E-06 | 9.95E-04 | 3.70E-04 | 0.005 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 2.39E-05 | 2.79E-06 | 9.77E-04 | 3.64E-04 | 0.005 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 2.58E-05 | 3.00E-06 | 1.06E-03 | 3.93E-04 | 0.005 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 2.50E-05 | 2.91E-06 | 1.03E-03 | 3.81E-04 | 0.005 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.24E-05 | 2.61E-06 | 9.15E-04 | 3.40E-04 | 0.005 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.45E-05 | 2.84E-06 | 1.01E-03 | 3.73E-04 | 0.005 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 2.45E-05 | 2.84E-06 | 1.01E-03 | 3.72E-04 | 0.005 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 2.21E-05 | 2.57E-06 | 9.09E-04 | 3.36E-04 | 0.005 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 1.89E-05 | 2.20E-06 | 7.72E-04 | 2.87E-04 | 0.004 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 1.61E-05 | 1.89E-06 | 6.53E-04 | 2.45E-04 | 0.003 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 1.64E-05 | 1.92E-06 | 6.68E-04 | 2.50E-04 | 0.003 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 2.53E-05 | 3.00E-06 | 1.01E-03 | 3.84E-04 | 0.005 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 2.58E-05 | 3.05E-06 | 1.03E-03 | 3.92E-04 | 0.005 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 2.68E-05 | 3.16E-06 | 1.08E-03 | 4.08E-04 | 0.006 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 2.77E-05 | 3.25E-06 | 1.12E-03 | 4.21E-04 | 0.006 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 2.90E-05 | 3.39E-06 | 1.18E-03 | 4.41E-04 | 0.006 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 3.01E-05 | 3.51E-06 | 1.23E-03 | 4.58E-04 | 0.006 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 2.84E-05 | 3.32E-06 | 1.16E-03 | 4.32E-04 | 0.006 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 2.71E-05 | 3.16E-06 | 1.10E-03 | 4.12E-04 | 0.006 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 2.89E-05 | 3.36E-06 | 1.19E-03 | 4.40E-04 | 0.006 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 2.78E-05 | 3.23E-06 | 1.14E-03 | 4.22E-04 | 0.006 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 2.65E-05 | 3.08E-06 | 1.09E-03 | 4.02E-04 | 0.006 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 2.89E-05 | 3.35E-06 | 1.19E-03 | 4.40E-04 | 0.006 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 2.75E-05 | 3.18E-06 | 1.14E-03 | 4.18E-04 | 0.006 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.42E-05 | 2.80E-06 | 9.95E-04 | 3.67E-04 | 0.005 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 1.98E-05 | 2.30E-06 | 8.07E-04 | 3.00E-04 | 0.004 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 1.90E-05 | 2.21E-06 | 7.75E-04 | 2.89E-04 | 0.004 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 1.88E-05 | 2.19E-06 | 7.69E-04 | 2.86E-04 | 0.004 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 1.78E-05 | 2.08E-06 | 7.27E-04 | 2.71E-04 | 0.004 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 1.76E-05 | 2.06E-06 | 7.19E-04 | 2.68E-04 | 0.004 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 2.33E-05 | 2.74E-06 | 9.42E-04 | 3.55E-04 | 0.005 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 2.29E-05 | 2.70E-06 | 9.19E-04 | 3.48E-04 | 0.005 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 2.56E-05 | 3.00E-06 | 1.03E-03 | 3.88E-04 | 0.005 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 3.18E-05 | 3.70E-06 | 1.30E-03 | 4.83E-04 | 0.007 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 3.17E-05 | 3.69E-06 | 1.30E-03 | 4.82E-04 | 0.007 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 3.29E-05 | 3.82E-06 | 1.35E-03 | 4.99E-04 | 0.007 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 3.34E-05 | 3.88E-06 | 1.37E-03 | 5.08E-04 | 0.007 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 3.06E-05 | 3.56E-06 | 1.25E-03 | 4.65E-04 | 0.006 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 3.31E-05 | 3.83E-06 | 1.36E-03 | 5.03E-04 | 0.007 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.13E-05 | 3.63E-06 | 1.29E-03 | 4.76E-04 | 0.007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.21E-05 | 3.72E-06 | 1.33E-03 | 4.88E-04 | 0.007 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.31E-05 | 3.83E-06 | 1.37E-03 | 5.04E-04 | 0.007 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 3.04E-05 | 3.51E-06 | 1.26E-03 | 4.62E-04 | 0.006 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 2.59E-05 | 3.01E-06 | 1.07E-03 | 3.94E-04 | 0.005 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.28E-05 | 2.66E-06 | 9.32E-04 | 3.47E-04 | 0.005 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 2.27E-05 | 2.65E-06 | 9.29E-04 | 3.45E-04 | 0.005 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 2.12E-05 | 2.48E-06 | 8.67E-04 | 3.23E-04 | 0.004 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 2.06E-05 | 2.41E-06 | 8.42E-04 | 3.14E-04 | 0.004 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 1.91E-05 | 2.23E-06 | 7.77E-04 | 2.90E-04 | 0.004 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 1.70E-05 | 1.99E-06 | 6.88E-04 | 2.58E-04 | 0.004 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.46E-05 | 1.71E-06 | 5.85E-04 | 2.21E-04 | 0.003 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 2.03E-05 | 2.38E-06 | 8.23E-04 | 3.09E-04 | 0.004 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 2.01E-05 | 2.34E-06 | 8.24E-04 | 3.05E-04 | 0.004 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 3.60E-05 | 4.13E-06 | 1.50E-03 | 5.47E-04 | 0.008 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 3.83E-05 | 4.40E-06 | 1.60E-03 | 5.82E-04 | 0.008 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 3.54E-05 | 4.07E-06 | 1.47E-03 | 5.38E-04 | 0.008 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 3.82E-05 | 4.39E-06 | 1.59E-03 | 5.80E-04 | 0.008 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 3.63E-05 | 4.18E-06 | 1.51E-03 | 5.51E-04 | 0.008 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 3.89E-05 | 4.47E-06 | 1.62E-03 | 5.91E-04 | 0.008 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 3.83E-05 | 4.41E-06 | 1.59E-03 | 5.82E-04 | 0.008 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 3.36E-05 | 3.88E-06 | 1.39E-03 | 5.11E-04 | 0.007 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 2.79E-05 | 3.24E-06 | 1.15E-03 | 4.25E-04 | 0.006 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 2.80E-05 | 3.24E-06 | 1.15E-03 | 4.25E-04 | 0.006 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 2.63E-05 | 3.05E-06 | 1.08E-03 | 4.00E-04 | 0.006 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 2.49E-05 | 2.90E-06 | 1.02E-03 | 3.79E-04 | 0.005 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 2.23E-05 | 2.60E-06 | 9.12E-04 | 3.39E-04 | 0.005 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 1.90E-05 | 2.22E-06 | 7.70E-04 | 2.88E-04 | 0.004 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 1.71E-05 | 2.01E-06 | 6.93E-04 | 2.60E-04 | 0.004 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 1.81E-05 | 2.11E-06 | 7.33E-04 | 2.74E-04 | 0.004 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 1.88E-05 | 2.19E-06 | 7.66E-04 | 2.86E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 1.91E-05 | 2.23E-06 | 7.80E-04 | 2.90E-04 | 0.004 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 4.44E-05 | 5.07E-06 | 1.87E-03 | 6.75E-04 | 0.010 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 4.25E-05 | 4.84E-06 | 1.80E-03 | 6.46E-04 | 0.009 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 4.47E-05 | 5.07E-06 | 1.90E-03 | 6.80E-04 | 0.010 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 4.26E-05 | 4.84E-06 | 1.80E-03 | 6.47E-04 | 0.009 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 4.74E-05 | 5.39E-06 | 2.01E-03 | 7.21E-04 | 0.010 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.28E-05 | 4.87E-06 | 1.80E-03 | 6.50E-04 | 0.009 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 3.76E-05 | 4.30E-06 | 1.58E-03 | 5.72E-04 | 0.008 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 3.52E-05 | 4.04E-06 | 1.47E-03 | 5.35E-04 | 0.008 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 3.36E-05 | 3.86E-06 | 1.40E-03 | 5.11E-04 | 0.007 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 3.11E-05 | 3.59E-06 | 1.29E-03 | 4.73E-04 | 0.007 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 2.65E-05 | 3.07E-06 | 1.09E-03 | 4.03E-04 | 0.006 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 2.23E-05 | 2.60E-06 | 9.10E-04 | 3.39E-04 | 0.005 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 2.36E-05 | 2.74E-06 | 9.66E-04 | 3.58E-04 | 0.005 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 2.42E-05 | 2.81E-06 | 9.97E-04 | 3.69E-04 | 0.005 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 2.42E-05 | 2.81E-06 | 9.98E-04 | 3.68E-04 | 0.005 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 2.37E-05 | 2.74E-06 | 9.75E-04 | 3.60E-04 | 0.005 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 2.25E-05 | 2.61E-06 | 9.27E-04 | 3.42E-04 | 0.005 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 2.12E-05 | 2.46E-06 | 8.70E-04 | 3.22E-04 | 0.004 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 1.96E-05 | 2.28E-06 | 8.01E-04 | 2.97E-04 | 0.004 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 4.46E-05 | 5.13E-06 | 1.86E-03 | 6.78E-04 | 0.010 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 5.51E-05 | 6.30E-06 | 2.32E-03 | 8.38E-04 | 0.012 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 5.93E-05 | 6.76E-06 | 2.50E-03 | 9.02E-04 | 0.013 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 5.86E-05 | 6.67E-06 | 2.48E-03 | 8.91E-04 | 0.013 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 5.82E-05 | 6.61E-06 | 2.47E-03 | 8.85E-04 | 0.013 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 5.07E-05 | 5.75E-06 | 2.15E-03 | 7.71E-04 | 0.011 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 4.74E-05 | 5.37E-06 | 2.02E-03 | 7.21E-04 | 0.010 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.54E-05 | 5.13E-06 | 1.93E-03 | 6.90E-04 | 0.010 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 4.00E-05 | 4.54E-06 | 1.70E-03 | 6.08E-04 | 0.009 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 3.17E-05 | 3.62E-06 | 1.34E-03 | 4.82E-04 | 0.007 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 3.40E-05 | 3.88E-06 | 1.43E-03 | 5.17E-04 | 0.007 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 3.44E-05 | 3.93E-06 | 1.45E-03 | 5.23E-04 | 0.007 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 3.30E-05 | 3.77E-06 | 1.38E-03 | 5.01E-04 | 0.007 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 3.06E-05 | 3.52E-06 | 1.28E-03 | 4.66E-04 | 0.007 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 2.74E-05 | 3.15E-06 | 1.14E-03 | 4.16E-04 | 0.006 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 2.63E-05 | 3.03E-06 | 1.09E-03 | 3.99E-04 | 0.006 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 2.58E-05 | 2.97E-06 | 1.07E-03 | 3.91E-04 | 0.005 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 2.49E-05 | 2.88E-06 | 1.03E-03 | 3.78E-04 | 0.005 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 2.36E-05 | 2.73E-06 | 9.75E-04 | 3.59E-04 | 0.005 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 2.25E-05 | 2.61E-06 | 9.26E-04 | 3.42E-04 | 0.005 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 2.19E-05 | 2.54E-06 | 9.04E-04 | 3.34E-04 | 0.005 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 8.08E-05 | 9.17E-06 | 3.43E-03 | 1.23E-03 | 0.018 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 9.15E-05 | 1.04E-05 | 3.89E-03 | 1.39E-03 | 0.020 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 7.90E-05 | 8.97E-06 | 3.35E-03 | 1.20E-03 | 0.017 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 7.17E-05 | 8.15E-06 | 3.04E-03 | 1.09E-03 | 0.016 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 7.00E-05 | 7.94E-06 | 2.97E-03 | 1.06E-03 | 0.015 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 5.92E-05 | 6.73E-06 | 2.51E-03 | 9.00E-04 | 0.013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 6.13E-05 | 6.96E-06 | 2.61E-03 | 9.32E-04 | 0.013 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 5.79E-05 | 6.55E-06 | 2.46E-03 | 8.79E-04 | 0.013 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 5.01E-05 | 5.67E-06 | 2.13E-03 | 7.62E-04 | 0.011 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 4.42E-05 | 5.01E-06 | 1.88E-03 | 6.72E-04 | 0.010 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 4.07E-05 | 4.61E-06 | 1.74E-03 | 6.19E-04 | 0.009 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 3.70E-05 | 4.20E-06 | 1.58E-03 | 5.63E-04 | 0.008 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 3.40E-05 | 3.86E-06 | 1.44E-03 | 5.17E-04 | 0.007 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 3.18E-05 | 3.62E-06 | 1.34E-03 | 4.83E-04 | 0.007 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 2.94E-05 | 3.36E-06 | 1.24E-03 | 4.47E-04 | 0.006 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 2.73E-05 | 3.13E-06 | 1.15E-03 | 4.16E-04 | 0.006 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 2.53E-05 | 2.91E-06 | 1.06E-03 | 3.85E-04 | 0.005 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 2.34E-05 | 2.69E-06 | 9.72E-04 | 3.55E-04 | 0.005 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 2.17E-05 | 2.51E-06 | 8.99E-04 | 3.30E-04 | 0.005 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 2.11E-05 | 2.44E-06 | 8.69E-04 | 3.20E-04 | 0.004 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 2.05E-05 | 2.37E-06 | 8.44E-04 | 3.11E-04 | 0.004 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.65E-04 | 1.86E-05 | 7.08E-03 | 2.51E-03 | 0.036 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 1.73E-04 | 1.95E-05 | 7.43E-03 | 2.63E-03 | 0.038 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 1.78E-04 | 2.01E-05 | 7.64E-03 | 2.71E-03 | 0.039 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 1.61E-04 | 1.82E-05 | 6.91E-03 | 2.45E-03 | 0.035 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.15E-04 | 1.29E-05 | 4.89E-03 | 1.74E-03 | 0.025 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 8.38E-05 | 9.48E-06 | 3.56E-03 | 1.27E-03 | 0.018 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 6.53E-05 | 7.41E-06 | 2.77E-03 | 9.92E-04 | 0.014 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 5.43E-05 | 6.18E-06 | 2.30E-03 | 8.26E-04 | 0.012 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 4.83E-05 | 5.49E-06 | 2.04E-03 | 7.33E-04 | 0.010 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 4.33E-05 | 4.93E-06 | 1.83E-03 | 6.59E-04 | 0.009 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 3.94E-05 | 4.47E-06 | 1.67E-03 | 5.98E-04 | 0.009 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 3.61E-05 | 4.10E-06 | 1.53E-03 | 5.49E-04 | 0.008 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 3.33E-05 | 3.77E-06 | 1.41E-03 | 5.06E-04 | 0.007 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 3.09E-05 | 3.50E-06 | 1.31E-03 | 4.70E-04 | 0.007 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 2.90E-05 | 3.29E-06 | 1.23E-03 | 4.40E-04 | 0.006 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 2.75E-05 | 3.13E-06 | 1.17E-03 | 4.19E-04 | 0.006 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 2.65E-05 | 3.02E-06 | 1.12E-03 | 4.02E-04 | 0.006 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 2.53E-05 | 2.89E-06 | 1.06E-03 | 3.85E-04 | 0.005 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 2.45E-05 | 2.80E-06 | 1.03E-03 | 3.72E-04 | 0.005 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 2.36E-05 | 2.70E-06 | 9.87E-04 | 3.59E-04 | 0.005 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 2.27E-05 | 2.61E-06 | 9.49E-04 | 3.46E-04 | 0.005 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 6.00E-05 | 6.81E-06 | 2.54E-03 | 9.11E-04 | 0.013 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 6.08E-05 | 6.88E-06 | 2.58E-03 | 9.24E-04 | 0.013 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 6.59E-05 | 7.47E-06 | 2.80E-03 | 1.00E-03 | 0.014 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 6.50E-05 | 7.37E-06 | 2.76E-03 | 9.88E-04 | 0.014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 6.71E-05 | 7.61E-06 | 2.85E-03 | 1.02E-03 | 0.015 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 5.87E-05 | 6.68E-06 | 2.49E-03 | 8.93E-04 | 0.013 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 5.05E-05 | 5.76E-06 | 2.13E-03 | 7.68E-04 | 0.011 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 4.56E-05 | 5.21E-06 | 1.92E-03 | 6.94E-04 | 0.010 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 4.25E-05 | 4.86E-06 | 1.79E-03 | 6.47E-04 | 0.009 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 4.01E-05 | 4.58E-06 | 1.69E-03 | 6.09E-04 | 0.009 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 3.78E-05 | 4.31E-06 | 1.59E-03 | 5.74E-04 | 0.008 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 3.54E-05 | 4.04E-06 | 1.49E-03 | 5.38E-04 | 0.008 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 3.33E-05 | 3.79E-06 | 1.41E-03 | 5.06E-04 | 0.007 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 3.12E-05 | 3.55E-06 | 1.32E-03 | 4.75E-04 | 0.007 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 2.93E-05 | 3.32E-06 | 1.24E-03 | 4.45E-04 | 0.006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 2.73E-05 | 3.10E-06 | 1.16E-03 | 4.15E-04 | 0.006 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 2.62E-05 | 2.97E-06 | 1.12E-03 | 3.99E-04 | 0.006 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 2.52E-05 | 2.85E-06 | 1.07E-03 | 3.83E-04 | 0.005 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 2.45E-05 | 2.78E-06 | 1.04E-03 | 3.72E-04 | 0.005 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 2.38E-05 | 2.71E-06 | 1.01E-03 | 3.62E-04 | 0.005 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 2.27E-05 | 2.59E-06 | 9.55E-04 | 3.45E-04 | 0.005 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 4.00E-05 | 4.56E-06 | 1.68E-03 | 6.08E-04 | 0.009 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 3.46E-05 | 3.97E-06 | 1.45E-03 | 5.26E-04 | 0.007 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 3.30E-05 | 3.78E-06 | 1.38E-03 | 5.01E-04 | 0.007 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 3.07E-05 | 3.52E-06 | 1.29E-03 | 4.67E-04 | 0.007 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 2.85E-05 | 3.27E-06 | 1.19E-03 | 4.33E-04 | 0.006 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 2.56E-05 | 2.93E-06 | 1.07E-03 | 3.88E-04 | 0.005 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 2.31E-05 | 2.65E-06 | 9.67E-04 | 3.51E-04 | 0.005 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 2.14E-05 | 2.45E-06 | 8.96E-04 | 3.25E-04 | 0.005 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 2.08E-05 | 2.38E-06 | 8.74E-04 | 3.16E-04 | 0.004 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 2.02E-05 | 2.30E-06 | 8.52E-04 | 3.07E-04 | 0.004 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 2.00E-05 | 2.28E-06 | 8.46E-04 | 3.04E-04 | 0.004 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 1.96E-05 | 2.23E-06 | 8.33E-04 | 2.98E-04 | 0.004 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 1.89E-05 | 2.15E-06 | 8.01E-04 | 2.87E-04 | 0.004 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2027

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 1.563E-04 | 9.91E-08 | 5.95E-08 | 9.91E-08 | 5.07E-07 | 1.11E-06 | 9.91E-08 | 1.59E-08 | 1.82E-06 | 1.98E-07 | 7.93E-09 | 2.94E-04 | 1.51E-06 | 130.00 |
| Paved road | 2027_PAVED | 4.532E-04 | 2.41E-07 | 1.45E-07 | 2.41E-07 | 1.54E-07 | 4.83E-06 | 4.44E-07 | 2.70E-08 | 1.04E-05 | 4.83E-07 | 3.67E-07 | 1.37E-03 | 3.67E-06 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | $\mu g/m^3$ | 0.2 |
| Mercury | $\mu g/m^3$ | 0.61 |
| Nickel | $\mu g/m^3$ | 0.2 |
| Vanadium | $\mu g/m^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.016 |
| Res | 0.039 |
| Acute | 0.014 |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 7.78E-05 | 9.07E-06 | 3.17E-03 | 1.18E-03 | 0.016 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 3.28E-05 | 4.51E-06 | 9.87E-04 | 4.99E-04 | 0.005 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 4.01E-06 | 5.53E-07 | 1.20E-04 | 6.10E-05 | 0.001 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 1.03E-05 | 1.39E-06 | 3.22E-04 | 1.56E-04 | 0.002 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 9.62E-05 | 1.12E-05 | 3.95E-03 | 1.46E-03 | 0.020 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 1.23E-04 | 1.41E-05 | 5.10E-03 | 1.87E-03 | 0.026 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 1.30E-04 | 1.49E-05 | 5.42E-03 | 1.98E-03 | 0.028 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 1.45E-04 | 1.66E-05 | 6.05E-03 | 2.20E-03 | 0.031 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 3.77E-05 | 5.00E-06 | 1.22E-03 | 5.72E-04 | 0.006 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 4.63E-05 | 5.74E-06 | 1.72E-03 | 7.04E-04 | 0.009 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 6.54E-05 | 7.66E-06 | 2.65E-03 | 9.94E-04 | 0.014 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 1.96E-05 | 2.67E-06 | 5.99E-04 | 2.98E-04 | 0.003 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 1.90E-05 | 2.59E-06 | 5.85E-04 | 2.89E-04 | 0.003 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 1.96E-05 | 2.63E-06 | 6.19E-04 | 2.98E-04 | 0.003 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 1.92E-05 | 2.57E-06 | 6.15E-04 | 2.92E-04 | 0.003 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 1.89E-05 | 2.51E-06 | 6.13E-04 | 2.88E-04 | 0.003 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 1.80E-05 | 2.39E-06 | 5.87E-04 | 2.74E-04 | 0.003 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 1.79E-05 | 2.36E-06 | 5.87E-04 | 2.72E-04 | 0.003 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 2.46E-05 | 3.30E-06 | 7.85E-04 | 3.75E-04 | 0.004 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 2.33E-05 | 3.09E-06 | 7.54E-04 | 3.54E-04 | 0.004 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 2.23E-05 | 2.96E-06 | 7.28E-04 | 3.39E-04 | 0.004 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 2.18E-05 | 2.88E-06 | 7.10E-04 | 3.31E-04 | 0.004 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 2.07E-05 | 2.75E-06 | 6.75E-04 | 3.15E-04 | 0.003 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 1.99E-05 | 2.64E-06 | 6.45E-04 | 3.02E-04 | 0.003 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 1.90E-05 | 2.53E-06 | 6.12E-04 | 2.88E-04 | 0.003 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 1.81E-05 | 2.42E-06 | 5.82E-04 | 2.75E-04 | 0.003 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 1.74E-05 | 2.33E-06 | 5.59E-04 | 2.65E-04 | 0.003 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 2.90E-05 | 3.90E-06 | 9.16E-04 | 4.41E-04 | 0.005 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 2.49E-05 | 3.33E-06 | 7.94E-04 | 3.79E-04 | 0.004 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 2.17E-05 | 2.91E-06 | 6.90E-04 | 3.30E-04 | 0.004 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 2.10E-05 | 2.80E-06 | 6.72E-04 | 3.19E-04 | 0.003 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 2.05E-05 | 2.73E-06 | 6.59E-04 | 3.11E-04 | 0.003 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 2.01E-05 | 2.67E-06 | 6.52E-04 | 3.06E-04 | 0.003 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 1.93E-05 | 2.57E-06 | 6.25E-04 | 2.94E-04 | 0.003 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 1.90E-05 | 2.52E-06 | 6.18E-04 | 2.89E-04 | 0.003 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 1.91E-05 | 2.52E-06 | 6.30E-04 | 2.90E-04 | 0.003 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 1.87E-05 | 2.46E-06 | 6.18E-04 | 2.84E-04 | 0.003 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 1.80E-05 | 2.36E-06 | 5.94E-04 | 2.73E-04 | 0.003 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 1.83E-05 | 2.39E-06 | 6.16E-04 | 2.79E-04 | 0.003 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 2.85E-05 | 3.80E-06 | 9.12E-04 | 4.33E-04 | 0.005 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 2.70E-05 | 3.58E-06 | 8.78E-04 | 4.10E-04 | 0.005 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 2.41E-05 | 3.17E-06 | 7.94E-04 | 3.66E-04 | 0.004 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 2.24E-05 | 2.95E-06 | 7.43E-04 | 3.41E-04 | 0.004 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 2.12E-05 | 2.79E-06 | 7.02E-04 | 3.22E-04 | 0.004 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 2.00E-05 | 2.63E-06 | 6.65E-04 | 3.05E-04 | 0.003 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 2.00E-05 | 2.61E-06 | 6.72E-04 | 3.03E-04 | 0.003 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 2.02E-05 | 2.61E-06 | 6.91E-04 | 3.07E-04 | 0.004 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 1.92E-05 | 2.48E-06 | 6.58E-04 | 2.92E-04 | 0.003 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 1.83E-05 | 2.37E-06 | 6.25E-04 | 2.78E-04 | 0.003 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 1.83E-05 | 2.37E-06 | 6.30E-04 | 2.79E-04 | 0.003 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 2.88E-05 | 3.80E-06 | 9.49E-04 | 4.38E-04 | 0.005 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 2.65E-05 | 3.48E-06 | 8.81E-04 | 4.03E-04 | 0.005 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 2.44E-05 | 3.19E-06 | 8.16E-04 | 3.71E-04 | 0.004 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 2.25E-05 | 2.94E-06 | 7.52E-04 | 3.41E-04 | 0.004 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 2.09E-05 | 2.74E-06 | 7.00E-04 | 3.18E-04 | 0.004 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 2.12E-05 | 2.76E-06 | 7.20E-04 | 3.23E-04 | 0.004 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 2.10E-05 | 2.72E-06 | 7.21E-04 | 3.20E-04 | 0.004 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 2.01E-05 | 2.61E-06 | 6.88E-04 | 3.06E-04 | 0.004 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 1.98E-05 | 2.56E-06 | 6.82E-04 | 3.02E-04 | 0.004 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 1.89E-05 | 2.50E-06 | 6.19E-04 | 2.87E-04 | 0.003 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 3.17E-05 | 4.46E-06 | 8.99E-04 | 4.82E-04 | 0.005 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 2.93E-05 | 3.99E-06 | 9.02E-04 | 4.46E-04 | 0.005 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 2.81E-05 | 3.80E-06 | 8.74E-04 | 4.26E-04 | 0.005 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 2.55E-05 | 3.44E-06 | 7.95E-04 | 3.87E-04 | 0.004 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 2.41E-05 | 3.24E-06 | 7.63E-04 | 3.67E-04 | 0.004 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 2.30E-05 | 3.07E-06 | 7.32E-04 | 3.49E-04 | 0.004 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 2.26E-05 | 2.98E-06 | 7.40E-04 | 3.43E-04 | 0.004 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 2.33E-05 | 3.04E-06 | 7.81E-04 | 3.54E-04 | 0.004 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 2.28E-05 | 2.97E-06 | 7.69E-04 | 3.47E-04 | 0.004 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 2.17E-05 | 2.83E-06 | 7.26E-04 | 3.29E-04 | 0.004 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 2.20E-05 | 2.86E-06 | 7.46E-04 | 3.34E-04 | 0.004 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 2.13E-05 | 2.76E-06 | 7.21E-04 | 3.23E-04 | 0.004 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 3.78E-05 | 5.37E-06 | 1.04E-03 | 5.74E-04 | 0.005 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 3.92E-05 | 5.59E-06 | 1.07E-03 | 5.96E-04 | 0.006 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 3.35E-05 | 4.51E-06 | 1.05E-03 | 5.09E-04 | 0.005 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 2.98E-05 | 4.00E-06 | 9.40E-04 | 4.52E-04 | 0.005 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 2.72E-05 | 3.64E-06 | 8.73E-04 | 4.14E-04 | 0.005 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 2.62E-05 | 3.49E-06 | 8.39E-04 | 3.98E-04 | 0.004 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 2.40E-05 | 3.20E-06 | 7.75E-04 | 3.65E-04 | 0.004 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 2.41E-05 | 3.18E-06 | 7.92E-04 | 3.66E-04 | 0.004 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 2.50E-05 | 3.26E-06 | 8.40E-04 | 3.79E-04 | 0.004 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 2.40E-05 | 3.13E-06 | 8.06E-04 | 3.64E-04 | 0.004 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 2.33E-05 | 3.04E-06 | 7.85E-04 | 3.54E-04 | 0.004 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 2.33E-05 | 3.02E-06 | 7.94E-04 | 3.54E-04 | 0.004 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 2.26E-05 | 2.93E-06 | 7.70E-04 | 3.44E-04 | 0.004 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 2.30E-05 | 2.96E-06 | 7.95E-04 | 3.50E-04 | 0.004 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 2.17E-05 | 2.80E-06 | 7.43E-04 | 3.29E-04 | 0.004 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 1.90E-05 | 2.49E-06 | 6.35E-04 | 2.89E-04 | 0.003 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 3.69E-05 | 4.88E-06 | 1.20E-03 | 5.60E-04 | 0.006 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 3.52E-05 | 4.65E-06 | 1.16E-03 | 5.35E-04 | 0.006 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 3.58E-05 | 4.74E-06 | 1.17E-03 | 5.44E-04 | 0.006 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 3.48E-05 | 4.60E-06 | 1.14E-03 | 5.29E-04 | 0.006 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 3.14E-05 | 4.14E-06 | 1.03E-03 | 4.78E-04 | 0.005 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 2.90E-05 | 3.81E-06 | 9.62E-04 | 4.41E-04 | 0.005 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 2.64E-05 | 3.47E-06 | 8.78E-04 | 4.01E-04 | 0.005 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 2.53E-05 | 3.32E-06 | 8.44E-04 | 3.85E-04 | 0.004 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 2.59E-05 | 3.37E-06 | 8.80E-04 | 3.94E-04 | 0.005 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 2.45E-05 | 3.19E-06 | 8.27E-04 | 3.72E-04 | 0.004 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 2.51E-05 | 3.24E-06 | 8.62E-04 | 3.82E-04 | 0.004 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 2.46E-05 | 3.17E-06 | 8.45E-04 | 3.73E-04 | 0.004 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 2.48E-05 | 3.18E-06 | 8.63E-04 | 3.77E-04 | 0.004 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 2.42E-05 | 3.10E-06 | 8.42E-04 | 3.68E-04 | 0.004 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 2.26E-05 | 2.92E-06 | 7.81E-04 | 3.44E-04 | 0.004 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 2.18E-05 | 2.81E-06 | 7.52E-04 | 3.32E-04 | 0.004 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 2.16E-05 | 2.78E-06 | 7.47E-04 | 3.28E-04 | 0.004 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 3.04E-05 | 3.93E-06 | 1.04E-03 | 4.62E-04 | 0.005 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 2.90E-05 | 3.75E-06 | 9.93E-04 | 4.40E-04 | 0.005 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 2.93E-05 | 3.80E-06 | 1.00E-03 | 4.46E-04 | 0.005 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 2.78E-05 | 3.59E-06 | 9.49E-04 | 4.22E-04 | 0.005 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 2.53E-05 | 3.28E-06 | 8.65E-04 | 3.85E-04 | 0.004 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 2.60E-05 | 3.34E-06 | 9.02E-04 | 3.95E-04 | 0.005 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 2.58E-05 | 3.30E-06 | 9.01E-04 | 3.92E-04 | 0.005 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 2.51E-05 | 3.21E-06 | 8.78E-04 | 3.82E-04 | 0.005 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 2.55E-05 | 3.24E-06 | 9.00E-04 | 3.87E-04 | 0.005 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 2.52E-05 | 3.20E-06 | 8.96E-04 | 3.84E-04 | 0.005 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 2.55E-05 | 3.22E-06 | 9.14E-04 | 3.88E-04 | 0.005 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 2.42E-05 | 3.07E-06 | 8.63E-04 | 3.68E-04 | 0.004 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 2.27E-05 | 2.88E-06 | 8.02E-04 | 3.45E-04 | 0.004 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 2.25E-05 | 2.86E-06 | 8.00E-04 | 3.42E-04 | 0.004 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 2.32E-05 | 2.93E-06 | 8.34E-04 | 3.53E-04 | 0.004 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 2.24E-05 | 2.82E-06 | 8.03E-04 | 3.40E-04 | 0.004 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 1.87E-05 | 2.40E-06 | 6.49E-04 | 2.84E-04 | 0.003 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 2.99E-05 | 3.98E-06 | 9.72E-04 | 4.55E-04 | 0.005 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 2.77E-05 | 3.66E-06 | 9.08E-04 | 4.21E-04 | 0.005 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 2.70E-05 | 3.53E-06 | 9.03E-04 | 4.10E-04 | 0.005 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 2.68E-05 | 3.47E-06 | 9.13E-04 | 4.07E-04 | 0.005 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 2.79E-05 | 3.56E-06 | 9.77E-04 | 4.24E-04 | 0.005 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 2.66E-05 | 3.39E-06 | 9.38E-04 | 4.05E-04 | 0.005 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 2.68E-05 | 3.38E-06 | 9.60E-04 | 4.07E-04 | 0.005 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 2.57E-05 | 3.23E-06 | 9.26E-04 | 3.91E-04 | 0.005 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 2.66E-05 | 3.31E-06 | 9.76E-04 | 4.04E-04 | 0.005 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 2.51E-05 | 3.12E-06 | 9.24E-04 | 3.81E-04 | 0.005 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 2.33E-05 | 2.90E-06 | 8.54E-04 | 3.54E-04 | 0.004 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 2.34E-05 | 2.91E-06 | 8.62E-04 | 3.56E-04 | 0.004 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 2.43E-05 | 3.01E-06 | 9.04E-04 | 3.70E-04 | 0.005 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 2.36E-05 | 2.92E-06 | 8.74E-04 | 3.58E-04 | 0.005 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 2.14E-05 | 2.68E-06 | 7.83E-04 | 3.26E-04 | 0.004 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 2.16E-05 | 2.70E-06 | 7.94E-04 | 3.29E-04 | 0.004 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 2.28E-05 | 2.82E-06 | 8.46E-04 | 3.46E-04 | 0.004 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 2.81E-05 | 3.73E-06 | 9.18E-04 | 4.28E-04 | 0.005 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 3.00E-05 | 3.91E-06 | 1.02E-03 | 4.56E-04 | 0.005 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 3.14E-05 | 4.03E-06 | 1.09E-03 | 4.77E-04 | 0.006 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 2.98E-05 | 3.84E-06 | 1.03E-03 | 4.53E-04 | 0.005 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 3.06E-05 | 3.90E-06 | 1.07E-03 | 4.64E-04 | 0.006 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 3.07E-05 | 3.90E-06 | 1.09E-03 | 4.67E-04 | 0.006 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 3.00E-05 | 3.79E-06 | 1.07E-03 | 4.55E-04 | 0.006 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 2.77E-05 | 3.51E-06 | 9.84E-04 | 4.21E-04 | 0.005 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 2.74E-05 | 3.46E-06 | 9.82E-04 | 4.16E-04 | 0.005 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 2.85E-05 | 3.56E-06 | 1.04E-03 | 4.34E-04 | 0.005 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 2.71E-05 | 3.39E-06 | 9.92E-04 | 4.13E-04 | 0.005 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 2.45E-05 | 3.08E-06 | 8.88E-04 | 3.73E-04 | 0.005 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 2.53E-05 | 3.14E-06 | 9.29E-04 | 3.84E-04 | 0.005 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 2.56E-05 | 3.16E-06 | 9.54E-04 | 3.89E-04 | 0.005 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 2.41E-05 | 2.98E-06 | 8.98E-04 | 3.67E-04 | 0.005 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 2.15E-05 | 2.68E-06 | 7.94E-04 | 3.27E-04 | 0.004 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 3.49E-05 | 4.62E-06 | 1.14E-03 | 5.31E-04 | 0.006 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 3.30E-05 | 4.36E-06 | 1.08E-03 | 5.01E-04 | 0.006 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 3.16E-05 | 4.16E-06 | 1.04E-03 | 4.80E-04 | 0.005 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 3.32E-05 | 4.31E-06 | 1.13E-03 | 5.04E-04 | 0.006 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 3.41E-05 | 4.38E-06 | 1.19E-03 | 5.19E-04 | 0.006 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 3.37E-05 | 4.31E-06 | 1.19E-03 | 5.13E-04 | 0.006 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 3.28E-05 | 4.17E-06 | 1.16E-03 | 4.99E-04 | 0.006 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 3.33E-05 | 4.19E-06 | 1.20E-03 | 5.06E-04 | 0.006 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 3.07E-05 | 3.88E-06 | 1.10E-03 | 4.67E-04 | 0.006 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 3.01E-05 | 3.80E-06 | 1.08E-03 | 4.58E-04 | 0.006 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 3.18E-05 | 3.98E-06 | 1.16E-03 | 4.84E-04 | 0.006 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 3.09E-05 | 3.86E-06 | 1.12E-03 | 4.69E-04 | 0.006 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 2.81E-05 | 3.53E-06 | 1.01E-03 | 4.26E-04 | 0.005 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 2.99E-05 | 3.73E-06 | 1.10E-03 | 4.55E-04 | 0.006 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 2.97E-05 | 3.69E-06 | 1.09E-03 | 4.52E-04 | 0.006 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 2.72E-05 | 3.40E-06 | 9.92E-04 | 4.13E-04 | 0.005 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 2.38E-05 | 3.01E-06 | 8.54E-04 | 3.62E-04 | 0.004 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 2.09E-05 | 2.67E-06 | 7.34E-04 | 3.18E-04 | 0.004 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 2.10E-05 | 2.66E-06 | 7.45E-04 | 3.19E-04 | 0.004 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 3.50E-05 | 4.58E-06 | 1.17E-03 | 5.32E-04 | 0.006 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 3.50E-05 | 4.55E-06 | 1.19E-03 | 5.32E-04 | 0.006 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 3.57E-05 | 4.61E-06 | 1.23E-03 | 5.43E-04 | 0.006 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 3.61E-05 | 4.62E-06 | 1.26E-03 | 5.49E-04 | 0.007 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 3.68E-05 | 4.67E-06 | 1.31E-03 | 5.60E-04 | 0.007 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 3.76E-05 | 4.72E-06 | 1.36E-03 | 5.71E-04 | 0.007 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 3.57E-05 | 4.51E-06 | 1.28E-03 | 5.43E-04 | 0.007 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 3.42E-05 | 4.32E-06 | 1.22E-03 | 5.20E-04 | 0.006 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 3.58E-05 | 4.48E-06 | 1.30E-03 | 5.44E-04 | 0.007 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 3.43E-05 | 4.30E-06 | 1.25E-03 | 5.22E-04 | 0.006 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 3.27E-05 | 4.10E-06 | 1.19E-03 | 4.98E-04 | 0.006 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 3.48E-05 | 4.31E-06 | 1.29E-03 | 5.29E-04 | 0.007 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 3.31E-05 | 4.10E-06 | 1.23E-03 | 5.03E-04 | 0.006 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 2.95E-05 | 3.67E-06 | 1.08E-03 | 4.48E-04 | 0.006 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 2.48E-05 | 3.13E-06 | 8.91E-04 | 3.77E-04 | 0.005 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 2.39E-05 | 3.01E-06 | 8.57E-04 | 3.63E-04 | 0.004 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 2.36E-05 | 2.98E-06 | 8.49E-04 | 3.59E-04 | 0.004 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 2.26E-05 | 2.85E-06 | 8.06E-04 | 3.43E-04 | 0.004 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 2.23E-05 | 2.81E-06 | 7.96E-04 | 3.38E-04 | 0.004 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 3.06E-05 | 3.92E-06 | 1.07E-03 | 4.65E-04 | 0.006 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 3.06E-05 | 3.95E-06 | 1.05E-03 | 4.65E-04 | 0.005 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 3.35E-05 | 4.30E-06 | 1.17E-03 | 5.10E-04 | 0.006 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 3.97E-05 | 5.00E-06 | 1.43E-03 | 6.04E-04 | 0.007 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 3.97E-05 | 5.00E-06 | 1.43E-03 | 6.03E-04 | 0.007 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 4.08E-05 | 5.11E-06 | 1.48E-03 | 6.19E-04 | 0.008 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 4.11E-05 | 5.14E-06 | 1.50E-03 | 6.25E-04 | 0.008 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 3.81E-05 | 4.78E-06 | 1.38E-03 | 5.79E-04 | 0.007 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 4.02E-05 | 5.00E-06 | 1.48E-03 | 6.11E-04 | 0.008 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 3.82E-05 | 4.76E-06 | 1.40E-03 | 5.81E-04 | 0.007 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 3.87E-05 | 4.79E-06 | 1.43E-03 | 5.88E-04 | 0.007 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 3.93E-05 | 4.84E-06 | 1.47E-03 | 5.98E-04 | 0.008 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 3.64E-05 | 4.49E-06 | 1.35E-03 | 5.53E-04 | 0.007 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 3.19E-05 | 3.99E-06 | 1.16E-03 | 4.85E-04 | 0.006 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 2.87E-05 | 3.62E-06 | 1.03E-03 | 4.36E-04 | 0.005 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 2.84E-05 | 3.58E-06 | 1.02E-03 | 4.32E-04 | 0.005 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 2.68E-05 | 3.38E-06 | 9.60E-04 | 4.07E-04 | 0.005 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 2.60E-05 | 3.28E-06 | 9.32E-04 | 3.95E-04 | 0.005 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 2.43E-05 | 3.07E-06 | 8.64E-04 | 3.69E-04 | 0.004 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 2.19E-05 | 2.80E-06 | 7.72E-04 | 3.33E-04 | 0.004 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 1.93E-05 | 2.49E-06 | 6.67E-04 | 2.94E-04 | 0.003 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 2.64E-05 | 3.36E-06 | 9.26E-04 | 4.01E-04 | 0.005 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 2.49E-05 | 3.11E-06 | 9.03E-04 | 3.78E-04 | 0.005 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 4.12E-05 | 5.00E-06 | 1.58E-03 | 6.27E-04 | 0.008 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 4.39E-05 | 5.33E-06 | 1.69E-03 | 6.68E-04 | 0.009 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 4.14E-05 | 5.07E-06 | 1.57E-03 | 6.30E-04 | 0.008 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 4.44E-05 | 5.42E-06 | 1.69E-03 | 6.75E-04 | 0.009 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 4.27E-05 | 5.24E-06 | 1.61E-03 | 6.49E-04 | 0.008 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 4.53E-05 | 5.54E-06 | 1.72E-03 | 6.89E-04 | 0.009 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 4.47E-05 | 5.47E-06 | 1.69E-03 | 6.80E-04 | 0.009 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 4.00E-05 | 4.94E-06 | 1.50E-03 | 6.09E-04 | 0.008 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 3.43E-05 | 4.28E-06 | 1.25E-03 | 5.21E-04 | 0.006 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 3.41E-05 | 4.24E-06 | 1.25E-03 | 5.18E-04 | 0.006 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 3.22E-05 | 4.02E-06 | 1.18E-03 | 4.90E-04 | 0.006 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 3.07E-05 | 3.84E-06 | 1.12E-03 | 4.66E-04 | 0.006 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 2.78E-05 | 3.50E-06 | 1.00E-03 | 4.23E-04 | 0.005 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 2.43E-05 | 3.09E-06 | 8.60E-04 | 3.69E-04 | 0.004 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 2.23E-05 | 2.85E-06 | 7.81E-04 | 3.39E-04 | 0.004 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 2.32E-05 | 2.94E-06 | 8.20E-04 | 3.52E-04 | 0.004 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 2.38E-05 | 3.01E-06 | 8.50E-04 | 3.62E-04 | 0.004 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 2.40E-05 | 3.03E-06 | 8.62E-04 | 3.65E-04 | 0.004 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 4.92E-05 | 5.88E-06 | 1.94E-03 | 7.48E-04 | 0.010 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 4.63E-05 | 5.49E-06 | 1.85E-03 | 7.04E-04 | 0.009 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 4.77E-05 | 5.59E-06 | 1.93E-03 | 7.25E-04 | 0.010 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 4.60E-05 | 5.44E-06 | 1.85E-03 | 7.00E-04 | 0.009 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 5.13E-05 | 6.05E-06 | 2.06E-03 | 7.79E-04 | 0.011 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 4.71E-05 | 5.61E-06 | 1.86E-03 | 7.16E-04 | 0.010 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 4.24E-05 | 5.10E-06 | 1.65E-03 | 6.45E-04 | 0.008 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 4.03E-05 | 4.89E-06 | 1.55E-03 | 6.13E-04 | 0.008 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 3.89E-05 | 4.75E-06 | 1.48E-03 | 5.92E-04 | 0.008 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 3.66E-05 | 4.49E-06 | 1.38E-03 | 5.57E-04 | 0.007 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 3.21E-05 | 4.00E-06 | 1.18E-03 | 4.89E-04 | 0.006 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 2.80E-05 | 3.53E-06 | 1.01E-03 | 4.26E-04 | 0.005 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 2.92E-05 | 3.66E-06 | 1.06E-03 | 4.44E-04 | 0.005 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 2.97E-05 | 3.71E-06 | 1.09E-03 | 4.52E-04 | 0.006 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 2.95E-05 | 3.68E-06 | 1.08E-03 | 4.49E-04 | 0.006 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 2.88E-05 | 3.59E-06 | 1.06E-03 | 4.38E-04 | 0.005 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 2.76E-05 | 3.44E-06 | 1.01E-03 | 4.19E-04 | 0.005 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 2.61E-05 | 3.27E-06 | 9.52E-04 | 3.97E-04 | 0.005 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 2.43E-05 | 3.05E-06 | 8.80E-04 | 3.69E-04 | 0.005 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 5.20E-05 | 6.36E-06 | 1.97E-03 | 7.91E-04 | 0.010 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 6.17E-05 | 7.40E-06 | 2.41E-03 | 9.38E-04 | 0.012 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 6.52E-05 | 7.75E-06 | 2.58E-03 | 9.90E-04 | 0.013 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 6.37E-05 | 7.53E-06 | 2.55E-03 | 9.68E-04 | 0.013 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 6.25E-05 | 7.34E-06 | 2.52E-03 | 9.49E-04 | 0.013 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 5.43E-05 | 6.38E-06 | 2.19E-03 | 8.26E-04 | 0.011 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 5.03E-05 | 5.89E-06 | 2.05E-03 | 7.65E-04 | 0.011 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 4.77E-05 | 5.54E-06 | 1.95E-03 | 7.25E-04 | 0.010 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 4.28E-05 | 5.02E-06 | 1.73E-03 | 6.50E-04 | 0.009 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 3.51E-05 | 4.18E-06 | 1.38E-03 | 5.33E-04 | 0.007 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 3.76E-05 | 4.49E-06 | 1.48E-03 | 5.72E-04 | 0.008 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 3.84E-05 | 4.59E-06 | 1.50E-03 | 5.83E-04 | 0.008 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 3.72E-05 | 4.48E-06 | 1.45E-03 | 5.66E-04 | 0.007 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 3.51E-05 | 4.26E-06 | 1.35E-03 | 5.34E-04 | 0.007 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 3.21E-05 | 3.93E-06 | 1.21E-03 | 4.88E-04 | 0.006 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 3.11E-05 | 3.82E-06 | 1.17E-03 | 4.73E-04 | 0.006 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 3.06E-05 | 3.78E-06 | 1.14E-03 | 4.66E-04 | 0.006 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 2.98E-05 | 3.68E-06 | 1.11E-03 | 4.53E-04 | 0.006 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 2.85E-05 | 3.54E-06 | 1.05E-03 | 4.33E-04 | 0.005 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 2.73E-05 | 3.40E-06 | 1.01E-03 | 4.15E-04 | 0.005 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 2.67E-05 | 3.32E-06 | 9.81E-04 | 4.05E-04 | 0.005 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 8.66E-05 | 1.02E-05 | 3.50E-03 | 1.32E-03 | 0.018 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 9.72E-05 | 1.14E-05 | 3.95E-03 | 1.48E-03 | 0.020 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 8.48E-05 | 9.96E-06 | 3.42E-03 | 1.29E-03 | 0.018 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 7.72E-05 | 9.10E-06 | 3.11E-03 | 1.17E-03 | 0.016 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 7.51E-05 | 8.82E-06 | 3.03E-03 | 1.14E-03 | 0.016 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 6.39E-05 | 7.53E-06 | 2.57E-03 | 9.71E-04 | 0.013 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 6.53E-05 | 7.65E-06 | 2.65E-03 | 9.93E-04 | 0.014 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 6.12E-05 | 7.15E-06 | 2.50E-03 | 9.31E-04 | 0.013 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 5.30E-05 | 6.18E-06 | 2.16E-03 | 8.05E-04 | 0.011 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 4.66E-05 | 5.43E-06 | 1.91E-03 | 7.08E-04 | 0.010 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 4.26E-05 | 4.95E-06 | 1.75E-03 | 6.48E-04 | 0.009 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 3.93E-05 | 4.59E-06 | 1.60E-03 | 5.97E-04 | 0.008 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 3.66E-05 | 4.31E-06 | 1.47E-03 | 5.57E-04 | 0.008 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 3.48E-05 | 4.12E-06 | 1.38E-03 | 5.28E-04 | 0.007 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 3.28E-05 | 3.92E-06 | 1.29E-03 | 4.98E-04 | 0.007 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 3.09E-05 | 3.73E-06 | 1.20E-03 | 4.70E-04 | 0.006 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 2.92E-05 | 3.55E-06 | 1.12E-03 | 4.44E-04 | 0.006 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 2.75E-05 | 3.36E-06 | 1.04E-03 | 4.17E-04 | 0.005 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 2.60E-05 | 3.21E-06 | 9.67E-04 | 3.95E-04 | 0.005 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 2.54E-05 | 3.15E-06 | 9.39E-04 | 3.86E-04 | 0.005 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 2.49E-05 | 3.09E-06 | 9.15E-04 | 3.78E-04 | 0.005 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 1.68E-04 | 1.92E-05 | 7.05E-03 | 2.55E-03 | 0.036 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 1.76E-04 | 2.01E-05 | 7.40E-03 | 2.68E-03 | 0.038 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 1.81E-04 | 2.07E-05 | 7.62E-03 | 2.76E-03 | 0.039 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 1.65E-04 | 1.89E-05 | 6.90E-03 | 2.50E-03 | 0.035 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.19E-04 | 1.37E-05 | 4.92E-03 | 1.81E-03 | 0.025 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 8.85E-05 | 1.03E-05 | 3.61E-03 | 1.34E-03 | 0.019 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 7.00E-05 | 8.22E-06 | 2.82E-03 | 1.06E-03 | 0.015 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 5.88E-05 | 6.93E-06 | 2.36E-03 | 8.93E-04 | 0.012 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 5.22E-05 | 6.17E-06 | 2.09E-03 | 7.94E-04 | 0.011 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 4.69E-05 | 5.53E-06 | 1.88E-03 | 7.12E-04 | 0.010 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 4.24E-05 | 4.99E-06 | 1.71E-03 | 6.44E-04 | 0.009 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 3.86E-05 | 4.54E-06 | 1.56E-03 | 5.87E-04 | 0.008 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 3.54E-05 | 4.14E-06 | 1.44E-03 | 5.38E-04 | 0.007 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 3.26E-05 | 3.80E-06 | 1.33E-03 | 4.96E-04 | 0.007 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 3.09E-05 | 3.62E-06 | 1.25E-03 | 4.70E-04 | 0.006 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 2.98E-05 | 3.52E-06 | 1.19E-03 | 4.53E-04 | 0.006 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 2.90E-05 | 3.45E-06 | 1.15E-03 | 4.41E-04 | 0.006 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 2.81E-05 | 3.36E-06 | 1.11E-03 | 4.28E-04 | 0.006 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 2.76E-05 | 3.31E-06 | 1.07E-03 | 4.19E-04 | 0.006 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 2.69E-05 | 3.25E-06 | 1.04E-03 | 4.09E-04 | 0.005 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 2.62E-05 | 3.19E-06 | 1.00E-03 | 3.99E-04 | 0.005 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 6.44E-05 | 7.57E-06 | 2.60E-03 | 9.78E-04 | 0.013 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 6.43E-05 | 7.51E-06 | 2.62E-03 | 9.78E-04 | 0.013 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 6.99E-05 | 8.17E-06 | 2.85E-03 | 1.06E-03 | 0.015 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 6.94E-05 | 8.13E-06 | 2.81E-03 | 1.05E-03 | 0.014 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 7.17E-05 | 8.42E-06 | 2.90E-03 | 1.09E-03 | 0.015 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 6.36E-05 | 7.51E-06 | 2.55E-03 | 9.67E-04 | 0.013 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 5.55E-05 | 6.60E-06 | 2.20E-03 | 8.44E-04 | 0.011 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 5.06E-05 | 6.04E-06 | 1.99E-03 | 7.69E-04 | 0.010 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 4.72E-05 | 5.65E-06 | 1.86E-03 | 7.18E-04 | 0.010 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 4.45E-05 | 5.31E-06 | 1.75E-03 | 6.76E-04 | 0.009 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 4.17E-05 | 4.98E-06 | 1.65E-03 | 6.34E-04 | 0.008 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 3.90E-05 | 4.63E-06 | 1.54E-03 | 5.92E-04 | 0.008 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 3.64E-05 | 4.31E-06 | 1.45E-03 | 5.53E-04 | 0.007 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 3.39E-05 | 4.00E-06 | 1.36E-03 | 5.15E-04 | 0.007 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 3.15E-05 | 3.71E-06 | 1.27E-03 | 4.79E-04 | 0.007 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 2.92E-05 | 3.42E-06 | 1.18E-03 | 4.43E-04 | 0.006 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 2.77E-05 | 3.24E-06 | 1.13E-03 | 4.22E-04 | 0.006 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 2.68E-05 | 3.14E-06 | 1.09E-03 | 4.08E-04 | 0.006 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 2.64E-05 | 3.11E-06 | 1.06E-03 | 4.02E-04 | 0.005 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 2.60E-05 | 3.08E-06 | 1.04E-03 | 3.95E-04 | 0.005 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 2.51E-05 | 3.00E-06 | 9.89E-04 | 3.82E-04 | 0.005 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 4.44E-05 | 5.30E-06 | 1.75E-03 | 6.74E-04 | 0.009 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 3.93E-05 | 4.75E-06 | 1.52E-03 | 5.98E-04 | 0.008 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 3.75E-05 | 4.53E-06 | 1.45E-03 | 5.70E-04 | 0.007 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 3.50E-05 | 4.23E-06 | 1.35E-03 | 5.32E-04 | 0.007 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 3.24E-05 | 3.92E-06 | 1.25E-03 | 4.93E-04 | 0.006 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 2.91E-05 | 3.53E-06 | 1.12E-03 | 4.43E-04 | 0.006 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 2.63E-05 | 3.18E-06 | 1.02E-03 | 4.00E-04 | 0.005 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 2.42E-05 | 2.92E-06 | 9.38E-04 | 3.68E-04 | 0.005 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 2.32E-05 | 2.78E-06 | 9.09E-04 | 3.53E-04 | 0.005 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 2.22E-05 | 2.65E-06 | 8.80E-04 | 3.38E-04 | 0.005 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 2.17E-05 | 2.57E-06 | 8.68E-04 | 3.30E-04 | 0.004 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 2.10E-05 | 2.47E-06 | 8.50E-04 | 3.20E-04 | 0.004 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 2.04E-05 | 2.40E-06 | 8.19E-04 | 3.10E-04 | 0.004 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2028

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 9.332E-05 | 2.548E-08 | 1.529E-08 | 2.548E-08 | 1.305E-07 | 2.854E-07 | 2.548E-08 | 4.077E-09 | 4.688E-07 | 5.096E-08 | 2.038E-09 | 7.568E-05 | 3.873E-07 | 130.00 |
| Paved road | 2028_PAVED | 4.502E-04 | 2.417E-07 | 1.450E-07 | 2.417E-07 | 1.547E-07 | 4.834E-06 | 4.447E-07 | 2.707E-08 | 1.044E-05 | 4.834E-07 | 3.673E-07 | 1.373E-03 | 3.673E-06 | 130.00 |
| Unpaved road | 2028_UNPAVED | 2.750E-04 | 1.196E-06 | 7.174E-07 | 1.196E-06 | 7.653E-07 | 2.391E-05 | 2.200E-06 | 1.339E-07 | 5.166E-05 | 2.391E-06 | 1.817E-06 | 6.791E-03 | 1.817E-05 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2029_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2029_UNPAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | $\mu g/m^3$ | 0.2 |
| Mercury | $\mu g/m^3$ | 0.61 |
| Nickel | $\mu g/m^3$ | 0.2 |
| Vanadium | $\mu g/m^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.036 |
| Res | 0.055 |
| Acute | 0.033 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.64E-04 | 1.85E-05 | 7.06E-03 | 2.50E-03 | 0.036 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.09E-04 | 1.22E-05 | 4.67E-03 | 1.65E-03 | 0.024 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 8.12E-05 | 9.19E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 8.46E-05 | 9.52E-06 | 3.63E-03 | 1.29E-03 | 0.019 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 1.73E-04 | 1.94E-05 | 7.43E-03 | 2.62E-03 | 0.038 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 2.00E-04 | 2.25E-05 | 8.63E-03 | 3.05E-03 | 0.044 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 2.01E-04 | 2.26E-05 | 8.67E-03 | 3.06E-03 | 0.044 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 2.18E-04 | 2.44E-05 | 9.38E-03 | 3.31E-03 | 0.048 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.07E-04 | 1.20E-05 | 4.57E-03 | 1.62E-03 | 0.023 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 1.10E-04 | 1.24E-05 | 4.73E-03 | 1.67E-03 | 0.024 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 1.47E-04 | 1.66E-05 | 6.33E-03 | 2.24E-03 | 0.033 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 6.94E-05 | 7.82E-06 | 2.97E-03 | 1.06E-03 | 0.015 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 6.59E-05 | 7.43E-06 | 2.82E-03 | 1.00E-03 | 0.014 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 6.33E-05 | 7.13E-06 | 2.71E-03 | 9.61E-04 | 0.014 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 5.95E-05 | 6.71E-06 | 2.55E-03 | 9.04E-04 | 0.013 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 5.57E-05 | 6.29E-06 | 2.39E-03 | 8.47E-04 | 0.012 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 5.14E-05 | 5.80E-06 | 2.20E-03 | 7.81E-04 | 0.011 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 4.84E-05 | 5.47E-06 | 2.07E-03 | 7.36E-04 | 0.011 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 6.84E-05 | 7.71E-06 | 2.93E-03 | 1.04E-03 | 0.015 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 6.37E-05 | 7.18E-06 | 2.73E-03 | 9.68E-04 | 0.014 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 5.88E-05 | 6.63E-06 | 2.52E-03 | 8.93E-04 | 0.013 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 5.55E-05 | 6.26E-06 | 2.37E-03 | 8.43E-04 | 0.012 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 5.65E-05 | 6.37E-06 | 2.42E-03 | 8.59E-04 | 0.012 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 5.74E-05 | 6.47E-06 | 2.46E-03 | 8.73E-04 | 0.013 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 5.82E-05 | 6.55E-06 | 2.49E-03 | 8.84E-04 | 0.013 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 5.88E-05 | 6.62E-06 | 2.52E-03 | 8.93E-04 | 0.013 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 5.94E-05 | 6.69E-06 | 2.54E-03 | 9.03E-04 | 0.013 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 6.65E-05 | 7.49E-06 | 2.85E-03 | 1.01E-03 | 0.015 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 6.63E-05 | 7.47E-06 | 2.84E-03 | 1.01E-03 | 0.015 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 6.59E-05 | 7.42E-06 | 2.82E-03 | 1.00E-03 | 0.014 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 6.69E-05 | 7.54E-06 | 2.87E-03 | 1.02E-03 | 0.015 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 6.77E-05 | 7.63E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 6.83E-05 | 7.70E-06 | 2.93E-03 | 1.04E-03 | 0.015 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 6.83E-05 | 7.69E-06 | 2.93E-03 | 1.04E-03 | 0.015 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 6.84E-05 | 7.70E-06 | 2.93E-03 | 1.04E-03 | 0.015 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 6.87E-05 | 7.74E-06 | 2.95E-03 | 1.04E-03 | 0.015 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 6.82E-05 | 7.68E-06 | 2.92E-03 | 1.04E-03 | 0.015 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 6.72E-05 | 7.56E-06 | 2.88E-03 | 1.02E-03 | 0.015 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 6.70E-05 | 7.55E-06 | 2.87E-03 | 1.02E-03 | 0.015 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 7.96E-05 | 8.97E-06 | 3.42E-03 | 1.21E-03 | 0.018 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 7.98E-05 | 8.99E-06 | 3.42E-03 | 1.21E-03 | 0.018 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 7.88E-05 | 8.87E-06 | 3.38E-03 | 1.20E-03 | 0.017 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 7.77E-05 | 8.75E-06 | 3.33E-03 | 1.18E-03 | 0.017 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 7.65E-05 | 8.61E-06 | 3.28E-03 | 1.16E-03 | 0.017 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 7.51E-05 | 8.45E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 7.44E-05 | 8.38E-06 | 3.19E-03 | 1.13E-03 | 0.016 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 7.38E-05 | 8.30E-06 | 3.16E-03 | 1.12E-03 | 0.016 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 7.17E-05 | 8.07E-06 | 3.07E-03 | 1.09E-03 | 0.016 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 6.93E-05 | 7.81E-06 | 2.97E-03 | 1.05E-03 | 0.015 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 6.77E-05 | 7.63E-06 | 2.91E-03 | 1.03E-03 | 0.015 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 8.81E-05 | 9.92E-06 | 3.78E-03 | 1.34E-03 | 0.019 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 8.57E-05 | 9.64E-06 | 3.68E-03 | 1.30E-03 | 0.019 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 8.30E-05 | 9.34E-06 | 3.56E-03 | 1.26E-03 | 0.018 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 7.99E-05 | 9.00E-06 | 3.43E-03 | 1.21E-03 | 0.018 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 7.68E-05 | 8.65E-06 | 3.30E-03 | 1.17E-03 | 0.017 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 7.52E-05 | 8.46E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 7.29E-05 | 8.21E-06 | 3.13E-03 | 1.11E-03 | 0.016 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 6.98E-05 | 7.86E-06 | 2.99E-03 | 1.06E-03 | 0.015 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 6.72E-05 | 7.57E-06 | 2.88E-03 | 1.02E-03 | 0.015 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 9.39E-05 | 1.06E-05 | 4.03E-03 | 1.43E-03 | 0.021 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 9.40E-05 | 1.06E-05 | 4.03E-03 | 1.43E-03 | 0.021 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 8.92E-05 | 1.00E-05 | 3.83E-03 | 1.36E-03 | 0.020 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 8.63E-05 | 9.71E-06 | 3.70E-03 | 1.31E-03 | 0.019 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 8.21E-05 | 9.24E-06 | 3.52E-03 | 1.25E-03 | 0.018 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 7.87E-05 | 8.86E-06 | 3.37E-03 | 1.20E-03 | 0.017 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 7.54E-05 | 8.50E-06 | 3.23E-03 | 1.15E-03 | 0.017 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 7.61E-05 | 8.57E-06 | 3.26E-03 | 1.16E-03 | 0.017 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 7.71E-05 | 8.69E-06 | 3.31E-03 | 1.17E-03 | 0.017 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 7.67E-05 | 8.63E-06 | 3.29E-03 | 1.17E-03 | 0.017 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 7.53E-05 | 8.48E-06 | 3.23E-03 | 1.14E-03 | 0.017 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 7.54E-05 | 8.48E-06 | 3.23E-03 | 1.15E-03 | 0.017 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 7.41E-05 | 8.34E-06 | 3.18E-03 | 1.13E-03 | 0.016 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 9.13E-05 | 1.03E-05 | 3.92E-03 | 1.39E-03 | 0.020 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 8.87E-05 | 9.99E-06 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 9.20E-05 | 1.04E-05 | 3.95E-03 | 1.40E-03 | 0.020 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 8.97E-05 | 1.01E-05 | 3.85E-03 | 1.36E-03 | 0.020 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 8.83E-05 | 9.94E-06 | 3.79E-03 | 1.34E-03 | 0.019 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 8.68E-05 | 9.77E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 8.48E-05 | 9.54E-06 | 3.64E-03 | 1.29E-03 | 0.019 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 8.43E-05 | 9.48E-06 | 3.62E-03 | 1.28E-03 | 0.019 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 8.42E-05 | 9.47E-06 | 3.61E-03 | 1.28E-03 | 0.019 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 8.21E-05 | 9.24E-06 | 3.52E-03 | 1.25E-03 | 0.018 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 8.02E-05 | 9.02E-06 | 3.44E-03 | 1.22E-03 | 0.018 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 7.88E-05 | 8.87E-06 | 3.39E-03 | 1.20E-03 | 0.017 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 7.67E-05 | 8.63E-06 | 3.29E-03 | 1.17E-03 | 0.017 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 7.56E-05 | 8.50E-06 | 3.25E-03 | 1.15E-03 | 0.017 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 7.34E-05 | 8.26E-06 | 3.15E-03 | 1.12E-03 | 0.016 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 7.03E-05 | 7.91E-06 | 3.02E-03 | 1.07E-03 | 0.015 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 1.07E-04 | 1.20E-05 | 4.59E-03 | 1.62E-03 | 0.024 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 1.04E-04 | 1.17E-05 | 4.48E-03 | 1.59E-03 | 0.023 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.03E-04 | 1.15E-05 | 4.40E-03 | 1.56E-03 | 0.023 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 9.99E-05 | 1.12E-05 | 4.29E-03 | 1.52E-03 | 0.022 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 9.60E-05 | 1.08E-05 | 4.12E-03 | 1.46E-03 | 0.021 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 9.26E-05 | 1.04E-05 | 3.98E-03 | 1.41E-03 | 0.020 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 8.87E-05 | 9.97E-06 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 8.69E-05 | 9.77E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 8.68E-05 | 9.77E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 8.46E-05 | 9.52E-06 | 3.63E-03 | 1.29E-03 | 0.019 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 8.43E-05 | 9.48E-06 | 3.62E-03 | 1.28E-03 | 0.019 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 8.27E-05 | 9.31E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 8.19E-05 | 9.21E-06 | 3.52E-03 | 1.24E-03 | 0.018 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 8.01E-05 | 9.01E-06 | 3.44E-03 | 1.22E-03 | 0.018 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 7.73E-05 | 8.69E-06 | 3.32E-03 | 1.17E-03 | 0.017 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 7.52E-05 | 8.46E-06 | 3.23E-03 | 1.14E-03 | 0.017 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 7.37E-05 | 8.29E-06 | 3.16E-03 | 1.12E-03 | 0.016 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 1.05E-04 | 1.18E-05 | 4.49E-03 | 1.59E-03 | 0.023 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 1.02E-04 | 1.14E-05 | 4.37E-03 | 1.55E-03 | 0.022 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 9.98E-05 | 1.12E-05 | 4.29E-03 | 1.52E-03 | 0.022 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 9.68E-05 | 1.09E-05 | 4.16E-03 | 1.47E-03 | 0.021 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 9.30E-05 | 1.05E-05 | 3.99E-03 | 1.41E-03 | 0.020 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 9.18E-05 | 1.03E-05 | 3.94E-03 | 1.40E-03 | 0.020 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 8.97E-05 | 1.01E-05 | 3.85E-03 | 1.36E-03 | 0.020 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 8.71E-05 | 9.80E-06 | 3.74E-03 | 1.32E-03 | 0.019 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 8.55E-05 | 9.62E-06 | 3.67E-03 | 1.30E-03 | 0.019 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 8.33E-05 | 9.38E-06 | 3.58E-03 | 1.27E-03 | 0.018 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 8.17E-05 | 9.19E-06 | 3.51E-03 | 1.24E-03 | 0.018 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 7.84E-05 | 8.82E-06 | 3.37E-03 | 1.19E-03 | 0.017 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 7.49E-05 | 8.43E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 7.29E-05 | 8.20E-06 | 3.13E-03 | 1.11E-03 | 0.016 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 7.17E-05 | 8.07E-06 | 3.08E-03 | 1.09E-03 | 0.016 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 6.90E-05 | 7.76E-06 | 2.96E-03 | 1.05E-03 | 0.015 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 6.36E-05 | 7.15E-06 | 2.73E-03 | 9.66E-04 | 0.014 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 9.83E-05 | 1.11E-05 | 4.22E-03 | 1.49E-03 | 0.022 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 9.42E-05 | 1.06E-05 | 4.05E-03 | 1.43E-03 | 0.021 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 9.14E-05 | 1.03E-05 | 3.92E-03 | 1.39E-03 | 0.020 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 8.88E-05 | 1.00E-05 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 8.76E-05 | 9.86E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 8.41E-05 | 9.46E-06 | 3.61E-03 | 1.28E-03 | 0.019 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 8.20E-05 | 9.23E-06 | 3.52E-03 | 1.25E-03 | 0.018 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 7.97E-05 | 8.97E-06 | 3.42E-03 | 1.21E-03 | 0.018 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 8.01E-05 | 9.01E-06 | 3.44E-03 | 1.22E-03 | 0.018 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 7.81E-05 | 8.79E-06 | 3.35E-03 | 1.19E-03 | 0.017 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 7.56E-05 | 8.51E-06 | 3.25E-03 | 1.15E-03 | 0.017 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 7.48E-05 | 8.42E-06 | 3.21E-03 | 1.14E-03 | 0.016 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 7.49E-05 | 8.42E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 7.32E-05 | 8.23E-06 | 3.14E-03 | 1.11E-03 | 0.016 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 7.02E-05 | 7.89E-06 | 3.01E-03 | 1.07E-03 | 0.015 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 6.95E-05 | 7.82E-06 | 2.98E-03 | 1.06E-03 | 0.015 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 6.98E-05 | 7.85E-06 | 3.00E-03 | 1.06E-03 | 0.015 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 9.07E-05 | 1.02E-05 | 3.89E-03 | 1.38E-03 | 0.020 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 9.15E-05 | 1.03E-05 | 3.93E-03 | 1.39E-03 | 0.020 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 9.16E-05 | 1.03E-05 | 3.93E-03 | 1.39E-03 | 0.020 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 8.87E-05 | 9.99E-06 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 8.83E-05 | 9.94E-06 | 3.79E-03 | 1.34E-03 | 0.019 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 8.73E-05 | 9.83E-06 | 3.75E-03 | 1.33E-03 | 0.019 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 8.54E-05 | 9.61E-06 | 3.66E-03 | 1.30E-03 | 0.019 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 8.20E-05 | 9.23E-06 | 3.52E-03 | 1.25E-03 | 0.018 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 8.06E-05 | 9.07E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 8.06E-05 | 9.07E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 7.82E-05 | 8.80E-06 | 3.35E-03 | 1.19E-03 | 0.017 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 7.45E-05 | 8.39E-06 | 3.20E-03 | 1.13E-03 | 0.016 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 7.42E-05 | 8.36E-06 | 3.19E-03 | 1.13E-03 | 0.016 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 7.36E-05 | 8.29E-06 | 3.16E-03 | 1.12E-03 | 0.016 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 7.11E-05 | 8.01E-06 | 3.05E-03 | 1.08E-03 | 0.016 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 6.76E-05 | 7.61E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 9.90E-05 | 1.11E-05 | 4.25E-03 | 1.50E-03 | 0.022 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.64E-05 | 1.09E-05 | 4.13E-03 | 1.46E-03 | 0.021 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.43E-05 | 1.06E-05 | 4.04E-03 | 1.43E-03 | 0.021 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 9.50E-05 | 1.07E-05 | 4.07E-03 | 1.44E-03 | 0.021 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 9.52E-05 | 1.07E-05 | 4.08E-03 | 1.45E-03 | 0.021 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 9.41E-05 | 1.06E-05 | 4.04E-03 | 1.43E-03 | 0.021 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 9.24E-05 | 1.04E-05 | 3.97E-03 | 1.40E-03 | 0.020 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 9.22E-05 | 1.04E-05 | 3.96E-03 | 1.40E-03 | 0.020 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 8.89E-05 | 1.00E-05 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 8.72E-05 | 9.82E-06 | 3.74E-03 | 1.33E-03 | 0.019 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 8.80E-05 | 9.90E-06 | 3.78E-03 | 1.34E-03 | 0.019 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 8.61E-05 | 9.69E-06 | 3.69E-03 | 1.31E-03 | 0.019 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 8.24E-05 | 9.27E-06 | 3.53E-03 | 1.25E-03 | 0.018 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 8.34E-05 | 9.39E-06 | 3.58E-03 | 1.27E-03 | 0.018 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 8.23E-05 | 9.27E-06 | 3.53E-03 | 1.25E-03 | 0.018 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 7.91E-05 | 8.90E-06 | 3.39E-03 | 1.20E-03 | 0.017 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 7.50E-05 | 8.44E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 7.13E-05 | 8.03E-06 | 3.06E-03 | 1.08E-03 | 0.016 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 7.07E-05 | 7.96E-06 | 3.03E-03 | 1.08E-03 | 0.016 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.12E-04 | 1.26E-05 | 4.82E-03 | 1.71E-03 | 0.025 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.11E-04 | 1.25E-05 | 4.75E-03 | 1.68E-03 | 0.024 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.10E-04 | 1.23E-05 | 4.71E-03 | 1.67E-03 | 0.024 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 1.09E-04 | 1.22E-05 | 4.66E-03 | 1.65E-03 | 0.024 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 1.08E-04 | 1.21E-05 | 4.64E-03 | 1.64E-03 | 0.024 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 1.07E-04 | 1.21E-05 | 4.61E-03 | 1.63E-03 | 0.024 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.04E-04 | 1.17E-05 | 4.46E-03 | 1.58E-03 | 0.023 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 1.01E-04 | 1.13E-05 | 4.33E-03 | 1.53E-03 | 0.022 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 1.01E-04 | 1.14E-05 | 4.34E-03 | 1.53E-03 | 0.022 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 9.83E-05 | 1.11E-05 | 4.22E-03 | 1.49E-03 | 0.022 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 9.55E-05 | 1.07E-05 | 4.10E-03 | 1.45E-03 | 0.021 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 9.64E-05 | 1.08E-05 | 4.14E-03 | 1.47E-03 | 0.021 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 9.36E-05 | 1.05E-05 | 4.02E-03 | 1.42E-03 | 0.021 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 8.90E-05 | 1.00E-05 | 3.82E-03 | 1.35E-03 | 0.020 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 8.34E-05 | 9.39E-06 | 3.58E-03 | 1.27E-03 | 0.018 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 8.14E-05 | 9.16E-06 | 3.49E-03 | 1.24E-03 | 0.018 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 8.00E-05 | 9.00E-06 | 3.43E-03 | 1.22E-03 | 0.018 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 7.78E-05 | 8.75E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 7.64E-05 | 8.59E-06 | 3.28E-03 | 1.16E-03 | 0.017 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.15E-04 | 1.29E-05 | 4.92E-03 | 1.74E-03 | 0.025 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.11E-04 | 1.25E-05 | 4.78E-03 | 1.69E-03 | 0.025 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.11E-04 | 1.25E-05 | 4.78E-03 | 1.69E-03 | 0.025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.15E-04 | 1.29E-05 | 4.94E-03 | 1.75E-03 | 0.025 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.13E-04 | 1.27E-05 | 4.84E-03 | 1.71E-03 | 0.025 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 1.12E-04 | 1.26E-05 | 4.80E-03 | 1.70E-03 | 0.025 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 1.10E-04 | 1.24E-05 | 4.73E-03 | 1.68E-03 | 0.024 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 1.06E-04 | 1.19E-05 | 4.54E-03 | 1.61E-03 | 0.023 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 1.06E-04 | 1.20E-05 | 4.56E-03 | 1.62E-03 | 0.023 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 1.03E-04 | 1.16E-05 | 4.41E-03 | 1.56E-03 | 0.023 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 1.02E-04 | 1.15E-05 | 4.38E-03 | 1.55E-03 | 0.022 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 1.01E-04 | 1.14E-05 | 4.36E-03 | 1.54E-03 | 0.022 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 9.73E-05 | 1.09E-05 | 4.18E-03 | 1.48E-03 | 0.021 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 9.14E-05 | 1.03E-05 | 3.92E-03 | 1.39E-03 | 0.020 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 8.69E-05 | 9.77E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 8.54E-05 | 9.61E-06 | 3.66E-03 | 1.30E-03 | 0.019 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 8.26E-05 | 9.29E-06 | 3.54E-03 | 1.26E-03 | 0.018 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 8.07E-05 | 9.08E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 7.80E-05 | 8.77E-06 | 3.35E-03 | 1.18E-03 | 0.017 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 7.47E-05 | 8.41E-06 | 3.20E-03 | 1.14E-03 | 0.016 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 7.12E-05 | 8.01E-06 | 3.05E-03 | 1.08E-03 | 0.016 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.10E-04 | 1.24E-05 | 4.72E-03 | 1.67E-03 | 0.024 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.08E-04 | 1.21E-05 | 4.63E-03 | 1.64E-03 | 0.024 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.19E-04 | 1.34E-05 | 5.10E-03 | 1.80E-03 | 0.026 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.19E-04 | 1.34E-05 | 5.10E-03 | 1.81E-03 | 0.026 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.14E-04 | 1.28E-05 | 4.89E-03 | 1.73E-03 | 0.025 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 1.15E-04 | 1.29E-05 | 4.92E-03 | 1.74E-03 | 0.025 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 1.11E-04 | 1.25E-05 | 4.76E-03 | 1.68E-03 | 0.024 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 1.12E-04 | 1.25E-05 | 4.80E-03 | 1.70E-03 | 0.025 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 1.09E-04 | 1.23E-05 | 4.70E-03 | 1.66E-03 | 0.024 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 1.03E-04 | 1.16E-05 | 4.44E-03 | 1.57E-03 | 0.023 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 9.62E-05 | 1.08E-05 | 4.13E-03 | 1.46E-03 | 0.021 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 9.48E-05 | 1.07E-05 | 4.07E-03 | 1.44E-03 | 0.021 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 9.17E-05 | 1.03E-05 | 3.94E-03 | 1.39E-03 | 0.020 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 8.91E-05 | 1.00E-05 | 3.82E-03 | 1.35E-03 | 0.020 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 8.52E-05 | 9.58E-06 | 3.66E-03 | 1.29E-03 | 0.019 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 8.07E-05 | 9.08E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 7.77E-05 | 8.74E-06 | 3.33E-03 | 1.18E-03 | 0.017 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 7.74E-05 | 8.71E-06 | 3.32E-03 | 1.18E-03 | 0.017 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 7.69E-05 | 8.66E-06 | 3.30E-03 | 1.17E-03 | 0.017 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 7.61E-05 | 8.57E-06 | 3.27E-03 | 1.16E-03 | 0.017 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 1.19E-04 | 1.34E-05 | 5.12E-03 | 1.81E-03 | 0.026 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.16E-04 | 1.30E-05 | 4.97E-03 | 1.76E-03 | 0.026 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.17E-04 | 1.31E-05 | 5.01E-03 | 1.77E-03 | 0.026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.13E-04 | 1.27E-05 | 4.84E-03 | 1.71E-03 | 0.025 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 1.16E-04 | 1.30E-05 | 4.97E-03 | 1.76E-03 | 0.025 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.09E-04 | 1.23E-05 | 4.70E-03 | 1.66E-03 | 0.024 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 1.03E-04 | 1.15E-05 | 4.41E-03 | 1.56E-03 | 0.023 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 9.87E-05 | 1.11E-05 | 4.24E-03 | 1.50E-03 | 0.022 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 9.57E-05 | 1.08E-05 | 4.11E-03 | 1.45E-03 | 0.021 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 9.18E-05 | 1.03E-05 | 3.94E-03 | 1.40E-03 | 0.020 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 8.59E-05 | 9.66E-06 | 3.69E-03 | 1.31E-03 | 0.019 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 8.05E-05 | 9.05E-06 | 3.45E-03 | 1.22E-03 | 0.018 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 8.05E-05 | 9.06E-06 | 3.46E-03 | 1.22E-03 | 0.018 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 8.00E-05 | 9.00E-06 | 3.43E-03 | 1.22E-03 | 0.018 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 7.89E-05 | 8.87E-06 | 3.39E-03 | 1.20E-03 | 0.017 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 7.72E-05 | 8.68E-06 | 3.31E-03 | 1.17E-03 | 0.017 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 7.50E-05 | 8.44E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 7.27E-05 | 8.18E-06 | 3.12E-03 | 1.11E-03 | 0.016 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 7.03E-05 | 7.91E-06 | 3.02E-03 | 1.07E-03 | 0.015 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 1.08E-04 | 1.22E-05 | 4.65E-03 | 1.65E-03 | 0.024 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 1.18E-04 | 1.32E-05 | 5.07E-03 | 1.79E-03 | 0.026 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 1.21E-04 | 1.36E-05 | 5.21E-03 | 1.84E-03 | 0.027 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 1.20E-04 | 1.35E-05 | 5.15E-03 | 1.82E-03 | 0.026 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.19E-04 | 1.33E-05 | 5.11E-03 | 1.81E-03 | 0.026 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 1.11E-04 | 1.24E-05 | 4.76E-03 | 1.68E-03 | 0.024 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 1.07E-04 | 1.20E-05 | 4.59E-03 | 1.62E-03 | 0.024 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 1.04E-04 | 1.17E-05 | 4.48E-03 | 1.58E-03 | 0.023 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 9.79E-05 | 1.10E-05 | 4.21E-03 | 1.49E-03 | 0.022 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 8.87E-05 | 9.98E-06 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 8.99E-05 | 1.01E-05 | 3.86E-03 | 1.37E-03 | 0.020 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 8.93E-05 | 1.00E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 8.70E-05 | 9.78E-06 | 3.74E-03 | 1.32E-03 | 0.019 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 8.38E-05 | 9.42E-06 | 3.60E-03 | 1.27E-03 | 0.018 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 7.97E-05 | 8.96E-06 | 3.42E-03 | 1.21E-03 | 0.018 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 7.77E-05 | 8.74E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 7.63E-05 | 8.58E-06 | 3.28E-03 | 1.16E-03 | 0.017 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 7.47E-05 | 8.40E-06 | 3.21E-03 | 1.14E-03 | 0.016 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 7.27E-05 | 8.18E-06 | 3.12E-03 | 1.11E-03 | 0.016 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 7.09E-05 | 7.97E-06 | 3.04E-03 | 1.08E-03 | 0.016 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 6.96E-05 | 7.83E-06 | 2.99E-03 | 1.06E-03 | 0.015 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 1.48E-04 | 1.66E-05 | 6.37E-03 | 2.25E-03 | 0.033 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 1.55E-04 | 1.74E-05 | 6.69E-03 | 2.36E-03 | 0.034 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 1.40E-04 | 1.57E-05 | 6.04E-03 | 2.13E-03 | 0.031 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 1.30E-04 | 1.46E-05 | 5.60E-03 | 1.98E-03 | 0.029 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.26E-04 | 1.41E-05 | 5.42E-03 | 1.91E-03 | 0.028 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 1.13E-04 | 1.27E-05 | 4.85E-03 | 1.71E-03 | 0.025 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 1.12E-04 | 1.26E-05 | 4.84E-03 | 1.71E-03 | 0.025 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 1.07E-04 | 1.20E-05 | 4.59E-03 | 1.62E-03 | 0.024 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 9.69E-05 | 1.09E-05 | 4.17E-03 | 1.47E-03 | 0.021 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 8.89E-05 | 1.00E-05 | 3.82E-03 | 1.35E-03 | 0.020 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 8.44E-05 | 9.49E-06 | 3.63E-03 | 1.28E-03 | 0.019 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 8.05E-05 | 9.05E-06 | 3.46E-03 | 1.22E-03 | 0.018 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 7.71E-05 | 8.67E-06 | 3.31E-03 | 1.17E-03 | 0.017 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 7.45E-05 | 8.38E-06 | 3.20E-03 | 1.13E-03 | 0.016 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 7.18E-05 | 8.08E-06 | 3.09E-03 | 1.09E-03 | 0.016 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 6.94E-05 | 7.80E-06 | 2.98E-03 | 1.05E-03 | 0.015 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 6.70E-05 | 7.54E-06 | 2.88E-03 | 1.02E-03 | 0.015 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 6.47E-05 | 7.28E-06 | 2.78E-03 | 9.83E-04 | 0.014 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 6.27E-05 | 7.05E-06 | 2.69E-03 | 9.52E-04 | 0.014 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 6.17E-05 | 6.94E-06 | 2.65E-03 | 9.37E-04 | 0.014 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 6.08E-05 | 6.84E-06 | 2.61E-03 | 9.23E-04 | 0.013 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 2.41E-04 | 2.71E-05 | 1.04E-02 | 3.67E-03 | 0.053 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.46E-04 | 2.76E-05 | 1.06E-02 | 3.74E-03 | 0.054 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.48E-04 | 2.79E-05 | 1.07E-02 | 3.77E-03 | 0.055 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.29E-04 | 2.57E-05 | 9.86E-03 | 3.48E-03 | 0.051 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.80E-04 | 2.03E-05 | 7.77E-03 | 2.74E-03 | 0.040 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 1.48E-04 | 1.66E-05 | 6.36E-03 | 2.24E-03 | 0.033 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 1.27E-04 | 1.43E-05 | 5.47E-03 | 1.93E-03 | 0.028 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 1.14E-04 | 1.28E-05 | 4.90E-03 | 1.73E-03 | 0.025 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 1.06E-04 | 1.19E-05 | 4.55E-03 | 1.61E-03 | 0.023 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 9.88E-05 | 1.11E-05 | 4.25E-03 | 1.50E-03 | 0.022 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 9.27E-05 | 1.04E-05 | 3.99E-03 | 1.41E-03 | 0.020 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 8.74E-05 | 9.82E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 8.26E-05 | 9.29E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 7.82E-05 | 8.79E-06 | 3.36E-03 | 1.19E-03 | 0.017 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 7.43E-05 | 8.35E-06 | 3.19E-03 | 1.13E-03 | 0.016 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 7.07E-05 | 7.95E-06 | 3.04E-03 | 1.07E-03 | 0.016 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 6.76E-05 | 7.59E-06 | 2.91E-03 | 1.03E-03 | 0.015 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 6.46E-05 | 7.26E-06 | 2.78E-03 | 9.81E-04 | 0.014 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 6.18E-05 | 6.95E-06 | 2.66E-03 | 9.39E-04 | 0.014 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 5.91E-05 | 6.64E-06 | 2.54E-03 | 8.98E-04 | 0.013 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 5.69E-05 | 6.40E-06 | 2.44E-03 | 8.65E-04 | 0.013 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 1.38E-04 | 1.56E-05 | 5.95E-03 | 2.10E-03 | 0.031 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 1.38E-04 | 1.55E-05 | 5.93E-03 | 2.10E-03 | 0.030 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.41E-04 | 1.59E-05 | 6.07E-03 | 2.14E-03 | 0.031 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 1.38E-04 | 1.55E-05 | 5.95E-03 | 2.10E-03 | 0.031 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 1.39E-04 | 1.56E-05 | 5.96E-03 | 2.11E-03 | 0.031 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 1.28E-04 | 1.44E-05 | 5.52E-03 | 1.95E-03 | 0.028 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 1.18E-04 | 1.33E-05 | 5.09E-03 | 1.80E-03 | 0.026 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 1.12E-04 | 1.26E-05 | 4.80E-03 | 1.70E-03 | 0.025 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 1.07E-04 | 1.20E-05 | 4.59E-03 | 1.62E-03 | 0.024 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 1.03E-04 | 1.15E-05 | 4.41E-03 | 1.56E-03 | 0.023 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 9.84E-05 | 1.11E-05 | 4.23E-03 | 1.50E-03 | 0.022 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 9.43E-05 | 1.06E-05 | 4.06E-03 | 1.43E-03 | 0.021 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 9.04E-05 | 1.02E-05 | 3.89E-03 | 1.37E-03 | 0.020 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 8.67E-05 | 9.75E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 8.29E-05 | 9.32E-06 | 3.56E-03 | 1.26E-03 | 0.018 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 7.93E-05 | 8.91E-06 | 3.41E-03 | 1.21E-03 | 0.017 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 7.64E-05 | 8.59E-06 | 3.29E-03 | 1.16E-03 | 0.017 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 7.35E-05 | 8.26E-06 | 3.16E-03 | 1.12E-03 | 0.016 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 7.10E-05 | 7.98E-06 | 3.05E-03 | 1.08E-03 | 0.016 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 6.84E-05 | 7.69E-06 | 2.94E-03 | 1.04E-03 | 0.015 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 6.55E-05 | 7.37E-06 | 2.82E-03 | 9.96E-04 | 0.014 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 1.07E-04 | 1.20E-05 | 4.58E-03 | 1.62E-03 | 0.024 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 9.79E-05 | 1.10E-05 | 4.20E-03 | 1.49E-03 | 0.022 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 9.51E-05 | 1.07E-05 | 4.09E-03 | 1.45E-03 | 0.021 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 9.19E-05 | 1.03E-05 | 3.95E-03 | 1.40E-03 | 0.020 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 8.85E-05 | 9.95E-06 | 3.80E-03 | 1.35E-03 | 0.020 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 8.45E-05 | 9.50E-06 | 3.63E-03 | 1.28E-03 | 0.019 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 8.08E-05 | 9.09E-06 | 3.47E-03 | 1.23E-03 | 0.018 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 7.78E-05 | 8.75E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 7.59E-05 | 8.54E-06 | 3.26E-03 | 1.15E-03 | 0.017 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 7.40E-05 | 8.33E-06 | 3.18E-03 | 1.13E-03 | 0.016 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 7.24E-05 | 8.15E-06 | 3.11E-03 | 1.10E-03 | 0.016 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.07E-05 | 7.96E-06 | 3.04E-03 | 1.08E-03 | 0.016 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 6.84E-05 | 7.69E-06 | 2.94E-03 | 1.04E-03 | 0.015 | Res |

# HRA Permanente Creek Restoration Project

Construction Year 2029

**Emissions Inputs**

| Construction Activity | Construction Year & Source | DPM Exhaust (tons/year) | PM10 Dust for speciation (tons/year) | Arsenic (tons/year) | Beryllium (tons/year) | Cadmium (tons/year) | Cobalt (tons/year) | Copper (tons/year) | Lead (tons/year) | Mercury (tons/year) | Nickel (tons/year) | Selenium (tons/year) | Chromium VI (tons/year) | Crystalline Silica (tons/year) | Vanadium (tons/year) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000 | 0.00 | 2.91E-12 | 1.74E-12 | 2.91E-12 | 1.49E-11 | 3.26E-11 | 2.91E-12 | 4.65E-13 | 5.35E-11 | 5.81E-12 | 2.33E-13 | 8.63E-09 | 4.42E-11 |
| Paved road | 2024_PAVED | 2.07E-04 | 0.08 | 1.04E-07 | 6.26E-08 | 1.04E-07 | 6.68E-08 | 2.09E-06 | 1.92E-07 | 1.17E-08 | 4.51E-06 | 2.09E-07 | 1.59E-07 | 5.93E-04 | 1.59E-06 |
| Unpaved road | 2024_CCP_UNPV | 6.27E-05 | 0.20 | 2.56E-07 | 1.54E-07 | 2.56E-07 | 1.64E-07 | 5.12E-06 | 4.71E-07 | 2.87E-08 | 1.11E-05 | 5.12E-07 | 3.89E-07 | 1.46E-03 | 3.89E-06 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.002 | 0.16 | 2.05E-07 | 1.23E-07 | 2.05E-07 | 1.05E-06 | 2.29E-06 | 2.05E-07 | 3.28E-08 | 3.77E-06 | 4.09E-07 | 1.64E-08 | 6.08E-04 | 3.11E-06 |
| Paved road | 2024_PAVED | 1.80E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2025_PAVED | 5.95E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.006 | 0.25 | 3.16E-07 | 1.89E-07 | 3.16E-07 | 1.62E-06 | 3.54E-06 | 3.16E-07 | 5.05E-08 | 5.81E-06 | 6.31E-07 | 2.53E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2026_PAVED | 5.84E-03 | 2.44 | 3.05E-06 | 1.83E-06 | 3.05E-06 | 1.95E-06 | 6.10E-05 | 5.61E-06 | 3.41E-07 | 1.32E-04 | 6.10E-06 | 4.63E-06 | 1.73E-02 | 4.63E-05 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.002 | 0.98 | 1.23E-06 | 7.36E-07 | 1.23E-06 | 6.28E-06 | 1.37E-05 | 1.23E-06 | 1.96E-07 | 2.26E-05 | 2.45E-06 | 9.82E-08 | 3.64E-03 | 1.87E-05 |
| Paved road | 2027_PAVED | 5.61E-03 | 2.39 | 2.99E-06 | 1.79E-06 | 2.99E-06 | 1.91E-06 | 5.98E-05 | 5.50E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.54E-06 | 1.70E-02 | 4.54E-05 |
| Material Removal 2028 | 2028_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2028_PAVED | 5.57E-03 | 2.39 | 2.99E-06 | 1.80E-06 | 2.99E-06 | 1.92E-06 | 5.98E-05 | 5.51E-06 | 3.35E-07 | 1.29E-04 | 5.98E-06 | 4.55E-06 | 1.70E-02 | 4.55E-05 |
| Unpaved road | 2028_UNPAVED | 3.40E-03 | 11.84 | 1.48E-05 | 8.88E-06 | 1.48E-05 | 9.47E-06 | 2.96E-04 | 2.72E-05 | 1.66E-06 | 6.40E-04 | 2.96E-05 | 2.25E-05 | 8.41E-02 | 2.25E-04 |
| Material Removal 2029 | 2029_MATRMVL | 0.001 | 0.25 | 3.15E-07 | 1.89E-07 | 3.15E-07 | 1.62E-06 | 3.53E-06 | 3.15E-07 | 5.05E-08 | 5.80E-06 | 6.31E-07 | 2.52E-08 | 9.37E-04 | 4.80E-06 |
| Paved road | 2029_PAVED | 5.56E-03 | 2.41 | 3.01E-06 | 1.81E-06 | 3.01E-06 | 1.93E-06 | 6.03E-05 | 5.55E-06 | 3.38E-07 | 1.30E-04 | 6.03E-06 | 4.58E-06 | 1.71E-02 | 4.58E-05 |
| Unpaved road | 2029_UNPAVED | 3.39E-03 | 11.93 | 1.49E-05 | 8.95E-06 | 1.49E-05 | 9.55E-06 | 2.98E-04 | 2.74E-05 | 1.67E-06 | 6.44E-04 | 2.98E-05 | 2.27E-05 | 8.47E-02 | 2.27E-04 |

| Construction Activity | Construction Year | DPM (g/s) | Arsenic (g/s) | Beryllium (g/s) | Cadmium (g/s) | Cobalt (g/s) | Copper (g/s) | Lead (g/s) | Mercury (g/s) | Nickel (g/s) | Selenium (g/s) | Chromium VI (g/s) | Crystalline Silica (g/s) | Vanadium (g/s) | No. of Workdays (days) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel 2024 | 2024_CONCRTE | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Unpaved road | 2024_CCP_UNPV | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2024 | 2024_CHAN_RCK | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2024_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Rock Pile Area 2025 | 2025_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2025_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Rock Pile Area 2026 | 2026_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2026_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Channel Widening 2027 | 2027_CHAN_RCK | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Paved road | 2027_PAVED | 0.000E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 130.00 |
| Material Removal 2028 | 2028_MATRMVL | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Paved road | 2028_PAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Unpaved road | 2028_UNPAVED | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 0.000E+00 | 130.00 |
| Material Removal 2029 | 2029_MATRMVL | 9.332E-05 | 2.55E-08 | 1.53E-08 | 2.55E-08 | 1.30E-07 | 2.85E-07 | 2.55E-08 | 4.08E-09 | 4.69E-07 | 5.10E-08 | 2.04E-09 | 7.57E-05 | 3.87E-07 | 130.00 |
| Paved road | 2029_PAVED | 4.487E-04 | 2.43E-07 | 1.46E-07 | 2.43E-07 | 1.56E-07 | 4.87E-06 | 4.48E-07 | 2.73E-08 | 1.05E-05 | 4.87E-07 | 3.70E-07 | 1.38E-03 | 3.70E-06 | 130.00 |
| Unpaved road | 2029_UNPAVED | 2.741E-04 | 1.20E-06 | 7.23E-07 | 1.20E-06 | 7.71E-07 | 2.41E-05 | 2.22E-06 | 1.35E-07 | 5.20E-05 | 2.41E-06 | 1.83E-06 | 6.84E-03 | 1.83E-05 | 130.00 |

N/A = not including PM10 on-site dust in HRA calculation; it is only for speciating metals.

**Acute REL**

| TAC | UOM | |
|---|---|---|
| Arsenic | $\mu g/m^3$ | 0.2 |
| Mercury | $\mu g/m^3$ | 0.61 |
| Nickel | $\mu g/m^3$ | 0.2 |
| Vanadium | $\mu g/m^3$ | 31 |

| | Max |
|---|---|
| CT House | 0.037 |
| Res | 0.055 |
| Acute | 0.033 |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| | | | 0.2 | 0.61 | 0.2 | 31 | | |
| 581336.22_4131207.48 | 581336.22 | 4131207.48 | 1.66E-04 | 1.86E-05 | 7.12E-03 | 2.52E-03 | 0.037 | CT House |
| 581554.22_4130688.06 | 581554.22 | 4130688.06 | 1.10E-04 | 1.23E-05 | 4.70E-03 | 1.66E-03 | 0.024 | Res |
| 579793.36_4131503.29 | 579793.36 | 4131503.29 | 8.18E-05 | 9.26E-06 | 3.48E-03 | 1.24E-03 | 0.018 | Acute |
| 580488.37_4131517.71 | 580488.37 | 4131517.71 | 8.52E-05 | 9.59E-06 | 3.66E-03 | 1.30E-03 | 0.019 | Acute |
| 581678.43_4131040.03 | 581678.43 | 4131040.03 | 1.74E-04 | 1.95E-05 | 7.48E-03 | 2.64E-03 | 0.038 | Res |
| 581635.43_4130978.54 | 581635.43 | 4130978.54 | 2.02E-04 | 2.27E-05 | 8.69E-03 | 3.07E-03 | 0.045 | Res |
| 581830.06_4131027.55 | 581830.06 | 4131027.55 | 2.03E-04 | 2.28E-05 | 8.73E-03 | 3.08E-03 | 0.045 | Res |
| 581727.48_4130976.54 | 581727.48 | 4130976.54 | 2.19E-04 | 2.46E-05 | 9.45E-03 | 3.33E-03 | 0.048 | Res |
| 581789.11_4130419.65 | 581789.11 | 4130419.65 | 1.07E-04 | 1.21E-05 | 4.60E-03 | 1.63E-03 | 0.024 | Res |
| 581700.32_4130781.89 | 581700.32 | 4130781.89 | 1.11E-04 | 1.25E-05 | 4.76E-03 | 1.69E-03 | 0.024 | Res |
| 581426.07_4131299.01 | 581426.07 | 4131299.01 | 1.49E-04 | 1.67E-05 | 6.38E-03 | 2.26E-03 | 0.033 | Acute |
| 582301.42_4129474.56 | 582301.42 | 4129474.56 | 6.99E-05 | 7.88E-06 | 3.00E-03 | 1.06E-03 | 0.015 | Res |
| 582357.99_4129474.56 | 582357.99 | 4129474.56 | 6.64E-05 | 7.49E-06 | 2.84E-03 | 1.01E-03 | 0.015 | Res |
| 582414.56_4129474.56 | 582414.56 | 4129474.56 | 6.37E-05 | 7.18E-06 | 2.73E-03 | 9.69E-04 | 0.014 | Res |
| 582471.13_4129474.56 | 582471.13 | 4129474.56 | 5.99E-05 | 6.76E-06 | 2.57E-03 | 9.11E-04 | 0.013 | Res |
| 582527.7_4129474.56 | 582527.7 | 4129474.56 | 5.61E-05 | 6.33E-06 | 2.40E-03 | 8.53E-04 | 0.012 | Res |
| 582584.27_4129474.56 | 582584.27 | 4129474.56 | 5.18E-05 | 5.84E-06 | 2.21E-03 | 7.87E-04 | 0.011 | Res |
| 582640.84_4129474.56 | 582640.84 | 4129474.56 | 4.88E-05 | 5.51E-06 | 2.09E-03 | 7.42E-04 | 0.011 | Res |
| 582244.85_4129558.47 | 582244.85 | 4129558.47 | 6.90E-05 | 7.77E-06 | 2.95E-03 | 1.05E-03 | 0.015 | Res |
| 582301.42_4129558.47 | 582301.42 | 4129558.47 | 6.42E-05 | 7.23E-06 | 2.75E-03 | 9.75E-04 | 0.014 | Res |
| 582357.99_4129558.47 | 582357.99 | 4129558.47 | 5.92E-05 | 6.68E-06 | 2.53E-03 | 9.00E-04 | 0.013 | Res |
| 582414.56_4129558.47 | 582414.56 | 4129558.47 | 5.59E-05 | 6.30E-06 | 2.39E-03 | 8.50E-04 | 0.012 | Res |
| 582471.13_4129558.47 | 582471.13 | 4129558.47 | 5.69E-05 | 6.42E-06 | 2.44E-03 | 8.65E-04 | 0.013 | Res |
| 582527.7_4129558.47 | 582527.7 | 4129558.47 | 5.79E-05 | 6.52E-06 | 2.48E-03 | 8.80E-04 | 0.013 | Res |
| 582584.27_4129558.47 | 582584.27 | 4129558.47 | 5.86E-05 | 6.60E-06 | 2.51E-03 | 8.91E-04 | 0.013 | Res |
| 582640.84_4129558.47 | 582640.84 | 4129558.47 | 5.92E-05 | 6.67E-06 | 2.54E-03 | 9.00E-04 | 0.013 | Res |
| 582697.41_4129558.47 | 582697.41 | 4129558.47 | 5.98E-05 | 6.74E-06 | 2.56E-03 | 9.09E-04 | 0.013 | Res |
| 582244.85_4129642.38 | 582244.85 | 4129642.38 | 6.70E-05 | 7.55E-06 | 2.87E-03 | 1.02E-03 | 0.015 | Res |
| 582301.42_4129642.38 | 582301.42 | 4129642.38 | 6.67E-05 | 7.52E-06 | 2.86E-03 | 1.01E-03 | 0.015 | Res |
| 582357.99_4129642.38 | 582357.99 | 4129642.38 | 6.64E-05 | 7.48E-06 | 2.84E-03 | 1.01E-03 | 0.015 | Res |
| 582414.56_4129642.38 | 582414.56 | 4129642.38 | 6.74E-05 | 7.59E-06 | 2.89E-03 | 1.02E-03 | 0.015 | Res |
| 582471.13_4129642.38 | 582471.13 | 4129642.38 | 6.82E-05 | 7.68E-06 | 2.92E-03 | 1.04E-03 | 0.015 | Res |
| 582527.7_4129642.38 | 582527.7 | 4129642.38 | 6.88E-05 | 7.75E-06 | 2.95E-03 | 1.05E-03 | 0.015 | Res |
| 582584.27_4129642.38 | 582584.27 | 4129642.38 | 6.88E-05 | 7.75E-06 | 2.95E-03 | 1.05E-03 | 0.015 | Res |
| 582640.84_4129642.38 | 582640.84 | 4129642.38 | 6.89E-05 | 7.76E-06 | 2.95E-03 | 1.05E-03 | 0.015 | Res |
| 582697.41_4129642.38 | 582697.41 | 4129642.38 | 6.92E-05 | 7.79E-06 | 2.97E-03 | 1.05E-03 | 0.015 | Res |
| 582753.98_4129642.38 | 582753.98 | 4129642.38 | 6.87E-05 | 7.74E-06 | 2.95E-03 | 1.04E-03 | 0.015 | Res |
| 582810.55_4129642.38 | 582810.55 | 4129642.38 | 6.77E-05 | 7.62E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 582867.12_4129642.38 | 582867.12 | 4129642.38 | 6.75E-05 | 7.60E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 582244.85_4129726.29 | 582244.85 | 4129726.29 | 8.02E-05 | 9.04E-06 | 3.44E-03 | 1.22E-03 | 0.018 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582301.42_4129726.29 | 582301.42 | 4129726.29 | 8.04E-05 | 9.06E-06 | 3.45E-03 | 1.22E-03 | 0.018 | Res |
| 582357.99_4129726.29 | 582357.99 | 4129726.29 | 7.93E-05 | 8.93E-06 | 3.40E-03 | 1.21E-03 | 0.017 | Res |
| 582414.56_4129726.29 | 582414.56 | 4129726.29 | 7.83E-05 | 8.81E-06 | 3.36E-03 | 1.19E-03 | 0.017 | Res |
| 582471.13_4129726.29 | 582471.13 | 4129726.29 | 7.71E-05 | 8.68E-06 | 3.30E-03 | 1.17E-03 | 0.017 | Res |
| 582527.7_4129726.29 | 582527.7 | 4129726.29 | 7.56E-05 | 8.51E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |
| 582584.27_4129726.29 | 582584.27 | 4129726.29 | 7.50E-05 | 8.44E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582640.84_4129726.29 | 582640.84 | 4129726.29 | 7.43E-05 | 8.37E-06 | 3.19E-03 | 1.13E-03 | 0.016 | Res |
| 582697.41_4129726.29 | 582697.41 | 4129726.29 | 7.22E-05 | 8.13E-06 | 3.10E-03 | 1.10E-03 | 0.016 | Res |
| 582753.98_4129726.29 | 582753.98 | 4129726.29 | 6.99E-05 | 7.87E-06 | 3.00E-03 | 1.06E-03 | 0.015 | Res |
| 582810.55_4129726.29 | 582810.55 | 4129726.29 | 6.83E-05 | 7.68E-06 | 2.93E-03 | 1.04E-03 | 0.015 | Res |
| 582244.85_4129810.2 | 582244.85 | 4129810.2 | 8.87E-05 | 9.99E-06 | 3.81E-03 | 1.35E-03 | 0.020 | Res |
| 582301.42_4129810.2 | 582301.42 | 4129810.2 | 8.63E-05 | 9.72E-06 | 3.70E-03 | 1.31E-03 | 0.019 | Res |
| 582357.99_4129810.2 | 582357.99 | 4129810.2 | 8.36E-05 | 9.41E-06 | 3.59E-03 | 1.27E-03 | 0.018 | Res |
| 582414.56_4129810.2 | 582414.56 | 4129810.2 | 8.05E-05 | 9.06E-06 | 3.45E-03 | 1.22E-03 | 0.018 | Res |
| 582471.13_4129810.2 | 582471.13 | 4129810.2 | 7.74E-05 | 8.71E-06 | 3.32E-03 | 1.18E-03 | 0.017 | Res |
| 582527.7_4129810.2 | 582527.7 | 4129810.2 | 7.57E-05 | 8.52E-06 | 3.25E-03 | 1.15E-03 | 0.017 | Res |
| 582584.27_4129810.2 | 582584.27 | 4129810.2 | 7.35E-05 | 8.27E-06 | 3.15E-03 | 1.12E-03 | 0.016 | Res |
| 582640.84_4129810.2 | 582640.84 | 4129810.2 | 7.03E-05 | 7.92E-06 | 3.01E-03 | 1.07E-03 | 0.015 | Res |
| 582697.41_4129810.2 | 582697.41 | 4129810.2 | 6.77E-05 | 7.62E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 581905.43_4129894.11 | 581905.43 | 4129894.11 | 9.46E-05 | 1.06E-05 | 4.06E-03 | 1.44E-03 | 0.021 | Res |
| 581962_4129894.11 | 581962 | 4129894.11 | 9.47E-05 | 1.07E-05 | 4.06E-03 | 1.44E-03 | 0.021 | Res |
| 582131.71_4129894.11 | 582131.71 | 4129894.11 | 8.99E-05 | 1.01E-05 | 3.86E-03 | 1.37E-03 | 0.020 | Res |
| 582188.28_4129894.11 | 582188.28 | 4129894.11 | 8.69E-05 | 9.79E-06 | 3.73E-03 | 1.32E-03 | 0.019 | Res |
| 582244.85_4129894.11 | 582244.85 | 4129894.11 | 8.27E-05 | 9.31E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582301.42_4129894.11 | 582301.42 | 4129894.11 | 7.93E-05 | 8.93E-06 | 3.40E-03 | 1.20E-03 | 0.017 | Res |
| 582357.99_4129894.11 | 582357.99 | 4129894.11 | 7.60E-05 | 8.56E-06 | 3.26E-03 | 1.16E-03 | 0.017 | Res |
| 582414.56_4129894.11 | 582414.56 | 4129894.11 | 7.67E-05 | 8.63E-06 | 3.29E-03 | 1.17E-03 | 0.017 | Res |
| 582471.13_4129894.11 | 582471.13 | 4129894.11 | 7.77E-05 | 8.75E-06 | 3.33E-03 | 1.18E-03 | 0.017 | Res |
| 582527.7_4129894.11 | 582527.7 | 4129894.11 | 7.72E-05 | 8.70E-06 | 3.31E-03 | 1.17E-03 | 0.017 | Res |
| 582584.27_4129894.11 | 582584.27 | 4129894.11 | 7.59E-05 | 8.54E-06 | 3.26E-03 | 1.15E-03 | 0.017 | Res |
| 582640.84_4129894.11 | 582640.84 | 4129894.11 | 7.59E-05 | 8.55E-06 | 3.26E-03 | 1.15E-03 | 0.017 | Res |
| 582697.41_4129894.11 | 582697.41 | 4129894.11 | 7.47E-05 | 8.41E-06 | 3.20E-03 | 1.14E-03 | 0.016 | Res |
| 581962_4129978.02 | 581962 | 4129978.02 | 9.20E-05 | 1.04E-05 | 3.95E-03 | 1.40E-03 | 0.020 | Res |
| 582018.57_4129978.02 | 582018.57 | 4129978.02 | 8.94E-05 | 1.01E-05 | 3.83E-03 | 1.36E-03 | 0.020 | Res |
| 582075.14_4129978.02 | 582075.14 | 4129978.02 | 9.27E-05 | 1.04E-05 | 3.98E-03 | 1.41E-03 | 0.020 | Res |
| 582131.71_4129978.02 | 582131.71 | 4129978.02 | 9.04E-05 | 1.02E-05 | 3.88E-03 | 1.37E-03 | 0.020 | Res |
| 582188.28_4129978.02 | 582188.28 | 4129978.02 | 8.89E-05 | 1.00E-05 | 3.82E-03 | 1.35E-03 | 0.020 | Res |
| 582244.85_4129978.02 | 582244.85 | 4129978.02 | 8.75E-05 | 9.85E-06 | 3.75E-03 | 1.33E-03 | 0.019 | Res |
| 582301.42_4129978.02 | 582301.42 | 4129978.02 | 8.54E-05 | 9.61E-06 | 3.66E-03 | 1.30E-03 | 0.019 | Res |
| 582357.99_4129978.02 | 582357.99 | 4129978.02 | 8.49E-05 | 9.56E-06 | 3.64E-03 | 1.29E-03 | 0.019 | Res |
| 582414.56_4129978.02 | 582414.56 | 4129978.02 | 8.48E-05 | 9.54E-06 | 3.64E-03 | 1.29E-03 | 0.019 | Res |
| 582471.13_4129978.02 | 582471.13 | 4129978.02 | 8.27E-05 | 9.31E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582527.7_4129978.02 | 582527.7 | 4129978.02 | 8.08E-05 | 9.09E-06 | 3.47E-03 | 1.23E-03 | 0.018 | Res |
| 582584.27_4129978.02 | 582584.27 | 4129978.02 | 7.94E-05 | 8.94E-06 | 3.41E-03 | 1.21E-03 | 0.018 | Res |
| 582640.84_4129978.02 | 582640.84 | 4129978.02 | 7.73E-05 | 8.69E-06 | 3.32E-03 | 1.17E-03 | 0.017 | Res |
| 582697.41_4129978.02 | 582697.41 | 4129978.02 | 7.62E-05 | 8.57E-06 | 3.27E-03 | 1.16E-03 | 0.017 | Res |
| 582753.98_4129978.02 | 582753.98 | 4129978.02 | 7.40E-05 | 8.32E-06 | 3.18E-03 | 1.12E-03 | 0.016 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582810.55_4129978.02 | 582810.55 | 4129978.02 | 7.08E-05 | 7.97E-06 | 3.04E-03 | 1.08E-03 | 0.016 | Res |
| 581905.43_4130061.93 | 581905.43 | 4130061.93 | 1.08E-04 | 1.21E-05 | 4.62E-03 | 1.64E-03 | 0.024 | Res |
| 581962_4130061.93 | 581962 | 4130061.93 | 1.05E-04 | 1.18E-05 | 4.52E-03 | 1.60E-03 | 0.023 | Res |
| 582018.57_4130061.93 | 582018.57 | 4130061.93 | 1.03E-04 | 1.16E-05 | 4.44E-03 | 1.57E-03 | 0.023 | Res |
| 582075.14_4130061.93 | 582075.14 | 4130061.93 | 1.01E-04 | 1.13E-05 | 4.32E-03 | 1.53E-03 | 0.022 | Res |
| 582131.71_4130061.93 | 582131.71 | 4130061.93 | 9.67E-05 | 1.09E-05 | 4.15E-03 | 1.47E-03 | 0.021 | Res |
| 582188.28_4130061.93 | 582188.28 | 4130061.93 | 9.32E-05 | 1.05E-05 | 4.01E-03 | 1.42E-03 | 0.021 | Res |
| 582244.85_4130061.93 | 582244.85 | 4130061.93 | 8.93E-05 | 1.00E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582301.42_4130061.93 | 582301.42 | 4130061.93 | 8.75E-05 | 9.85E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582357.99_4130061.93 | 582357.99 | 4130061.93 | 8.75E-05 | 9.84E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582414.56_4130061.93 | 582414.56 | 4130061.93 | 8.53E-05 | 9.59E-06 | 3.66E-03 | 1.30E-03 | 0.019 | Res |
| 582471.13_4130061.93 | 582471.13 | 4130061.93 | 8.49E-05 | 9.55E-06 | 3.65E-03 | 1.29E-03 | 0.019 | Res |
| 582527.7_4130061.93 | 582527.7 | 4130061.93 | 8.34E-05 | 9.37E-06 | 3.58E-03 | 1.27E-03 | 0.018 | Res |
| 582584.27_4130061.93 | 582584.27 | 4130061.93 | 8.25E-05 | 9.28E-06 | 3.54E-03 | 1.25E-03 | 0.018 | Res |
| 582640.84_4130061.93 | 582640.84 | 4130061.93 | 8.07E-05 | 9.08E-06 | 3.47E-03 | 1.23E-03 | 0.018 | Res |
| 582697.41_4130061.93 | 582697.41 | 4130061.93 | 7.79E-05 | 8.76E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582753.98_4130061.93 | 582753.98 | 4130061.93 | 7.58E-05 | 8.53E-06 | 3.26E-03 | 1.15E-03 | 0.017 | Res |
| 582810.55_4130061.93 | 582810.55 | 4130061.93 | 7.42E-05 | 8.35E-06 | 3.19E-03 | 1.13E-03 | 0.016 | Res |
| 581962_4130145.84 | 581962 | 4130145.84 | 1.05E-04 | 1.19E-05 | 4.53E-03 | 1.60E-03 | 0.023 | Res |
| 582018.57_4130145.84 | 582018.57 | 4130145.84 | 1.03E-04 | 1.15E-05 | 4.40E-03 | 1.56E-03 | 0.023 | Res |
| 582075.14_4130145.84 | 582075.14 | 4130145.84 | 1.01E-04 | 1.13E-05 | 4.32E-03 | 1.53E-03 | 0.022 | Res |
| 582131.71_4130145.84 | 582131.71 | 4130145.84 | 9.75E-05 | 1.10E-05 | 4.19E-03 | 1.48E-03 | 0.021 | Res |
| 582188.28_4130145.84 | 582188.28 | 4130145.84 | 9.37E-05 | 1.05E-05 | 4.02E-03 | 1.42E-03 | 0.021 | Res |
| 582244.85_4130145.84 | 582244.85 | 4130145.84 | 9.25E-05 | 1.04E-05 | 3.97E-03 | 1.41E-03 | 0.020 | Res |
| 582301.42_4130145.84 | 582301.42 | 4130145.84 | 9.04E-05 | 1.02E-05 | 3.88E-03 | 1.37E-03 | 0.020 | Res |
| 582357.99_4130145.84 | 582357.99 | 4130145.84 | 8.78E-05 | 9.87E-06 | 3.77E-03 | 1.33E-03 | 0.019 | Res |
| 582414.56_4130145.84 | 582414.56 | 4130145.84 | 8.62E-05 | 9.69E-06 | 3.70E-03 | 1.31E-03 | 0.019 | Res |
| 582471.13_4130145.84 | 582471.13 | 4130145.84 | 8.40E-05 | 9.45E-06 | 3.61E-03 | 1.28E-03 | 0.019 | Res |
| 582527.7_4130145.84 | 582527.7 | 4130145.84 | 8.23E-05 | 9.25E-06 | 3.53E-03 | 1.25E-03 | 0.018 | Res |
| 582584.27_4130145.84 | 582584.27 | 4130145.84 | 7.90E-05 | 8.88E-06 | 3.39E-03 | 1.20E-03 | 0.017 | Res |
| 582640.84_4130145.84 | 582640.84 | 4130145.84 | 7.55E-05 | 8.49E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |
| 582697.41_4130145.84 | 582697.41 | 4130145.84 | 7.34E-05 | 8.26E-06 | 3.15E-03 | 1.12E-03 | 0.016 | Res |
| 582753.98_4130145.84 | 582753.98 | 4130145.84 | 7.22E-05 | 8.13E-06 | 3.10E-03 | 1.10E-03 | 0.016 | Res |
| 582810.55_4130145.84 | 582810.55 | 4130145.84 | 6.95E-05 | 7.82E-06 | 2.98E-03 | 1.06E-03 | 0.015 | Res |
| 582867.12_4130145.84 | 582867.12 | 4130145.84 | 6.40E-05 | 7.21E-06 | 2.75E-03 | 9.73E-04 | 0.014 | Res |
| 581962_4130229.75 | 581962 | 4130229.75 | 9.91E-05 | 1.11E-05 | 4.25E-03 | 1.51E-03 | 0.022 | Res |
| 582018.57_4130229.75 | 582018.57 | 4130229.75 | 9.49E-05 | 1.07E-05 | 4.08E-03 | 1.44E-03 | 0.021 | Res |
| 582075.14_4130229.75 | 582075.14 | 4130229.75 | 9.21E-05 | 1.04E-05 | 3.95E-03 | 1.40E-03 | 0.020 | Res |
| 582131.71_4130229.75 | 582131.71 | 4130229.75 | 8.95E-05 | 1.01E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582188.28_4130229.75 | 582188.28 | 4130229.75 | 8.83E-05 | 9.93E-06 | 3.79E-03 | 1.34E-03 | 0.019 | Res |
| 582244.85_4130229.75 | 582244.85 | 4130229.75 | 8.47E-05 | 9.53E-06 | 3.64E-03 | 1.29E-03 | 0.019 | Res |
| 582301.42_4130229.75 | 582301.42 | 4130229.75 | 8.26E-05 | 9.29E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582357.99_4130229.75 | 582357.99 | 4130229.75 | 8.03E-05 | 9.03E-06 | 3.45E-03 | 1.22E-03 | 0.018 | Res |
| 582414.56_4130229.75 | 582414.56 | 4130229.75 | 8.07E-05 | 9.08E-06 | 3.46E-03 | 1.23E-03 | 0.018 | Res |
| 582471.13_4130229.75 | 582471.13 | 4130229.75 | 7.87E-05 | 8.85E-06 | 3.38E-03 | 1.20E-03 | 0.017 | Res |
| 582527.7_4130229.75 | 582527.7 | 4130229.75 | 7.62E-05 | 8.57E-06 | 3.27E-03 | 1.16E-03 | 0.017 | Res |
| 582584.27_4130229.75 | 582584.27 | 4130229.75 | 7.54E-05 | 8.48E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |
| 582640.84_4130229.75 | 582640.84 | 4130229.75 | 7.54E-05 | 8.49E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582697.41_4130229.75 | 582697.41 | 4130229.75 | 7.37E-05 | 8.29E-06 | 3.17E-03 | 1.12E-03 | 0.016 | Res |
| 582753.98_4130229.75 | 582753.98 | 4130229.75 | 7.07E-05 | 7.95E-06 | 3.04E-03 | 1.07E-03 | 0.016 | Res |
| 582810.55_4130229.75 | 582810.55 | 4130229.75 | 7.00E-05 | 7.88E-06 | 3.01E-03 | 1.06E-03 | 0.015 | Res |
| 582867.12_4130229.75 | 582867.12 | 4130229.75 | 7.03E-05 | 7.91E-06 | 3.02E-03 | 1.07E-03 | 0.015 | Res |
| 582018.57_4130313.66 | 582018.57 | 4130313.66 | 9.14E-05 | 1.03E-05 | 3.92E-03 | 1.39E-03 | 0.020 | Res |
| 582075.14_4130313.66 | 582075.14 | 4130313.66 | 9.22E-05 | 1.04E-05 | 3.96E-03 | 1.40E-03 | 0.020 | Res |
| 582131.71_4130313.66 | 582131.71 | 4130313.66 | 9.22E-05 | 1.04E-05 | 3.96E-03 | 1.40E-03 | 0.020 | Res |
| 582188.28_4130313.66 | 582188.28 | 4130313.66 | 8.94E-05 | 1.01E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582244.85_4130313.66 | 582244.85 | 4130313.66 | 8.89E-05 | 1.00E-05 | 3.82E-03 | 1.35E-03 | 0.020 | Res |
| 582301.42_4130313.66 | 582301.42 | 4130313.66 | 8.80E-05 | 9.90E-06 | 3.78E-03 | 1.34E-03 | 0.019 | Res |
| 582357.99_4130313.66 | 582357.99 | 4130313.66 | 8.60E-05 | 9.68E-06 | 3.69E-03 | 1.31E-03 | 0.019 | Res |
| 582414.56_4130313.66 | 582414.56 | 4130313.66 | 8.26E-05 | 9.30E-06 | 3.55E-03 | 1.26E-03 | 0.018 | Res |
| 582471.13_4130313.66 | 582471.13 | 4130313.66 | 8.12E-05 | 9.14E-06 | 3.49E-03 | 1.23E-03 | 0.018 | Res |
| 582527.7_4130313.66 | 582527.7 | 4130313.66 | 8.12E-05 | 9.14E-06 | 3.49E-03 | 1.23E-03 | 0.018 | Res |
| 582584.27_4130313.66 | 582584.27 | 4130313.66 | 7.88E-05 | 8.86E-06 | 3.38E-03 | 1.20E-03 | 0.017 | Res |
| 582640.84_4130313.66 | 582640.84 | 4130313.66 | 7.51E-05 | 8.45E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582697.41_4130313.66 | 582697.41 | 4130313.66 | 7.48E-05 | 8.42E-06 | 3.21E-03 | 1.14E-03 | 0.016 | Res |
| 582753.98_4130313.66 | 582753.98 | 4130313.66 | 7.42E-05 | 8.35E-06 | 3.18E-03 | 1.13E-03 | 0.016 | Res |
| 582810.55_4130313.66 | 582810.55 | 4130313.66 | 7.17E-05 | 8.07E-06 | 3.08E-03 | 1.09E-03 | 0.016 | Res |
| 582867.12_4130313.66 | 582867.12 | 4130313.66 | 6.81E-05 | 7.66E-06 | 2.92E-03 | 1.03E-03 | 0.015 | Res |
| 581848.86_4130397.57 | 581848.86 | 4130397.57 | 9.97E-05 | 1.12E-05 | 4.28E-03 | 1.52E-03 | 0.022 | Res |
| 581905.43_4130397.57 | 581905.43 | 4130397.57 | 9.71E-05 | 1.09E-05 | 4.16E-03 | 1.48E-03 | 0.021 | Res |
| 581962_4130397.57 | 581962 | 4130397.57 | 9.50E-05 | 1.07E-05 | 4.07E-03 | 1.44E-03 | 0.021 | Res |
| 582018.57_4130397.57 | 582018.57 | 4130397.57 | 9.57E-05 | 1.08E-05 | 4.10E-03 | 1.45E-03 | 0.021 | Res |
| 582075.14_4130397.57 | 582075.14 | 4130397.57 | 9.59E-05 | 1.08E-05 | 4.11E-03 | 1.46E-03 | 0.021 | Res |
| 582131.71_4130397.57 | 582131.71 | 4130397.57 | 9.48E-05 | 1.07E-05 | 4.07E-03 | 1.44E-03 | 0.021 | Res |
| 582188.28_4130397.57 | 582188.28 | 4130397.57 | 9.31E-05 | 1.05E-05 | 3.99E-03 | 1.42E-03 | 0.021 | Res |
| 582244.85_4130397.57 | 582244.85 | 4130397.57 | 9.29E-05 | 1.05E-05 | 3.99E-03 | 1.41E-03 | 0.020 | Res |
| 582301.42_4130397.57 | 582301.42 | 4130397.57 | 8.95E-05 | 1.01E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582357.99_4130397.57 | 582357.99 | 4130397.57 | 8.79E-05 | 9.89E-06 | 3.77E-03 | 1.34E-03 | 0.019 | Res |
| 582414.56_4130397.57 | 582414.56 | 4130397.57 | 8.86E-05 | 9.98E-06 | 3.80E-03 | 1.35E-03 | 0.020 | Res |
| 582471.13_4130397.57 | 582471.13 | 4130397.57 | 8.67E-05 | 9.76E-06 | 3.72E-03 | 1.32E-03 | 0.019 | Res |
| 582527.7_4130397.57 | 582527.7 | 4130397.57 | 8.30E-05 | 9.34E-06 | 3.56E-03 | 1.26E-03 | 0.018 | Res |
| 582584.27_4130397.57 | 582584.27 | 4130397.57 | 8.40E-05 | 9.45E-06 | 3.61E-03 | 1.28E-03 | 0.019 | Res |
| 582640.84_4130397.57 | 582640.84 | 4130397.57 | 8.30E-05 | 9.34E-06 | 3.56E-03 | 1.26E-03 | 0.018 | Res |
| 582697.41_4130397.57 | 582697.41 | 4130397.57 | 7.97E-05 | 8.97E-06 | 3.42E-03 | 1.21E-03 | 0.018 | Res |
| 582753.98_4130397.57 | 582753.98 | 4130397.57 | 7.55E-05 | 8.50E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |
| 582810.55_4130397.57 | 582810.55 | 4130397.57 | 7.19E-05 | 8.09E-06 | 3.08E-03 | 1.09E-03 | 0.016 | Res |
| 582867.12_4130397.57 | 582867.12 | 4130397.57 | 7.13E-05 | 8.02E-06 | 3.06E-03 | 1.08E-03 | 0.016 | Res |
| 581848.86_4130481.48 | 581848.86 | 4130481.48 | 1.13E-04 | 1.27E-05 | 4.86E-03 | 1.72E-03 | 0.025 | Res |
| 581905.43_4130481.48 | 581905.43 | 4130481.48 | 1.11E-04 | 1.25E-05 | 4.79E-03 | 1.69E-03 | 0.025 | Res |
| 581962_4130481.48 | 581962 | 4130481.48 | 1.10E-04 | 1.24E-05 | 4.74E-03 | 1.68E-03 | 0.024 | Res |
| 582018.57_4130481.48 | 582018.57 | 4130481.48 | 1.09E-04 | 1.23E-05 | 4.70E-03 | 1.66E-03 | 0.024 | Res |
| 582075.14_4130481.48 | 582075.14 | 4130481.48 | 1.09E-04 | 1.22E-05 | 4.67E-03 | 1.65E-03 | 0.024 | Res |
| 582131.71_4130481.48 | 582131.71 | 4130481.48 | 1.08E-04 | 1.22E-05 | 4.64E-03 | 1.64E-03 | 0.024 | Res |
| 582188.28_4130481.48 | 582188.28 | 4130481.48 | 1.05E-04 | 1.18E-05 | 4.49E-03 | 1.59E-03 | 0.023 | Res |
| 582244.85_4130481.48 | 582244.85 | 4130481.48 | 1.02E-04 | 1.14E-05 | 4.36E-03 | 1.54E-03 | 0.022 | Res |
| 582301.42_4130481.48 | 582301.42 | 4130481.48 | 1.02E-04 | 1.14E-05 | 4.37E-03 | 1.55E-03 | 0.022 | Res |
| 582357.99_4130481.48 | 582357.99 | 4130481.48 | 9.90E-05 | 1.11E-05 | 4.25E-03 | 1.51E-03 | 0.022 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582414.56_4130481.48 | 582414.56 | 4130481.48 | 9.62E-05 | 1.08E-05 | 4.13E-03 | 1.46E-03 | 0.021 | Res |
| 582471.13_4130481.48 | 582471.13 | 4130481.48 | 9.71E-05 | 1.09E-05 | 4.17E-03 | 1.48E-03 | 0.021 | Res |
| 582527.7_4130481.48 | 582527.7 | 4130481.48 | 9.43E-05 | 1.06E-05 | 4.05E-03 | 1.43E-03 | 0.021 | Res |
| 582584.27_4130481.48 | 582584.27 | 4130481.48 | 8.97E-05 | 1.01E-05 | 3.85E-03 | 1.36E-03 | 0.020 | Res |
| 582640.84_4130481.48 | 582640.84 | 4130481.48 | 8.40E-05 | 9.46E-06 | 3.61E-03 | 1.28E-03 | 0.019 | Res |
| 582697.41_4130481.48 | 582697.41 | 4130481.48 | 8.20E-05 | 9.23E-06 | 3.52E-03 | 1.25E-03 | 0.018 | Res |
| 582753.98_4130481.48 | 582753.98 | 4130481.48 | 8.05E-05 | 9.06E-06 | 3.46E-03 | 1.22E-03 | 0.018 | Res |
| 582810.55_4130481.48 | 582810.55 | 4130481.48 | 7.83E-05 | 8.82E-06 | 3.36E-03 | 1.19E-03 | 0.017 | Res |
| 582867.12_4130481.48 | 582867.12 | 4130481.48 | 7.69E-05 | 8.66E-06 | 3.30E-03 | 1.17E-03 | 0.017 | Res |
| 581735.72_4130565.39 | 581735.72 | 4130565.39 | 1.15E-04 | 1.30E-05 | 4.96E-03 | 1.76E-03 | 0.025 | Res |
| 581792.29_4130565.39 | 581792.29 | 4130565.39 | 1.12E-04 | 1.26E-05 | 4.82E-03 | 1.71E-03 | 0.025 | Res |
| 581848.86_4130565.39 | 581848.86 | 4130565.39 | 1.12E-04 | 1.26E-05 | 4.82E-03 | 1.71E-03 | 0.025 | Res |
| 581905.43_4130565.39 | 581905.43 | 4130565.39 | 1.16E-04 | 1.30E-05 | 4.98E-03 | 1.76E-03 | 0.026 | Res |
| 581962_4130565.39 | 581962 | 4130565.39 | 1.14E-04 | 1.28E-05 | 4.88E-03 | 1.73E-03 | 0.025 | Res |
| 582018.57_4130565.39 | 582018.57 | 4130565.39 | 1.13E-04 | 1.27E-05 | 4.83E-03 | 1.71E-03 | 0.025 | Res |
| 582075.14_4130565.39 | 582075.14 | 4130565.39 | 1.11E-04 | 1.25E-05 | 4.77E-03 | 1.69E-03 | 0.024 | Res |
| 582131.71_4130565.39 | 582131.71 | 4130565.39 | 1.06E-04 | 1.20E-05 | 4.57E-03 | 1.62E-03 | 0.023 | Res |
| 582188.28_4130565.39 | 582188.28 | 4130565.39 | 1.07E-04 | 1.20E-05 | 4.60E-03 | 1.63E-03 | 0.024 | Res |
| 582244.85_4130565.39 | 582244.85 | 4130565.39 | 1.04E-04 | 1.17E-05 | 4.45E-03 | 1.57E-03 | 0.023 | Res |
| 582301.42_4130565.39 | 582301.42 | 4130565.39 | 1.03E-04 | 1.16E-05 | 4.41E-03 | 1.56E-03 | 0.023 | Res |
| 582357.99_4130565.39 | 582357.99 | 4130565.39 | 1.02E-04 | 1.15E-05 | 4.39E-03 | 1.55E-03 | 0.023 | Res |
| 582414.56_4130565.39 | 582414.56 | 4130565.39 | 9.80E-05 | 1.10E-05 | 4.21E-03 | 1.49E-03 | 0.022 | Res |
| 582471.13_4130565.39 | 582471.13 | 4130565.39 | 9.20E-05 | 1.04E-05 | 3.95E-03 | 1.40E-03 | 0.020 | Res |
| 582527.7_4130565.39 | 582527.7 | 4130565.39 | 8.75E-05 | 9.85E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582584.27_4130565.39 | 582584.27 | 4130565.39 | 8.60E-05 | 9.68E-06 | 3.69E-03 | 1.31E-03 | 0.019 | Res |
| 582640.84_4130565.39 | 582640.84 | 4130565.39 | 8.32E-05 | 9.36E-06 | 3.57E-03 | 1.26E-03 | 0.018 | Res |
| 582697.41_4130565.39 | 582697.41 | 4130565.39 | 8.13E-05 | 9.15E-06 | 3.49E-03 | 1.24E-03 | 0.018 | Res |
| 582753.98_4130565.39 | 582753.98 | 4130565.39 | 7.85E-05 | 8.84E-06 | 3.37E-03 | 1.19E-03 | 0.017 | Res |
| 582810.55_4130565.39 | 582810.55 | 4130565.39 | 7.52E-05 | 8.47E-06 | 3.23E-03 | 1.14E-03 | 0.017 | Res |
| 582867.12_4130565.39 | 582867.12 | 4130565.39 | 7.17E-05 | 8.07E-06 | 3.08E-03 | 1.09E-03 | 0.016 | Res |
| 581735.72_4130649.3 | 581735.72 | 4130649.3 | 1.11E-04 | 1.25E-05 | 4.75E-03 | 1.68E-03 | 0.024 | Res |
| 581792.29_4130649.3 | 581792.29 | 4130649.3 | 1.09E-04 | 1.22E-05 | 4.66E-03 | 1.65E-03 | 0.024 | Res |
| 581905.43_4130649.3 | 581905.43 | 4130649.3 | 1.20E-04 | 1.35E-05 | 5.14E-03 | 1.82E-03 | 0.026 | Res |
| 581962_4130649.3 | 581962 | 4130649.3 | 1.20E-04 | 1.35E-05 | 5.14E-03 | 1.82E-03 | 0.026 | Res |
| 582018.57_4130649.3 | 582018.57 | 4130649.3 | 1.15E-04 | 1.29E-05 | 4.93E-03 | 1.74E-03 | 0.025 | Res |
| 582075.14_4130649.3 | 582075.14 | 4130649.3 | 1.15E-04 | 1.30E-05 | 4.96E-03 | 1.75E-03 | 0.025 | Res |
| 582131.71_4130649.3 | 582131.71 | 4130649.3 | 1.12E-04 | 1.26E-05 | 4.80E-03 | 1.70E-03 | 0.025 | Res |
| 582188.28_4130649.3 | 582188.28 | 4130649.3 | 1.12E-04 | 1.26E-05 | 4.83E-03 | 1.71E-03 | 0.025 | Res |
| 582244.85_4130649.3 | 582244.85 | 4130649.3 | 1.10E-04 | 1.24E-05 | 4.74E-03 | 1.68E-03 | 0.024 | Res |
| 582301.42_4130649.3 | 582301.42 | 4130649.3 | 1.04E-04 | 1.17E-05 | 4.47E-03 | 1.58E-03 | 0.023 | Res |
| 582357.99_4130649.3 | 582357.99 | 4130649.3 | 9.69E-05 | 1.09E-05 | 4.16E-03 | 1.47E-03 | 0.021 | Res |
| 582414.56_4130649.3 | 582414.56 | 4130649.3 | 9.55E-05 | 1.07E-05 | 4.10E-03 | 1.45E-03 | 0.021 | Res |
| 582471.13_4130649.3 | 582471.13 | 4130649.3 | 9.24E-05 | 1.04E-05 | 3.97E-03 | 1.40E-03 | 0.020 | Res |
| 582527.7_4130649.3 | 582527.7 | 4130649.3 | 8.97E-05 | 1.01E-05 | 3.85E-03 | 1.36E-03 | 0.020 | Res |
| 582584.27_4130649.3 | 582584.27 | 4130649.3 | 8.58E-05 | 9.65E-06 | 3.68E-03 | 1.30E-03 | 0.019 | Res |
| 582640.84_4130649.3 | 582640.84 | 4130649.3 | 8.13E-05 | 9.14E-06 | 3.49E-03 | 1.24E-03 | 0.018 | Res |
| 582697.41_4130649.3 | 582697.41 | 4130649.3 | 7.82E-05 | 8.81E-06 | 3.36E-03 | 1.19E-03 | 0.017 | Res |
| 582753.98_4130649.3 | 582753.98 | 4130649.3 | 7.79E-05 | 8.77E-06 | 3.35E-03 | 1.18E-03 | 0.017 | Res |
| 582810.55_4130649.3 | 582810.55 | 4130649.3 | 7.75E-05 | 8.72E-06 | 3.33E-03 | 1.18E-03 | 0.017 | Res |

Acute Calculation, $\sum C_{TAC}$ /REL

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Total HI | Receptor Type |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | | |
| 582867.12_4130649.3 | 582867.12 | 4130649.3 | 7.67E-05 | 8.63E-06 | 3.29E-03 | 1.17E-03 | 0.017 | Res |
| 581848.86_4130733.21 | 581848.86 | 4130733.21 | 1.20E-04 | 1.35E-05 | 5.16E-03 | 1.82E-03 | 0.026 | Res |
| 581905.43_4130733.21 | 581905.43 | 4130733.21 | 1.17E-04 | 1.31E-05 | 5.01E-03 | 1.77E-03 | 0.026 | Res |
| 581962_4130733.21 | 581962 | 4130733.21 | 1.17E-04 | 1.32E-05 | 5.05E-03 | 1.78E-03 | 0.026 | Res |
| 582018.57_4130733.21 | 582018.57 | 4130733.21 | 1.13E-04 | 1.27E-05 | 4.87E-03 | 1.72E-03 | 0.025 | Res |
| 582075.14_4130733.21 | 582075.14 | 4130733.21 | 1.16E-04 | 1.31E-05 | 5.00E-03 | 1.77E-03 | 0.026 | Res |
| 582131.71_4130733.21 | 582131.71 | 4130733.21 | 1.10E-04 | 1.24E-05 | 4.73E-03 | 1.67E-03 | 0.024 | Res |
| 582188.28_4130733.21 | 582188.28 | 4130733.21 | 1.03E-04 | 1.16E-05 | 4.44E-03 | 1.57E-03 | 0.023 | Res |
| 582244.85_4130733.21 | 582244.85 | 4130733.21 | 9.95E-05 | 1.12E-05 | 4.27E-03 | 1.51E-03 | 0.022 | Res |
| 582301.42_4130733.21 | 582301.42 | 4130733.21 | 9.64E-05 | 1.08E-05 | 4.14E-03 | 1.46E-03 | 0.021 | Res |
| 582357.99_4130733.21 | 582357.99 | 4130733.21 | 9.25E-05 | 1.04E-05 | 3.97E-03 | 1.41E-03 | 0.020 | Res |
| 582414.56_4130733.21 | 582414.56 | 4130733.21 | 8.65E-05 | 9.73E-06 | 3.72E-03 | 1.32E-03 | 0.019 | Res |
| 582471.13_4130733.21 | 582471.13 | 4130733.21 | 8.11E-05 | 9.12E-06 | 3.48E-03 | 1.23E-03 | 0.018 | Res |
| 582527.7_4130733.21 | 582527.7 | 4130733.21 | 8.11E-05 | 9.12E-06 | 3.48E-03 | 1.23E-03 | 0.018 | Res |
| 582584.27_4130733.21 | 582584.27 | 4130733.21 | 8.06E-05 | 9.07E-06 | 3.46E-03 | 1.22E-03 | 0.018 | Res |
| 582640.84_4130733.21 | 582640.84 | 4130733.21 | 7.94E-05 | 8.94E-06 | 3.41E-03 | 1.21E-03 | 0.018 | Res |
| 582697.41_4130733.21 | 582697.41 | 4130733.21 | 7.78E-05 | 8.75E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582753.98_4130733.21 | 582753.98 | 4130733.21 | 7.55E-05 | 8.50E-06 | 3.24E-03 | 1.15E-03 | 0.017 | Res |
| 582810.55_4130733.21 | 582810.55 | 4130733.21 | 7.33E-05 | 8.24E-06 | 3.15E-03 | 1.11E-03 | 0.016 | Res |
| 582867.12_4130733.21 | 582867.12 | 4130733.21 | 7.08E-05 | 7.97E-06 | 3.04E-03 | 1.08E-03 | 0.016 | Res |
| 581735.72_4130817.12 | 581735.72 | 4130817.12 | 1.09E-04 | 1.23E-05 | 4.69E-03 | 1.66E-03 | 0.024 | Res |
| 581792.29_4130817.12 | 581792.29 | 4130817.12 | 1.19E-04 | 1.33E-05 | 5.11E-03 | 1.80E-03 | 0.026 | Res |
| 581848.86_4130817.12 | 581848.86 | 4130817.12 | 1.22E-04 | 1.37E-05 | 5.25E-03 | 1.86E-03 | 0.027 | Res |
| 581905.43_4130817.12 | 581905.43 | 4130817.12 | 1.21E-04 | 1.36E-05 | 5.19E-03 | 1.83E-03 | 0.027 | Res |
| 581962_4130817.12 | 581962 | 4130817.12 | 1.20E-04 | 1.34E-05 | 5.15E-03 | 1.82E-03 | 0.026 | Res |
| 582018.57_4130817.12 | 582018.57 | 4130817.12 | 1.12E-04 | 1.25E-05 | 4.80E-03 | 1.70E-03 | 0.025 | Res |
| 582075.14_4130817.12 | 582075.14 | 4130817.12 | 1.08E-04 | 1.21E-05 | 4.63E-03 | 1.64E-03 | 0.024 | Res |
| 582131.71_4130817.12 | 582131.71 | 4130817.12 | 1.05E-04 | 1.18E-05 | 4.51E-03 | 1.59E-03 | 0.023 | Res |
| 582188.28_4130817.12 | 582188.28 | 4130817.12 | 9.86E-05 | 1.11E-05 | 4.24E-03 | 1.50E-03 | 0.022 | Res |
| 582244.85_4130817.12 | 582244.85 | 4130817.12 | 8.94E-05 | 1.01E-05 | 3.84E-03 | 1.36E-03 | 0.020 | Res |
| 582301.42_4130817.12 | 582301.42 | 4130817.12 | 9.05E-05 | 1.02E-05 | 3.89E-03 | 1.38E-03 | 0.020 | Res |
| 582357.99_4130817.12 | 582357.99 | 4130817.12 | 9.00E-05 | 1.01E-05 | 3.87E-03 | 1.37E-03 | 0.020 | Res |
| 582414.56_4130817.12 | 582414.56 | 4130817.12 | 8.76E-05 | 9.85E-06 | 3.76E-03 | 1.33E-03 | 0.019 | Res |
| 582471.13_4130817.12 | 582471.13 | 4130817.12 | 8.44E-05 | 9.49E-06 | 3.63E-03 | 1.28E-03 | 0.019 | Res |
| 582527.7_4130817.12 | 582527.7 | 4130817.12 | 8.03E-05 | 9.03E-06 | 3.45E-03 | 1.22E-03 | 0.018 | Res |
| 582584.27_4130817.12 | 582584.27 | 4130817.12 | 7.82E-05 | 8.80E-06 | 3.36E-03 | 1.19E-03 | 0.017 | Res |
| 582640.84_4130817.12 | 582640.84 | 4130817.12 | 7.69E-05 | 8.65E-06 | 3.30E-03 | 1.17E-03 | 0.017 | Res |
| 582697.41_4130817.12 | 582697.41 | 4130817.12 | 7.52E-05 | 8.46E-06 | 3.23E-03 | 1.14E-03 | 0.017 | Res |
| 582753.98_4130817.12 | 582753.98 | 4130817.12 | 7.32E-05 | 8.24E-06 | 3.15E-03 | 1.11E-03 | 0.016 | Res |
| 582810.55_4130817.12 | 582810.55 | 4130817.12 | 7.14E-05 | 8.03E-06 | 3.07E-03 | 1.09E-03 | 0.016 | Res |
| 582867.12_4130817.12 | 582867.12 | 4130817.12 | 7.01E-05 | 7.89E-06 | 3.01E-03 | 1.07E-03 | 0.015 | Res |
| 581735.72_4130901.03 | 581735.72 | 4130901.03 | 1.49E-04 | 1.67E-05 | 6.42E-03 | 2.27E-03 | 0.033 | Res |
| 581792.29_4130901.03 | 581792.29 | 4130901.03 | 1.57E-04 | 1.76E-05 | 6.74E-03 | 2.38E-03 | 0.035 | Res |
| 581848.86_4130901.03 | 581848.86 | 4130901.03 | 1.41E-04 | 1.59E-05 | 6.08E-03 | 2.15E-03 | 0.031 | Res |
| 581905.43_4130901.03 | 581905.43 | 4130901.03 | 1.31E-04 | 1.47E-05 | 5.64E-03 | 1.99E-03 | 0.029 | Res |
| 581962_4130901.03 | 581962 | 4130901.03 | 1.27E-04 | 1.42E-05 | 5.46E-03 | 1.93E-03 | 0.028 | Res |
| 582018.57_4130901.03 | 582018.57 | 4130901.03 | 1.14E-04 | 1.28E-05 | 4.89E-03 | 1.73E-03 | 0.025 | Res |
| 582075.14_4130901.03 | 582075.14 | 4130901.03 | 1.13E-04 | 1.27E-05 | 4.87E-03 | 1.72E-03 | 0.025 | Res |
| 582131.71_4130901.03 | 582131.71 | 4130901.03 | 1.08E-04 | 1.21E-05 | 4.63E-03 | 1.63E-03 | 0.024 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582188.28_4130901.03 | 582188.28 | 4130901.03 | 9.76E-05 | 1.10E-05 | 4.20E-03 | 1.48E-03 | 0.022 | Res |
| 582244.85_4130901.03 | 582244.85 | 4130901.03 | 8.96E-05 | 1.01E-05 | 3.85E-03 | 1.36E-03 | 0.020 | Res |
| 582301.42_4130901.03 | 582301.42 | 4130901.03 | 8.50E-05 | 9.56E-06 | 3.66E-03 | 1.29E-03 | 0.019 | Res |
| 582357.99_4130901.03 | 582357.99 | 4130901.03 | 8.11E-05 | 9.11E-06 | 3.48E-03 | 1.23E-03 | 0.018 | Res |
| 582414.56_4130901.03 | 582414.56 | 4130901.03 | 7.77E-05 | 8.74E-06 | 3.34E-03 | 1.18E-03 | 0.017 | Res |
| 582471.13_4130901.03 | 582471.13 | 4130901.03 | 7.50E-05 | 8.44E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582527.7_4130901.03 | 582527.7 | 4130901.03 | 7.24E-05 | 8.14E-06 | 3.11E-03 | 1.10E-03 | 0.016 | Res |
| 582584.27_4130901.03 | 582584.27 | 4130901.03 | 6.99E-05 | 7.86E-06 | 3.00E-03 | 1.06E-03 | 0.015 | Res |
| 582640.84_4130901.03 | 582640.84 | 4130901.03 | 6.75E-05 | 7.60E-06 | 2.90E-03 | 1.03E-03 | 0.015 | Res |
| 582697.41_4130901.03 | 582697.41 | 4130901.03 | 6.52E-05 | 7.33E-06 | 2.80E-03 | 9.90E-04 | 0.014 | Res |
| 582753.98_4130901.03 | 582753.98 | 4130901.03 | 6.31E-05 | 7.10E-06 | 2.71E-03 | 9.59E-04 | 0.014 | Res |
| 582810.55_4130901.03 | 582810.55 | 4130901.03 | 6.21E-05 | 6.99E-06 | 2.67E-03 | 9.44E-04 | 0.014 | Res |
| 582867.12_4130901.03 | 582867.12 | 4130901.03 | 6.12E-05 | 6.89E-06 | 2.63E-03 | 9.30E-04 | 0.013 | Res |
| 581735.72_4130984.94 | 581735.72 | 4130984.94 | 2.43E-04 | 2.73E-05 | 1.05E-02 | 3.69E-03 | 0.054 | Res |
| 581792.29_4130984.94 | 581792.29 | 4130984.94 | 2.48E-04 | 2.78E-05 | 1.07E-02 | 3.77E-03 | 0.055 | Res |
| 581848.86_4130984.94 | 581848.86 | 4130984.94 | 2.50E-04 | 2.81E-05 | 1.08E-02 | 3.80E-03 | 0.055 | Res |
| 581905.43_4130984.94 | 581905.43 | 4130984.94 | 2.31E-04 | 2.59E-05 | 9.94E-03 | 3.50E-03 | 0.051 | Res |
| 581962_4130984.94 | 581962 | 4130984.94 | 1.82E-04 | 2.04E-05 | 7.83E-03 | 2.76E-03 | 0.040 | Res |
| 582018.57_4130984.94 | 582018.57 | 4130984.94 | 1.49E-04 | 1.67E-05 | 6.40E-03 | 2.26E-03 | 0.033 | Res |
| 582075.14_4130984.94 | 582075.14 | 4130984.94 | 1.28E-04 | 1.44E-05 | 5.51E-03 | 1.95E-03 | 0.028 | Res |
| 582131.71_4130984.94 | 582131.71 | 4130984.94 | 1.15E-04 | 1.29E-05 | 4.94E-03 | 1.75E-03 | 0.025 | Res |
| 582188.28_4130984.94 | 582188.28 | 4130984.94 | 1.06E-04 | 1.20E-05 | 4.58E-03 | 1.62E-03 | 0.024 | Res |
| 582244.85_4130984.94 | 582244.85 | 4130984.94 | 9.95E-05 | 1.12E-05 | 4.28E-03 | 1.51E-03 | 0.022 | Res |
| 582301.42_4130984.94 | 582301.42 | 4130984.94 | 9.33E-05 | 1.05E-05 | 4.02E-03 | 1.42E-03 | 0.021 | Res |
| 582357.99_4130984.94 | 582357.99 | 4130984.94 | 8.80E-05 | 9.89E-06 | 3.79E-03 | 1.34E-03 | 0.019 | Res |
| 582414.56_4130984.94 | 582414.56 | 4130984.94 | 8.33E-05 | 9.35E-06 | 3.58E-03 | 1.27E-03 | 0.018 | Res |
| 582471.13_4130984.94 | 582471.13 | 4130984.94 | 7.88E-05 | 8.85E-06 | 3.39E-03 | 1.20E-03 | 0.017 | Res |
| 582527.7_4130984.94 | 582527.7 | 4130984.94 | 7.48E-05 | 8.41E-06 | 3.22E-03 | 1.14E-03 | 0.017 | Res |
| 582584.27_4130984.94 | 582584.27 | 4130984.94 | 7.12E-05 | 8.01E-06 | 3.06E-03 | 1.08E-03 | 0.016 | Res |
| 582640.84_4130984.94 | 582640.84 | 4130984.94 | 6.81E-05 | 7.65E-06 | 2.93E-03 | 1.03E-03 | 0.015 | Res |
| 582697.41_4130984.94 | 582697.41 | 4130984.94 | 6.51E-05 | 7.31E-06 | 2.80E-03 | 9.89E-04 | 0.014 | Res |
| 582753.98_4130984.94 | 582753.98 | 4130984.94 | 6.23E-05 | 7.00E-06 | 2.68E-03 | 9.46E-04 | 0.014 | Res |
| 582810.55_4130984.94 | 582810.55 | 4130984.94 | 5.95E-05 | 6.69E-06 | 2.56E-03 | 9.05E-04 | 0.013 | Res |
| 582867.12_4130984.94 | 582867.12 | 4130984.94 | 5.73E-05 | 6.45E-06 | 2.46E-03 | 8.71E-04 | 0.013 | Res |
| 581735.72_4131068.85 | 581735.72 | 4131068.85 | 1.39E-04 | 1.57E-05 | 5.99E-03 | 2.12E-03 | 0.031 | Res |
| 581792.29_4131068.85 | 581792.29 | 4131068.85 | 1.39E-04 | 1.56E-05 | 5.97E-03 | 2.11E-03 | 0.031 | Res |
| 581848.86_4131068.85 | 581848.86 | 4131068.85 | 1.42E-04 | 1.60E-05 | 6.11E-03 | 2.16E-03 | 0.031 | Res |
| 581905.43_4131068.85 | 581905.43 | 4131068.85 | 1.39E-04 | 1.57E-05 | 5.99E-03 | 2.12E-03 | 0.031 | Res |
| 581962_4131068.85 | 581962 | 4131068.85 | 1.40E-04 | 1.57E-05 | 6.00E-03 | 2.12E-03 | 0.031 | Res |
| 582018.57_4131068.85 | 582018.57 | 4131068.85 | 1.29E-04 | 1.45E-05 | 5.56E-03 | 1.97E-03 | 0.029 | Res |
| 582075.14_4131068.85 | 582075.14 | 4131068.85 | 1.19E-04 | 1.34E-05 | 5.13E-03 | 1.81E-03 | 0.026 | Res |
| 582131.71_4131068.85 | 582131.71 | 4131068.85 | 1.13E-04 | 1.26E-05 | 4.84E-03 | 1.71E-03 | 0.025 | Res |
| 582188.28_4131068.85 | 582188.28 | 4131068.85 | 1.08E-04 | 1.21E-05 | 4.63E-03 | 1.64E-03 | 0.024 | Res |
| 582244.85_4131068.85 | 582244.85 | 4131068.85 | 1.03E-04 | 1.16E-05 | 4.44E-03 | 1.57E-03 | 0.023 | Res |
| 582301.42_4131068.85 | 582301.42 | 4131068.85 | 9.92E-05 | 1.11E-05 | 4.26E-03 | 1.51E-03 | 0.022 | Res |
| 582357.99_4131068.85 | 582357.99 | 4131068.85 | 9.50E-05 | 1.07E-05 | 4.09E-03 | 1.44E-03 | 0.021 | Res |
| 582414.56_4131068.85 | 582414.56 | 4131068.85 | 9.11E-05 | 1.02E-05 | 3.92E-03 | 1.38E-03 | 0.020 | Res |
| 582471.13_4131068.85 | 582471.13 | 4131068.85 | 8.73E-05 | 9.82E-06 | 3.75E-03 | 1.33E-03 | 0.019 | Res |
| 582527.7_4131068.85 | 582527.7 | 4131068.85 | 8.35E-05 | 9.39E-06 | 3.59E-03 | 1.27E-03 | 0.018 | Res |

| Receptor Lookup | Receptor Location | | TAC Concentration, $C_{AIR}$ ($\mu g/m^3$) | | | | Acute Calculation, $\sum C_{TAC}$ /REL | |
|---|---|---|---|---|---|---|---|---|
| | UTM X | UTM Y | Arsenic | Mercury | Nickel | Vanadium | Total HI | Receptor Type |
| 582584.27_4131068.85 | 582584.27 | 4131068.85 | 7.99E-05 | 8.98E-06 | 3.43E-03 | 1.21E-03 | 0.018 | Res |
| 582640.84_4131068.85 | 582640.84 | 4131068.85 | 7.70E-05 | 8.66E-06 | 3.31E-03 | 1.17E-03 | 0.017 | Res |
| 582697.41_4131068.85 | 582697.41 | 4131068.85 | 7.40E-05 | 8.32E-06 | 3.18E-03 | 1.13E-03 | 0.016 | Res |
| 582753.98_4131068.85 | 582753.98 | 4131068.85 | 7.15E-05 | 8.04E-06 | 3.07E-03 | 1.09E-03 | 0.016 | Res |
| 582810.55_4131068.85 | 582810.55 | 4131068.85 | 6.89E-05 | 7.75E-06 | 2.96E-03 | 1.05E-03 | 0.015 | Res |
| 582867.12_4131068.85 | 582867.12 | 4131068.85 | 6.60E-05 | 7.42E-06 | 2.84E-03 | 1.00E-03 | 0.015 | Res |
| 582018.57_4131152.76 | 582018.57 | 4131152.76 | 1.07E-04 | 1.21E-05 | 4.62E-03 | 1.63E-03 | 0.024 | Res |
| 582244.85_4131152.76 | 582244.85 | 4131152.76 | 9.86E-05 | 1.11E-05 | 4.24E-03 | 1.50E-03 | 0.022 | Res |
| 582301.42_4131152.76 | 582301.42 | 4131152.76 | 9.58E-05 | 1.08E-05 | 4.12E-03 | 1.46E-03 | 0.021 | Res |
| 582357.99_4131152.76 | 582357.99 | 4131152.76 | 9.25E-05 | 1.04E-05 | 3.98E-03 | 1.41E-03 | 0.020 | Res |
| 582414.56_4131152.76 | 582414.56 | 4131152.76 | 8.92E-05 | 1.00E-05 | 3.83E-03 | 1.36E-03 | 0.020 | Res |
| 582471.13_4131152.76 | 582471.13 | 4131152.76 | 8.51E-05 | 9.57E-06 | 3.65E-03 | 1.29E-03 | 0.019 | Res |
| 582527.7_4131152.76 | 582527.7 | 4131152.76 | 8.14E-05 | 9.15E-06 | 3.50E-03 | 1.24E-03 | 0.018 | Res |
| 582584.27_4131152.76 | 582584.27 | 4131152.76 | 7.84E-05 | 8.82E-06 | 3.37E-03 | 1.19E-03 | 0.017 | Res |
| 582640.84_4131152.76 | 582640.84 | 4131152.76 | 7.65E-05 | 8.60E-06 | 3.28E-03 | 1.16E-03 | 0.017 | Res |
| 582697.41_4131152.76 | 582697.41 | 4131152.76 | 7.46E-05 | 8.39E-06 | 3.20E-03 | 1.13E-03 | 0.016 | Res |
| 582753.98_4131152.76 | 582753.98 | 4131152.76 | 7.30E-05 | 8.21E-06 | 3.13E-03 | 1.11E-03 | 0.016 | Res |
| 582810.55_4131152.76 | 582810.55 | 4131152.76 | 7.13E-05 | 8.01E-06 | 3.06E-03 | 1.08E-03 | 0.016 | Res |
| 582867.12_4131152.76 | 582867.12 | 4131152.76 | 6.89E-05 | 7.75E-06 | 2.96E-03 | 1.05E-03 | 0.015 | Res |

# B-6 Aermod Output Plot Files by Source

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| * | AERMOD ( 191 | 91): C:\Lakes\P | CRP\PCRP.isc | | | | | |
| * | AERMET ( 141 | 34): | | | | | | |
| * | MODELING OPT | IONS USED: Re | gDFAULT CONC | | | | | |
| * | PLOT | FILE OF ANNUAL | VALUES AVERA | | | | | |
| * | FOR | A TOTAL OF 1 | 0 RECEPTORS. | | | | | |
| * | FORM | AT: (3(1X,F13.5 | ),3(1X,F8.2), | | | | | |
| * | X | Y | AVERAGE CONC | | | | | |
| * | _____ | _____ | MATRMVL | CHAN_RCK | CONCRTE | UNPAVED | PAVED | CCP_UNPV |
| 581336.22_4131207 | 581336.22 | 4131207.48 | 0.01546 | 0.02114 | 0.10034 | 0.02517 | 1.1474 | 0.32144 |
| 581554.22_413068 | 581554.22 | 4130688.06 | 0.01642 | 0.04303 | 0.17671 | 0.03208 | 0.75927 | 0.6034 |
| 579793.36_413150 | 579793.36 | 4131503.29 | 0.02495 | 0.03484 | 0.04993 | 0.042 | 0.03845 | 0.02634 |
| 580488.37_413151 | 580488.37 | 4131517.71 | 0.01365 | 0.02017 | 0.10858 | 0.02613 | 0.07249 | 0.17866 |
| 581678.43_413104 | 581678.43 | 4131040.03 | 0.01232 | 0.02584 | 0.10671 | 0.02166 | 3.68051 | 0.3229 |
| 581635.43_413097 | 581635.43 | 4130978.54 | 0.01275 | 0.02846 | 0.14556 | 0.02306 | 7.46525 | 0.47181 |
| 581830.06_413102 | 581830.06 | 4131027.55 | 0.01141 | 0.02275 | 0.08991 | 0.01975 | 3.39026 | 0.22463 |
| 581727.48_413097 | 581727.48 | 4130976.54 | 0.01215 | 0.02587 | 0.12164 | 0.02163 | 9.04165 | 0.33828 |
| 581789.11_413041 | 581789.11 | 4130419.65 | 0.01677 | 0.05525 | 0.18162 | 0.03094 | 0.56897 | 0.47297 |
| 581700.32_413078 | 581700.32 | 4130781.89 | 0.01388 | 0.03025 | 0.21366 | 0.02556 | 1.7784 | 0.53937 |
| 581426.07_413129 | 581426.07 | 4131299.01 | 0.01462 | 0.01865 | 0.07415 | 0.02172 | 0.40726 | 0.18495 |
| 582301.42_412947 | 582301.42 | 4129474.56 | 0.014 | 0.05076 | 0.16902 | 0.02326 | 0.17134 | 0.27119 |
| 582357.99_412947 | 582357.99 | 4129474.56 | 0.01369 | 0.04808 | 0.15121 | 0.02223 | 0.15989 | 0.24417 |
| 582414.56_412947 | 582414.56 | 4129474.56 | 0.01341 | 0.04567 | 0.13571 | 0.02129 | 0.14952 | 0.21821 |
| 582471.13_412947 | 582471.13 | 4129474.56 | 0.01313 | 0.04339 | 0.12161 | 0.02041 | 0.14018 | 0.19348 |
| 582527.7_4129474. | 582527.7 | 4129474.56 | 0.01287 | 0.04139 | 0.11037 | 0.01963 | 0.13217 | 0.17315 |
| 582584.27_412947 | 582584.27 | 4129474.56 | 0.01259 | 0.03934 | 0.09859 | 0.01886 | 0.12407 | 0.15274 |
| 582640.84_412947 | 582640.84 | 4129474.56 | 0.01233 | 0.03746 | 0.08901 | 0.01816 | 0.11538 | 0.13636 |
| 582244.85_412955 | 582244.85 | 4129558.47 | 0.01468 | 0.0584 | 0.12054 | 0.02384 | 0.17277 | 0.26059 |
| 582301.42_412955 | 582301.42 | 4129558.47 | 0.01429 | 0.05306 | 0.15191 | 0.02269 | 0.17196 | 0.27813 |
| 582357.99_412955 | 582357.99 | 4129558.47 | 0.01392 | 0.04911 | 0.14808 | 0.02167 | 0.16323 | 0.24482 |
| 582414.56_412955 | 582414.56 | 4129558.47 | 0.01362 | 0.04645 | 0.13219 | 0.02082 | 0.15296 | 0.21483 |
| 582471.13_412955 | 582471.13 | 4129558.47 | 0.01329 | 0.04352 | 0.11315 | 0.01996 | 0.14297 | 0.18105 |
| 582527.7_4129558. | 582527.7 | 4129558.47 | 0.013 | 0.04137 | 0.10183 | 0.01925 | 0.13352 | 0.16079 |
| 582584.27_412955 | 582584.27 | 4129558.47 | 0.01272 | 0.0394 | 0.09247 | 0.01859 | 0.12456 | 0.14417 |
| 582640.84_412955 | 582640.84 | 4129558.47 | 0.01247 | 0.03768 | 0.08503 | 0.01801 | 0.11705 | 0.13088 |
| 582697.41_412955 | 582697.41 | 4129558.47 | 0.01222 | 0.03605 | 0.07842 | 0.01747 | 0.10985 | 0.11933 |
| 582244.85_412964 | 582244.85 | 4129642.38 | 0.01496 | 0.06176 | 0.08853 | 0.02356 | 0.15017 | 0.1735 |
| 582301.42_412964 | 582301.42 | 4129642.38 | 0.01451 | 0.05512 | 0.11835 | 0.02245 | 0.16719 | 0.2408 |
| 582357.99_412964 | 582357.99 | 4129642.38 | 0.01409 | 0.04968 | 0.14225 | 0.02146 | 0.166 | 0.24022 |
| 582414.56_412964 | 582414.56 | 4129642.38 | 0.01374 | 0.04632 | 0.12459 | 0.02064 | 0.15675 | 0.20371 |
| 582471.13_412964 | 582471.13 | 4129642.38 | 0.01342 | 0.04364 | 0.10943 | 0.01992 | 0.14694 | 0.17582 |
| 582527.7_4129642. | 582527.7 | 4129642.38 | 0.01311 | 0.04138 | 0.09828 | 0.01928 | 0.13788 | 0.15577 |
| 582584.27_412964 | 582584.27 | 4129642.38 | 0.01281 | 0.03929 | 0.08867 | 0.01868 | 0.12796 | 0.13903 |
| 582640.84_412964 | 582640.84 | 4129642.38 | 0.01255 | 0.03746 | 0.08121 | 0.01815 | 0.11938 | 0.12593 |
| 582697.41_412964 | 582697.41 | 4129642.38 | 0.01229 | 0.03582 | 0.07498 | 0.01766 | 0.11153 | 0.11504 |
| 582753.98_412964 | 582753.98 | 4129642.38 | 0.01203 | 0.03434 | 0.06963 | 0.01721 | 0.10389 | 0.10583 |
| 582810.55_412964 | 582810.55 | 4129642.38 | 0.01178 | 0.03303 | 0.06534 | 0.0168 | 0.09703 | 0.09846 |
| 582867.12_412964 | 582867.12 | 4129642.38 | 0.01156 | 0.03172 | 0.0609 | 0.0164 | 0.08956 | 0.09143 |
| 582244.85_412972 | 582244.85 | 4129726.29 | 0.01499 | 0.05993 | 0.09752 | 0.02338 | 0.16634 | 0.1927 |
| 582301.42_412972 | 582301.42 | 4129726.29 | 0.01461 | 0.05544 | 0.10272 | 0.02252 | 0.16253 | 0.20344 |
| 582357.99_412972 | 582357.99 | 4129726.29 | 0.01418 | 0.04963 | 0.13012 | 0.02161 | 0.16722 | 0.23202 |
| 582414.56_412972 | 582414.56 | 4129726.29 | 0.01381 | 0.04619 | 0.12059 | 0.02087 | 0.15994 | 0.20098 |
| 582471.13_412972 | 582471.13 | 4129726.29 | 0.01348 | 0.04353 | 0.10754 | 0.02021 | 0.15081 | 0.17508 |
| 582527.7_4129726. | 582527.7 | 4129726.29 | 0.01315 | 0.04104 | 0.0953 | 0.01959 | 0.14169 | 0.15236 |
| 582584.27_412972 | 582584.27 | 4129726.29 | 0.01284 | 0.03898 | 0.08629 | 0.01903 | 0.13246 | 0.13626 |
| 582640.84_412972 | 582640.84 | 4129726.29 | 0.01256 | 0.03717 | 0.07915 | 0.01852 | 0.12334 | 0.12376 |
| 582697.41_412972 | 582697.41 | 4129726.29 | 0.01229 | 0.0355 | 0.07273 | 0.01803 | 0.11373 | 0.11291 |
| 582753.98_412972 | 582753.98 | 4129726.29 | 0.01201 | 0.03394 | 0.06702 | 0.01757 | 0.10423 | 0.10363 |
| 582810.55_412972 | 582810.55 | 4129726.29 | 0.01173 | 0.03238 | 0.06137 | 0.0171 | 0.09442 | 0.09497 |

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|---|---|---|---|---|---|---|---|---|
| 582244.85_412981( | 582244.85 | 4129810.2 | 0.01499 | 0.05947 | 0.08814 | 0.02371 | 0.16159 | 0.16554 |
| 582301.42_412981( | 582301.42 | 4129810.2 | 0.01456 | 0.054 | 0.10103 | 0.02282 | 0.16517 | 0.19686 |
| 582357.99_412981( | 582357.99 | 4129810.2 | 0.01416 | 0.04933 | 0.11581 | 0.02202 | 0.16495 | 0.21438 |
| 582414.56_412981( | 582414.56 | 4129810.2 | 0.01377 | 0.04548 | 0.114 | 0.02126 | 0.16128 | 0.19446 |
| 582471.13_412981( | 582471.13 | 4129810.2 | 0.0134 | 0.04246 | 0.10052 | 0.02057 | 0.15407 | 0.16574 |
| 582527.7_4129810. | 582527.7 | 4129810.2 | 0.01307 | 0.04031 | 0.09093 | 0.01998 | 0.14422 | 0.14775 |
| 582584.27_412981( | 582584.27 | 4129810.2 | 0.01275 | 0.03825 | 0.08212 | 0.0194 | 0.13399 | 0.13197 |
| 582640.84_412981( | 582640.84 | 4129810.2 | 0.01245 | 0.03634 | 0.07435 | 0.01885 | 0.12206 | 0.11877 |
| 582697.41_412981( | 582697.41 | 4129810.2 | 0.01216 | 0.03468 | 0.06826 | 0.01834 | 0.11128 | 0.10875 |
| 581905.43_412989( | 581905.43 | 4129894.11 | 0.01782 | 0.05159 | 0.11215 | 0.03073 | 0.21448 | 0.22809 |
| 581962_4129894.11 | 581962 | 4129894.11 | 0.01716 | 0.06893 | 0.1076 | 0.02915 | 0.2149 | 0.21692 |
| 582131.71_412989( | 582131.71 | 4129894.11 | 0.01569 | 0.06584 | 0.09214 | 0.02587 | 0.18639 | 0.17891 |
| 582188.28_412989( | 582188.28 | 4129894.11 | 0.01524 | 0.06099 | 0.09168 | 0.02492 | 0.17971 | 0.17511 |
| 582244.85_412989( | 582244.85 | 4129894.11 | 0.01479 | 0.05586 | 0.09721 | 0.02401 | 0.17672 | 0.19028 |
| 582301.42_412989( | 582301.42 | 4129894.11 | 0.01438 | 0.05157 | 0.10417 | 0.02319 | 0.17109 | 0.20396 |
| 582357.99_412989( | 582357.99 | 4129894.11 | 0.014 | 0.04793 | 0.10708 | 0.02241 | 0.16352 | 0.20185 |
| 582414.56_412989( | 582414.56 | 4129894.11 | 0.01357 | 0.04347 | 0.10445 | 0.02156 | 0.16715 | 0.17843 |
| 582471.13_412989( | 582471.13 | 4129894.11 | 0.0132 | 0.04073 | 0.0911 | 0.02083 | 0.15643 | 0.15214 |
| 582527.7_4129894. | 582527.7 | 4129894.11 | 0.01287 | 0.03869 | 0.08257 | 0.02021 | 0.14364 | 0.1367 |
| 582584.27_412989( | 582584.27 | 4129894.11 | 0.01256 | 0.03688 | 0.07559 | 0.01962 | 0.13097 | 0.12446 |
| 582640.84_412989( | 582640.84 | 4129894.11 | 0.01227 | 0.0352 | 0.06939 | 0.01906 | 0.11892 | 0.11386 |
| 582697.41_412989( | 582697.41 | 4129894.11 | 0.01199 | 0.03364 | 0.06388 | 0.01851 | 0.10772 | 0.10456 |
| 581962_4129978.02 | 581962 | 4129978.02 | 0.01694 | 0.06838 | 0.10294 | 0.02962 | 0.22462 | 0.20898 |
| 582018.57_412997( | 582018.57 | 4129978.02 | 0.01643 | 0.06943 | 0.09464 | 0.02845 | 0.21086 | 0.18579 |
| 582075.14_412997( | 582075.14 | 4129978.02 | 0.01586 | 0.0656 | 0.10185 | 0.02714 | 0.21896 | 0.20579 |
| 582131.71_412997( | 582131.71 | 4129978.02 | 0.01537 | 0.05946 | 0.10879 | 0.02604 | 0.2197 | 0.22468 |
| 582188.28_412997( | 582188.28 | 4129978.02 | 0.0149 | 0.05369 | 0.12874 | 0.02501 | 0.22058 | 0.26608 |
| 582244.85_412997( | 582244.85 | 4129978.02 | 0.01451 | 0.05085 | 0.11709 | 0.02418 | 0.19859 | 0.23492 |
| 582301.42_412997( | 582301.42 | 4129978.02 | 0.01407 | 0.04635 | 0.12056 | 0.02324 | 0.19687 | 0.2194 |
| 582357.99_412997( | 582357.99 | 4129978.02 | 0.01367 | 0.04322 | 0.10538 | 0.0224 | 0.18617 | 0.18429 |
| 582414.56_412997( | 582414.56 | 4129978.02 | 0.01332 | 0.04085 | 0.094 | 0.02165 | 0.17178 | 0.16176 |
| 582471.13_412997( | 582471.13 | 4129978.02 | 0.01299 | 0.03876 | 0.08475 | 0.02095 | 0.1568 | 0.14441 |
| 582527.7_4129978. | 582527.7 | 4129978.02 | 0.01266 | 0.03693 | 0.07741 | 0.02029 | 0.14209 | 0.13091 |
| 582584.27_412997( | 582584.27 | 4129978.02 | 0.01234 | 0.03526 | 0.07106 | 0.01967 | 0.12844 | 0.11933 |
| 582640.84_412997( | 582640.84 | 4129978.02 | 0.01205 | 0.03374 | 0.06569 | 0.01907 | 0.11618 | 0.10939 |
| 582697.41_412997( | 582697.41 | 4129978.02 | 0.01178 | 0.03231 | 0.06094 | 0.01851 | 0.10492 | 0.10037 |
| 582753.98_412997( | 582753.98 | 4129978.02 | 0.0115 | 0.0309 | 0.0563 | 0.01794 | 0.0939 | 0.0915 |
| 582810.55_412997( | 582810.55 | 4129978.02 | 0.01121 | 0.02939 | 0.05128 | 0.01736 | 0.08199 | 0.08232 |
| 581905.43_413006( | 581905.43 | 4130061.93 | 0.0169 | 0.06964 | 0.15888 | 0.03046 | 0.33096 | 0.38419 |
| 581962_4130061.93 | 581962 | 4130061.93 | 0.01641 | 0.06473 | 0.14652 | 0.02925 | 0.31208 | 0.3466 |
| 582018.57_413006( | 582018.57 | 4130061.93 | 0.01601 | 0.06291 | 0.11437 | 0.02828 | 0.26342 | 0.24252 |
| 582075.14_413006( | 582075.14 | 4130061.93 | 0.01558 | 0.05953 | 0.10119 | 0.02726 | 0.23395 | 0.20324 |
| 582131.71_413006( | 582131.71 | 4130061.93 | 0.01509 | 0.05416 | 0.10839 | 0.02613 | 0.23041 | 0.22542 |
| 582188.28_413006( | 582188.28 | 4130061.93 | 0.01464 | 0.0495 | 0.12153 | 0.02507 | 0.22572 | 0.25216 |
| 582244.85_413006( | 582244.85 | 4130061.93 | 0.01419 | 0.04523 | 0.12467 | 0.02405 | 0.22174 | 0.2349 |
| 582301.42_413006( | 582301.42 | 4130061.93 | 0.01381 | 0.04251 | 0.11091 | 0.02316 | 0.20557 | 0.20184 |
| 582357.99_413006( | 582357.99 | 4130061.93 | 0.01344 | 0.04012 | 0.0987 | 0.02234 | 0.19026 | 0.17515 |
| 582414.56_413006( | 582414.56 | 4130061.93 | 0.0131 | 0.03807 | 0.08888 | 0.02156 | 0.17383 | 0.15517 |
| 582471.13_413006( | 582471.13 | 4130061.93 | 0.01277 | 0.03619 | 0.08053 | 0.02083 | 0.15702 | 0.13859 |
| 582527.7_4130061. | 582527.7 | 4130061.93 | 0.01246 | 0.03455 | 0.07393 | 0.02014 | 0.14092 | 0.12542 |
| 582584.27_413006( | 582584.27 | 4130061.93 | 0.01215 | 0.03306 | 0.06834 | 0.0195 | 0.12655 | 0.11398 |
| 582640.84_413006( | 582640.84 | 4130061.93 | 0.01186 | 0.03165 | 0.06333 | 0.01888 | 0.11326 | 0.1035 |
| 582697.41_413006( | 582697.41 | 4130061.93 | 0.01159 | 0.03037 | 0.0591 | 0.01829 | 0.10171 | 0.09433 |
| 582753.98_413006( | 582753.98 | 4130061.93 | 0.01134 | 0.02918 | 0.05536 | 0.01773 | 0.09163 | 0.08602 |
| 582810.55_413006( | 582810.55 | 4130061.93 | 0.01107 | 0.02801 | 0.05182 | 0.01719 | 0.08251 | 0.07824 |
| 581962_4130145.84 | 581962 | 4130145.84 | 0.01604 | 0.05557 | 0.18835 | 0.02895 | 0.36811 | 0.4519 |
| 582018.57_413014( | 582018.57 | 4130145.84 | 0.01559 | 0.05192 | 0.17484 | 0.02778 | 0.34067 | 0.39389 |
| 582075.14_413014( | 582075.14 | 4130145.84 | 0.01522 | 0.05041 | 0.13577 | 0.02682 | 0.28794 | 0.30061 |

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|---|---|---|---|---|---|---|---|---|
| 582131.71_413014 | 582131.71 | 4130145.84 | 0.01479 | 0.04699 | 0.13335 | 0.02575 | 0.26644 | 0.28273 |
| 582188.28_413014 | 582188.28 | 4130145.84 | 0.01433 | 0.04306 | 0.12855 | 0.02463 | 0.2578 | 0.24641 |
| 582244.85_413014 | 582244.85 | 4130145.84 | 0.01394 | 0.04058 | 0.11397 | 0.02369 | 0.23458 | 0.21097 |
| 582301.42_413014 | 582301.42 | 4130145.84 | 0.01359 | 0.03854 | 0.10284 | 0.02283 | 0.21202 | 0.18613 |
| 582357.99_413014 | 582357.99 | 4130145.84 | 0.01324 | 0.03663 | 0.0931 | 0.02201 | 0.1924 | 0.16468 |
| 582414.56_413014 | 582414.56 | 4130145.84 | 0.01291 | 0.03488 | 0.08489 | 0.02124 | 0.1739 | 0.14672 |
| 582471.13_413014 | 582471.13 | 4130145.84 | 0.0126 | 0.03328 | 0.07784 | 0.02051 | 0.15574 | 0.13124 |
| 582527.7_4130145. | 582527.7 | 4130145.84 | 0.01229 | 0.03181 | 0.07186 | 0.01981 | 0.13815 | 0.11787 |
| 582584.27_413014 | 582584.27 | 4130145.84 | 0.012 | 0.03045 | 0.06663 | 0.01916 | 0.12223 | 0.10604 |
| 582640.84_413014 | 582640.84 | 4130145.84 | 0.01171 | 0.02918 | 0.06202 | 0.01853 | 0.10855 | 0.09561 |
| 582697.41_413014 | 582697.41 | 4130145.84 | 0.01144 | 0.02802 | 0.05808 | 0.01794 | 0.09698 | 0.08663 |
| 582753.98_413014 | 582753.98 | 4130145.84 | 0.01119 | 0.02696 | 0.05468 | 0.01739 | 0.08739 | 0.0789 |
| 582810.55_413014 | 582810.55 | 4130145.84 | 0.01095 | 0.02596 | 0.0516 | 0.01686 | 0.07936 | 0.07214 |
| 582867.12_413014 | 582867.12 | 4130145.84 | 0.01067 | 0.02469 | 0.04692 | 0.01627 | 0.0692 | 0.06409 |
| 581962_4130229.75 | 581962 | 4130229.75 | 0.01585 | 0.05262 | 0.16018 | 0.02861 | 0.37712 | 0.37943 |
| 582018.57_413022 | 582018.57 | 4130229.75 | 0.01538 | 0.04827 | 0.16427 | 0.02734 | 0.3599 | 0.36778 |
| 582075.14_413022 | 582075.14 | 4130229.75 | 0.01493 | 0.04476 | 0.15161 | 0.02617 | 0.33437 | 0.30929 |
| 582131.71_413022 | 582131.71 | 4130229.75 | 0.01452 | 0.04201 | 0.13425 | 0.02511 | 0.30018 | 0.26178 |
| 582188.28_413022 | 582188.28 | 4130229.75 | 0.01414 | 0.03966 | 0.1201 | 0.02414 | 0.26672 | 0.22606 |
| 582244.85_413022 | 582244.85 | 4130229.75 | 0.01378 | 0.03753 | 0.10818 | 0.02323 | 0.23764 | 0.19695 |
| 582301.42_413022 | 582301.42 | 4130229.75 | 0.01343 | 0.0356 | 0.09824 | 0.02238 | 0.21302 | 0.17314 |
| 582357.99_413022 | 582357.99 | 4130229.75 | 0.01309 | 0.03383 | 0.08975 | 0.02157 | 0.19142 | 0.15292 |
| 582414.56_413022 | 582414.56 | 4130229.75 | 0.01277 | 0.03222 | 0.08248 | 0.02081 | 0.17002 | 0.13567 |
| 582471.13_413022 | 582471.13 | 4130229.75 | 0.01247 | 0.03075 | 0.07624 | 0.02009 | 0.1492 | 0.12086 |
| 582527.7_4130229. | 582527.7 | 4130229.75 | 0.01217 | 0.02939 | 0.07074 | 0.01941 | 0.13086 | 0.10804 |
| 582584.27_413022 | 582584.27 | 4130229.75 | 0.01189 | 0.02813 | 0.0659 | 0.01877 | 0.1153 | 0.09702 |
| 582640.84_413022 | 582640.84 | 4130229.75 | 0.01162 | 0.02696 | 0.06163 | 0.01816 | 0.10232 | 0.08762 |
| 582697.41_413022 | 582697.41 | 4130229.75 | 0.01136 | 0.02592 | 0.05805 | 0.01759 | 0.09197 | 0.07989 |
| 582753.98_413022 | 582753.98 | 4130229.75 | 0.0111 | 0.02491 | 0.05457 | 0.01704 | 0.08317 | 0.07293 |
| 582810.55_413022 | 582810.55 | 4130229.75 | 0.01086 | 0.02398 | 0.05153 | 0.01652 | 0.07602 | 0.0671 |
| 582867.12_413022 | 582867.12 | 4130229.75 | 0.01063 | 0.02314 | 0.0489 | 0.01603 | 0.07004 | 0.0622 |
| 582018.57_413031 | 582018.57 | 4130313.66 | 0.0152 | 0.04611 | 0.15991 | 0.02671 | 0.38949 | 0.34087 |
| 582075.14_413031 | 582075.14 | 4130313.66 | 0.01475 | 0.04263 | 0.1411 | 0.02554 | 0.36052 | 0.27581 |
| 582131.71_413031 | 582131.71 | 4130313.66 | 0.01436 | 0.04016 | 0.1263 | 0.02454 | 0.31439 | 0.23624 |
| 582188.28_413031 | 582188.28 | 4130313.66 | 0.014 | 0.03794 | 0.11434 | 0.02361 | 0.27368 | 0.2053 |
| 582244.85_413031 | 582244.85 | 4130313.66 | 0.01364 | 0.03591 | 0.10425 | 0.02273 | 0.24052 | 0.17953 |
| 582301.42_413031 | 582301.42 | 4130313.66 | 0.0133 | 0.03403 | 0.09546 | 0.02191 | 0.21266 | 0.15747 |
| 582357.99_413031 | 582357.99 | 4130313.66 | 0.01297 | 0.0323 | 0.08781 | 0.02113 | 0.18594 | 0.13876 |
| 582414.56_413031 | 582414.56 | 4130313.66 | 0.01266 | 0.03072 | 0.08113 | 0.0204 | 0.16103 | 0.12297 |
| 582471.13_413031 | 582471.13 | 4130313.66 | 0.01236 | 0.02926 | 0.07528 | 0.0197 | 0.13968 | 0.10974 |
| 582527.7_4130313. | 582527.7 | 4130313.66 | 0.01207 | 0.02791 | 0.07013 | 0.01905 | 0.12225 | 0.09868 |
| 582584.27_413031 | 582584.27 | 4130313.66 | 0.0118 | 0.02667 | 0.0655 | 0.01843 | 0.1079 | 0.08932 |
| 582640.84_413031 | 582640.84 | 4130313.66 | 0.01154 | 0.02553 | 0.06142 | 0.01784 | 0.09644 | 0.08151 |
| 582697.41_413031 | 582697.41 | 4130313.66 | 0.01128 | 0.02446 | 0.05769 | 0.01728 | 0.08694 | 0.07482 |
| 582753.98_413031 | 582753.98 | 4130313.66 | 0.01103 | 0.02349 | 0.05441 | 0.01676 | 0.07891 | 0.0692 |
| 582810.55_413031 | 582810.55 | 4130313.66 | 0.0108 | 0.02259 | 0.05143 | 0.01626 | 0.07183 | 0.06435 |
| 582867.12_413031 | 582867.12 | 4130313.66 | 0.01057 | 0.02176 | 0.04879 | 0.01579 | 0.06567 | 0.06023 |
| 581848.86_413039 | 581848.86 | 4130397.57 | 0.01633 | 0.05341 | 0.17882 | 0.02971 | 0.53782 | 0.45333 |
| 581905.43_413039 | 581905.43 | 4130397.57 | 0.01585 | 0.04971 | 0.18048 | 0.02837 | 0.52179 | 0.43154 |
| 581962_4130397.57 | 581962 | 4130397.57 | 0.01538 | 0.04631 | 0.1713 | 0.0271 | 0.49325 | 0.36042 |
| 582018.57_413039 | 582018.57 | 4130397.57 | 0.01495 | 0.04358 | 0.15116 | 0.02597 | 0.44128 | 0.2948 |
| 582075.14_413039 | 582075.14 | 4130397.57 | 0.01454 | 0.04109 | 0.13375 | 0.02491 | 0.38522 | 0.24529 |
| 582131.71_413039 | 582131.71 | 4130397.57 | 0.01417 | 0.03897 | 0.12106 | 0.02397 | 0.32783 | 0.21109 |
| 582188.28_413039 | 582188.28 | 4130397.57 | 0.01381 | 0.03697 | 0.11022 | 0.02308 | 0.28313 | 0.18294 |
| 582244.85_413039 | 582244.85 | 4130397.57 | 0.01348 | 0.03513 | 0.10149 | 0.02225 | 0.24261 | 0.16072 |
| 582301.42_413039 | 582301.42 | 4130397.57 | 0.01315 | 0.03337 | 0.09343 | 0.02147 | 0.20745 | 0.14161 |
| 582357.99_413039 | 582357.99 | 4130397.57 | 0.01283 | 0.03172 | 0.08629 | 0.02073 | 0.176 | 0.12577 |
| 582414.56_413039 | 582414.56 | 4130397.57 | 0.01252 | 0.03014 | 0.07977 | 0.02002 | 0.15092 | 0.11241 |

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|---|---|---|---|---|---|---|---|---|
| 582471.13_413039 | 582471.13 | 4130397.57 | 0.01223 | 0.02871 | 0.07422 | 0.01936 | 0.13105 | 0.10164 |
| 582527.7_4130397. | 582527.7 | 4130397.57 | 0.01195 | 0.02737 | 0.06928 | 0.01874 | 0.11498 | 0.09267 |
| 582584.27_413039 | 582584.27 | 4130397.57 | 0.01168 | 0.02611 | 0.06473 | 0.01815 | 0.10186 | 0.08495 |
| 582640.84_413039 | 582640.84 | 4130397.57 | 0.01143 | 0.02497 | 0.0608 | 0.01759 | 0.091 | 0.07857 |
| 582697.41_413039 | 582697.41 | 4130397.57 | 0.01118 | 0.02388 | 0.05705 | 0.01705 | 0.0814 | 0.07287 |
| 582753.98_413039 | 582753.98 | 4130397.57 | 0.01094 | 0.02289 | 0.05387 | 0.01655 | 0.07341 | 0.06815 |
| 582810.55_413039 | 582810.55 | 4130397.57 | 0.01071 | 0.02198 | 0.05098 | 0.01607 | 0.06658 | 0.06404 |
| 582867.12_413039 | 582867.12 | 4130397.57 | 0.01048 | 0.02112 | 0.04831 | 0.01562 | 0.06065 | 0.06038 |
| 581848.86_413048 | 581848.86 | 4130481.48 | 0.01585 | 0.04456 | 0.20657 | 0.02849 | 0.70241 | 0.46033 |
| 581905.43_413048 | 581905.43 | 4130481.48 | 0.01541 | 0.04297 | 0.18113 | 0.0273 | 0.65022 | 0.37157 |
| 581962_4130481.48 | 581962 | 4130481.48 | 0.01503 | 0.04179 | 0.16342 | 0.02627 | 0.55177 | 0.31757 |
| 582018.57_413048 | 582018.57 | 4130481.48 | 0.0146 | 0.0399 | 0.14364 | 0.02519 | 0.48423 | 0.25821 |
| 582075.14_413048 | 582075.14 | 4130481.48 | 0.01422 | 0.0383 | 0.12859 | 0.02422 | 0.40694 | 0.21836 |
| 582131.71_413048 | 582131.71 | 4130481.48 | 0.01386 | 0.03675 | 0.11627 | 0.02332 | 0.34309 | 0.18785 |
| 582188.28_413048 | 582188.28 | 4130481.48 | 0.01352 | 0.03528 | 0.10653 | 0.02249 | 0.28766 | 0.16469 |
| 582244.85_413048 | 582244.85 | 4130481.48 | 0.0132 | 0.03386 | 0.09835 | 0.02171 | 0.2373 | 0.1464 |
| 582301.42_413048 | 582301.42 | 4130481.48 | 0.01288 | 0.03242 | 0.09058 | 0.02097 | 0.19677 | 0.13079 |
| 582357.99_413048 | 582357.99 | 4130481.48 | 0.01258 | 0.03103 | 0.08385 | 0.02027 | 0.16571 | 0.11812 |
| 582414.56_413048 | 582414.56 | 4130481.48 | 0.01229 | 0.02967 | 0.07767 | 0.01961 | 0.14228 | 0.10732 |
| 582471.13_413048 | 582471.13 | 4130481.48 | 0.01201 | 0.02841 | 0.07269 | 0.01899 | 0.12349 | 0.09882 |
| 582527.7_4130481. | 582527.7 | 4130481.48 | 0.01174 | 0.02717 | 0.0677 | 0.01839 | 0.10788 | 0.09099 |
| 582584.27_413048 | 582584.27 | 4130481.48 | 0.01149 | 0.026 | 0.06347 | 0.01783 | 0.09514 | 0.08451 |
| 582640.84_413048 | 582640.84 | 4130481.48 | 0.01123 | 0.02487 | 0.05937 | 0.01729 | 0.08425 | 0.07856 |
| 582697.41_413048 | 582697.41 | 4130481.48 | 0.01099 | 0.02381 | 0.05575 | 0.01678 | 0.07519 | 0.07341 |
| 582753.98_413048 | 582753.98 | 4130481.48 | 0.01076 | 0.02284 | 0.05267 | 0.0163 | 0.0678 | 0.06904 |
| 582810.55_413048 | 582810.55 | 4130481.48 | 0.01054 | 0.02192 | 0.0499 | 0.01585 | 0.06159 | 0.0652 |
| 582867.12_413048 | 582867.12 | 4130481.48 | 0.01033 | 0.02105 | 0.04736 | 0.01541 | 0.05628 | 0.06171 |
| 581735.72_413056 | 581735.72 | 4130565.39 | 0.01617 | 0.03966 | 0.2366 | 0.02979 | 0.85884 | 0.63705 |
| 581792.29_413056 | 581792.29 | 4130565.39 | 0.01572 | 0.03841 | 0.21641 | 0.02852 | 0.84619 | 0.51303 |
| 581848.86_413056 | 581848.86 | 4130565.39 | 0.01529 | 0.03738 | 0.19565 | 0.02734 | 0.80459 | 0.41418 |
| 581905.43_413056 | 581905.43 | 4130565.39 | 0.01484 | 0.03603 | 0.17007 | 0.02615 | 0.76831 | 0.32453 |
| 581962_4130565.39 | 581962 | 4130565.39 | 0.01444 | 0.03513 | 0.14927 | 0.0251 | 0.66085 | 0.26775 |
| 582018.57_413056 | 582018.57 | 4130565.39 | 0.01408 | 0.03443 | 0.13489 | 0.02417 | 0.53151 | 0.22961 |
| 582075.14_413056 | 582075.14 | 4130565.39 | 0.01373 | 0.03366 | 0.12189 | 0.02328 | 0.42863 | 0.1988 |
| 582131.71_413056 | 582131.71 | 4130565.39 | 0.01339 | 0.03284 | 0.11063 | 0.02246 | 0.34881 | 0.1744 |
| 582188.28_413056 | 582188.28 | 4130565.39 | 0.01307 | 0.03205 | 0.102 | 0.0217 | 0.27743 | 0.15626 |
| 582244.85_413056 | 582244.85 | 4130565.39 | 0.01277 | 0.0312 | 0.09407 | 0.02097 | 0.22283 | 0.14094 |
| 582301.42_413056 | 582301.42 | 4130565.39 | 0.01247 | 0.03025 | 0.08639 | 0.02027 | 0.18561 | 0.12733 |
| 582357.99_413056 | 582357.99 | 4130565.39 | 0.01218 | 0.02932 | 0.08 | 0.01962 | 0.15535 | 0.11633 |
| 582414.56_413056 | 582414.56 | 4130565.39 | 0.01191 | 0.02836 | 0.07436 | 0.019 | 0.13201 | 0.10696 |
| 582471.13_413056 | 582471.13 | 4130565.39 | 0.01165 | 0.0274 | 0.0693 | 0.01841 | 0.11369 | 0.09881 |
| 582527.7_4130565. | 582527.7 | 4130565.39 | 0.01139 | 0.02643 | 0.06467 | 0.01786 | 0.099 | 0.09153 |
| 582584.27_413056 | 582584.27 | 4130565.39 | 0.01115 | 0.02551 | 0.06077 | 0.01734 | 0.08733 | 0.08544 |
| 582640.84_413056 | 582640.84 | 4130565.39 | 0.01091 | 0.02455 | 0.05678 | 0.01683 | 0.07723 | 0.07944 |
| 582697.41_413056 | 582697.41 | 4130565.39 | 0.01068 | 0.02365 | 0.05353 | 0.01635 | 0.06929 | 0.07449 |
| 582753.98_413056 | 582753.98 | 4130565.39 | 0.01047 | 0.02278 | 0.05061 | 0.0159 | 0.06275 | 0.07004 |
| 582810.55_413056 | 582810.55 | 4130565.39 | 0.01026 | 0.02195 | 0.04802 | 0.01547 | 0.05741 | 0.06611 |
| 582867.12_413056 | 582867.12 | 4130565.39 | 0.01006 | 0.02114 | 0.04565 | 0.01506 | 0.05295 | 0.06251 |
| 581735.72_413064 | 581735.72 | 4130649.3 | 0.01533 | 0.03482 | 0.1816 | 0.02823 | 0.93348 | 0.47623 |
| 581792.29_413064 | 581792.29 | 4130649.3 | 0.01493 | 0.03335 | 0.16947 | 0.02706 | 0.90355 | 0.40787 |
| 581905.43_413064 | 581905.43 | 4130649.3 | 0.01406 | 0.02994 | 0.15861 | 0.0247 | 0.9054 | 0.29645 |
| 581962_4130649.3 | 581962 | 4130649.3 | 0.01369 | 0.02916 | 0.13832 | 0.02372 | 0.74906 | 0.24817 |
| 582018.57_413064 | 582018.57 | 4130649.3 | 0.01336 | 0.02873 | 0.12535 | 0.02287 | 0.56505 | 0.2173 |
| 582075.14_413064 | 582075.14 | 4130649.3 | 0.01304 | 0.02831 | 0.11345 | 0.02206 | 0.43534 | 0.19154 |
| 582131.71_413064 | 582131.71 | 4130649.3 | 0.01274 | 0.02794 | 0.10342 | 0.0213 | 0.33492 | 0.17087 |
| 582188.28_413064 | 582188.28 | 4130649.3 | 0.01244 | 0.02756 | 0.09462 | 0.02058 | 0.26046 | 0.15362 |
| 582244.85_413064 | 582244.85 | 4130649.3 | 0.01216 | 0.0272 | 0.08738 | 0.01991 | 0.20678 | 0.13966 |
| 582301.42_413064 | 582301.42 | 4130649.3 | 0.01189 | 0.02676 | 0.08047 | 0.01927 | 0.16852 | 0.127 |

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|---|---|---|---|---|---|---|---|---|
| 582357.99_413064 | 582357.99 | 4130649.3 | 0.01163 | 0.02631 | 0.07475 | 0.01867 | 0.1407 | 0.11656 |
| 582414.56_413064 | 582414.56 | 4130649.3 | 0.01138 | 0.02584 | 0.06988 | 0.01811 | 0.11994 | 0.10772 |
| 582471.13_413064 | 582471.13 | 4130649.3 | 0.01114 | 0.02527 | 0.0649 | 0.01756 | 0.10325 | 0.09909 |
| 582527.7_4130649. | 582527.7 | 4130649.3 | 0.0109 | 0.02469 | 0.06068 | 0.01705 | 0.09022 | 0.09176 |
| 582584.27_413064 | 582584.27 | 4130649.3 | 0.01068 | 0.02409 | 0.05698 | 0.01657 | 0.08001 | 0.08535 |
| 582640.84_413064 | 582640.84 | 4130649.3 | 0.01046 | 0.02347 | 0.05369 | 0.01611 | 0.07192 | 0.07965 |
| 582697.41_413064 | 582697.41 | 4130649.3 | 0.01025 | 0.02282 | 0.05059 | 0.01566 | 0.06534 | 0.07439 |
| 582753.98_413064 | 582753.98 | 4130649.3 | 0.01005 | 0.02217 | 0.04793 | 0.01525 | 0.06009 | 0.06983 |
| 582810.55_413064 | 582810.55 | 4130649.3 | 0.00986 | 0.02154 | 0.0456 | 0.01485 | 0.05581 | 0.06584 |
| 582867.12_413064 | 582867.12 | 4130649.3 | 0.00967 | 0.02088 | 0.04333 | 0.01447 | 0.05206 | 0.06201 |
| 581848.86_413073 | 581848.86 | 4130733.21 | 0.0135 | 0.02701 | 0.16244 | 0.02393 | 1.35525 | 0.33279 |
| 581905.43_413073 | 581905.43 | 4130733.21 | 0.01315 | 0.02574 | 0.14095 | 0.02297 | 1.15487 | 0.27812 |
| 581962_4130733.21 | 581962 | 4130733.21 | 0.01283 | 0.02485 | 0.12525 | 0.0221 | 0.84513 | 0.2399 |
| 582018.57_413073 | 582018.57 | 4130733.21 | 0.01253 | 0.02424 | 0.11381 | 0.02132 | 0.5885 | 0.21206 |
| 582075.14_413073 | 582075.14 | 4130733.21 | 0.01225 | 0.02378 | 0.1039 | 0.02058 | 0.41178 | 0.18903 |
| 582131.71_413073 | 582131.71 | 4130733.21 | 0.01197 | 0.02343 | 0.09498 | 0.01988 | 0.29739 | 0.16931 |
| 582188.28_413073 | 582188.28 | 4130733.21 | 0.01171 | 0.02317 | 0.08724 | 0.01923 | 0.2274 | 0.1526 |
| 582244.85_413073 | 582244.85 | 4130733.21 | 0.01145 | 0.02295 | 0.08029 | 0.01861 | 0.18022 | 0.13809 |
| 582301.42_413073 | 582301.42 | 4130733.21 | 0.0112 | 0.02277 | 0.07431 | 0.01803 | 0.14767 | 0.12577 |
| 582357.99_413073 | 582357.99 | 4130733.21 | 0.01097 | 0.0226 | 0.06909 | 0.01749 | 0.12432 | 0.11515 |
| 582414.56_413073 | 582414.56 | 4130733.21 | 0.01074 | 0.02242 | 0.06427 | 0.01696 | 0.10706 | 0.1056 |
| 582471.13_413073 | 582471.13 | 4130733.21 | 0.01052 | 0.02221 | 0.06005 | 0.01646 | 0.09419 | 0.09733 |
| 582527.7_4130733. | 582527.7 | 4130733.21 | 0.0103 | 0.02197 | 0.05621 | 0.01599 | 0.08428 | 0.08992 |
| 582584.27_413073 | 582584.27 | 4130733.21 | 0.0101 | 0.0217 | 0.05282 | 0.01555 | 0.0765 | 0.08344 |
| 582640.84_413073 | 582640.84 | 4130733.21 | 0.0099 | 0.02141 | 0.04982 | 0.01513 | 0.07017 | 0.07771 |
| 582697.41_413073 | 582697.41 | 4130733.21 | 0.00972 | 0.02108 | 0.04716 | 0.01474 | 0.0649 | 0.07271 |
| 582753.98_413073 | 582753.98 | 4130733.21 | 0.00953 | 0.02072 | 0.04473 | 0.01436 | 0.06035 | 0.06818 |
| 582810.55_413073 | 582810.55 | 4130733.21 | 0.00936 | 0.02036 | 0.04277 | 0.014 | 0.05661 | 0.06445 |
| 582867.12_413073 | 582867.12 | 4130733.21 | 0.00919 | 0.01996 | 0.04081 | 0.01366 | 0.0531 | 0.06084 |
| 581735.72_413081 | 581735.72 | 4130817.12 | 0.01328 | 0.02858 | 0.18488 | 0.02415 | 1.99892 | 0.46451 |
| 581792.29_413081 | 581792.29 | 4130817.12 | 0.0129 | 0.02645 | 0.15731 | 0.02308 | 2.25873 | 0.36698 |
| 581848.86_413081 | 581848.86 | 4130817.12 | 0.01258 | 0.02496 | 0.13974 | 0.02217 | 2.02531 | 0.31029 |
| 581905.43_413081 | 581905.43 | 4130817.12 | 0.01226 | 0.02355 | 0.12312 | 0.02129 | 1.52846 | 0.2627 |
| 581962_4130817.12 | 581962 | 4130817.12 | 0.01198 | 0.02246 | 0.11148 | 0.02051 | 0.92195 | 0.22923 |
| 582018.57_413081 | 582018.57 | 4130817.12 | 0.01171 | 0.02155 | 0.1019 | 0.01979 | 0.5472 | 0.20266 |
| 582075.14_413081 | 582075.14 | 4130817.12 | 0.01145 | 0.02084 | 0.09381 | 0.01911 | 0.35006 | 0.18106 |
| 582131.71_413081 | 582131.71 | 4130817.12 | 0.0112 | 0.02026 | 0.08632 | 0.01847 | 0.24902 | 0.16234 |
| 582188.28_413081 | 582188.28 | 4130817.12 | 0.01096 | 0.01982 | 0.07963 | 0.01786 | 0.19094 | 0.14632 |
| 582244.85_413081 | 582244.85 | 4130817.12 | 0.01073 | 0.01948 | 0.07353 | 0.01729 | 0.1545 | 0.13234 |
| 582301.42_413081 | 582301.42 | 4130817.12 | 0.0105 | 0.01925 | 0.06822 | 0.01675 | 0.13042 | 0.12046 |
| 582357.99_413081 | 582357.99 | 4130817.12 | 0.01028 | 0.01909 | 0.06342 | 0.01624 | 0.11343 | 0.11007 |
| 582414.56_413081 | 582414.56 | 4130817.12 | 0.01007 | 0.01898 | 0.05906 | 0.01575 | 0.1006 | 0.10087 |
| 582471.13_413081 | 582471.13 | 4130817.12 | 0.00987 | 0.01892 | 0.05537 | 0.0153 | 0.0908 | 0.09316 |
| 582527.7_4130817. | 582527.7 | 4130817.12 | 0.00968 | 0.01885 | 0.0519 | 0.01487 | 0.08257 | 0.08611 |
| 582584.27_413081 | 582584.27 | 4130817.12 | 0.0095 | 0.0188 | 0.04894 | 0.01447 | 0.07586 | 0.08013 |
| 582640.84_413081 | 582640.84 | 4130817.12 | 0.00932 | 0.01874 | 0.04631 | 0.01408 | 0.07014 | 0.07489 |
| 582697.41_413081 | 582697.41 | 4130817.12 | 0.00915 | 0.01866 | 0.04393 | 0.01372 | 0.06514 | 0.07021 |
| 582753.98_413081 | 582753.98 | 4130817.12 | 0.00898 | 0.01854 | 0.04163 | 0.01337 | 0.06057 | 0.06582 |
| 582810.55_413081 | 582810.55 | 4130817.12 | 0.00883 | 0.0184 | 0.03966 | 0.01305 | 0.05661 | 0.06203 |
| 582867.12_413081 | 582867.12 | 4130817.12 | 0.00867 | 0.01824 | 0.0379 | 0.01273 | 0.05311 | 0.05868 |
| 581735.72_413090 | 581735.72 | 4130901.03 | 0.0125 | 0.02681 | 0.147 | 0.0225 | 3.99035 | 0.39064 |
| 581792.29_413090 | 581792.29 | 4130901.03 | 0.01216 | 0.02518 | 0.12991 | 0.0216 | 4.26291 | 0.32207 |
| 581848.86_413090 | 581848.86 | 4130901.03 | 0.01185 | 0.02378 | 0.1175 | 0.02077 | 3.79835 | 0.2741 |
| 581905.43_413090 | 581905.43 | 4130901.03 | 0.01155 | 0.02246 | 0.10643 | 0.01997 | 1.98839 | 0.23564 |
| 581962_4130901.03 | 581962 | 4130901.03 | 0.01128 | 0.02131 | 0.098 | 0.01926 | 0.79956 | 0.20696 |
| 582018.57_413090 | 582018.57 | 4130901.03 | 0.01102 | 0.02024 | 0.09009 | 0.01856 | 0.42352 | 0.18269 |
| 582075.14_413090 | 582075.14 | 4130901.03 | 0.01077 | 0.01935 | 0.08397 | 0.01793 | 0.28056 | 0.16411 |
| 582131.71_413090 | 582131.71 | 4130901.03 | 0.01053 | 0.01853 | 0.07787 | 0.01732 | 0.21243 | 0.14751 |

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|---|---|---|---|---|---|---|---|---|
| 582188.28_4130901 | 582188.28 | 4130901.03 | 0.01031 | 0.01785 | 0.07246 | 0.01675 | 0.17238 | 0.13356 |
| 582244.85_4130901 | 582244.85 | 4130901.03 | 0.01009 | 0.01729 | 0.0674 | 0.0162 | 0.14526 | 0.12136 |
| 582301.42_4130901 | 582301.42 | 4130901.03 | 0.00987 | 0.01685 | 0.06274 | 0.01568 | 0.12524 | 0.11068 |
| 582357.99_4130901 | 582357.99 | 4130901.03 | 0.00967 | 0.01652 | 0.05861 | 0.0152 | 0.11 | 0.10154 |
| 582414.56_4130901 | 582414.56 | 4130901.03 | 0.00947 | 0.01628 | 0.05479 | 0.01474 | 0.09777 | 0.09344 |
| 582471.13_4130901 | 582471.13 | 4130901.03 | 0.00929 | 0.01613 | 0.05143 | 0.0143 | 0.08798 | 0.08645 |
| 582527.7_4130901. | 582527.7 | 4130901.03 | 0.00911 | 0.01604 | 0.04833 | 0.01389 | 0.07979 | 0.0802 |
| 582584.27_4130901 | 582584.27 | 4130901.03 | 0.00894 | 0.01601 | 0.04564 | 0.01351 | 0.07312 | 0.07485 |
| 582640.84_4130901 | 582640.84 | 4130901.03 | 0.00877 | 0.01601 | 0.04326 | 0.01314 | 0.06751 | 0.07015 |
| 582697.41_4130901 | 582697.41 | 4130901.03 | 0.00861 | 0.01602 | 0.04109 | 0.0128 | 0.06266 | 0.06595 |
| 582753.98_4130901 | 582753.98 | 4130901.03 | 0.00846 | 0.01604 | 0.03906 | 0.01247 | 0.0584 | 0.06216 |
| 582810.55_4130901 | 582810.55 | 4130901.03 | 0.00831 | 0.01605 | 0.03717 | 0.01216 | 0.05454 | 0.05863 |
| 582867.12_4130901 | 582867.12 | 4130901.03 | 0.00817 | 0.01605 | 0.03552 | 0.01186 | 0.05122 | 0.05558 |
| 581735.72_4130984 | 581735.72 | 4130984.94 | 0.01207 | 0.02552 | 0.11682 | 0.02142 | 10.66172 | 0.32238 |
| 581792.29_4130984 | 581792.29 | 4130984.94 | 0.01173 | 0.02411 | 0.10612 | 0.02061 | 14.00216 | 0.27156 |
| 581848.86_4130984 | 581848.86 | 4130984.94 | 0.01141 | 0.02285 | 0.09756 | 0.01985 | 16.29253 | 0.23312 |
| 581905.43_4130984 | 581905.43 | 4130984.94 | 0.01112 | 0.02174 | 0.09127 | 0.01915 | 1.28529 | 0.20455 |
| 581962_4130984.94 | 581962 | 4130984.94 | 0.01084 | 0.02063 | 0.08468 | 0.01846 | 0.5449 | 0.17958 |
| 582018.57_4130984 | 582018.57 | 4130984.94 | 0.01057 | 0.01958 | 0.07883 | 0.0178 | 0.34689 | 0.15916 |
| 582075.14_4130984 | 582075.14 | 4130984.94 | 0.01032 | 0.01863 | 0.07391 | 0.01718 | 0.25291 | 0.14274 |
| 582131.71_4130984 | 582131.71 | 4130984.94 | 0.01008 | 0.01775 | 0.06949 | 0.0166 | 0.19785 | 0.12901 |
| 582188.28_4130984 | 582188.28 | 4130984.94 | 0.00985 | 0.01693 | 0.06529 | 0.01604 | 0.16134 | 0.11715 |
| 582244.85_4130984 | 582244.85 | 4130984.94 | 0.00963 | 0.01621 | 0.06136 | 0.01551 | 0.1355 | 0.10689 |
| 582301.42_4130984 | 582301.42 | 4130984.94 | 0.00942 | 0.01557 | 0.05771 | 0.015 | 0.11643 | 0.098 |
| 582357.99_4130984 | 582357.99 | 4130984.94 | 0.00921 | 0.01504 | 0.05434 | 0.01453 | 0.1019 | 0.09028 |
| 582414.56_4130984 | 582414.56 | 4130984.94 | 0.00902 | 0.01461 | 0.05119 | 0.01407 | 0.09044 | 0.08347 |
| 582471.13_4130984 | 582471.13 | 4130984.94 | 0.00884 | 0.01427 | 0.04827 | 0.01364 | 0.0812 | 0.07743 |
| 582527.7_4130984. | 582527.7 | 4130984.94 | 0.00866 | 0.01402 | 0.04554 | 0.01323 | 0.07358 | 0.07204 |
| 582584.27_4130984 | 582584.27 | 4130984.94 | 0.00849 | 0.01386 | 0.04315 | 0.01285 | 0.06745 | 0.06741 |
| 582640.84_4130984 | 582640.84 | 4130984.94 | 0.00833 | 0.01377 | 0.04106 | 0.01249 | 0.06248 | 0.06345 |
| 582697.41_4130984 | 582697.41 | 4130984.94 | 0.00817 | 0.01373 | 0.03897 | 0.01215 | 0.05798 | 0.05968 |
| 582753.98_4130984 | 582753.98 | 4130984.94 | 0.00803 | 0.01374 | 0.03716 | 0.01182 | 0.0543 | 0.05649 |
| 582810.55_4130984 | 582810.55 | 4130984.94 | 0.00788 | 0.01376 | 0.03545 | 0.01151 | 0.05095 | 0.05347 |
| 582867.12_4130984 | 582867.12 | 4130984.94 | 0.00774 | 0.0138 | 0.03378 | 0.01122 | 0.04795 | 0.05068 |
| 581735.72_4131068 | 581735.72 | 4131068.85 | 0.01196 | 0.0242 | 0.09102 | 0.02067 | 1.7308 | 0.25597 |
| 581792.29_4131068 | 581792.29 | 4131068.85 | 0.0116 | 0.02301 | 0.08428 | 0.01994 | 1.37832 | 0.22396 |
| 581848.86_4131068 | 581848.86 | 4131068.85 | 0.01127 | 0.02193 | 0.07898 | 0.01926 | 0.73631 | 0.19799 |
| 581905.43_4131068 | 581905.43 | 4131068.85 | 0.01095 | 0.02087 | 0.074 | 0.0186 | 0.46486 | 0.17514 |
| 581962_4131068.85 | 581962 | 4131068.85 | 0.01066 | 0.01994 | 0.07033 | 0.01798 | 0.33372 | 0.15696 |
| 582018.57_4131068 | 582018.57 | 4131068.85 | 0.01038 | 0.01903 | 0.06664 | 0.01737 | 0.25042 | 0.14065 |
| 582075.14_4131068 | 582075.14 | 4131068.85 | 0.01011 | 0.01815 | 0.06324 | 0.01679 | 0.19657 | 0.12658 |
| 582131.71_4131068 | 582131.71 | 4131068.85 | 0.00986 | 0.01732 | 0.06024 | 0.01624 | 0.16035 | 0.11468 |
| 582188.28_4131068 | 582188.28 | 4131068.85 | 0.00962 | 0.01651 | 0.05733 | 0.0157 | 0.13409 | 0.10427 |
| 582244.85_4131068 | 582244.85 | 4131068.85 | 0.00939 | 0.01576 | 0.05468 | 0.01518 | 0.11477 | 0.09534 |
| 582301.42_4131068 | 582301.42 | 4131068.85 | 0.00917 | 0.01505 | 0.05211 | 0.01469 | 0.0999 | 0.08751 |
| 582357.99_4131068 | 582357.99 | 4131068.85 | 0.00896 | 0.0144 | 0.04963 | 0.01421 | 0.08817 | 0.08059 |
| 582414.56_4131068 | 582414.56 | 4131068.85 | 0.00876 | 0.01382 | 0.04728 | 0.01377 | 0.07888 | 0.07454 |
| 582471.13_4131068 | 582471.13 | 4131068.85 | 0.00857 | 0.01331 | 0.04499 | 0.01333 | 0.07127 | 0.06915 |
| 582527.7_4131068. | 582527.7 | 4131068.85 | 0.00838 | 0.01288 | 0.04274 | 0.01292 | 0.06493 | 0.0643 |
| 582584.27_4131068 | 582584.27 | 4131068.85 | 0.0082 | 0.01253 | 0.04052 | 0.01253 | 0.05947 | 0.05987 |
| 582640.84_4131068 | 582640.84 | 4131068.85 | 0.00804 | 0.01228 | 0.03885 | 0.01216 | 0.05549 | 0.05643 |
| 582697.41_4131068 | 582697.41 | 4131068.85 | 0.00788 | 0.0121 | 0.03711 | 0.0118 | 0.05186 | 0.05317 |
| 582753.98_4131068 | 582753.98 | 4131068.85 | 0.00773 | 0.012 | 0.03566 | 0.01148 | 0.04893 | 0.05046 |
| 582810.55_4131068 | 582810.55 | 4131068.85 | 0.00759 | 0.01195 | 0.03427 | 0.01117 | 0.04632 | 0.04798 |
| 582867.12_4131068 | 582867.12 | 4131068.85 | 0.00744 | 0.0119 | 0.03255 | 0.01086 | 0.04358 | 0.04526 |
| 582018.57_4131152 | 582018.57 | 4131152.76 | 0.01041 | 0.01839 | 0.0546 | 0.01707 | 0.16394 | 0.12383 |
| 582244.85_4131152 | 582244.85 | 4131152.76 | 0.00935 | 0.01548 | 0.04672 | 0.01505 | 0.09551 | 0.0889 |
| 582301.42_4131152 | 582301.42 | 4131152.76 | 0.00911 | 0.01481 | 0.04517 | 0.01458 | 0.08525 | 0.08206 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 582357.99_4131152 | 582357.99 | 4131152.76 | 0.00889 | 0.01416 | 0.04362 | 0.01413 | 0.07628 | 0.0758 |
| 582414.56_4131152 | 582414.56 | 4131152.76 | 0.00868 | 0.01355 | 0.04223 | 0.0137 | 0.06889 | 0.07032 |
| 582471.13_4131152 | 582471.13 | 4131152.76 | 0.00847 | 0.01295 | 0.04046 | 0.01327 | 0.06196 | 0.06486 |
| 582527.7_4131152. | 582527.7 | 4131152.76 | 0.00827 | 0.01241 | 0.03894 | 0.01286 | 0.05649 | 0.06023 |
| 582584.27_4131152 | 582584.27 | 4131152.76 | 0.00808 | 0.01192 | 0.0374 | 0.01246 | 0.05183 | 0.05601 |
| 582640.84_4131152 | 582640.84 | 4131152.76 | 0.0079 | 0.01152 | 0.03602 | 0.01209 | 0.0481 | 0.05239 |
| 582697.41_4131152 | 582697.41 | 4131152.76 | 0.00773 | 0.01118 | 0.0347 | 0.01173 | 0.04494 | 0.04916 |
| 582753.98_4131152 | 582753.98 | 4131152.76 | 0.00758 | 0.01093 | 0.03375 | 0.01139 | 0.04261 | 0.04664 |
| 582810.55_4131152 | 582810.55 | 4131152.76 | 0.00743 | 0.01075 | 0.03269 | 0.01108 | 0.04044 | 0.04425 |
| 582867.12_4131152 | 582867.12 | 4131152.76 | 0.00728 | 0.01057 | 0.03123 | 0.01076 | 0.03813 | 0.04159 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| * | AERMOD ( 191 | 91): C:\Lakes\P | CRP\PCRP.isc | | | | | | |
| * | AERMET ( 141 | 34): | | | | | | | |
| * | MODELING OPT | IONS USED: Re | gDFAULT CONC | | | | | | |
| * | PLOT | FILE OF ANNUAL | VALUES AVERA | | | | | | |
| * | FOR | A TOTAL OF 1 | 0 RECEPTORS. | | | | | | |
| * | FORM | AT: (3(1X,F13.5 | ),3(1X,F8.2), | | | | | | |
| * | X | Y | AVERAGE CONC | | | | | | |
| * | _____ | _____ | MATRMVL | CHAN_RCK | CONCRTE | UNPAVED | PAVED | CCP_UNPV | |
| 58133 | 581336.22 | 4131207.48 | 57.09191 | 76.20496 | 302.36092 | 77.41213 | 290.9752 | 594.83419 | |
| 58155 | 581554.22 | 4130688.06 | 47.97161 | 175.22527 | 42.90898 | 76.94998 | 64.03871 | 96.34793 | |
| 57979 | 579793.36 | 4131503.29 | 80.12044 | 21.79723 | 17.77155 | 64.6571 | 7.66508 | 29.71855 | |
| 58048 | 580488.37 | 4131517.71 | 37.84138 | 49.63809 | 28.08359 | 65.45945 | 22.18574 | 48.49792 | |
| 58167 | 581678.43 | 4131040.03 | 46.1998 | 83.43209 | 193.19146 | 69.79188 | 364.1903 | 499.98746 | |
| 58163 | 581635.43 | 4130978.54 | 43.45856 | 83.95915 | 267.30043 | 70.84095 | 474.1072 | 555.57861 | |
| 58183 | 581830.06 | 4131027.55 | 41.42779 | 78.79922 | 187.83163 | 65.10715 | 506.2539 | 368.26775 | |
| 58172 | 581727.48 | 4130976.54 | 40.53569 | 80.63016 | 237.83863 | 66.78055 | 565.9552 | 409.42597 | |
| 58178 | 581789.11 | 4130419.65 | 50.31901 | 164.39326 | 78.42603 | 70.13251 | 88.53486 | 259.74389 | |
| 58170 | 581700.32 | 4130781.89 | 41.0028 | 115.74497 | 266.28964 | 62.00052 | 144.3693 | 508.93389 | |
| 58142 | 581426.07 | 4131299.01 | 55.65347 | 71.31808 | 250.32099 | 73.26407 | 241.6693 | 482.27922 | |
| 58230 | 582301.42 | 4129474.56 | 39.22386 | 100.73061 | 147.70978 | 49.16282 | 39.85151 | 219.43663 | |
| 58235 | 582357.99 | 4129474.56 | 38.44397 | 96.57674 | 132.46603 | 46.38902 | 39.22951 | 221.62473 | |
| 58241 | 582414.56 | 4129474.56 | 37.56939 | 92.18279 | 124.18092 | 43.35442 | 43.27102 | 203.10324 | |
| 58247 | 582471.13 | 4129474.56 | 36.65568 | 87.56428 | 119.99878 | 40.15559 | 43.62292 | 174.59731 | |
| 58252 | 582527.7 | 4129474.56 | 35.66092 | 83.01269 | 115.82051 | 36.89733 | 44.30665 | 180.39844 | |
| 58258 | 582584.27 | 4129474.56 | 34.66986 | 78.13337 | 105.63847 | 33.61993 | 42.59249 | 167.58492 | |
| 58264 | 582640.84 | 4129474.56 | 33.62031 | 75.71267 | 96.56604 | 31.09311 | 43.01057 | 159.09466 | |
| 58224 | 582244.85 | 4129558.47 | 39.04368 | 113.72203 | 71.94707 | 45.2103 | 55.41423 | 208.70454 | |
| 58230 | 582301.42 | 4129558.47 | 37.78526 | 102.18067 | 145.78659 | 41.45396 | 54.47838 | 265.17306 | |
| 58235 | 582357.99 | 4129558.47 | 36.51993 | 96.22876 | 144.91857 | 37.66681 | 52.96271 | 228.7212 | |
| 58241 | 582414.56 | 4129558.47 | 35.2255 | 93.42625 | 136.79977 | 35.19361 | 51.77004 | 208.84728 | |
| 58247 | 582471.13 | 4129558.47 | 33.90702 | 89.81737 | 115.06921 | 36.62507 | 49.04205 | 187.09731 | |
| 58252 | 582527.7 | 4129558.47 | 32.61505 | 87.1729 | 105.17675 | 37.92425 | 46.62857 | 170.32648 | |
| 58258 | 582584.27 | 4129558.47 | 32.43504 | 84.44433 | 100.00825 | 39.08205 | 43.92142 | 175.25681 | |
| 58264 | 582640.84 | 4129558.47 | 32.44638 | 81.76069 | 100.36587 | 40.0876 | 41.46875 | 171.22947 | |
| 58269 | 582697.41 | 4129558.47 | 32.38626 | 78.91171 | 99.20664 | 40.93546 | 39.77675 | 155.91252 | |
| 58224 | 582244.85 | 4129642.38 | 37.03235 | 136.72771 | 37.23062 | 41.88868 | 63.94152 | 98.81403 | |
| 58230 | 582301.42 | 4129642.38 | 36.968 | 114.55602 | 90.98319 | 43.27294 | 56.14877 | 248.60183 | |
| 58235 | 582357.99 | 4129642.38 | 36.78958 | 100.33905 | 150.40235 | 44.48893 | 48.62181 | 250.10957 | |
| 58241 | 582414.56 | 4129642.38 | 36.56739 | 95.18484 | 130.60547 | 45.4962 | 47.79977 | 217.2393 | |
| 58247 | 582471.13 | 4129642.38 | 36.28551 | 91.60537 | 118.36362 | 46.29186 | 47.20287 | 197.94243 | |
| 58252 | 582527.7 | 4129642.38 | 35.96448 | 88.46249 | 113.4186 | 46.87661 | 47.03917 | 193.27935 | |
| 58258 | 582584.27 | 4129642.38 | 35.59021 | 85.41941 | 107.81229 | 47.23941 | 44.97855 | 176.09906 | |
| 58264 | 582640.84 | 4129642.38 | 35.16404 | 82.51012 | 103.40824 | 47.3878 | 44.85791 | 151.59439 | |
| 58269 | 582697.41 | 4129642.38 | 34.71587 | 79.58709 | 98.56659 | 47.31036 | 46.47258 | 139.79392 | |
| 58275 | 582753.98 | 4129642.38 | 34.20379 | 76.83132 | 92.91856 | 47.02905 | 45.8502 | 144.40769 | |
| 58281 | 582810.55 | 4129642.38 | 33.66379 | 74.12226 | 87.28959 | 46.5652 | 43.9588 | 152.31651 | |
| 58286 | 582867.12 | 4129642.38 | 33.12297 | 71.46159 | 79.52289 | 45.92603 | 46.61719 | 151.10447 | |
| 58224 | 582244.85 | 4129726.29 | 40.34288 | 129.39619 | 50.84879 | 52.63998 | 64.84739 | 138.41981 | |
| 58230 | 582301.42 | 4129726.29 | 39.73553 | 117.19578 | 71.98721 | 53.05202 | 63.6672 | 215.08427 | |
| 58235 | 582357.99 | 4129726.29 | 39.05829 | 99.98046 | 152.65063 | 53.17613 | 58.65155 | 258.65373 | |
| 58241 | 582414.56 | 4129726.29 | 38.36951 | 92.41706 | 146.258 | 53.03633 | 55.04359 | 250.79188 | |
| 58247 | 582471.13 | 4129726.29 | 37.64854 | 86.91455 | 135.34212 | 52.63404 | 52.09147 | 224.74459 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 58252 | 582527.7 | 4129726.29 | 36.9057 | 81.88908 | 120.4001 | 51.99649 | 49.40649 | 184.35346 |
| 58258 | 582584.27 | 4129726.29 | 36.17644 | 77.67446 | 110.28665 | 51.17871 | 50.82544 | 159.10883 |
| 58264 | 582640.84 | 4129726.29 | 35.37509 | 73.71283 | 101.6622 | 50.14476 | 53.37592 | 162.26529 |
| 58269 | 582697.41 | 4129726.29 | 34.55003 | 70.02926 | 91.83088 | 48.92902 | 50.83048 | 168.15934 |
| 58275 | 582753.98 | 4129726.29 | 33.76392 | 67.63293 | 81.5421 | 47.56244 | 48.06767 | 164.74655 |
| 58281 | 582810.55 | 4129726.29 | 32.93114 | 65.85292 | 77.10171 | 46.06776 | 48.92325 | 151.69681 |
| 58224 | 582244.85 | 4129810.2 | 40.29861 | 120.50102 | 39.46883 | 58.68443 | 69.89375 | 119.70709 |
| 58230 | 582301.42 | 4129810.2 | 39.27006 | 107.57979 | 76.62813 | 57.53822 | 65.69354 | 234.46716 |
| 58235 | 582357.99 | 4129810.2 | 38.31045 | 96.80518 | 137.82629 | 56.16581 | 61.30987 | 313.85097 |
| 58241 | 582414.56 | 4129810.2 | 37.86508 | 88.70735 | 148.25431 | 54.58659 | 56.62456 | 248.98048 |
| 58247 | 582471.13 | 4129810.2 | 37.39018 | 83.28203 | 127.44287 | 52.82423 | 52.57373 | 188.99009 |
| 58252 | 582527.7 | 4129810.2 | 36.88702 | 80.00114 | 113.90295 | 50.93214 | 55.07444 | 187.87839 |
| 58258 | 582584.27 | 4129810.2 | 36.36778 | 76.80098 | 98.56024 | 48.94941 | 55.66405 | 189.5301 |
| 58264 | 582640.84 | 4129810.2 | 35.81589 | 73.8231 | 88.71063 | 46.86169 | 53.06037 | 180.79266 |
| 58269 | 582697.41 | 4129810.2 | 35.23223 | 71.27058 | 85.80929 | 44.7301 | 52.96551 | 166.49463 |
| 58190 | 581905.43 | 4129894.11 | 45.58613 | 80.10465 | 19.87424 | 68.36795 | 45.38225 | 55.65882 |
| 58196 | 581962 | 4129894.11 | 44.91966 | 190.93557 | 21.31236 | 67.0045 | 52.84329 | 67.24095 |
| 58213 | 582131.71 | 4129894.11 | 42.7426 | 148.42799 | 32.71283 | 61.47993 | 60.53269 | 93.30912 |
| 58218 | 582188.28 | 4129894.11 | 41.95175 | 137.48228 | 39.64275 | 59.17845 | 59.76792 | 118.11145 |
| 58224 | 582244.85 | 4129894.11 | 41.15919 | 123.95917 | 61.74168 | 56.73626 | 54.57637 | 188.04041 |
| 58230 | 582301.42 | 4129894.11 | 40.35372 | 113.68564 | 98.40187 | 54.16303 | 53.29389 | 276.7808 |
| 58235 | 582357.99 | 4129894.11 | 39.53417 | 105.80266 | 131.00089 | 51.79452 | 51.68197 | 268.92332 |
| 58241 | 582414.56 | 4129894.11 | 38.73424 | 95.52731 | 126.10523 | 51.84535 | 54.25272 | 219.03871 |
| 58247 | 582471.13 | 4129894.11 | 37.93483 | 91.27389 | 100.62318 | 51.79538 | 58.91217 | 204.84931 |
| 58252 | 582527.7 | 4129894.11 | 37.07213 | 88.20546 | 96.13746 | 51.55442 | 58.29618 | 197.12828 |
| 58258 | 582584.27 | 4129894.11 | 36.22389 | 85.40041 | 92.11404 | 51.17947 | 54.64259 | 180.67524 |
| 58264 | 582640.84 | 4129894.11 | 35.41864 | 82.75253 | 87.84694 | 50.72693 | 57.07053 | 156.37478 |
| 58269 | 582697.41 | 4129894.11 | 34.58789 | 80.26166 | 84.6851 | 50.11823 | 55.08952 | 164.7093 |
| 58196 | 581962 | 4129978.02 | 45.47523 | 240.34259 | 23.89368 | 63.74064 | 57.78081 | 66.94065 |
| 58201 | 582018.57 | 4129978.02 | 44.30177 | 252.26952 | 25.25948 | 61.39466 | 58.75972 | 65.285 |
| 58207 | 582075.14 | 4129978.02 | 43.17392 | 160.17953 | 37.29535 | 61.26402 | 73.05657 | 107.57183 |
| 58213 | 582131.71 | 4129978.02 | 41.99302 | 140.78006 | 57.45925 | 60.90586 | 65.4798 | 172.56353 |
| 58218 | 582188.28 | 4129978.02 | 40.84959 | 123.30976 | 127.18673 | 60.39016 | 62.16136 | 350.27994 |
| 58224 | 582244.85 | 4129978.02 | 39.77251 | 118.55923 | 124.65426 | 59.70028 | 59.71964 | 298.05428 |
| 58230 | 582301.42 | 4129978.02 | 38.66892 | 107.03512 | 138.0336 | 58.83388 | 55.59334 | 258.4874 |
| 58235 | 582357.99 | 4129978.02 | 37.53569 | 101.0638 | 114.44313 | 57.89383 | 58.32186 | 238.05407 |
| 58241 | 582414.56 | 4129978.02 | 36.46542 | 96.89268 | 106.124 | 56.78044 | 63.61108 | 221.54799 |
| 58247 | 582471.13 | 4129978.02 | 35.46931 | 93.1842 | 99.51479 | 55.56307 | 61.03816 | 197.59475 |
| 58252 | 582527.7 | 4129978.02 | 34.40191 | 89.85117 | 95.28831 | 54.27431 | 59.60559 | 175.88979 |
| 58258 | 582584.27 | 4129978.02 | 33.36181 | 86.74876 | 90.73782 | 52.90727 | 60.96732 | 186.19735 |
| 58264 | 582640.84 | 4129978.02 | 32.37838 | 83.88104 | 86.2407 | 51.47385 | 59.1974 | 187.64002 |
| 58269 | 582697.41 | 4129978.02 | 31.47683 | 81.18559 | 81.19496 | 50.0053 | 62.04828 | 179.96992 |
| 58275 | 582753.98 | 4129978.02 | 30.50265 | 78.57175 | 74.50144 | 49.1302 | 57.51635 | 163.40514 |
| 58281 | 582810.55 | 4129978.02 | 29.55389 | 76.02897 | 65.43397 | 48.5544 | 47.5912 | 141.52812 |
| 58190 | 581905.43 | 4130061.93 | 43.16616 | 157.73523 | 55.92276 | 70.62034 | 87.90651 | 171.29101 |
| 58196 | 581962 | 4130061.93 | 41.69087 | 148.26104 | 62.0139 | 69.19175 | 85.04456 | 193.01076 |
| 58201 | 582018.57 | 4130061.93 | 40.32349 | 152.99431 | 42.55531 | 67.61586 | 85.55442 | 127.77116 |
| 58207 | 582075.14 | 4130061.93 | 38.96021 | 148.24446 | 40.87672 | 65.91037 | 83.27542 | 109.47008 |
| 58213 | 582131.71 | 4130061.93 | 37.55398 | 131.35828 | 67.04067 | 64.0643 | 76.26998 | 198.54145 |
| 58218 | 582188.28 | 4130061.93 | 36.25809 | 117.88455 | 118.43836 | 62.14351 | 71.68347 | 324.43284 |
| 58224 | 582244.85 | 4130061.93 | 35.06075 | 107.02568 | 130.54559 | 60.18976 | 65.43957 | 301.25827 |
| 58230 | 582301.42 | 4130061.93 | 33.84293 | 101.99838 | 122.73146 | 59.19268 | 63.11966 | 272.23834 |

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|---|---|---|---|---|---|---|---|---|
| 58235 | 582357.99 | 4130061.93 | 33.26738 | 97.76868 | 113.8997 | 58.32275 | 67.26509 | 230.58261 |
| 58241 | 582414.56 | 4130061.93 | 32.81645 | 94.16354 | 105.6789 | 57.36659 | 62.85829 | 209.34872 |
| 58247 | 582471.13 | 4130061.93 | 32.38511 | 90.8391 | 97.15541 | 56.31587 | 66.74263 | 212.30518 |
| 58252 | 582527.7 | 4130061.93 | 31.93459 | 87.86233 | 90.15714 | 55.24091 | 65.68046 | 207.58907 |
| 58258 | 582584.27 | 4130061.93 | 31.48092 | 85.10545 | 83.36528 | 54.09375 | 67.8539 | 193.69215 |
| 58264 | 582640.84 | 4130061.93 | 31.0341 | 82.48575 | 80.63256 | 52.9167 | 66.35295 | 171.70567 |
| 58269 | 582697.41 | 4130061.93 | 30.59056 | 80.04671 | 80.64427 | 51.67604 | 60.92611 | 145.96703 |
| 58275 | 582753.98 | 4130061.93 | 30.15444 | 77.73663 | 80.29858 | 50.44657 | 58.52574 | 125.57144 |
| 58281 | 582810.55 | 4130061.93 | 29.71687 | 75.49856 | 78.88605 | 49.17572 | 58.41648 | 120.36658 |
| 58196 | 581962 | 4130145.84 | 39.97293 | 109.99755 | 162.73305 | 70.3441 | 80.69585 | 449.51153 |
| 58201 | 582018.57 | 4130145.84 | 39.22374 | 105.28259 | 169.56328 | 68.73855 | 76.80526 | 390.05785 |
| 58207 | 582075.14 | 4130145.84 | 38.48496 | 107.88385 | 108.68652 | 67.05416 | 77.15166 | 338.9956 |
| 58213 | 582131.71 | 4130145.84 | 37.76284 | 101.79759 | 132.36017 | 65.32018 | 73.24358 | 367.48648 |
| 58218 | 582188.28 | 4130145.84 | 37.05403 | 93.276 | 133.83305 | 63.52746 | 66.61857 | 309.77348 |
| 58224 | 582244.85 | 4130145.84 | 36.35262 | 89.65297 | 122.8077 | 61.72312 | 70.8198 | 259.40779 |
| 58230 | 582301.42 | 4130145.84 | 35.65748 | 86.88037 | 113.86122 | 59.90557 | 71.20481 | 249.52914 |
| 58235 | 582357.99 | 4130145.84 | 34.97744 | 84.0999 | 103.89503 | 58.06788 | 69.45788 | 247.11256 |
| 58241 | 582414.56 | 4130145.84 | 34.31725 | 81.47792 | 101.67558 | 56.22346 | 72.07006 | 232.66002 |
| 58247 | 582471.13 | 4130145.84 | 33.67062 | 79.03023 | 99.49553 | 54.40641 | 72.13979 | 208.39671 |
| 58252 | 582527.7 | 4130145.84 | 33.03264 | 76.74379 | 97.38777 | 52.5758 | 74.26577 | 178.28249 |
| 58258 | 582584.27 | 4130145.84 | 32.4076 | 74.54742 | 94.93257 | 50.76473 | 69.68742 | 145.62083 |
| 58264 | 582640.84 | 4130145.84 | 31.7978 | 72.44124 | 92.17867 | 48.99606 | 64.21044 | 139.0969 |
| 58269 | 582697.41 | 4130145.84 | 31.20587 | 70.47965 | 89.59392 | 47.27494 | 64.36827 | 137.84392 |
| 58275 | 582753.98 | 4130145.84 | 30.6315 | 68.6478 | 87.20486 | 45.55717 | 68.01752 | 133.70832 |
| 58281 | 582810.55 | 4130145.84 | 30.07376 | 66.86949 | 84.47382 | 43.87071 | 65.26738 | 126.68144 |
| 58286 | 582867.12 | 4130145.84 | 29.51558 | 64.64325 | 75.40689 | 42.23318 | 50.90845 | 114.94887 |
| 58196 | 581962 | 4130229.75 | 40.15185 | 130.9501 | 112.17313 | 67.16551 | 70.30964 | 362.62229 |
| 58201 | 582018.57 | 4130229.75 | 39.2038 | 117.29752 | 151.84776 | 64.51562 | 66.5845 | 395.3312 |
| 58207 | 582075.14 | 4130229.75 | 38.2905 | 107.13561 | 144.21208 | 61.88051 | 67.89089 | 359.39338 |
| 58213 | 582131.71 | 4130229.75 | 37.3912 | 99.483 | 133.8497 | 59.32697 | 70.16132 | 301.54398 |
| 58218 | 582188.28 | 4130229.75 | 36.50345 | 92.53477 | 130.22779 | 56.83605 | 77.47602 | 295.19058 |
| 58224 | 582244.85 | 4130229.75 | 35.64103 | 86.22037 | 126.02775 | 54.41514 | 74.90087 | 283.03664 |
| 58230 | 582301.42 | 4130229.75 | 34.81148 | 80.2677 | 121.86822 | 52.05048 | 78.06964 | 258.17908 |
| 58235 | 582357.99 | 4130229.75 | 34.01784 | 74.77554 | 117.32066 | 50.61824 | 75.73204 | 222.97266 |
| 58241 | 582414.56 | 4130229.75 | 33.25641 | 69.75136 | 112.67755 | 49.81614 | 81.41374 | 182.8928 |
| 58247 | 582471.13 | 4130229.75 | 32.52357 | 64.96882 | 108.05189 | 49.0123 | 77.23843 | 165.61787 |
| 58252 | 582527.7 | 4130229.75 | 31.80846 | 61.71566 | 103.08189 | 48.17135 | 71.09162 | 162.46519 |
| 58258 | 582584.27 | 4130229.75 | 31.09098 | 60.87981 | 98.13089 | 47.37603 | 71.97992 | 154.9626 |
| 58264 | 582640.84 | 4130229.75 | 30.38642 | 59.97009 | 93.21007 | 46.57861 | 76.17467 | 144.74276 |
| 58269 | 582697.41 | 4130229.75 | 29.70355 | 59.06705 | 89.03639 | 45.73335 | 73.44048 | 141.32528 |
| 58275 | 582753.98 | 4130229.75 | 29.20291 | 58.12921 | 85.87129 | 44.9361 | 64.90029 | 133.75618 |
| 58281 | 582810.55 | 4130229.75 | 28.83773 | 57.24932 | 83.84892 | 44.14886 | 66.17604 | 124.76727 |
| 58286 | 582867.12 | 4130229.75 | 28.4874 | 56.40829 | 82.21715 | 43.33804 | 71.25025 | 114.8836 |
| 58201 | 582018.57 | 4130313.66 | 41.63812 | 121.19392 | 160.84429 | 61.4942 | 66.80439 | 382.34522 |
| 58207 | 582075.14 | 4130313.66 | 40.91057 | 114.28943 | 150.56782 | 60.01733 | 77.42533 | 336.08736 |
| 58213 | 582131.71 | 4130313.66 | 40.19402 | 109.567 | 143.24247 | 58.54843 | 84.96148 | 312.56894 |
| 58218 | 582188.28 | 4130313.66 | 39.49536 | 104.93038 | 136.94559 | 57.11432 | 80.41451 | 278.14512 |
| 58224 | 582244.85 | 4130313.66 | 38.82091 | 100.19751 | 130.5552 | 55.74177 | 85.43337 | 233.13322 |
| 58230 | 582301.42 | 4130313.66 | 38.16839 | 95.49246 | 123.53608 | 54.38456 | 88.17662 | 198.67559 |
| 58235 | 582357.99 | 4130313.66 | 37.5382 | 90.78493 | 116.32975 | 53.04563 | 86.8187 | 193.52889 |
| 58241 | 582414.56 | 4130313.66 | 36.92686 | 86.27522 | 112.23679 | 51.7638 | 79.28029 | 182.83517 |
| 58247 | 582471.13 | 4130313.66 | 36.3348 | 81.82384 | 108.16807 | 50.49089 | 79.88302 | 171.70709 |

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| 58252 | 582527.7 | 4130313.66 | 35.75974 | 77.55253 | 104.1993 | 49.21291 | 86.36812 | 163.85221 |
| 58258 | 582584.27 | 4130313.66 | 35.19855 | 73.46319 | 100.12949 | 47.99643 | 82.29256 | 152.53533 |
| 58264 | 582640.84 | 4130313.66 | 34.64754 | 69.50403 | 96.37845 | 46.82479 | 73.01305 | 139.58321 |
| 58269 | 582697.41 | 4130313.66 | 34.10522 | 65.81024 | 92.42369 | 45.67689 | 77.58863 | 125.00546 |
| 58275 | 582753.98 | 4130313.66 | 33.56987 | 62.209 | 88.88602 | 44.56123 | 80.57405 | 110.46531 |
| 58281 | 582810.55 | 4130313.66 | 33.04418 | 58.83941 | 86.09069 | 43.47393 | 75.78926 | 96.11818 |
| 58286 | 582867.12 | 4130313.66 | 32.53049 | 55.71447 | 83.95965 | 42.40698 | 66.36941 | 98.04054 |
| 58184 | 581848.86 | 4130397.57 | 48.69756 | 148.89076 | 114.44404 | 64.86929 | 83.58578 | 375.22293 |
| 58190 | 581905.43 | 4130397.57 | 47.65578 | 139.58476 | 162.91881 | 63.54225 | 79.33732 | 471.63254 |
| 58196 | 581962 | 4130397.57 | 46.64955 | 131.02559 | 173.576 | 62.24672 | 77.15737 | 425.68924 |
| 58201 | 582018.57 | 4130397.57 | 45.67584 | 124.21925 | 160.70929 | 60.99877 | 86.40833 | 358.51854 |
| 58207 | 582075.14 | 4130397.57 | 44.73409 | 117.43699 | 148.52675 | 59.80371 | 93.14941 | 288.86325 |
| 58213 | 582131.71 | 4130397.57 | 43.8247 | 110.78001 | 142.10007 | 58.65843 | 94.32211 | 234.6363 |
| 58218 | 582188.28 | 4130397.57 | 42.94628 | 104.00622 | 135.65304 | 57.51569 | 93.29388 | 227.31185 |
| 58224 | 582244.85 | 4130397.57 | 42.09807 | 97.30981 | 131.08025 | 56.41149 | 97.99556 | 215.7784 |
| 58230 | 582301.42 | 4130397.57 | 41.27851 | 91.87624 | 125.29577 | 55.3472 | 89.49791 | 204.25898 |
| 58235 | 582357.99 | 4130397.57 | 40.48628 | 89.87307 | 120.28768 | 54.32712 | 87.90535 | 191.52911 |
| 58241 | 582414.56 | 4130397.57 | 39.71949 | 87.55665 | 114.66604 | 53.34282 | 95.92103 | 173.93259 |
| 58247 | 582471.13 | 4130397.57 | 38.9777 | 85.08948 | 110.00997 | 52.37228 | 92.90807 | 155.59837 |
| 58252 | 582527.7 | 4130397.57 | 38.25964 | 82.47483 | 105.65526 | 51.41676 | 82.35972 | 136.44748 |
| 58258 | 582584.27 | 4130397.57 | 37.56374 | 79.73449 | 100.92316 | 50.48319 | 91.30705 | 120.42151 |
| 58264 | 582640.84 | 4130397.57 | 36.8892 | 76.96633 | 96.95991 | 49.58958 | 91.47703 | 125.049 |
| 58269 | 582697.41 | 4130397.57 | 36.23511 | 74.15792 | 92.50739 | 48.74437 | 82.18389 | 127.15907 |
| 58275 | 582753.98 | 4130397.57 | 35.60083 | 71.34579 | 88.92947 | 47.92711 | 69.41829 | 128.68142 |
| 58281 | 582810.55 | 4130397.57 | 34.98467 | 68.60386 | 85.4653 | 47.11674 | 58.39148 | 128.75361 |
| 58286 | 582867.12 | 4130397.57 | 34.38562 | 65.82738 | 82.08838 | 46.2988 | 59.95257 | 127.40385 |
| 58184 | 581848.86 | 4130481.48 | 48.50065 | 138.01071 | 195.63776 | 75.00294 | 88.43543 | 463.30357 |
| 58190 | 581905.43 | 4130481.48 | 47.40847 | 131.78157 | 183.29005 | 73.13489 | 91.0173 | 390.23679 |
| 58196 | 581962 | 4130481.48 | 46.35789 | 127.26931 | 179.94636 | 71.33932 | 95.81651 | 344.82538 |
| 58201 | 582018.57 | 4130481.48 | 45.34666 | 120.47868 | 161.96563 | 69.60141 | 100.1581 | 280.58148 |
| 58207 | 582075.14 | 4130481.48 | 44.37271 | 113.62946 | 150.11484 | 67.93222 | 105.9825 | 253.04396 |
| 58213 | 582131.71 | 4130481.48 | 43.43413 | 108.15237 | 140.53505 | 66.33239 | 111.1845 | 236.18385 |
| 58218 | 582188.28 | 4130481.48 | 42.52914 | 106.0284 | 133.95234 | 64.78804 | 104.5544 | 218.22089 |
| 58224 | 582244.85 | 4130481.48 | 41.65606 | 103.1927 | 128.46711 | 63.31677 | 99.30389 | 197.35814 |
| 58230 | 582301.42 | 4130481.48 | 40.81326 | 99.7002 | 121.41186 | 61.90607 | 107.2654 | 171.7507 |
| 58235 | 582357.99 | 4130481.48 | 39.99937 | 95.78636 | 114.97023 | 60.53118 | 102.9723 | 159.72828 |
| 58241 | 582414.56 | 4130481.48 | 39.21284 | 91.48652 | 108.18692 | 59.18617 | 98.06932 | 162.32903 |
| 58247 | 582471.13 | 4130481.48 | 38.45245 | 87.1201 | 103.43466 | 57.89654 | 108.4533 | 164.76505 |
| 58252 | 582527.7 | 4130481.48 | 37.71693 | 82.56433 | 97.21725 | 56.65768 | 103.0869 | 162.595 |
| 58258 | 582584.27 | 4130481.48 | 37.00525 | 77.94993 | 93.63007 | 55.45375 | 90.09243 | 159.73297 |
| 58264 | 582640.84 | 4130481.48 | 36.31627 | 73.38055 | 89.68954 | 54.30339 | 72.65784 | 153.8587 |
| 58269 | 582697.41 | 4130481.48 | 35.64895 | 71.16204 | 86.20145 | 53.20004 | 69.76441 | 147.20778 |
| 58275 | 582753.98 | 4130481.48 | 35.00237 | 69.98393 | 83.55761 | 52.13702 | 69.18438 | 140.44593 |
| 58281 | 582810.55 | 4130481.48 | 34.37565 | 68.64938 | 81.11565 | 51.10696 | 65.2945 | 133.23987 |
| 58286 | 582867.12 | 4130481.48 | 33.76786 | 67.16683 | 78.80716 | 50.09319 | 64.6057 | 125.44557 |
| 58173 | 581735.72 | 4130565.39 | 50.90415 | 103.87419 | 199.30291 | 77.80606 | 83.98865 | 567.22767 |
| 58179 | 581792.29 | 4130565.39 | 49.74719 | 109.98728 | 209.88048 | 75.62581 | 81.57509 | 499.31848 |
| 58184 | 581848.86 | 4130565.39 | 48.63437 | 114.27797 | 199.22646 | 73.55439 | 91.96951 | 389.63085 |
| 58190 | 581905.43 | 4130565.39 | 47.56287 | 115.41526 | 178.03488 | 71.56748 | 117.1191 | 322.10804 |
| 58196 | 581962 | 4130565.39 | 46.53079 | 116.00593 | 161.20407 | 69.67299 | 116.77 | 283.77462 |
| 58201 | 582018.57 | 4130565.39 | 45.53593 | 115.12148 | 154.35357 | 67.86671 | 121.5664 | 255.84449 |
| 58207 | 582075.14 | 4130565.39 | 44.57637 | 112.63627 | 146.06781 | 66.15756 | 124.0175 | 220.71951 |

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| 58213 | 582131.71 | 4130565.39 | 43.65042 | 108.81525 | 138.2568 | 64.5443 | 113.1055 | 211.98137 |
| 58218 | 582188.28 | 4130565.39 | 42.75576 | 104.85381 | 134.28512 | 62.99353 | 123.5784 | 215.06153 |
| 58224 | 582244.85 | 4130565.39 | 41.89168 | 101.2623 | 129.50043 | 61.50108 | 116.6965 | 213.14441 |
| 58230 | 582301.42 | 4130565.39 | 41.05643 | 96.85486 | 122.85476 | 60.07316 | 120.4776 | 204.9812 |
| 58235 | 582357.99 | 4130565.39 | 40.24939 | 91.967 | 117.91888 | 58.70659 | 125.1252 | 196.44238 |
| 58241 | 582414.56 | 4130565.39 | 39.46927 | 88.27471 | 113.44782 | 57.38316 | 114.4133 | 186.23842 |
| 58247 | 582471.13 | 4130565.39 | 38.71491 | 87.03732 | 109.15123 | 56.10209 | 96.36622 | 174.71245 |
| 58252 | 582527.7 | 4130565.39 | 37.98502 | 85.24772 | 104.84631 | 54.86738 | 83.90062 | 161.81509 |
| 58258 | 582584.27 | 4130565.39 | 37.27859 | 83.05058 | 101.70188 | 53.67318 | 83.73032 | 153.80737 |
| 58264 | 582640.84 | 4130565.39 | 36.59449 | 80.47858 | 97.17432 | 52.51983 | 77.97826 | 149.54698 |
| 58269 | 582697.41 | 4130565.39 | 35.93161 | 77.68851 | 94.14948 | 51.40757 | 75.79306 | 146.25116 |
| 58275 | 582753.98 | 4130565.39 | 35.28917 | 74.68136 | 91.42702 | 50.33247 | 69.81396 | 142.32471 |
| 58281 | 582810.55 | 4130565.39 | 34.66609 | 71.60368 | 89.12033 | 49.29342 | 61.49123 | 138.18662 |
| 58286 | 582867.12 | 4130565.39 | 34.06168 | 68.38477 | 86.93757 | 48.29031 | 52.02485 | 133.5902 |
| 58173 | 581735.72 | 4130649.3 | 47.2263 | 86.64902 | 116.93209 | 76.0136 | 73.6084 | 334.395 |
| 58179 | 581792.29 | 4130649.3 | 46.28869 | 69.4647 | 135.37662 | 74.09599 | 74.43287 | 370.0592 |
| 58190 | 581905.43 | 4130649.3 | 44.512 | 79.97298 | 190.98671 | 70.46687 | 137.9313 | 313.66414 |
| 58196 | 581962 | 4130649.3 | 43.67105 | 85.99403 | 169.30702 | 68.76355 | 146.7393 | 286.38155 |
| 58201 | 582018.57 | 4130649.3 | 42.85449 | 90.857 | 162.18335 | 67.13086 | 134.3321 | 276.71069 |
| 58207 | 582075.14 | 4130649.3 | 42.06248 | 94.34525 | 153.08127 | 65.55267 | 145.2818 | 259.75366 |
| 58213 | 582131.71 | 4130649.3 | 41.29265 | 96.3782 | 145.46617 | 64.0351 | 137.3807 | 241.53108 |
| 58218 | 582188.28 | 4130649.3 | 40.54451 | 97.12302 | 138.21089 | 62.59583 | 147.808 | 221.56824 |
| 58224 | 582244.85 | 4130649.3 | 39.81541 | 96.70053 | 132.83332 | 61.2172 | 145.5392 | 213.28906 |
| 58230 | 582301.42 | 4130649.3 | 39.10479 | 95.0623 | 126.13796 | 59.8792 | 126.8403 | 204.83415 |
| 58235 | 582357.99 | 4130649.3 | 38.41316 | 92.54032 | 121.24131 | 58.5931 | 103.9389 | 197.13493 |
| 58241 | 582414.56 | 4130649.3 | 37.74185 | 89.27417 | 117.28544 | 57.35152 | 104.4409 | 189.46808 |
| 58247 | 582471.13 | 4130649.3 | 37.09042 | 86.87676 | 111.50547 | 56.14901 | 97.87352 | 178.21482 |
| 58252 | 582527.7 | 4130649.3 | 36.45869 | 83.99497 | 106.97224 | 54.98893 | 92.63589 | 168.55225 |
| 58258 | 582584.27 | 4130649.3 | 35.84481 | 80.63779 | 103.01353 | 53.84658 | 82.2392 | 163.02714 |
| 58264 | 582640.84 | 4130649.3 | 35.24861 | 76.95816 | 99.52793 | 52.7495 | 69.04291 | 157.27206 |
| 58269 | 582697.41 | 4130649.3 | 34.66819 | 74.33264 | 95.89987 | 51.70839 | 61.85986 | 150.79361 |
| 58275 | 582753.98 | 4130649.3 | 34.10359 | 73.66244 | 93.03696 | 50.69298 | 65.71623 | 144.90755 |
| 58281 | 582810.55 | 4130649.3 | 33.55341 | 72.62897 | 90.79479 | 49.71314 | 68.81407 | 139.47341 |
| 58286 | 582867.12 | 4130649.3 | 33.01749 | 71.19202 | 88.16095 | 48.77632 | 70.18845 | 133.22849 |
| 58184 | 581848.86 | 4130733.21 | 41.64533 | 76.26546 | 196.31023 | 63.80802 | 172.6148 | 359.56886 |
| 58190 | 581905.43 | 4130733.21 | 40.84168 | 63.14518 | 172.61108 | 62.3497 | 166.0525 | 319.64462 |
| 58196 | 581962 | 4130733.21 | 40.05606 | 51.72044 | 158.81342 | 60.94491 | 176.3586 | 295.45336 |
| 58201 | 582018.57 | 4130733.21 | 39.28792 | 58.37609 | 152.03676 | 59.57327 | 166.801 | 278.37886 |
| 58207 | 582075.14 | 4130733.21 | 38.54118 | 64.57806 | 145.65665 | 58.24238 | 185.9161 | 263.36794 |
| 58213 | 582131.71 | 4130733.21 | 37.81743 | 70.04597 | 138.75221 | 56.94207 | 166.4431 | 249.85955 |
| 58218 | 582188.28 | 4130733.21 | 37.11289 | 74.6631 | 132.53737 | 55.70459 | 145.0306 | 235.91916 |
| 58224 | 582244.85 | 4130733.21 | 36.42575 | 78.25848 | 126.32193 | 54.51077 | 134.9801 | 221.41568 |
| 58230 | 582301.42 | 4130733.21 | 35.75492 | 80.91142 | 121.03582 | 53.35044 | 128.116 | 207.72241 |
| 58235 | 582357.99 | 4130733.21 | 35.09964 | 82.5595 | 116.42673 | 52.21877 | 117.8376 | 194.71837 |
| 58241 | 582414.56 | 4130733.21 | 34.45949 | 83.24525 | 111.48459 | 51.08902 | 98.99984 | 181.34775 |
| 58247 | 582471.13 | 4130733.21 | 33.83683 | 83.05408 | 107.18407 | 50.00256 | 81.94142 | 168.9456 |
| 58252 | 582527.7 | 4130733.21 | 33.23112 | 82.02212 | 102.96343 | 48.96812 | 87.25505 | 156.99919 |
| 58258 | 582584.27 | 4130733.21 | 32.64199 | 80.29527 | 99.29833 | 47.97031 | 90.18961 | 146.00817 |
| 58264 | 582640.84 | 4130733.21 | 32.06795 | 77.99484 | 96.09372 | 47.00073 | 90.3814 | 139.65154 |
| 58269 | 582697.41 | 4130733.21 | 31.50851 | 75.94771 | 93.43266 | 46.03678 | 88.30515 | 135.30513 |
| 58275 | 582753.98 | 4130733.21 | 30.96209 | 74.07439 | 90.82632 | 45.09388 | 83.85996 | 131.07871 |
| 58281 | 582810.55 | 4130733.21 | 30.42608 | 71.8457 | 89.44341 | 44.28047 | 78.68275 | 128.21794 |

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| 58286 | 582867.12 | 4130733.21 | 29.9021 | 69.21348 | 87.47518 | 43.55295 | 72.282 | 124.55686 |
| 58173 | 581735.72 | 4130817.12 | 37.88813 | 111.99594 | 262.27239 | 55.46 | 169.4913 | 494.17717 |
| 58179 | 581792.29 | 4130817.12 | 37.40391 | 103.2714 | 218.66058 | 54.67036 | 213.2475 | 385.19392 |
| 58184 | 581848.86 | 4130817.12 | 36.92116 | 94.16225 | 199.65121 | 53.81395 | 231.2931 | 343.31211 |
| 58190 | 581905.43 | 4130817.12 | 36.43538 | 83.66592 | 177.16896 | 53.06093 | 229.4388 | 299.50695 |
| 58196 | 581962 | 4130817.12 | 35.9493 | 72.78529 | 164.94968 | 52.30984 | 228.902 | 273.97312 |
| 58201 | 582018.57 | 4130817.12 | 35.46497 | 62.08018 | 154.80857 | 51.53682 | 199.5411 | 257.94665 |
| 58207 | 582075.14 | 4130817.12 | 34.97563 | 52.02857 | 146.42597 | 50.72087 | 187.1789 | 244.11253 |
| 58213 | 582131.71 | 4130817.12 | 34.50291 | 42.89299 | 136.99797 | 50.00112 | 179.858 | 229.68895 |
| 58218 | 582188.28 | 4130817.12 | 34.03657 | 47.97997 | 127.93211 | 49.28629 | 157.5824 | 215.82634 |
| 58224 | 582244.85 | 4130817.12 | 33.5673 | 53.18907 | 118.84063 | 48.5456 | 123.3702 | 202.11127 |
| 58230 | 582301.42 | 4130817.12 | 33.09922 | 57.96632 | 110.60971 | 47.7614 | 132.0564 | 192.64081 |
| 58235 | 582357.99 | 4130817.12 | 32.63018 | 62.15138 | 102.79977 | 47.02106 | 133.3582 | 184.04109 |
| 58241 | 582414.56 | 4130817.12 | 32.16843 | 65.71673 | 95.95866 | 46.33389 | 127.1801 | 175.65271 |
| 58247 | 582471.13 | 4130817.12 | 31.7166 | 68.59032 | 93.14445 | 45.65929 | 117.3804 | 168.91503 |
| 58252 | 582527.7 | 4130817.12 | 31.26983 | 70.6886 | 90.0258 | 44.96539 | 103.866 | 161.81138 |
| 58258 | 582584.27 | 4130817.12 | 30.83305 | 72.04871 | 87.59462 | 44.23884 | 99.2205 | 156.04946 |
| 58264 | 582640.84 | 4130817.12 | 30.40233 | 72.74327 | 85.60406 | 43.55187 | 97.07391 | 150.89405 |
| 58269 | 582697.41 | 4130817.12 | 29.97362 | 72.79584 | 83.75427 | 42.92105 | 93.543 | 146.20887 |
| 58275 | 582753.98 | 4130817.12 | 29.54859 | 72.19603 | 81.46462 | 42.29397 | 88.46064 | 141.0817 |
| 58281 | 582810.55 | 4130817.12 | 29.13274 | 71.03239 | 79.70566 | 41.6661 | 83.97402 | 136.97653 |
| 58286 | 582867.12 | 4130817.12 | 28.7262 | 69.43412 | 78.34112 | 41.01385 | 81.96363 | 133.47828 |
| 58173 | 581735.72 | 4130901.03 | 33.14782 | 100.27373 | 251.46019 | 58.85706 | 317.6474 | 444.58779 |
| 58179 | 581792.29 | 4130901.03 | 31.60725 | 100.69045 | 218.93563 | 56.21181 | 361.3062 | 392.22932 |
| 58184 | 581848.86 | 4130901.03 | 30.13971 | 98.43516 | 202.74213 | 53.77 | 310.7117 | 359.08172 |
| 58190 | 581905.43 | 4130901.03 | 29.66197 | 93.52377 | 186.12731 | 51.26722 | 281.6094 | 329.12378 |
| 58196 | 581962 | 4130901.03 | 29.48705 | 86.69283 | 174.64453 | 48.9452 | 275.3293 | 307.10235 |
| 58201 | 582018.57 | 4130901.03 | 29.29592 | 78.53157 | 161.58451 | 46.67472 | 232.4374 | 285.96926 |
| 58207 | 582075.14 | 4130901.03 | 29.08037 | 69.72147 | 152.09885 | 44.44639 | 241.9706 | 270.59413 |
| 58213 | 582131.71 | 4130901.03 | 28.88818 | 60.65992 | 144.93133 | 42.43294 | 228.7599 | 254.49449 |
| 58218 | 582188.28 | 4130901.03 | 28.68644 | 51.86001 | 139.04566 | 40.34505 | 198.142 | 240.34099 |
| 58224 | 582244.85 | 4130901.03 | 28.46909 | 43.71412 | 132.51082 | 38.37967 | 175.1193 | 226.66277 |
| 58230 | 582301.42 | 4130901.03 | 28.24211 | 36.2504 | 125.70558 | 37.3004 | 161.7326 | 213.79445 |
| 58235 | 582357.99 | 4130901.03 | 28.00812 | 40.03069 | 119.40426 | 37.11932 | 146.3572 | 202.42882 |
| 58241 | 582414.56 | 4130901.03 | 27.76377 | 44.44957 | 112.96873 | 36.91391 | 133.5139 | 191.75264 |
| 58247 | 582471.13 | 4130901.03 | 27.53203 | 48.62491 | 107.31166 | 36.62807 | 124.0509 | 182.35459 |
| 58252 | 582527.7 | 4130901.03 | 27.29831 | 52.48463 | 101.49071 | 36.41082 | 114.1546 | 173.53808 |
| 58258 | 582584.27 | 4130901.03 | 27.05215 | 55.83193 | 96.56232 | 36.16595 | 105.2616 | 166.18396 |
| 58264 | 582640.84 | 4130901.03 | 26.79844 | 58.70681 | 92.1142 | 35.91744 | 96.83742 | 159.65056 |
| 58269 | 582697.41 | 4130901.03 | 26.54916 | 61.04387 | 87.82833 | 35.60367 | 88.66422 | 153.68294 |
| 58275 | 582753.98 | 4130901.03 | 26.30056 | 62.83364 | 83.49975 | 35.31699 | 81.74844 | 148.20207 |
| 58281 | 582810.55 | 4130901.03 | 26.04731 | 64.03076 | 79.56443 | 35.0674 | 78.8971 | 142.75009 |
| 58286 | 582867.12 | 4130901.03 | 25.79352 | 64.70662 | 75.52845 | 34.80079 | 76.4743 | 138.36805 |
| 58173 | 581735.72 | 4130984.94 | 40.99446 | 79.29431 | 229.27421 | 66.93679 | 662.2798 | 413.19466 |
| 58179 | 581792.29 | 4130984.94 | 39.36184 | 85.33002 | 214.75514 | 64.64295 | 695.0566 | 356.89116 |
| 58184 | 581848.86 | 4130984.94 | 37.80617 | 89.0359 | 201.97955 | 62.39385 | 714.7421 | 310.84973 |
| 58190 | 581905.43 | 4130984.94 | 36.23669 | 90.31781 | 192.8947 | 60.13297 | 645.4449 | 278.51889 |
| 58196 | 581962 | 4130984.94 | 34.71665 | 89.04104 | 179.59954 | 57.93961 | 456.3143 | 261.14753 |
| 58201 | 582018.57 | 4130984.94 | 33.28692 | 85.5174 | 167.54839 | 55.77988 | 331.352 | 245.68301 |
| 58207 | 582075.14 | 4130984.94 | 31.89343 | 80.30577 | 156.66159 | 53.67218 | 256.833 | 233.09691 |
| 58213 | 582131.71 | 4130984.94 | 30.54042 | 73.86007 | 151.30361 | 51.60439 | 213.1165 | 221.86653 |
| 58218 | 582188.28 | 4130984.94 | 29.24156 | 66.54571 | 144.92984 | 49.55714 | 189.1259 | 210.97233 |

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| 58224 | 582244.85 | 4130984.94 | 28.03331 | 58.91905 | 137.64934 | 47.64664 | 169.929 | 200.67866 |
| 58230 | 582301.42 | 4130984.94 | 26.84071 | 51.2497 | 130.0929 | 45.67597 | 154.5726 | 191.00485 |
| 58235 | 582357.99 | 4130984.94 | 25.68295 | 44.02413 | 122.61072 | 43.83732 | 142.0271 | 182.02404 |
| 58241 | 582414.56 | 4130984.94 | 24.58937 | 37.20913 | 115.05092 | 42.02894 | 131.3841 | 173.606 |
| 58247 | 582471.13 | 4130984.94 | 23.5745 | 31.16582 | 108.011 | 40.19749 | 122.2691 | 165.54409 |
| 58252 | 582527.7 | 4130984.94 | 22.56019 | 33.86578 | 104.37629 | 38.55798 | 114.1993 | 157.91798 |
| 58258 | 582584.27 | 4130984.94 | 22.13873 | 37.71755 | 101.46495 | 36.84358 | 107.9694 | 151.50052 |
| 58264 | 582640.84 | 4130984.94 | 22.06438 | 41.36633 | 98.78716 | 35.16686 | 103.2672 | 146.33487 |
| 58269 | 582697.41 | 4130984.94 | 21.98316 | 44.80022 | 95.6585 | 33.69433 | 98.16015 | 140.4777 |
| 58275 | 582753.98 | 4130984.94 | 21.91037 | 47.97658 | 92.90236 | 32.12103 | 94.45446 | 136.49734 |
| 58281 | 582810.55 | 4130984.94 | 21.82044 | 50.75218 | 89.98251 | 30.63519 | 90.57103 | 132.52955 |
| 58286 | 582867.12 | 4130984.94 | 21.72095 | 53.10501 | 86.4732 | 29.57207 | 86.87763 | 128.57298 |
| 58173 | 581735.72 | 4131068.85 | 45.94029 | 75.29341 | 173.49339 | 67.09992 | 235.7764 | 451.17598 |
| 58179 | 581792.29 | 4131068.85 | 44.54543 | 63.84149 | 150.78517 | 65.8131 | 240.2302 | 409.40963 |
| 58184 | 581848.86 | 4131068.85 | 43.17352 | 71.00515 | 159.05918 | 64.43905 | 260.5216 | 366.56362 |
| 58190 | 581905.43 | 4131068.85 | 41.76444 | 76.47328 | 161.946 | 63.01403 | 256.0047 | 322.7075 |
| 58196 | 581962 | 4131068.85 | 40.35649 | 80.12798 | 164.04316 | 61.55605 | 264.3251 | 303.95271 |
| 58201 | 582018.57 | 4131068.85 | 39.01488 | 81.61648 | 161.69685 | 59.99164 | 230.0722 | 284.04056 |
| 58207 | 582075.14 | 4131068.85 | 37.66309 | 81.04721 | 157.36063 | 58.44244 | 196.7628 | 263.63313 |
| 58213 | 582131.71 | 4131068.85 | 36.32113 | 78.59204 | 151.6196 | 56.80182 | 177.2387 | 244.06736 |
| 58218 | 582188.28 | 4131068.85 | 35.04291 | 74.65194 | 144.36227 | 55.22269 | 165.0651 | 224.81414 |
| 58224 | 582244.85 | 4131068.85 | 33.7903 | 69.45379 | 138.12696 | 53.56401 | 155.694 | 206.63591 |
| 58230 | 582301.42 | 4131068.85 | 32.54708 | 63.48754 | 131.15972 | 51.96217 | 146.8143 | 189.26214 |
| 58235 | 582357.99 | 4131068.85 | 31.3499 | 57.0279 | 123.41382 | 50.33866 | 137.9703 | 172.82248 |
| 58241 | 582414.56 | 4131068.85 | 30.22655 | 50.45882 | 119.64924 | 48.69746 | 130.0035 | 157.56901 |
| 58247 | 582471.13 | 4131068.85 | 29.09979 | 43.94183 | 115.45602 | 47.15816 | 122.3413 | 143.34882 |
| 58252 | 582527.7 | 4131068.85 | 27.99182 | 37.83209 | 110.60317 | 45.51786 | 114.9256 | 129.99386 |
| 58258 | 582584.27 | 4131068.85 | 26.95568 | 32.21324 | 105.26105 | 44.00511 | 107.56 | 117.52267 |
| 58264 | 582640.84 | 4131068.85 | 25.96695 | 27.0958 | 101.81338 | 42.40823 | 103.7694 | 115.35513 |
| 58269 | 582697.41 | 4131068.85 | 24.96933 | 29.0004 | 97.02905 | 40.8781 | 99.24722 | 113.46385 |
| 58275 | 582753.98 | 4131068.85 | 24.00235 | 32.38156 | 93.09904 | 39.42396 | 96.15088 | 112.53538 |
| 58281 | 582810.55 | 4131068.85 | 23.11153 | 35.65382 | 89.45095 | 37.91325 | 93.06158 | 111.49559 |
| 58286 | 582867.12 | 4131068.85 | 22.24978 | 38.65241 | 84.92493 | 36.52293 | 88.12906 | 108.18425 |
| 58201 | 582018.57 | 4131152.76 | 41.80675 | 69.22122 | 117.54256 | 56.9488 | 155.3221 | 290.15344 |
| 58224 | 582244.85 | 4131152.76 | 37.5934 | 72.6175 | 130.20788 | 54.13304 | 133.1691 | 215.66834 |
| 58230 | 582301.42 | 4131152.76 | 36.51525 | 69.60109 | 128.48863 | 53.16192 | 126.6844 | 200.63945 |
| 58235 | 582357.99 | 4131152.76 | 35.4818 | 65.46459 | 125.3728 | 52.20701 | 118.0184 | 193.93391 |
| 58241 | 582414.56 | 4131152.76 | 34.42664 | 60.5876 | 121.54683 | 51.1617 | 109.4584 | 186.84328 |
| 58247 | 582471.13 | 4131152.76 | 33.3715 | 55.10264 | 114.88028 | 50.08807 | 98.10712 | 176.57613 |
| 58252 | 582527.7 | 4131152.76 | 32.37057 | 49.35761 | 110.07426 | 48.92693 | 88.75288 | 167.22624 |
| 58258 | 582584.27 | 4131152.76 | 31.37266 | 43.60918 | 104.42008 | 47.76036 | 82.36156 | 157.37308 |
| 58264 | 582640.84 | 4131152.76 | 30.35511 | 38.1881 | 99.18718 | 46.56754 | 80.52131 | 148.27265 |
| 58269 | 582697.41 | 4131152.76 | 29.37383 | 32.9654 | 96.67243 | 45.38438 | 78.63665 | 139.41748 |
| 58275 | 582753.98 | 4131152.76 | 28.45019 | 28.19991 | 96.41887 | 44.13284 | 78.34121 | 132.55538 |
| 58281 | 582810.55 | 4131152.76 | 27.50547 | 23.96185 | 95.27361 | 42.94796 | 77.29049 | 125.4808 |
| 58286 | 582867.12 | 4131152.76 | 26.57334 | 25.05022 | 91.12903 | 41.6492 | 74.18563 | 115.90009 |

# B-7 AERMOD Input File

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**
** AERMOD Input Produced by:
** AERMOD View Ver. 9.8.3
** Lakes Environmental Software Inc.
** Date: 6/23/2021
** File: C:\Lakes\PCRP\PCRP.ADI
**
**************************************
**
**
**************************************
** AERMOD Control Pathway
**************************************
**
**
CO STARTING
   TITLEONE C:\Lakes\PCRP\PCRP.isc
   MODELOPT DFAULT CONC
   AVERTIME 1 ANNUAL
   POLLUTID PM_10
   FLAGPOLE 1.80
   RUNORNOT RUN
   ERRORFIL PCRP.err
CO FINISHED
**
**************************************
** AERMOD Source Pathway
**************************************
**
**
SO STARTING
** Source Location **
** Source ID - Type - X Coord. - Y Coord. **
   LOCATION MATRMVL      AREAPOLY   578632.279  4130448.278      358.130
** DESCRSRC Material Removal
   LOCATION CHAN_RCK     AREAPOLY   580202.060  4129976.283      197.930
** DESCRSRC Channel Widening and Rock Pile
   LOCATION CONCRTE      AREAPOLY   581057.474  4130833.749      151.220
** DESCRSRC Concrete Channel Planting Area
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** Line Source Represented by Area Sources
** LINE AREA Source ID = UNPAVED
** DESCRSRC Unpaved Road
** PREFIX
** Length of Side = 16.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0000387657
** Nodes = 17
** 580018.939, 4130299.860, 291.35, 2.55
** 579980.203, 4130396.699, 307.22, 2.55
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** 579935.012, 4130431.131, 313.77, 2.55
** 579831.717, 4130497.842, 323.68, 2.55
** 579758.549, 4130568.858, 332.31, 2.55
** 579706.902, 4130648.481, 334.13, 2.55
** 579605.759, 4130678.609, 338.65, 2.55
** 579526.136, 4130657.089, 344.94, 2.55
** 579442.208, 4130639.873, 352.07, 2.55
** 579328.154, 4130639.873, 361.23, 2.55
** 579310.938, 4130659.241, 359.64, 2.55
** 579272.202, 4130674.305, 358.08, 2.55
** 579242.074, 4130672.153, 355.32, 2.55
** 578968.773, 4130508.602, 343.56, 2.55
** 578869.782, 4130476.323, 347.33, 2.55
** 578751.423, 4130459.107, 349.76, 2.55
** 578648.128, 4130450.499, 357.31, 2.55
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   LOCATION A0000058     AREA     580026.367 4130302.831 292.70
   LOCATION A0000059     AREA     579985.052 4130403.063 306.99
   LOCATION A0000060     AREA     579939.352 4130437.851 314.26
   LOCATION A0000061     AREA     579837.288 4130503.583 332.50
   LOCATION A0000062     AREA     579765.261 4130573.211 335.97
   LOCATION A0000063     AREA     579709.186 4130656.148 343.39
   LOCATION A0000064     AREA     579603.672 4130686.331 348.64
   LOCATION A0000065     AREA     579524.528 4130664.926 348.65
   LOCATION A0000066     AREA     579442.208 4130647.873 361.38
   LOCATION A0000067     AREA     579334.133 4130645.188 361.52
   LOCATION A0000068     AREA     579313.837 4130666.697 359.77
   LOCATION A0000069     AREA     579271.632 4130682.284 356.71
   LOCATION A0000070     AREA     579237.966 4130679.017 350.53
   LOCATION A0000071     AREA     579101.316 4130597.242 340.58
   LOCATION A0000072     AREA     578966.293 4130516.208 341.93
   LOCATION A0000073     AREA     578868.631 4130484.239 346.98
   LOCATION A0000074     AREA     578750.759 4130467.079 351.45
** End of LINE AREA Source ID = UNPAVED
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** Line Source Represented by Area Sources
** LINE AREA Source ID = PAVED
** DESCRSRC Paved Road
** PREFIX
** Length of Side = 9.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0000420952
** Nodes = 32
** 581860.761, 4131004.678, 124.58, 2.55
** 581706.259, 4131008.510, 130.45, 2.55
** 581645.330, 4131015.641, 133.72, 2.55
** 581584.791, 4131034.708, 137.49, 2.55
** 581386.111, 4131122.290, 150.52, 0.00
** 581350.603, 4131125.518, 152.64, 0.00
** 581321.551, 4131119.062, 154.50, 0.00
** 581305.411, 4131110.992, 154.95, 0.00
** 581284.429, 4131098.080, 155.79, 0.00
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** 581237.624, 4131036.749, 156.37, 0.00
** 581215.028, 4131014.153, 155.88, 0.00
** 581190.818, 4131006.083, 156.18, 0.00
** 581069.769, 4130978.645, 160.03, 0.00
** 581058.471, 4130968.961, 161.01, 0.00
** 580977.771, 4130873.736, 168.22, 0.00
** 580788.935, 4130565.464, 169.31, 0.00
** 580822.828, 4130429.889, 165.24, 0.00
** 580822.828, 4130405.679, 166.84, 0.00
** 580755.041, 4130229.754, 171.25, 0.00
** 580732.445, 4130184.563, 172.65, 0.00
** 580675.955, 4130100.635, 175.07, 0.00
** 580651.746, 4130097.407, 175.11, 0.00
** 580608.168, 4130069.969, 178.81, 0.00
** 580504.873, 4130039.304, 195.83, 0.00
** 580462.909, 4130045.759, 201.83, 0.00
** 580364.456, 4130076.425, 219.01, 0.00
** 580307.966, 4130100.635, 231.11, 0.00
** 580230.494, 4130107.091, 242.69, 0.00
** 580159.479, 4130111.933, 254.80, 0.00
** 580109.445, 4130144.213, 265.01, 0.00
** 580083.621, 4130186.177, 272.29, 0.00
** 580020.676, 4130291.086, 292.35, 0.00
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   LOCATION A0000123     AREA     581860.873 4131009.176 124.55
   LOCATION A0000124     AREA     581783.622 4131011.092 126.64
   LOCATION A0000125     AREA     581706.783 4131012.979 129.75
   LOCATION A0000126     AREA     581646.682 4131019.933 133.39
   LOCATION A0000127     AREA     581586.606 4131038.826 136.70
   LOCATION A0000128     AREA     581520.380 4131068.020 141.44
   LOCATION A0000129     AREA     581454.153 4131097.214 145.30
   LOCATION A0000130     AREA     581386.518 4131126.772 150.89
   LOCATION A0000131     AREA     581349.627 4131129.911 154.69
   LOCATION A0000132     AREA     581319.539 4131123.087 154.39
   LOCATION A0000133     AREA     581303.053 4131114.825 154.16
   LOCATION A0000134     AREA     581280.852 4131100.810 155.98
   LOCATION A0000135     AREA     581234.442 4131039.931 156.19
   LOCATION A0000136     AREA     581213.605 4131018.422 155.78
   LOCATION A0000137     AREA     581189.823 4131010.472 155.83
   LOCATION A0000138     AREA     581129.299 4130996.753 147.70
   LOCATION A0000139     AREA     581066.840 4130982.062 160.11
   LOCATION A0000140     AREA     581055.038 4130971.871 161.19
   LOCATION A0000141     AREA     581014.688 4130924.258 165.04
   LOCATION A0000142     AREA     580973.934 4130876.087 168.26
   LOCATION A0000143     AREA     580936.167 4130814.432 168.62
   LOCATION A0000144     AREA     580898.399 4130752.778 169.57
   LOCATION A0000145     AREA     580860.632 4130691.123 169.77
   LOCATION A0000146     AREA     580822.865 4130629.469 169.92
   LOCATION A0000147     AREA     580784.569 4130564.373 169.39
   LOCATION A0000148     AREA     580801.516 4130496.585 163.09
   LOCATION A0000149     AREA     580818.328 4130429.889 164.72
   LOCATION A0000150     AREA     580818.629 4130407.297 165.46
   LOCATION A0000151     AREA     580796.034 4130348.655 167.24
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   LOCATION A0000153     AREA     580751.016 4130231.767 170.42
   LOCATION A0000154     AREA     580728.712 4130187.075 172.17
   LOCATION A0000155     AREA     580700.467 4130145.112 174.29
   LOCATION A0000156     AREA     580675.361 4130105.096 174.79
   LOCATION A0000157     AREA     580649.348 4130101.215 174.64
   LOCATION A0000158     AREA     580606.887 4130074.283 179.62
   LOCATION A0000159     AREA     580555.240 4130058.950 187.41
   LOCATION A0000160     AREA     580505.557 4130043.751 195.31
   LOCATION A0000161     AREA     580464.247 4130050.056 202.66
   LOCATION A0000162     AREA     580415.020 4130065.389 211.17
   LOCATION A0000163     AREA     580366.228 4130080.561 219.84
   LOCATION A0000164     AREA     580308.340 4130105.120 231.50
   LOCATION A0000165     AREA     580230.801 4130111.581 244.67
   LOCATION A0000166     AREA     580161.918 4130115.714 254.54
   LOCATION A0000167     AREA     580113.278 4130146.571 264.42
   LOCATION A0000168     AREA     580087.480 4130188.492 272.95
   LOCATION A0000169     AREA     580056.007 4130240.946 282.91
** End of LINE AREA Source ID = PAVED
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** Line Source Represented by Area Sources
** LINE AREA Source ID = CCP_UNPV
** DESCRSRC Concrete Channel Planting Unpaved Road
** PREFIX
** Length of Side = 9.00
** Ratio = 10
** Vertical Dimension = 2.37
** Emission Rate = 0.0004578927
** Nodes = 7
** 581189.242, 4130998.911, 156.49, 2.55
** 581184.678, 4130979.514, 155.78, 2.55
** 581161.858, 4130928.169, 155.47, 2.55
** 581151.589, 4130915.618, 155.48, 2.55
** 581131.051, 4130897.362, 155.65, 2.55
** 581112.795, 4130846.018, 160.37, 2.55
** 581075.143, 4130788.968, 163.48, 2.55
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   LOCATION A0000117     AREA     581184.862 4130999.941 156.45
   LOCATION A0000118     AREA     581180.566 4130981.341 156.01
   LOCATION A0000119     AREA     581158.375 4130931.019 155.43
   LOCATION A0000120     AREA     581148.600 4130918.982 155.53
   LOCATION A0000121     AREA     581126.811 4130898.870 155.47
   LOCATION A0000122     AREA     581109.040 4130848.497 158.43
** End of LINE AREA Source ID = CCP_UNPV
** Source Parameters **
   SRCPARAM MATRMVL      0.0000632236     5.000         8     1.400
   AREAVERT MATRMVL      578632.279 4130448.278 578595.156 4130493.356
   AREAVERT MATRMVL      578451.967 4130541.086 578377.720 4130535.783
   AREAVERT MATRMVL      578343.249 4130519.873 578303.474 4130506.614
   AREAVERT MATRMVL      578385.675 4130477.446 578478.483 4130464.188
   SRCPARAM CHAN_RCK     0.0000730653     5.000        12     1.400
   AREAVERT CHAN_RCK     580202.060 4129976.283 580196.756 4130005.451
   AREAVERT CHAN_RCK     580289.564 4130010.755 580499.045 4129970.980
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   AREAVERT CHAN_RCK     580533.517 4129986.890 580586.550 4130026.665
   AREAVERT CHAN_RCK     580599.808 4130042.575 580605.111 4130016.058
   AREAVERT CHAN_RCK     580573.292 4129973.632 580514.955 4129941.812
   AREAVERT CHAN_RCK     580355.856 4129957.722 580281.609 4129981.587
   SRCPARAM CONCRTE      0.0001515202     5.000         6     1.400
   AREAVERT CONCRTE      581057.474 4130833.749 581068.904 4130826.414
   AREAVERT CONCRTE      580867.455 4130533.014 580837.452 4130443.527
   AREAVERT CONCRTE      580820.308 4130449.395 580850.311 4130530.080
** LINE AREA Source ID = UNPAVED
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   SRCPARAM A0000059     0.0000387657     2.550    56.814    16.000  -142.696
    2.372
   SRCPARAM A0000060     0.0000387657     2.550   122.964    16.000  -147.144
    2.372
   SRCPARAM A0000061     0.0000387657     2.550   101.964    16.000  -135.855
    2.372
   SRCPARAM A0000062     0.0000387657     2.550    94.907    16.000  -122.969
    2.372
   SRCPARAM A0000063     0.0000387657     2.550   105.535    16.000  -163.413
    2.372
   SRCPARAM A0000064     0.0000387657     2.550    82.480    16.000   164.876
    2.372
   SRCPARAM A0000065     0.0000387657     2.550    85.675    16.000   168.408
    2.372
   SRCPARAM A0000066     0.0000387657     2.550   114.055    16.000   180.000
    2.372
   SRCPARAM A0000067     0.0000387657     2.550    25.913    16.000  -131.634
    2.372
   SRCPARAM A0000068     0.0000387657     2.550    41.562    16.000  -158.749
    2.372
   SRCPARAM A0000069     0.0000387657     2.550    30.204    16.000   175.914
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   SRCPARAM A0000070     0.0000387657     2.550   159.250    16.000   149.103
    2.372
   SRCPARAM A0000071     0.0000387657     2.550   159.250    16.000   149.103
    2.372
   SRCPARAM A0000072     0.0000387657     2.550   104.121    16.000   161.940
    2.372
   SRCPARAM A0000073     0.0000387657     2.550   119.604    16.000   171.724
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   SRCPARAM A0000074     0.0000387657     2.550   103.653    16.000   175.236
    2.372
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** LINE AREA Source ID = PAVED
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   SRCPARAM A0000124     0.0000420952     2.550    77.275     9.000  -178.579
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   SRCPARAM A0000125     0.0000420952     2.550    61.345     9.000  -173.324
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SRCPARAM A0000130     0.0000420952     0.000    35.654     9.000  -174.806
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SRCPARAM A0000131     0.0000420952     0.000    29.760     9.000   167.471
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SRCPARAM A0000132     0.0000420952     0.000    18.045     9.000   153.435
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SRCPARAM A0000139     0.0000420952     0.000    14.880     9.000   139.399
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SRCPARAM A0000140     0.0000420952     0.000    62.410     9.000   130.280
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SRCPARAM A0000142     0.0000420952     0.000    72.302     9.000   121.490
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SRCPARAM A0000143     0.0000420952     0.000    72.302     9.000   121.490
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SRCPARAM A0000144     0.0000420952     0.000    72.302     9.000   121.490
 2.372
SRCPARAM A0000145     0.0000420952     0.000    72.302     9.000   121.490
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SRCPARAM A0000146     0.0000420952     0.000    72.302     9.000   121.490
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SRCPARAM A0000147     0.0000420952     0.000    69.874     9.000    75.964
 2.372
SRCPARAM A0000148     0.0000420952     0.000    69.874     9.000    75.964
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SRCPARAM A0000149     0.0000420952     0.000    24.210     9.000    90.000
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SRCPARAM A0000150     0.0000420952     0.000    62.844     9.000   111.073
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SRCPARAM A0000151     0.0000420952     0.000    62.844     9.000   111.073
 2.372
SRCPARAM A0000152     0.0000420952     0.000    62.844     9.000   111.073
 2.372
SRCPARAM A0000153     0.0000420952     0.000    50.526     9.000   116.565
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    2.372
   SRCPARAM A0000154     0.0000420952     0.000    50.584     9.000   123.944
    2.372
   SRCPARAM A0000155     0.0000420952     0.000    50.584     9.000   123.944
    2.372
   SRCPARAM A0000156     0.0000420952     0.000    24.424     9.000   172.405
    2.372
   SRCPARAM A0000157     0.0000420952     0.000    51.496     9.000   147.804
    2.372
   SRCPARAM A0000158     0.0000420952     0.000    53.876     9.000   163.465
    2.372
   SRCPARAM A0000159     0.0000420952     0.000    53.876     9.000   163.465
    2.372
   SRCPARAM A0000160     0.0000420952     0.000    42.457     9.000  -171.254
    2.372
   SRCPARAM A0000161     0.0000420952     0.000    51.559     9.000  -162.699
    2.372
   SRCPARAM A0000162     0.0000420952     0.000    51.559     9.000  -162.699
    2.372
   SRCPARAM A0000163     0.0000420952     0.000    61.459     9.000  -156.801
    2.372
   SRCPARAM A0000164     0.0000420952     0.000    77.740     9.000  -175.236
    2.372
   SRCPARAM A0000165     0.0000420952     0.000    71.180     9.000  -176.100
    2.372
   SRCPARAM A0000166     0.0000420952     0.000    59.543     9.000  -147.171
    2.372
   SRCPARAM A0000167     0.0000420952     0.000    49.273     9.000  -121.608
    2.372
   SRCPARAM A0000168     0.0000420952     0.000    61.172     9.000  -120.964
    2.372
   SRCPARAM A0000169     0.0000420952     0.000    61.172     9.000  -120.964
    2.372
** ------------------------------------------------------------------
** LINE AREA Source ID = CCP_UNPV
   SRCPARAM A0000117     0.0004578927     2.550    19.927     9.000   103.241
    2.372
   SRCPARAM A0000118     0.0004578927     2.550    56.187     9.000   113.962
    2.372
   SRCPARAM A0000119     0.0004578927     2.550    16.217     9.000   129.289
    2.372
   SRCPARAM A0000120     0.0004578927     2.550    27.479     9.000   138.366
    2.372
   SRCPARAM A0000121     0.0004578927     2.550    54.494     9.000   109.573
    2.372
   SRCPARAM A0000122     0.0004578927     2.550    68.355     9.000   123.425
    2.372
** ------------------------------------------------------------------

** Variable Emissions Type: "By Hour / Seven Days (HRDOW7)"
** Variable Emission Scenario: "Scenario 2"
   EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
   EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
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EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
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EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000117     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000117     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000118     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000118     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000119     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000119     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000120     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000120     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000121     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000121     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000122     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT A0000122     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000117     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000118     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000119     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000120     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000121     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000122     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CHAN_RCK     HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CHAN_RCK     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT CONCRTE      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
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EMISFACT CONCRTE      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT CONCRTE      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT MATRMVL      HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
EMISFACT MATRMVL      HRDOW7 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT MATRMVL      HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000123     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
EMISFACT A0000123     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
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EMISFACT A0000131     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000168     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
EMISFACT A0000169     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
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EMISFACT A0000074     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4
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EMISFACT A0000073     HRDOW7 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4
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EMISFACT A0000058     HRDOW7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
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** AERMOD Meteorology Pathway
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   PROFFILE "Moffett Field Met\745090.PFL"
   SURFDATA 23244 2009
   UAIRDATA 23230 2009 OAKLAND/WSO_AP
   PROFBASE 11.9 METERS
ME FINISHED
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** AERMOD Output Pathway
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   PLOTFILE 1 CCP_UNPV 1ST PCRP.AD\01H1G001.PLT 32
   PLOTFILE 1 CHAN_RCK 1ST PCRP.AD\01H1G002.PLT 33
   PLOTFILE 1 CONCRTE 1ST PCRP.AD\01H1G003.PLT 34
   PLOTFILE 1 MATRMVL 1ST PCRP.AD\01H1G004.PLT 35
   PLOTFILE 1 PAVED 1ST PCRP.AD\01H1G005.PLT 36
   PLOTFILE 1 UNPAVED 1ST PCRP.AD\01H1G006.PLT 37
   PLOTFILE ANNUAL ALL PCRP.AD\AN00GALL.PLT 38
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   PLOTFILE ANNUAL UNPAVED PCRP.AD\AN00G006.PLT 44
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** Project Parameters
**************************************
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** DESCPTN  UTM: Universal Transverse Mercator
** DATUM    World Geodetic System 1984
** DTMRGN   Global Definition
** UNITS    m
** ZONE     10
** ZONEINX  0
**
```

# B-8 Health Risk Summary

# HRA Permanente Creek Restoration Project

**Health Risk Assessment Summary of Results - OEHHA 2003 Guidance**

| Risk Impact | Residence near Stevens Creek Blvd. | Caretaker's House | Year |
|---|---|---|---|
| Cancer (per million) | 0.5098 | 0.0365 | 2024-2029 |
| $PM_{2.5}$ Impact ($\mu g/m^3$) | 0.0014 | 0.0001 | 2025/2026 |
| Chronic Hazard Index | 0.0080 | 0.0006 | 2025 |
| Acute Hazard Index | 0.0553 | 0.0365 | 2029 |

| Chronic Hazard Index | Residence near Stevens Creek Blvd. | Caretaker's House |
|---|---|---|
| 2024 | 0.008 | 0.001 |
| 2025 | 0.008 | 0.001 |
| 2026 | 0.008 | 0.001 |
| 2027 | 0.008 | 0.001 |
| 2028 | 0.008 | 0.001 |
| 2029 | 0.008 | 0.001 |

| Acute Hazard Index | Residence near Stevens Creek Blvd. | Caretaker's House |
|---|---|---|
| 2024 | 0.041 | 0.019 |
| 2025 | 0.039 | 0.016 |
| 2026 | 0.039 | 0.016 |
| 2027 | 0.039 | 0.016 |
| 2028 | 0.055 | 0.036 |
| 2029 | 0.055 | 0.037 |

# HRA Permanente Creek Restoration Project

**Health Risk Assessment Summary of Results - OEHHA 2015 Guidance**

| Risk Impact | Residence near Stevens Creek Blvd. | Caretaker's House | Year |
|---|---|---|---|
| Cancer (per million) | 0.7797 | 0.0559 | 2024-2029 |
| $PM_{2.5}$ Impact ($\mu g/m^3$) | 0.0014 | 0.0001 | 2025/2026 |
| Chronic Hazard Index | 0.01 | 0.0006 | 2025 |
| Acute Hazard Index | 0.06 | 0.0365 | 2029 |

| Chronic Hazard Index | Residence near Stevens Creek Blvd. | Caretaker's House |
|---|---|---|
| 2024 | 0.008 | 0.001 |
| 2025 | 0.008 | 0.001 |
| 2026 | 0.008 | 0.001 |
| 2027 | 0.008 | 0.001 |
| 2028 | 0.008 | 0.001 |
| 2029 | 0.008 | 0.001 |

| Acute Hazard Index | Residence near Stevens Creek Blvd. | Caretaker's House |
|---|---|---|
| 2024 | 0.041 | 0.019 |
| 2025 | 0.039 | 0.016 |
| 2026 | 0.039 | 0.016 |
| 2027 | 0.039 | 0.016 |
| 2028 | 0.055 | 0.036 |
| 2029 | 0.055 | 0.037 |

Paved road
Unpaved road
Paved road
Concrete Channel
and Planting
Unpaved road
Material Removal
Rock Pile and
Channel Widening
Permanente
Permanente Rd
Stevens Creek Blvd
Longdown Rd
Hammond-Snyder Loop Trail
Canyon Oak Way
Madrone Ct
Voss Ave
Avenida Ln
El Cerrito Rd
PG&E Trail
Google Earth

Majstrpm25: 0.003121
Railpm25: 0.001608
Railcan: 1.007598
Majstrcancer: 0.145183
Highpm25: 0.107606
Highcancer: 3.847426

# Appendix E
## **Biological Resources**

# E1. Revised Draft Biological Assessment (GEI Consultants, Inc., May 2016)

Revised Draft Biological Assessment
for the

# Permanente Creek Restoration Project

Prepared for:

Lehigh Southwest Cement Company

GEI Consultants
in association with
AECOM

May 2016

Revised Draft Biological Assessment
for the

# Permanente Creek Restoration Project

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Prepared by:

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In association with

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Project Manager
916/631-4515



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May 2016

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# ACRONYMS AND OTHER ABBREVIATIONS

| | |
|---|---|
| BA | biological assessment |
| BO | biological opinion |
| CFR | Code of Federal Regulations |
| CRLF | California red-legged frog |
| ESA | Endangered Species Act |
| FR | *Federal Register* |
| Lehigh | Lehigh Southwest Cement Company |
| MMP | mitigation and monitoring plan |
| NMFS | National Marine Fisheries Service |
| Project | Permanente Creek Restoration Project |
| RWQCB | Regional Water Quality Control Board |
| Service | U.S. Fish and Wildlife Service |
| SWPPP | storm water pollution prevention plan |
| USACE | U.S. Army Corps of Engineers |
| USC | U.S. Code |

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# 1 BACKGROUND

## 1.1 INTRODUCTION

The purpose of this draft biological assessment (BA) is to review the Permanente Creek Restoration Project (Project) in sufficient detail to determine the extent to which it may affect any of the federally listed species described in Section 1.3, "Species Evaluated in the Biological Assessment." The species evaluated in this BA were derived from the federal endangered species list for species that may occur in the Action Area, as provided by the U.S. Fish and Wildlife Service (Service) on April 26, 2016 (Appendix A).

This BA has been prepared in accordance with requirements set forth under Section 7 of the federal Endangered Species Act (ESA) (16 U.S. Code [USC] 1536[c]). It initiates consultation with the Service and the National Marine Fisheries Service (NMFS) regarding effects of the Project on federally listed species.

Under provisions of ESA Section 7(a)(2), a federal agency that permits, licenses, funds, or otherwise authorizes activities must consult with NMFS and/or the Service, as appropriate, to prevent its action from jeopardizing the continued existence of any listed species or adversely modifying critical habitat (16 USC 1536[c]). A federal agency is required to consult if an action "may affect" listed species or designated critical habitat.

As defined in 50 Code of Federal Regulations (CFR) 402.2, the term "biological assessment" refers to the information prepared by, or under the direction of, the federal agency regarding listed species, species proposed for listing, and the designated and proposed critical habitat that may be present in the Action Area (see Section 1.2, "Action Area"), and the evaluation of a project's potential effects on those species and habitat. A BA must be prepared if listed species or critical habitat may be present in an area that would be affected by a "major construction activity." When a federal agency determines, through a BA or other review, that its action is "likely to adversely affect" a listed species or designated critical habitat, the agency must submit a request for formal consultation to NMFS and/or the Service. This consultation must take place within 90 days, then NMFS and the Service must prepare biological opinions (BOs) within the subsequent 45 days. The BOs present determinations by NMFS and the Service regarding whether the project would be likely to jeopardize the species or adversely modify its critical habitat. If a "jeopardy" or "adverse modification" determination is made, the BO must identify any reasonable and prudent alternative actions that could satisfy the purpose of and need for the project.

## 1.2 ACTION AREA

As defined by ESA guidelines, the "Action Area" is "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR 402.02). The Action Area includes all areas that would be directly or indirectly affected by project components. The Action Area for the Project consists of the 127.19-acre wetland delineation study area (see Exhibit 1), which is the area of potential direct effect, plus adjacent areas extending out to 500 feet, which compose the extent of potential indirect effects on water quality or wildlife dispersal that may occur outside of the construction area. The Action Area totals approximately 662.4 acres (see Exhibit 2). The Action Area focuses on a portion of Permanente Creek located south of the Lehigh Southwest Cement Company (Lehigh) Cement Plant, and is situated within the U.S. Geological Survey Mindego Hill and Cupertino Quadrangles. Elevations range from approximately 470 feet above mean sea level at the eastern boundary of the Action Area to 1,870 feet above mean sea level at the western boundary.

## 1.3 SPECIES AND HABITATS EVALUATED IN THE BIOLOGICAL ASSESSMENT

The Service provided an automated list to GEI Consultants on April 26, 2016, showing the federally listed and candidate species that potentially could be affected by the Project. All species on that list were analyzed for their potential occurrence within the Action Area and for the Project to affect those species. The species shown in Table 1 could be affected by the Project. The species listed in Table 2 are not anticipated to be affected by the Project. For the species in Table 2, a rationale for the "no effect" determination is provided.

### 1.3.1 SPECIES INCLUDED IN THE ANALYSIS

Based on the list provided by the Service (Appendix A) and the anticipated effects of the Project on listed species and their habitats in the Action Area, one species shown in Table 1—California red-legged frog (CRLF) (*Rana draytonii*), federally listed as threatened—is carried forward for effects analysis in this BA. This species is known to occur in the Action Area and may be affected by the Project.

**Table 1. Federally Listed or Candidate Species that May Be Affected by the Project**

| Species | ESA Listing Status | Critical Habitat Designated in the Action Area (Yes/No) | Potential to Occur in the Action Area |
|---|---|---|---|
| **Wildlife** | | | |
| California red-legged frog *Rana draytonii* | Threatened | No | This species is found in permanent and semi-permanent ponds or backwaters of streams. California red-legged frog is known to occur in Ponds 9, 21, and 22 (and adjacent to the Action Area at Pond 14), based on a series of focused surveys (WRA 2011). Permanente Creek in the Action Area contains suitable aquatic and upland habitat. |

Notes: BA = biological assessment; ESA = federal Endangered Species Act; Project = Permanente Creek Restoration Project
Source: Data compiled by AECOM in 2015

### 1.3.2 SPECIES ELIMINATED FROM FURTHER ANALYSIS

The species shown in Table 2 were eliminated from further analysis in this BA because their known range does not overlap with the Action Area, the Action Area does not contain suitable habitat for the species, or Project activities are not expected to affect the species or its habitat in the Action Area.

**Table 2. Federally Listed or Candidate Species that Are Not Expected to be Affected by the Project**

| Species | ESA Listing Status | Reasoning for No Effect Determination |
|---|---|---|
| **Plant Species** | | |
| San Mateo woolly sunflower *Eriophyllum latilobum* | Endangered | San Mateo woolly sunflower is restricted to shaded moist sites on steep grassy or sparsely wooded slopes of serpentine soils in San Mateo County. There is marginally suitable habitat for this species in the Action Area; however, the species was not detected during 2008 protocol floristic surveys and no occurrences are documented within 4.5 miles. Thus, this species is not expected to be affected by the Project. |

| Table 2. Federally Listed or Candidate Species that Are Not Expected to be Affected by the Project | | |
|---|---|---|
| Species | ESA Listing Status | Reasoning for No Effect Determination |
| **Fish and Wildlife Species** | | |
| Tidewater goby *Eucyclogobius newberryi* | Endangered | Tidewater goby is found in the Sacramento and San Joaquin Rivers and associated tributaries. Permanente Creek does not provide suitable habitat for this species and the species is not known to occur in the Action Area. |
| San Bruno elfin butterfly *Incisalia mossii bayensis* | Endangered | San Bruno elfin butterfly is found in coastal mountains near San Francisco Bay, in the fog belt of steep north-facing slopes that receive little direct sunlight. There is no suitable habitat for this species in the Action Area, and thus, this species is not expected to be affected by the Project. |
| California clapper [Ridgway's] rail *Rallus longirostris obsoletus* | Endangered | California clapper rail occurs in emergent marsh habitat in the San Francisco Bay region. The Action Area does not contain suitable habitat for this species. Therefore, this species is not expected to be affected by the Project. |
| California least tern *Sternula antillarum (=Sterna, =albifrons) browni* | Endangered | California least tern occurs in beach and scrub habitats along the Pacific Coast from San Francisco to Baja California, Mexico. The Action Area does not contain suitable habitat for this species. Therefore, this species is not expected to be affected by the Project. |
| San Francisco garter snake *Thamnophis sirtalis tetrataenia* | Endangered | San Francisco garter snake occurs in pond habitats and feeds primarily on California red-legged frogs. The species' historical range was the San Francisco Peninsula south to Santa Cruz County. This species is not known to occur in the Action Area. Therefore, this species is not expected to be affected by the Project. |
| California tiger salamander *Ambystoma californiense* | Threatened | California tiger salamander breeds in vernal pool habitat and spends the majority of the year in upland refugia habitat (burrows) up to 1.5 miles from breeding ponds. There is no suitable breeding habitat for this species in the Action Area and the Action Area is not within 1.5 miles of known breeding locations. The nearest known occurrences of tiger salamander to the Action Area are approximately 12 miles to the southeast. Therefore, this species is not expected to be affected by the Project. |
| Marbled murrelet *Brachyramphus marmoratus* | Threatened | Marbled murrelet breeds in coniferous forests near coasts, nesting on large horizontal branches high up in trees. This species is not known to occur in the Action Area and is not expected to be affected by the Project. |
| Bay checkerspot butterfly *Euphydryas editha bayensis* | Threatened | Bay checkerspot butterfly is found in areas with serpentine soils. There is no suitable habitat for this species in the Action Area, and thus, this species is not expected to be affected by the Project. |
| Delta smelt *Hypomesus transpacificus* | Threatened | Delta smelt is found in the Sacramento–San Joaquin Delta and associated tributaries. Permanente Creek does not provide suitable habitat for this species and the species is not known to occur in the Action Area. |
| Central California Coastal steelhead DPS *Oncorhynchus mykiss* | Threatened | Central California coastal steelhead are found in coastal drainages from the Russian River south to Aptos Creek, including drainages of San Francisco and San Pablo Bays east to the confluence of the Sacramento and San Joaquin Rivers. Although steelhead occur in Stevens Creek, which is hydrologically connected to Permanente Creek by the Permanente Creek Diversion Channel, the diversion channel is impassable for steelhead, which do not occur in Permanente Creek. Further, depending on rainfall and drought conditions, flows in upper Permanente Creek may not reach Stevens Creek through the diversion channel (Permanente Creek is typically dry upstream of the diversion structure). In addition, Stevens Creek is over 4 miles downstream of the Action Area and is unlikely to experience increased sedimentation or other adverse conditions as a result of the proposed action. Therefore, this species is unlikely to be affected by the Project. |

Notes: DPS = Distinct Population Segment; ESA = federal Endangered Species Act; Project = Permanente Creek Restoration Project
Source: Data compiled by AECOM in 2015

### 1.3.3 CRITICAL HABITAT IN THE ACTION AREA

ESA Section 3(5)A defines "critical habitat" as the specific areas in the geographical area occupied by the species where physical or biological features are found that are essential to the conservation of the species and may require special management considerations or protection. Designations of critical habitat also may include specific areas outside the geographical area occupied by the species, based on a determination that such areas are essential to the conservation of the species.

The Action Area does not contain designated critical habitat for any federally listed species. The closest designated critical habitat to the Action Area is for Central California Coastal Steelhead, approximately 4 miles downstream of the Action Area, in Stevens Creek. Critical habitat for CRLF in Unit SNM-2, is present approximately 2 miles southwest of the Action Area.

### 1.3.4 ESSENTIAL FISH HABITAT IN THE ACTION AREA

Section 305(b)(2) of the Magnuson Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104 267), requires that Essential Fish Habitat (EFH) be identified and described in federal fishery management plans and that federal agencies consult with NMFS on any activity that they fund, permit, or carry out that may adversely affect EFH for federally managed fish species. EFH includes those waters and substrate necessary for fish spawning, breeding, feeding, or growth to maturity.

The Pacific Fishery Management Council has identified and described EFH, adverse impacts, and recommended conservation measures for salmon in Amendment 14 to the Pacific Coast Salmon Plan. Freshwater EFH for Pacific salmon includes all currently viable waters and most of the habitat historically accessible to salmon. The Action Area is within the Coyote Creek U.S. Geologic Survey Hydrologic Unit, which is designated EFH for Chinook Salmon (*Oncorhynchus tshawytscha*). Permanente Creek is not currently viable habitat for Chinook Salmon, because it is inaccessible to salmon.

### 1.3.5 CONSULTATION TO DATE

Table 3 summarizes consultation that has occurred to date between the U.S. Army Corps of Engineers (USACE) and the Service.

**Table 3. Consultation with U.S. Fish and Wildlife Service**

| Date | Consultation | Summary of Topics |
|---|---|---|
| November 18, 2014 | Meeting at SFBRWQCB office | Interagency meeting at the SFBRWQCB office to discuss the project. USFWS, as well as CDFW and RWQCB staff were in attendance. |
| June 3, 2015 | Federal species list | AECOM received automated list from the Service of federally listed species that may occur in the Action Area. |
| July 8, 2015 | Pre-application meeting (USACE) | Pre-application meeting with USACE and USFWS to discuss the proposed action. |
| April 26, 2016 | Federal species list update | GEI Consultants received automated list from the Service of federally listed species that may occur in the Action Area. |

Note: Service = U.S. Fish and Wildlife Service
Source: Data compiled by GEI in 2016

# 2 PROJECT DESCRIPTION

## 2.1 PROJECT LOCATION

The Project site is located in unincorporated Santa Clara County west of Cupertino and in the eastern foothills of the Santa Cruz Mountains, a part of the California Coast Ranges between the San Francisco Bay Area and the Pacific Ocean (Exhibit 1). The Action Area consists of Permanente Creek and its floodplain adjacent to the southern boundary of the Permanente Quarry. Exhibit 2 depicts the Project location next to the Permanente Quarry. Most of the area around the creek is undeveloped and includes natural areas such as the Rancho San Antonio Open Space to the north. Areas downstream of the Action Area are highly urbanized and include the cities of Cupertino, Los Altos, Palo Alto, and Saratoga.

## 2.2 PROJECT PURPOSE AND OBJECTIVES

Pursuant to a negotiated consent decree in *Sierra Club v. Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc.* (U.S. District Court, Northern District, Case No. 5:11-cv-06392-HRL) and a cleanup and abatement order issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB) (CAO No. 99-018:Section 9), Lehigh, the current facility operator, and Hanson Permanente Cement, Inc., the landowner, propose to restore portions of the Permanente Creek streambed, banks, and floodplain.

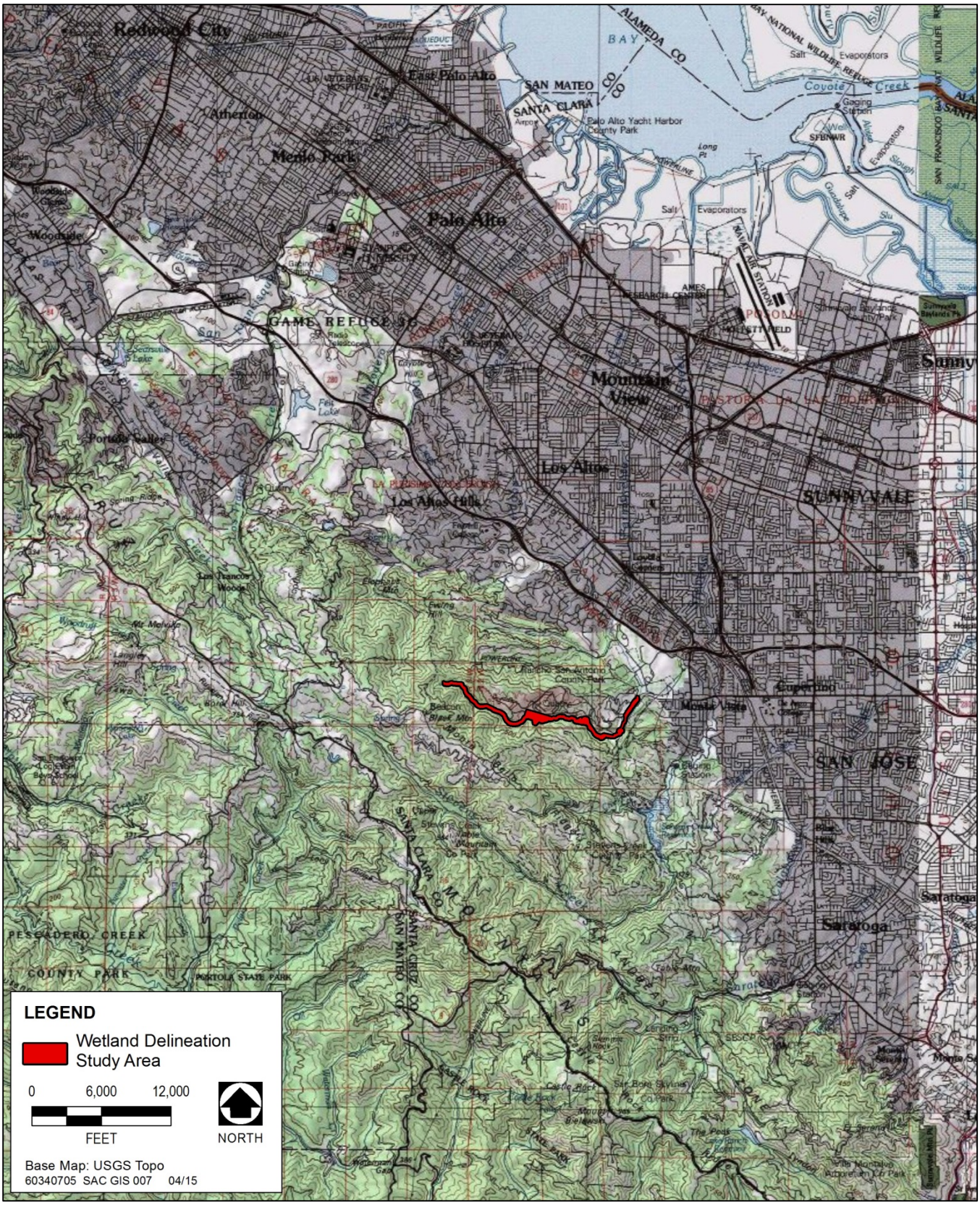
As part of the Project, Lehigh would remove a substantial volume of rock material (e.g., riprap, soil, debris) from specified areas in and/or adjacent to the creek, restore adjacent floodplain areas, and contour the stream to recreate meanders and match elevation controls created by bedrock. This may require removing an existing instream settling pond (Pond 13) and associated dam infrastructure. Second, to address additional downstream areas, Lehigh would remove culverts to create additional "daylighted" stream reaches, remove other concrete structures, remove an adjacent rock pile to provide additional space for meanders, and plant riparian vegetation along an existing concrete channel. Additional details regarding the restoration activities are provided below.

The proposed restoration of Permanente Creek has the following objectives:

- Remove mine-related materials from banks, and adjacent slopes of Permanente Creek.
- Restore streambed and floodplain hydraulics.
- Restore streambed hydrology and geomorphology, including stream meanders within the floodplain.
- Increase the quantity and quality of resident rainbow trout habitat.
- Improve and maintain riparian habitat on the banks and floodplain.
- Layback creek banks and adjacent hill slopes to provide stable slopes sufficient to prevent fill from entering the creek
- Remove or alter culverts and concrete structures to expose and create new streambed habitat.

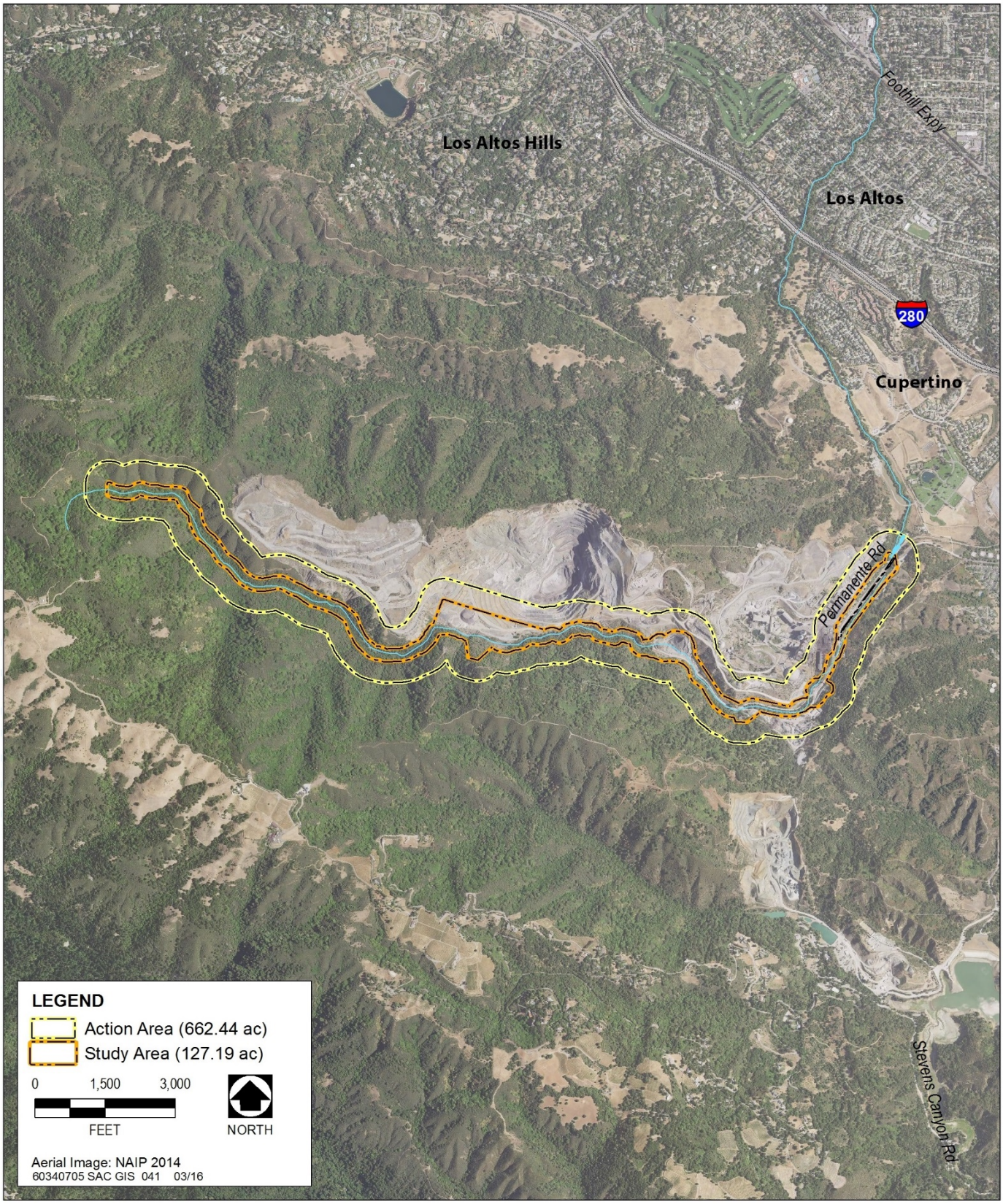
## 2.3 PROPOSED PROJECT

The Project would involve stream restoration on approximately 9,000 feet of Permanente Creek. In this length of the creek, portions of the streambed naturally achieve steep gradients (e.g., between 5% and >10%) and areas of exposed bedrock act as grade control points. The restoration would attempt to establish approximate pre-disturbance creek alignment and slopes in certain areas (*e.g.*, Reaches 17 and 18), and improve riparian habitat, including improvement to channel and stream bank stability and ecological/geomorphic function, based on current stream restoration approaches and engineering.




Source: Data compiled by AECOM in 2015

**Exhibit 1. Regional Location**




Source: Data compiled by AECOM in 2015, adapted by GEI 2016

**Exhibit 2. Action Area**

The Project, as fully depicted in the Project Design Drawings (Appendix B), would include realignment of the creek in several areas affected by rock material (*e.g*., riprap, soil, debris) from the adjacent mining operation. For example, rock material would be excavated in the "Material Removal Area" near Reach 17. The Project would involve removing this material, realigning the stream, and providing a floodplain bench area to restore natural geomorphic processes, allowing the stream to overtop its banks and meander within the stream corridor. Where Permanente Creek is incised in some areas, the restored streambed would be relatively shallow, allowing the stream to overflow its banks during substantial rainfall and inundate the floodplain. This beneficial stream process does not occur now in areas where the creek is channelized or constrained by fill or human-made structures in the floodplain. Restoring this process would provide natural removal of sediment and may provide some improvements in downstream water quality.

The proposed creek restoration plan has been developed over the last several years in consultation with the Sierra Club, and state, and federal agencies. In 2013, Lehigh and the Sierra Club signed a Consent Decree, outlining creek modifications that were based on certain assumptions. As actual design plans were prepared and consultation occurred with the California Department of Fish and Wildlife, the San Francisco Bay RWQCB, the U.S. Fish & Wildlife Service, and the U.S. Army Corps of Engineers, the project was modified as reflected in the enclosed design plans (Appendix B), and an amended Consent Decree was executed by the Sierra Club and Lehigh. Therefore, more recently, Lehigh and the Sierra Club developed a stream restoration plan that focuses on stream hydraulics, streambank and floodplain habitat, protection of resident/local fish populations, and improved wildlife habitat.

The Project would include the following components:

- establishing temporary access roads and staging areas for construction equipment and materials,
- completing a geotechnical investigation to support final design of the stream alignment,
- removing rock material from the adjacent quarry operation from the creek banks and bed,
- constructing new stream channel and floodplain areas,
- preparing stable side slopes,
- planting streambank and floodplain areas with riparian vegetation,
- removing human-made structures adjacent to the creek, and
- generally restoring the site.

The construction contractor would access the site through the main entrance off Permanente Road and would establish temporary access roadways that complement existing roadways in the area. This access would allow the contractor to drill geotechnical borings needed to inform the channel design, and to access the floodplain and stream channel during construction and habitat restoration. The construction contractor also would establish several construction staging areas for equipment storage, materials laydown, office trailers, and employee parking. During restoration, these areas would be used to store and prepare containerized plants before planting. Both the construction access roadways and the staging areas would be located to minimize erosion and loss of trees and other vegetation. It is anticipated that restoration activities would occur during the dry season, approximately May through September, over approximately five (5) consecutive seasons immediately after receipt of all necessary permits and approvals.

### 2.3.1 PROPOSED RESTORATION COMPONENTS

The subsections below describe the proposed features, construction methods, and measures Lehigh would use to minimize construction effects, and the required permits and approvals. Appendix B provides several design drawings and shows the overall layout of the proposed features and upgrades: the construction access roads and

staging area, culverts and other structures to be removed, locations of rock removal and slope stabilization, location and topographical design of the stream channel and floodplain improvements, and vegetation restoration location and components.

## 2.3.2 PROJECT CONSTRUCTION

Construction would be completed in the following steps as described in greater detail below:

- establishment of temporary access roads and staging areas for construction equipment and materials,
- geotechnical investigations to support final design of the stream alignment,
- removal of fallen rock material from the adjacent quarry,
- construction of new stream channel and floodplain areas,
- preparation of stable side slopes,
- planting of streambank and floodplain areas with riparian vegetation,
- removal of human-made structures adjacent to the creek, and
- general site restoration.

### SITE PREPARATION—ACCESS ROADS AND STAGING AREAS

Before construction, crews would establish access roads and staging areas at the Project site. The crews would access the site through the main entrance and would establish temporary construction-access roadways that would be designed to be a minimum of 14 feet wide. Establishing these roadways would allow the contractor to drill the geotechnical borings needed to inform final channel design and would provide access to the Project site during construction. The staging areas are required for storage of equipment and construction materials, office trailers, and employee parking. Seven staging areas are proposed. From west to east, two staging areas would be located near Culvert 10/11, one at Culvert 9, two at Culvert 8, one at Culvert 2, and one at Culvert 1. The access roads and staging areas would be located to minimize erosion and loss of trees and other vegetation.

### ROCK MATERIAL REMOVAL

The contractor would excavate rock material from affected stream reaches to move the toe of the slope to the north and restore the floodplain. Rock material would be removed within Reaches 8–12 (see the Project Design Drawings in Appendix B) by reducing the width of the adjacent roadway and removing rock material. Additional rock material would be removed within Reaches 17 and 18, and the toe of the north slope would be moved approximately 25 feet to the north. The material would be loaded into dump trucks, transported to an area within the adjacent Permanente Quarry, and used to support the future quarry reclamation process. Trees or stumps removed during excavation would be stored and used for habitat creation and restoration. The excavated areas would be graded to provide a level surface for channel excavation and planting. Brush, timber, and removed stumps not used for habitat restoration would be disposed of in accordance with local restrictions and regulatory requirements. Non-limestone rock would be used for streambank stabilization.

### CONSTRUCTION OF STREAM CHANNEL

The principal restoration action would be construction of a new stream channel within the newly restored floodplain areas created by removing rock material. The new channel would be designed to use the underlying bedrock where present to guide the channel's alignment and profile. The stream restoration would be designed to protect water quality by diverting stream flow around the construction area. The contractor would then excavate

the new stream channel within the floodplain area according to design specifications for channel depth that would allow overbanking at the desired interval while providing bank stability and adequate cover and shading. The stream channel would be excavated by heavy equipment such as excavators. The walls of the new channel would be shored or sloped to prevent collapse. The excavated material (non-limestone) would be used to backfill the old channel in areas where a new stream channel is constructed in a more desirable location. Generally, any removed limestone would be transported out of the stream channel and used in cement plant manufacturing and/or quarry reclamation. Based on current estimates, approximately 420,000 cubic yards of fill would be removed from the channel during rock removal and stream channel construction. The final volume is pending geotechnical excavations.

Pond 13 is an instream settling pond in Reach 13, created by a steel and concrete dam and associated steel half-culvert supported by concrete. These human-made structures would be removed. Based on bedrock locations to be determined during construction, the final design profile could allow Pond 13 to remain, and the dam would be replaced with a boulder grade control structure. However, if so dictated by bedrock, construction of the new channel would necessitate removal of the Pond 13 dam and the pond would be replaced by a new reach of the creek.

### STREAM HABITAT RESTORATION

Before allowing flow in the new channel, the contractor would plant native vegetation to stabilize the streambanks and to provide shading and bank habitat. Woody debris and instream vegetation would be placed to enhance instream cover habitat. Barriers would be removed and/or new passage routes would be established to enhance movement by local fish.

The contractor would then plant riparian vegetation along the new streambanks and in the floodplain in accordance with restoration design specifications. This would stabilize the new banks, reduce erosion, enhance riparian habitat, and enhance aquatic habitat. Planting locations would be selected to provide shade for the stream and cover for fish and other aquatic species. Table 4 provides a preliminary list of riparian plantings.

**Table 4. Species List**

| Scientific Name | Common Name |
|---|---|
| *Acer macrophyllum* | Big leaf maple |
| *Aesculus californica* | California buckeye |
| *Alnus rhombifolia* | White alder |
| *Baccharis pilularis* | Coyote brush |
| *Heteromeles arbutifolia* | Toyon |
| *Quercus agrifolia* | Coast live oak |
| *Rosa californica* | California wild rose |
| *Rubus ursinus* | California blackberry |
| *Salix laevigata* | Red willow |
| *Salix lasiolepis* | Arroyo willow |
| *Salvia mellifera* | Black sage |
| *Sambucus nigra* spp. *caerulea* | Blue elderberry |
| *Schoenoplectus californicus* | Tule |

Source: Data provided by WRA, Inc. in 2011 and updated by AECOM 2015 site surveys

After construction, the contractor would restore the areas used for staging and access roads to approximate preconstruction conditions by applying a hydroseed mix and installing permanent erosion and sedimentation controls. Hydroseeding would occur between September 1 and December 1. The success of the hydroseeded habitat would be judged based on performance standards including percent cover and species richness. Surface soils would be stabilized with mulch consisting of straw or erosion-control fabric that complies with storm water pollution prevention plan (SWPPP) standards. This process would be completed approximately 1 month after final grading is complete.

### 2.3.3 CONSTRUCTION SCHEDULE

Stream restoration would be completed over a period of approximately five dry/work seasons years, after permit procurement. The physical setting, mitigation, and schedule constraints would prohibit work in the rainy season. The proposed construction schedule also incorporates work windows to avoid or minimize effects on sensitive species. Each year, the initial activity would be to construct site access roads, install stream diversions and sediment controls, and perform geotechnical investigations as needed for design. The second activity would be to excavate rock material, create a new stream channel in those areas, and truck the excavated material to the quarry. Next, the stream would be prepared to receive streamflow by planting bank vegetation and allowing the streambed sediments to consolidate. In the final phase, flow would be diverted into the new channel. These activities would likely occur in each year during the work season over the life of the project.

The phasing of restoration activities in discrete segments of the stream would be planned to allow mitigation of sediment transport that may be caused by the work. Consideration in phasing would also be given to minimize the amount of stream area undergoing active disturbance at any one time.

Lehigh hopes to initiate construction at the start of the first work season following receipt of all authorizations. Construction activities would comply with all applicable local ordinances and would remain within the constraints established during the permitting and California Environmental Quality Act processes.

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# 3 ENVIRONMENTAL BASELINE CONDITIONS

Permanente Creek in the Action Area begins in the west at higher elevations. The creek flows easterly to lower elevations through a narrow corridor for approximately 3.25 miles, with the quarry to the north and steep mountain slopes (Exhibit 3) to the south, until it reaches Pond 13. In May 2015, portions of this area were observed to be dry (Exhibit 4). The creek then becomes more channelized (Exhibit 5) and flows through flatter terrain (Exhibit 6) for the remaining 1.15 miles until it exits the Action Area. Most of the wetland features mapped in the 662.4-acre Action Area are in the lower third of the drainage.

Source: Photograph taken by AECOM in May 2015

**Exhibit 3. Permanente Creek Drainage Upstream of Pond 13**

Plant community names present in the Action Area conform to *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), where applicable. Community names from *A Manual of California Vegetation* (Sawyer et al. 2009) are provided in the text where applicable. Wetland community names conforming to *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) are also given where appropriate. Vegetation communities identified in the Action Area consist primarily of upland mixed oak woodland and forest, ruderal grasslands, and a mix of native and nonnative trees composing a riparian corridor along Permanente Creek.

Source: Photograph taken by AECOM in May 2015

**Exhibit 4. Permanente Creek Canyon and Drainage in Middle Reaches of the Action Area**

Source: Photograph taken by AECOM in May 2015

**Exhibit 5. Channelized Portion of Permanente Creek Immediately Downstream of Pond 13**

Source: Photograph taken by AECOM in May 2015

**Exhibit 6. Lower Elevation Reaches of Permanente Creek, East of Pond 9**

## 3.1 UPLAND HABITATS

### 3.1.1 OAK WOODLANDS AND FOREST

Oak woodlands and forest habitats (including California bay forest) make up the majority of the Action Area, and generally occur on the north-facing slopes above the Permanente Creek riparian zone. However, a narrow band of this habitat type also is present on the south-facing slope, above the riparian zone and below the chamise scrub habitat. The dominant tree species in this community include coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), and tanoak (*Notholithocarpus densiflorus*). Shrubs are prevalent and include poison oak (*Toxicodendron diversilobum*), western raspberry (*Rubus leucodermis*), creeping snowberry (*Symphoricarpos mollis*), and ocean spray (*Holodiscus discolor*). Forbs generally are sparse because little light penetrates to the forest floor; however, hillside woodland star (*Lithophragma heterophyllum*) was observed blooming during the May 2015 field reconnaissance survey. Approximately 0.80 acre of oak woodland forest and California bay forest is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.1.2 RIPARIAN FOREST

Riparian forest habitat in the Action Area is restricted to a narrow band along Permanente Creek that includes California buckeye woodland, white alder riparian forest, and willow riparian forest. Dominant vegetation in the riparian forest communities along Permanente Creek includes Goodding's willow (*Salix gooddingii*), red willow (*S. laevigata*), arroyo willow (*S. lasiolepis*), white alder (*Alnus rhombifolia*), big leaf maple (*Acer macrophyllum*), western creek dogwood (*Cornus sericea* ssp. *occidentalis*), and California buckeye (*Aesculus californica*). Stinging nettle (*Urtica diotica*) and poison oak are abundant close to the creek channel. False Solomon's seal

(*Maianthemum racemosum*) and sweet cicely (*Osmorhiza berteroi*) were observed scattered along the creek channel in upstream areas of Permanente Creek. Approximately 3.57 acres of riparian forest are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.1.3 MIXED SCRUB AND CHAPARRAL

Mixed scrub and chaparral (including chamise chaparral, mixed scrub, northern mixed chaparral, oak chaparral, and poison oak scrub) habitats typically are present in the Action Area on the south-facing slopes. These habitats are dominated by species with thick, waxy leaves and include coyote brush (*Baccharis pilularis*), chamise (*Adenostoma fasciculatum*), California sagebrush (*Artemisia californica*), and white-leaf manzanita (*Arctostaphylos viscida*). Other species include California buckwheat (*Eriogonum fasciculatum*) and naked buckwheat (*E. nudum*). Approximately 0.12 acre of mixed scrub and chaparral is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.1.4 RUDERAL GRASSLAND/DISTURBED AND NONNATIVE ANNUAL GRASSLAND

Small portions of the eastern part of the Action Area are previously disturbed and support primarily ruderal (disturbance-related) species and nonnative grasses. These species include wild oats (*Avena* spp.), ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), Italian ryegrass (*Festuca perennis*), filaree (*Erodium botrys* and *E. cicutarium*), small fescue (*Festuca microstachys*), California poppy (*Eschscholzia californica*), bird vetch (*Vicia cracca*), and birdsfoot trefoil (*Lotus corniculatus*) (WRA 2011). Approximately 5.12 acres of ruderal grassland and disturbed areas are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.1.5 ROCK OUTCROP AND ACTIVE QUARRY

A rock outcrop is located south of Permanente Creek and the active quarry pit. Approximately 12.81 acres of rock outcrop and active quarry are subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

## 3.2 AQUATIC HABITATS

### 3.2.1 PERENNIAL STREAMS

Perennial waterways in the Action Area consist of approximately 5 miles of Permanente Creek. The creek's headwaters are located approximately 0.6 mile west of the western boundary of the Action Area. Permanente Creek is located in the Santa Cruz Mountains, and steep slopes constrain the channel through much of the Action Area. In the western portion of the Action Area, the channel is relatively narrow as the channel flows east, then widens as ephemeral tributaries contribute flow to Permanente Creek. Historic quarry operations affected portions of Permanente Creek upstream of Pond 13. Downstream, the creek is affected by rock material (*e.g.*, riprap, concrete debris), an alluvial fan of gravel, artificial fill narrowing the channel for roads, etc. In addition, portions of the Permanente Creek were realigned into a straight channel or placed into underground culverts. The creek flows east for approximately 5 miles and then north for approximately 8 miles until it enters Mountain View Slough, which drains directly into the southern portion of San Francisco Bay. Approximately 1.44 acre of perennial stream is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.2.2 EPHEMERAL STREAMS OR DRAINAGES

A total of 15 unnamed ephemeral drainages are present in the Action Area. All but two of these ephemeral drainages form outside of the Action Area, high in the surrounding mountains. Approximately 0.02 acre of ephemeral stream and drainage is subject to potential direct effects as part of the Project (Table 5).

### 3.2.3 OFF-CHANNEL SETTLING PONDS/SEDIMENTATION BASINS

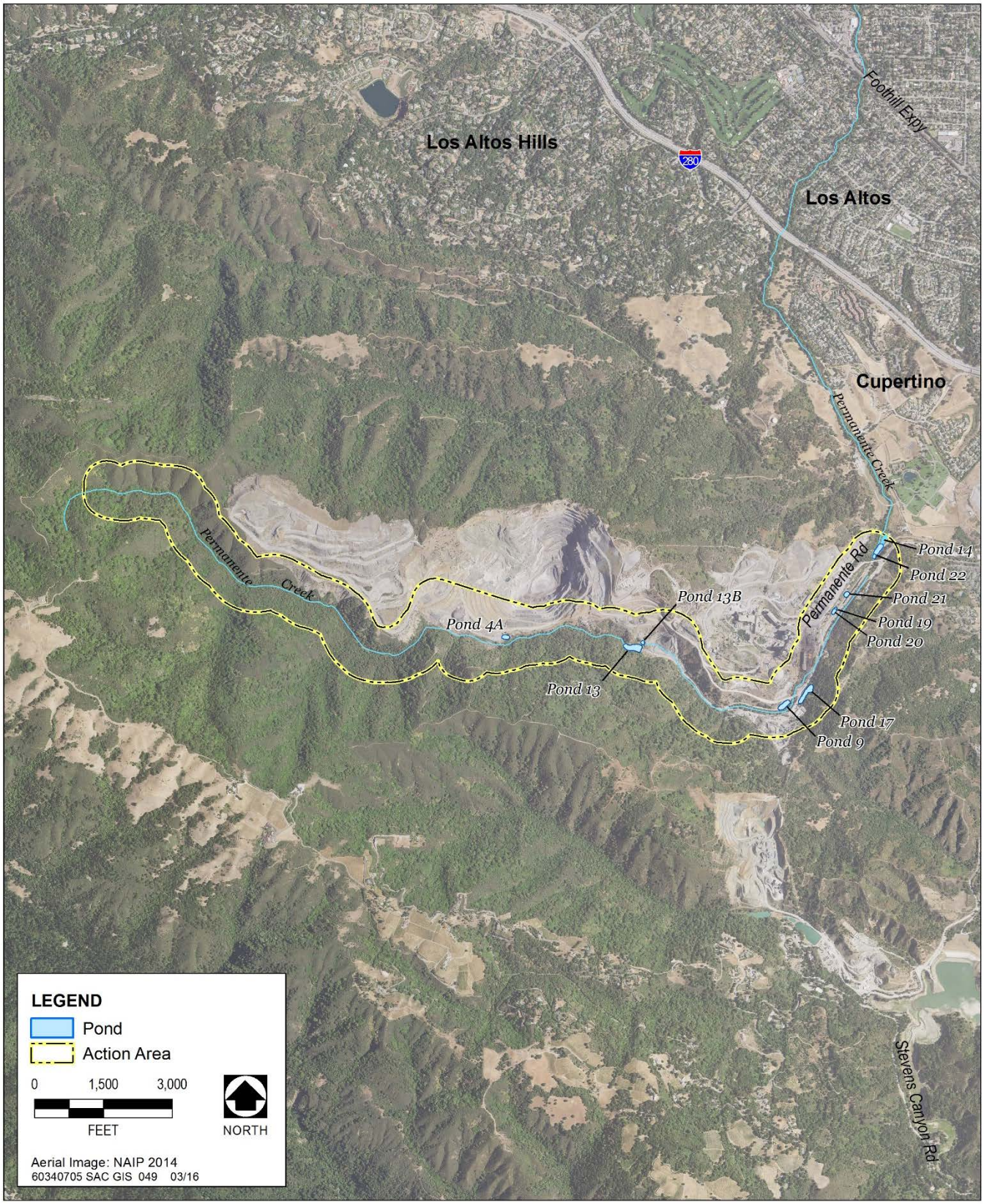
Several non-jurisdictional storm water sedimentation basins are present in the Action Area (Ponds 4A, 13B, 9, 17, 19, and 20). They were excavated in uplands and receive process water and storm water from the quarry pit (Pond 4A), or storm water from other areas of operations, to settle suspended solids. These ponds are actively managed as part of ongoing quarry operations. No settling ponds/sedimentation basins are subject to potential direct effects as part of the Project.

### 3.2.4 IN-STREAM/JURISDICTIONAL PONDS AND IMPOUNDMENTS

There are four in-stream or otherwise jurisdictional ponds or impoundments in the Action Area: Ponds 13, 14, 21, and 22 (Exhibit 7). A significant amount of riparian vegetation, including Gooding's black willow (*Salix gooddingii*), white alder (*Alnus rhombifolia*), and big leaf maple (*Acer macrophyllum*) is growing around the margins of the ponds. Dense growth of narrowleaf cattail (*Typha angustifolia*) surrounds Ponds 21 and 22. Approximately 0.50 acre of in-stream pond and impoundment is subject to potential direct effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").

### 3.2.5 WETLANDS AND MARSHES

Several wetlands and marshes are present in the Action Area. Most of the features are contiguous with Permanente Creek, but a few are connected via culvert. These wetlands are dominated by Pampas grass (*Cortaderia selloana*) and willow species, including arroyo willow (*Salix lasiolepis*), stinging nettle (*Urtica dioica*), mugwort (*Artemisia douglasiana*), water cress (*Nasturtium officinale*), and tall flat sedge (*Cyperus eragrostis*). Approximately 0.09 acre of wetland and marsh is subject to potential direct and indirect effects as part of the Project (see Table 5 in Section 5, "Potential Project Effects").




Source: AECOM 2015, adapted by GEI

**Exhibit 7. Location of Ponds in Action Area**

# 4 BASIC BIOLOGY, LIFE HISTORY, AND BASELINE FOR CALIFORNIA RED-LEGGED FROG

CRLF was federally listed as threatened in May 1996 (61 *Federal Register* [FR] 25813, May 23, 1996). Critical habitat has been designated for this species and is discussed in further detail below. The *Recovery Plan for the California Red-Legged Frog* was also developed for CRLF in September 2002 (USFWS 2002).

## 4.1 SPECIES DESCRIPTION

CRLF is the largest native frog in the western United States (Wright and Wright 1949). The abdomen and hind legs of adults are often a red or salmon color. The back of a CRLF is characterized by small black flecks and larger dark blotches with indistinct outlines on a brown, gray, olive, or reddish-brown background color (Stebbins 2003). Dorsolateral folds are prominent. Tadpoles range from 0.6 inch to 3.1 inches long, and a line of very small, gold-colored spots becomes the dorsolateral fold (USFWS 2002). Adults are highly aquatic and are most active at night (USFWS 2002). CRLF also uses terrestrial habitat, especially after precipitation events, for nonmigratory forays into adjacent upland habitats and migratory overland movements to breeding sites. Movement of up to 1 mile from breeding to aestivation sites is typical (Stebbins 2003); however, CRLF has been reported to travel up to 2 miles between habitats (Bulger et al. 2003).

Breeding typically begins between November and mid-December and continues through April in most years, but is dictated by winter rainfall (Jennings and Hayes 1994). At breeding sites, males call in groups of three to seven individuals to attract females (Jennings and Hayes 1994). During amplexus (breeding posture), eggs are fertilized by the male while the female deposits the egg mass (Jennings and Hayes 1994). Larvae typically hatch in 6–22 days, and metamorphosis is usually completed in 4–5 months (Jennings and Hayes 1994; Bobzien et al. 2000). Males and females usually attain sexual maturity at 2 years and 3 years, respectively (Jennings and Hayes 1994).

## 4.2 HABITAT REQUIREMENTS AND RANGE

The CRLF historically ranged from Redding and Marin County in the north, south to northern Baja California, Mexico, and essentially throughout lowland California (Jennings and Hayes 1994). Since then, its range has been reduced to mostly isolated drainages within the Coast Ranges and near-coastal foothills. The Service notes that although the CRLF once occupied 46 counties, it now is known from only 22, with the greatest concentrations in Monterey, San Luis Obispo, and Santa Barbara Counties (USFWS 2002).

Optimal habitat for CRLF includes ponds, stream courses, permanent pools, and intermittent streams fed by drainage areas no larger than 115 square miles (USFWS 2002). This species occurs at elevations between sea level and 5,000 feet (USFWS 2002). Typical habitat characteristics include water depth of at least 2.5 feet, largely intact emergent or shoreline vegetation, and absence of competitors/predators such as bullfrogs (*Rana catesbeiana*) and largemouth bass (*Micropterus salmoides*) (Hayes and Jennings 1988). CRLF uses a wide variety of habitats in the absence of optimal conditions, such as temporary pools and streams and stock ponds. However, permanent aquatic habitat is essential to the survival of local CRLF populations. CRLF is threatened by potential degradation and loss of its habitat from agriculture, urbanization, mining, overgrazing, recreation, timber harvesting, nonnative-plant invasions, impoundments, water diversions, degraded water quality, use of pesticides, and introduced predators (USFWS 2002).

## 4.3 POTENTIAL TO OCCUR IN THE ACTION AREA

CRLF is known to occur in the Action Area. This species has been documented during repeated focused surveys and habitat assessments conducted from 1997 to 2014, protocol-level surveys performed in 2006 and 2007 (Jennings 2006, 2007), and incidental observations while conducting surveys unrelated to CRLF. Incidental observations of presumed CRLF in Pond 22 occurred in 2000 during fish surveys (WRA 2011). CRLF was detected in 2006 and 2007 during the protocol-level surveys in in-stream or adjacent wetlands, at Ponds 14, 21 (adjacent wetlands), and 22, on the eastern edge of the Action Area. CRLF was observed in Pond 9 during an August 2014 pre-construction survey conducted in anticipation of potential vegetation and silt removal (vegetation and sediment removal ceased after this observation). Breeding has been documented in Permanente Creek in Ponds 14 and 21 (WRA 2011). Aquatic habitat for CRLF was delineated and characterized in wetland delineations conducted for the Project in 2008 (WRA 2008) and again in 2015 (AECOM 2015).

Suitable aquatic breeding habitat for CRLF is present in several of the ponds created as impoundments along Permanente Creek, as well as ponds and wetlands adjacent to the creek (Appendix C). Surface water was observed in all ponds during field surveys in May 2015. Pond 9 was previously used as a settling basin for localized storm water and now only receives upwelling groundwater contributions; Pond 9 has suitable aquatic habitat that could potentially support breeding CRLF. This pond is approximately 3 feet deep and has a thick layer of green algae coating the bottom surface. Dense growth of narrowleaf cattail surrounds Ponds 9, 14, and 21. Instead of cattail, common horsetail (*Equisetum arvense*) is the dominant emergent vegetation present at Pond 13, mostly upstream of the pond. Pond 13 itself has relatively steep, vegetated sides and a maximum depth of 5 feet. Ponds 9, 21, and 14 are cattail marshes with open water that is approximately 3–4 feet deep. CRLF has not been documented in Pond 13. Cattail vegetation is absent at Pond 22 and the typical vegetation there is riparian species such as black willow and white alder.

Upstream of these ponds, aquatic habitat is generally not present in Permanente Creek in the Action Area because of lack of deep pools. The stream corridor, however, could still function as upland and dispersal habitat. CRLF are unlikely to occur in heavily disturbed portions on the north side of Permanente Creek adjacent to the quarry because of lack of cover, exposure to predation, and frequent vehicle traffic.

## 4.4 CRITICAL HABITAT

Critical habitat was first designated for CRLF in April 2006 (71 FR 19244, April 13, 2006) and was revised in March 2010 (75 FR 12816, March 17, 2010). In designating critical habitat for CRLF, the Service evaluated the following specific primary constituent elements of habitat:

> **Aquatic breeding habitat**: Low-gradient freshwater habitats, such as pools and marshes that should hold water for a minimum of 20 weeks in most years and have salinity less than 7.0 parts per thousand.
>
> **Nonbreeding aquatic habitat**: This habitat that could be defined as aquatic breeding habitat and also includes intermittent creeks, seeps, or springs that could provide refuge or foraging habitat during drought periods.

**Upland habitat**: Terrestrial habitat within 200 feet of aquatic habitat and could include riparian, grassland, or woodland habitats. Upland habitat considered suitable includes features that provide refuge for the species, such as active mammal burrows.

**Dispersal habitat**: This habitat can be a variety of upland habitat types, provided that it is free of barriers such as highways. The Service considers 1 mile a dispersal distance that in most cases will provide for connectivity between breeding habitats and nonbreeding aquatic and upland habitats.

The Action Area does not include designated critical habitat for CRLF. The closest designated critical-habitat unit to the Action Area is SNM-2 in San Mateo County, approximately 1.5 miles southwest of the Action Area.

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# 5 POTENTIAL PROJECT EFFECTS

## 5.1 INTRODUCTION

This section discusses potential effects of Project construction and operation on federally listed species and any designated critical habitat(s) or EFH that may occur.

The 24.47-acre Designated Restoration Plan Area lies within the 662.4-acre Action Area, and encompasses the portion of upland and aquatic habitats in the Action Area where potential direct effects to listed species could occur from construction activities (see Exhibit 8). Construction and restoration activities within each designated phase of restoration would be completed within a single season. Completion of all restoration phases would require several seasons to complete. Potential effects on listed species that may occur in the Designated Restoration Plan Area are estimated based on the maximum acreages of suitable habitat that could be affected by Project construction and maintenance. Potentially suitable habitat is classified based on literature review, site surveys, and/or desktop research. Under the ESA, direct effects are those that would be caused by the Project and would occur at the same time as the action (e.g., construction-related effects). Indirect effects are those that would be caused by the Project later in time, but would be reasonably certain to occur (e.g., operational effects). Avoidance and minimization measures for both direct and indirect effects are presented in Section 6, "Avoidance and Minimization Measures."

## 5.2 DIRECT AND INDIRECT EFFECTS ON CALIFORNIA RED-LEGGED FROG IN THE ACTION AREA

### 5.2.1 DIRECT EFFECTS

CRLF is known to occur within the Action Area. Suitable aquatic habitat for this species is present in the Action Area, associated with cattail marsh and stock ponds at Ponds 9, 13, 14, 21, and 22. Breeding has been documented at Ponds 14 and 21. Pond 13 is the only pond located within the Designated Restoration Plan Area and would be the only pond directly affected by Project construction. Although the Project would result in a net benefit for CRLF by expanding the available aquatic and upland refugia habitat, occupied aquatic and associated upland refugia and movement corridors may be affected temporarily during construction. Table 5 provides a breakdown of this direct effect acreage by community.

Of the 24.47 acres subject to direct effects, (the Designated Restoration Plan Area), construction activities associated with the Project would affect up to 11.66 total acres of potential CRLF aquatic and upland habitat (Table 6). Of these 11.66 acres of direct effect, at least 11.16 acres would include temporary effects, and up to 0.5 acre of habitat at Pond 13 may be permanently altered at. To date, CRLF has not been documented within Pond 13 (WRA 2011). As described in Section 2.3.2, *Project Construction*, a pond may remain in this location if bedrock conditions allow the dam to be replaced with a boulder grade control structure. Alternatively, the dam would be removed permanently, and a new reach of the creek would be constructed at the location. Under the latter scenario, the 0.5-acre pond would be converted to stream channel and associated riparian upland habitat.

| Table 5. Direct Effects by Community | | |
|---|---|---|
| Vegetation Community | Acres | Temporary or Permanent |
| Oak woodlands and forest | 0.30 | Temporary |
| California bay forest | 0.50 | Temporary |
| White alder riparian | 2.32 | Temporary |
| Willow riparian forest and scrub | 1.25 | Temporary |
| Northern mixed chaparral | 0.04 | Temporary |
| Mixed scrub | 0.03 | Temporary |
| Poison oak scrub | 0.05 | Temporary |
| Disturbed | 0.33 | Temporary |
| Ruderal grassland | 4.79 | Temporary |
| Rock outcrop | 0.07 | Temporary |
| Active quarry | 12.74 | Temporary |
| Perennial streams | 1.44 | Temporary |
| Ephemeral streams/drainage | 0.02 | Temporary |
| Instream ponds and impoundments | 0.50 | Permanent |
| Wetlands and marshes | 0.09 | Temporary |
| **Total** | 24.47 | |
| Source: Data compiled by AECOM in 2015 | | |

| Table 6. Effects on Suitable California Red-Legged Frog Habitats | | |
|---|---|---|
| | Acres of Directly Affected Suitable Habitat | Permanent or Temporary Effect |
| Aquatic habitat[1] | 1.55 | Temporary |
| Pond 13 (Conversion of pond habitat to stream channel and associated riparian upland habitat ) | 0.5 | Permanent |
| Riparian forest and scrub, grassland, scrub/chaparral, disturbed, and oak woodland for upland refugia and dispersal habitat[2] | 9.61 | Temporary |
| **Total** | 11.66 | |

Notes:

[1] Includes jurisdictional wetlands, potential waters of the United States, and sedimentation basin.

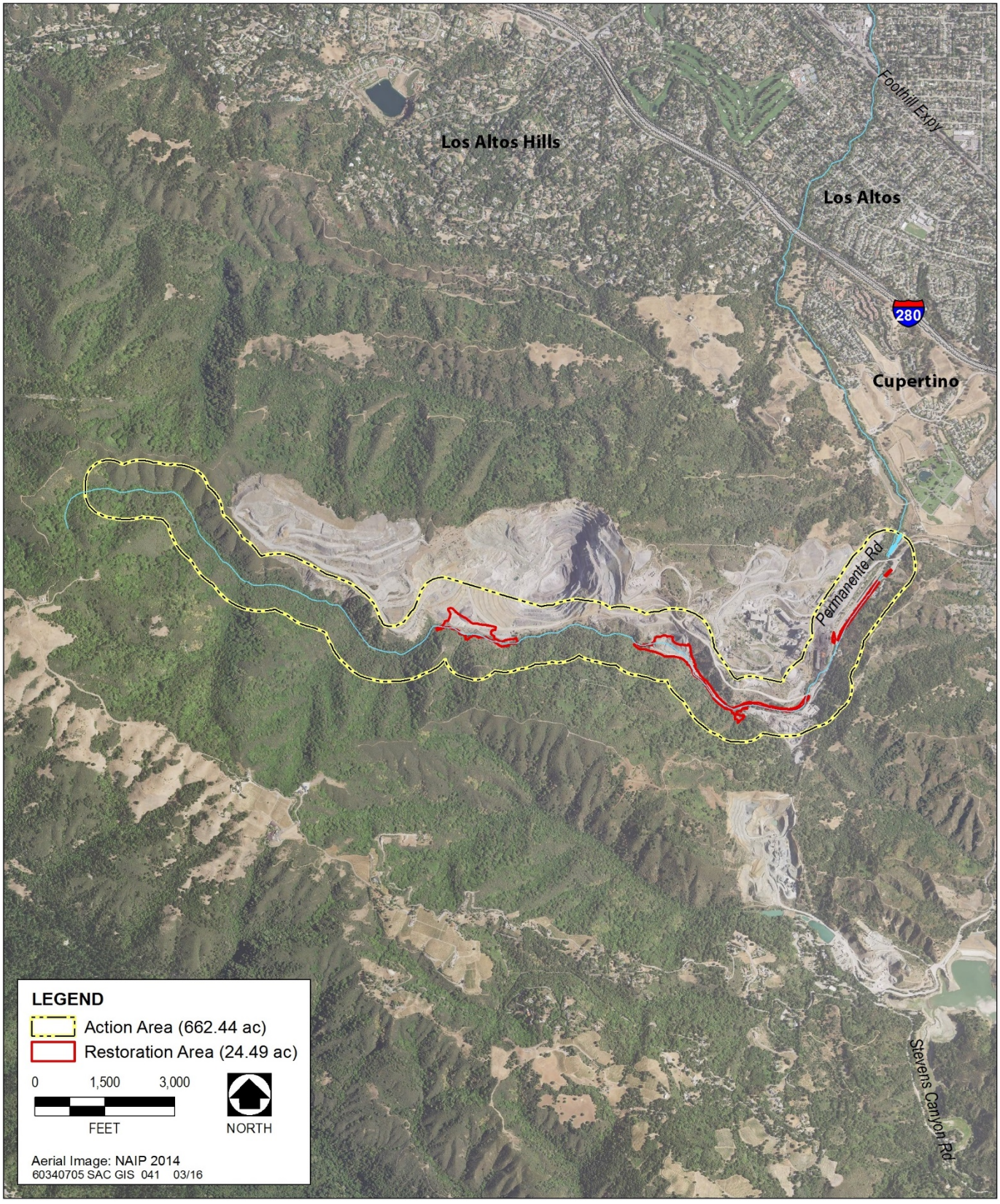
[2] All upland habitat within 200 feet of the area of direct disturbance was considered suitable for California red-legged frog with the exception of active quarry areas and rock outcrops.

Source: Data compiled by AECOM in 2015

Direct mortality of frogs may occur during ground disturbance activities in the suitable wetland and riparian woodland as a result of restoration activities or from being struck by construction vehicles in the construction or staging area. The Project would include activities in areas where CRLF has been documented. To avoid and minimize potential effects on CRLF, the Project would implement the conservation measures described in Section 6, "Avoidance and Minimization Measures."

### 5.2.2 INDIRECT EFFECTS

Potential indirect effects on CRLF include potential temporary degradation of water quality resulting from discharge of contaminants or sediment from construction, and alteration of the hydrology in Permanente Creek during creek restoration activities.




Source: AECOM 2015, adapted by GEI

**Exhibit 8. Designated Restoration Plan Area**

In addition, noise, visual disturbance, and vibrations from construction activity could cause CRLF individuals to vacate or avoid suitable habitat, potentially resulting in increased predation and stress associated with the temporary loss of movement and foraging habitat. In addition, increases in human concentrations and activity near suitable habitat may increase the number of native and nonnative predators attracted to trash or food left in the area. To avoid and minimize potential effects on CRLF, the Project would follow conservation measures, such as implementing standard best management practices for water quality, as described in Section 6.

## 5.3 EFFECTS ON CRITICAL HABITAT AND ESSENTIAL FISH HABITAT

### 5.3.1 CRITICAL HABITAT

Designated critical habitat for CRLF and Central California Coastal Steelhead are present near the Action Area. The nearest unit of CRLF critical habitat is approximately 2 miles to the southwest, but it is not hydrologically connected to the Action Area and would not be affected by the Proposed Action. Designated critical habitat for Central California Coastal Steelhead includes Stevens Creek, which is approximately 4 miles downstream of and hydrologically connected to the Action Area, via Permanente Creek and the Permanente Creek Diversion Channel. Because of the intermittent flows to Stevens Creek, and the distance downstream of Stevens Creek, it is very unlikely that any potential temporary increase in sedimentation or other adverse conditions that could result from the Proposed Action would extend to critical habitat in Stevens Creek. Therefore, no effect on designated critical habitat for CRLF or steelhead would occur.

### 5.3.2 ESSENTIAL FISH HABITAT

The Action Area is within the Coyote Creek U.S. Geologic Survey Hydrologic Unit, which is designated EFH for Chinook Salmon. Permanente Creek is currently inaccessible to salmon. Implementation of the proposed action would enhance habitat quality in Permanente Creek and would not diminish future potential to establish access to the creek for salmon. Therefore, no effect on salmon EFH would occur.

## 5.4 INTERRELATED AND INTERDEPENDENT ACTIONS

ESA Section 7(a)(2) requires agencies with regulatory authority over listed species to issue BOs, evaluating the direct and indirect effects of federal actions, and actions that are interrelated or interdependent with such actions. A BO must determine whether the actions being evaluated may appreciably reduce the listed species' likelihood of survival or recovery in the wild by reducing their productivity, numbers, or distribution.

No additional projects or actions associated with the Project analyzed in this BA are interrelated or interdependent on the Project. There are no related projects associated with the Project. The ongoing mining activities at the Lehigh site and the future reclamation of the mine and associated facilities are not dependent on the Project for their implementation or success.

## 5.5 CUMULATIVE EFFECTS

Cumulative effects on listed species and habitat include the effects of pending, and future state, tribal, local, or private actions that are reasonably certain to occur in the Action Area under consideration. The effects of projects that require a federal action are not considered in the cumulative-effects evaluation during Section 7 consultation evaluations because they are subject to separate consultation (USFWS and NMFS 1998). Also, the nonfederal

action must be located in the Action Area, or project site, that is evaluated in the Section 7 consultation process (USFWS and NMFS 1998).

No other projects are expected to occur in the Action Area as defined by this Project. Lehigh will continue implementing the approved off-channel reclamation plan for the existing quarry and surrounding areas, and the work described herein is expected to satisfy creek restoration obligations, of that reclamation plan.. Therefore, implementation of the reclamation plan is exempted from the cumulative impact analysis for this Project.

In addition, the stream restoration project is expected to result in improvement to and expansion of existing aquatic and upland habitat upon Project completion. Therefore, the Project is not expected to result in a cumulative effect on CRLF or its habitat. The Action Area does not contain designated critical habitat for CRLF; therefore, critical habitat would not be subject to cumulative effects from the Project.

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# 6 AVOIDANCE AND MINIMIZATION MEASURES

This section describes avoidance and minimization and habitat conservation measures that would be incorporated as part of the Project. The measures described in this section are proposed in part to avoid and minimize effects on the federally listed species (i.e., CRLF) that may occur in the Action Area.

## 6.1 STANDARD ENVIRONMENTAL COMMITMENTS

Lehigh would implement standard environmental protection measures (environmental commitments) during construction to minimize environmental effects and disruption of surrounding areas. These commitments include those required by State of California regulations as well as county ordinances. This would include completing stormwater permitting, and preparing and implementing a SWPPP as required by the San Francisco Bay RWQCB to minimize erosion and potential impacts on downstream water quality. The SWPPP would outline stormwater best management practices, such as placing sandbags around stormwater catch basins, silt fences around disturbed areas, and covers on excavated soil piles, and spraying disturbed areas using water trucks to minimize fugitive dust and dirt emissions. The Project would comply with city ordinances related to noise generation, traffic control, public notices, protection of historical resources, and protection of existing vegetation. The Project also would comply with state and local requirements to characterize and dispose of hazardous materials and recycle solid waste.

## 6.2 COMPLIANCE WITH PERMIT TERMS AND CONDITIONS

Lehigh would require its contractors and suppliers, its general contractor, and all of the general contractor's subcontractors and suppliers to comply with all terms and conditions of all required Project permits, approvals, and conditions. Lehigh ultimately would be responsible for the actions of its contractors regarding compliance with permit conditions.

Before the start of any ground-disturbing activity associated with construction of any Project feature that would affect waters of the United States, including wetlands, or waters of the state, Lehigh would obtain all necessary permits for the Project under Sections 404 and 401 of the Clean Water Act or the state's Porter-Cologne Water Quality Control Act.

All permits, regulatory approvals, and permit conditions for effects on wetland habitats would be secured before implementation of any grading activities in waters of the United States or wetland habitats, including waters of the state. Lehigh would commit to replacing, restoring, or enhancing on a "no net loss" basis (in accordance with USACE and the San Francisco Bay RWQCB) the acreage of all wetlands and other waters of the United States, if any, that would be removed, lost, and/or degraded with Project implementation.

Wetland habitat would be restored, enhanced, and/or replaced at an acreage and location and by methods agreeable to USACE and the San Francisco Bay RWQCB, as determined during the Section 404 and Section 401 permitting processes. Final mitigation ratios would be determined during the permitting process. All mitigation requirements determined through this process would be implemented before grading plans are approved.

Water quality certification pursuant to Section 401 of the Clean Water Act is required before issuance of the record of decision and a Section 404 permit. Before construction in any areas containing wetland features, Lehigh

would obtain water quality certification for the Project. Any measures required as part of the issuance of water quality certification would be implemented.

## 6.3 SPECIES-SPECIFIC AVOIDANCE AND MINIMIZATION AND HABITAT CONSERVATION MEASURES

Applicable avoidance and minimization measures from the 2014 Programmatic Biological Opinion for Section 404 Permits potentially affecting CRLF (USFWS 2014) were included in this biological assessment. The following conservation measures would be implemented before and during Project construction:

a) Prepare a Wetland Mitigation Plan. A qualified wetland biologist will prepare a wetland mitigation and monitoring plan (MMP) for impacts on wetlands and waters under state or federal jurisdiction. The MMP will outline the anticipated mitigation obligations for temporary and permanent impacts on waters of the United States, including wetlands, resulting from Project-related activities. The wetland MMP will include the following elements:

- Baseline information.
- Anticipated habitat enhancements to be achieved through onsite restoration actions.
- When possible, a preference for mitigation within the Permanente Quarry property, for impacts on both jurisdictional waters and wetlands.
- Performance and success criteria for habitat enhancement of Permanente Creek and adjacent features to compensate for impacts on other waters, including:
  - a replanting plan for appropriate native riparian woody vegetation;
  - an 80% overall revegetation planting success rate for mitigation areas over a 10-year period;
  - a minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;
  - plantings that are self-reliant, exhibit average or better health and vigor, and have observable growth in stems and leaves at least 2 years before the end of the 10-year monitoring period;
  - visual inspection of all revegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;
  - observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new nonnative species; and
  - annual monitoring reports submitted to the California Department of Fish and Wildlife and the San Francisco Bay RWQCB documenting revegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.

- Performance and success criteria for wetland creation or enhancement, including but not limited to the following:

  - At least 70% survival of installed plants for each of the first 3 years following planting.

  - Performance criteria for vegetation percent cover in years 1–4 as follows: at least 10% cover of installed plants in year 1; at least 20% cover in year 2; at least 30% cover in year 3; and at least 40% cover in year 4.

  - Performance criteria for hydrology in Years 1–5 as follows: 14 or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of 3 of the 5 monitoring years OR establishment of a prevalence of wetland obligate plant species.

  - Limitations on relative cover contributed by invasive plant species that can threaten the success of created or enhanced wetlands, as follows: no greater than 35% in year 1, 20% in years 2 and 3, 15% in year 4, and 10% in year 5.

  - Supplemental water provided by a water truck for the first 2 years following installation, if necessary. Any supplemental water must be removed or turned off for a minimum of 2 consecutive years before the end of the monitoring period, and the wetland must meet all other criteria during this period. At the end of the 5-year monitoring period, the wetland must be self-sufficient and capable of persistence without supplemental water.

  - At least 75 percent cover by hydrophytic vegetation at the end of the 5-year monitoring period. In addition, wetland hydrology and hydric soils as defined by the USACE (2008) must be present and defined as follows:

    - *Hydrophytic vegetation:* A plant community occurring in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present.

    - *Wetland hydrology:* Identified by indicators such as sediment deposits, water stains on vegetation, and oxidized rhizospheres along living roots in the upper 12 inches of the soil, or satisfaction of the hydrology performance criteria listed above.

    - *Hydric soils:* Soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions, which often are characterized by features such as redox concentrations that form by the reduction, translocation, and/or oxidation of iron and manganese oxides. Hydric soils may lack hydric indicators for a number of reasons. In such cases, the same standard used to determine wetland hydrology (when indicators are lacking) can be used.

  - 5 years after any wetland creation, performance of a wetland delineation to determine whether created wetlands are developing as planned. If they are not, remedial measures will be taken to meet the mitigation measure's performance standard.

- Monitoring and reporting requirements.

  - The wetland MMP also will include conceptual site-specific plans to compensate for wetland losses resulting from the Project and the USACE Section 404 permit terms. These may include but are not limited to the provision of on-site mitigation through wetland creation or enhancement of existing jurisdictional features; additional on-site wetland creation or enhancement; or off-site mitigation.

b) **Implement Riparian Mitigation.** The purpose of the Project is to restore wetland and riparian habitat along Permanente Creek. Stream restoration activities include hand planting of woody riparian vegetation, as well as seeding for understory riparian vegetation. Replacement and restoration plantings will restore and expand existing riparian habitat along Permanente Creek. The restoration and planting will be consistent with the revegetation plan prepared as part of the Amended Consent Decree with the Sierra Club and the approved *Reclamation Plan for Permanente Quarry* (WRA 2011), and the adopted mitigation monitoring and reporting program (Santa Clara County 2011). The 5-year performance standards identified in the revegetation plan include:

- species richness of two tree or shrub species per plot,
- 45 percent canopy cover,
- an average density of 200 plantings per acre, and
- 60 percent survival of plantings.

c) **Manage Wildlife Passage during Construction.** Wherever possible, Lehigh will enhance or construct wildlife passage for CRLF across access roads during construction. Accommodations will be made for terrestrial wildlife movement through existing culverts that convey hydrology.

d) **Designate a Point of Contact.** USACE will ensure that Lehigh implements the conservation measures of the BO and that Lehigh designates a point of contact for all inquiries for the duration of the construction period. The name and contact information will be provided to the Service no more than 30 calendar days before the date of initial ground disturbance. At least 14 calendar days before the date of initial ground disturbance, USACE will ensure that Lehigh submits a signed letter to the Service verifying they possess a copy of the BO and have read and fully understand their responsibilities.

e) **Allow Site Access to Agencies.** Lehigh will ensure that the Service, California Department of Fish and Wildlife, and/or their designated agents can immediately and without delay, access and inspect the Project site for compliance with the Project description, conservation measures, and reasonable and prudent measures included in the BO and evaluate Project effects on CRLF and its habitat.

f) **Implement a Worker Environmental Awareness Program.** The Service-approved biologist will conduct employee education training for employees working on earthmoving and/or construction activities. Personnel will be required to attend the presentation, which will describe the CRLF; avoidance, minimization, and conservation measures; legal protection of CRLF; and other related issues. Each attendee will sign an attendance sheet that includes his or her printed name, company or

agency, e-mail address, and telephone number. The sign-in sheet will be sent to the Service within 7 calendar days of the completion of the training.

g) **Minimize the Work Area.** Lehigh will limit the number of access routes, construction areas, equipment staging, storage, parking, and stockpile areas to the maximum extent possible. All Project-related traffic will be restricted to established roads, construction areas, equipment staging, storage, parking, and stockpile areas. These areas will be included in any preconstruction surveys and, to the maximum extent possible, established in previously disturbed locations.

h) **Enforce Seasonal Work Restrictions.** To the extent practicable, construction in the Permanente Creek channel and suitable pond habitats will be conducted during the dry summer months, between June 15 and October 15, to minimize potential impacts on moving or breeding CRLF.

i) **Post and Observe Construction Speed Limits.** A 10-mile-per-hour speed limit will be posted by Lehigh or its representatives at all construction locations except on roads with a posted speed limit. This speed limit will be observed by all Project personnel. On roads with posted speed limits, construction-related vehicles will observe the minimum safe speed.

j) **Conduct CRLF Preconstruction Surveys and Relocate Individuals.** Preconstruction surveys for CRLF will be conducted within 24 hours before the start of initial ground disturbance. The preconstruction surveys will be conducted by a qualified biologist, who will be preapproved by the Service and experienced in identifying CRLF. The biologist will consult with the Service before conducting the preconstruction surveys to coordinate on methodology for movement of CRLF individuals found in the work area. If CRLF are observed, a Service-permitted biologist will remove them from the construction site and temporarily relocate them to nearby suitable aquatic habitat.

   The Service-approved biologist will limit the duration of the handling and captivity of the CRLF to the minimum amount of time necessary to complete the task. If the animal must be held in captivity, it will be kept in a cool, dark, moist, aerated environment, such as a clean and disinfected bucket or plastic container with a damp sponge. The holding container will not contain any standing water.

   Lehigh will immediately notify the Service once the CRLF and the site are secure.

k) **Enforce a Litter Control Program.** A litter control program will be instituted at the Project site. All workers will ensure that their food scraps, paper wrappers, food containers, cans, bottles, and other trash are deposited in covered or closed trash containers. The trash containers will be removed from the Project site each working day.

l) **Restrict Pets and Firearms.** No pets will be permitted at the Project site. No firearms will be allowed at the Project site with the exception of those carried by authorized security personnel or local, state, or federal law enforcement officials.

m) **Stop Work during Rain Events.** To the maximum extent practicable, no construction activities will occur during rain events or within 24 hours following a rain event. A Service-approved biologist will inspect the construction area and all equipment/materials for the presence of CRLF before the resumption of construction activities after rain events. Any CRLF found in the construction area will be avoided and allowed to leave on its own or removed as agreed to under the Service-approved CRLF relocation methodology.

n) **Minimize or Avoid Nighttime Construction.** To the maximum extent practicable, nighttime construction will be minimized or avoided.

o) **Avoid Use of Woven Netting in Erosion Control Measures.** Plastic monofilament netting, loosely woven netting, or similar materials will not be used at the Project site because CRLF can become entangled in this material. Materials using fixed weaves, polypropylene, polymer, or other synthetic materials will not be used. Any materials found on-site will be immediately removed by Lehigh or its designated representatives.

p) **Control Dust.** If necessary, dust control measures will be implemented during construction. These measures will include regular truck watering of construction access areas and disturbed soil areas with water or organic soil stabilizers. Watering guidelines will be established to avoid excessive runoff into potential aquatic habitat for CRLF.

q) **Cover Trenches.** Trenches or pits 1 foot or deeper that will be left unfilled for more than 48 hours will be securely covered with boards or other materials to prevent CRLF from falling into them. If this is not possible, Lehigh will ensure that wooden ramps or other structures of suitable surface that provide adequate footing for CRLF are placed in the trench or pit to allow for their unaided escape. The trench, pit, or hole will be inspected by the Service-approved biologist each workday morning at least 1 hour before the initiation of work and in the late afternoon no more than 1 hour after work has ceased to ascertain whether any individuals have become trapped. If the ramps fail to allow the animal to escape, the Service-approved biologist will remove the CRLF and transport it to a safe location.

r) **Monitor Construction within Aquatic Habitats.** To minimize disturbance on CRLF, any restoration or grading within suitable aquatic habitat will be conducted under the supervision of a Service-approved biologist and first cleared of any CRLF by transferring them to suitable habitat where construction is not occurring, as agreed to by the Service. Before the initial ground disturbance, Lehigh will obtain approval of the relocation protocol from the Service in the event that a CRLF is encountered and needs to be moved away from the Project site.

   The construction site will be checked at the beginning of each day to confirm that CRLF have not reentered the site. CRLF that reenter the Project site will be relocated as designated by the Service.

s) **Provide Stop-Work Authority.** The Service-approved biologist will have oversight over implementation of all the conservation measures and have the authority and responsibility to stop Project activities if the biologist determines that any of the environmental requirements are not being fulfilled.

t) **Implement Dewatering Protocols.** If the work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 5 millimeters to prevent CRLF from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any barriers to flow will be removed in a manner that will allow flow to resume with the least disturbance to the substrate.

u) **Remove Exotic Species.** The Service-approved biologist will permanently remove any aquatic exotic wildlife species such as bullfrogs and crayfish to the maximum extent possible during construction activities.

v) **Notify the Service If Take Occurs.** USACE will ensure that Lehigh reports any information to the Service about take or suspected take of listed wildlife species not exempted by the BO for the project. The Service will be notified via electronic mail and telephone within 24 hours from the time the information is received by Lehigh. Notification will include the species, number of individuals, sex (if known), date, time, location of the incident or of the finding of a dead or injured animal, how the individual was taken, photographs of the species animal, and names of persons who observed the take and/or found the animal. The individual animal will be preserved, as appropriate, and held in a secure location until instructions are received from the Service regarding the disposition of the specimen or until the Service takes custody of the specimen.

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# 7 CONCLUSIONS

Based on the biology and ecology of the federally listed species with the potential to occur in the Action Area, on the environmental baseline for the Action Area, and on the potential effects of the Project, implementing the Project may affect, and is likely adversely affect CRLF. The Project would have no effect on designated critical habitat or EFH.

**California Red-Legged Frog**: The Project may affect, and is likely to adversely affect CRLF through potential loss of individuals and disturbance of individuals or their habitat. However, with the exception of potential conversion of Pond 13 to stream channel and associated riparian habitat, these effects are expected to be localized and temporary. CRLF has not been documented within Pond 13, and conversion of this pond to other suitable CRLF habitat is not expected to result in loss of occupied aquatic habitat in the Action Area. Relatively few CRLF individuals would be affected given the quality of habitat on the site and the limited extent of the Project, both spatially and temporally. Furthermore, the restoration of Permanente Creek would result in a net long-term benefit to the species by increasing aquatic and upland habitat for CRLF. The Project would not jeopardize the continued existence of this species based on the limited effects of the Project and the limited local population size of CRLF in the Action Area. The Project is expected to result in increased carrying capacity for CRLF in the Action Area upon Project completion and therefore provide a net benefit to local CRLF populations.

**Critical Habitat**: The project would have no effect on designated critical habitat. The nearest unit of CRLF critical habitat is approximately 2 miles southwest of and is not hydrologically connected the Action Area. The Action Area is approximately 4 miles upstream of critical habitat for Central California Coastal Steelhead, and Project implementation is very unlikely to increase sedimentation or result in other adverse effects to this habitat.

**Essential Fish Habitat**: The project would have no effect on EFH for Chinook Salmon. Implementation of the proposed action would enhance habitat quality in Permanente Creek and would not diminish potential to establish access to the creek for salmon if the Permanente Creek Diversion Channel is altered as part of a future unrelated action.

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# 9 LIST OF PREPARERS

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Tracy Walker, wildlife biologist, AECOM

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# APPENDIX A

U.S. Fish and Wildlife Service Species List

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
FEDERAL BUILDING, 2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
PHONE: (916)414-6600 FAX: (916)414-6713

Consultation Code: 08ESMF00-2016-SLI-1351 April 26, 2016
Event Code: 08ESMF00-2016-E-02936
Project Name: Permanente Creek Restoration Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2)

of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

# Official Species List

**Provided by:**

Sacramento Fish and Wildlife Office
FEDERAL BUILDING
2800 COTTAGE WAY, ROOM W-2605
SACRAMENTO, CA 95825
(916) 414-6600

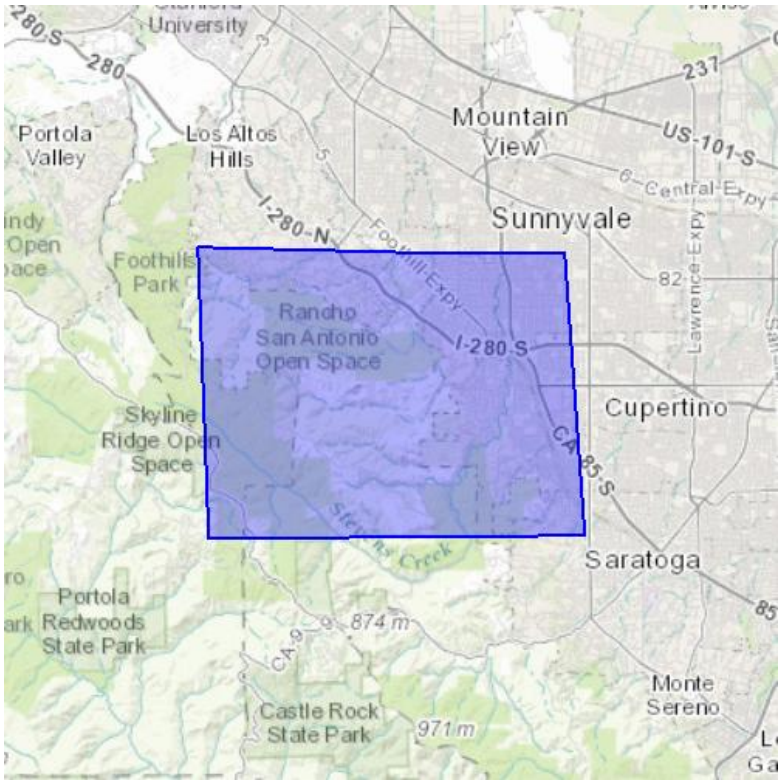
**Consultation Code:** 08ESMF00-2016-SLI-1351
**Event Code:** 08ESMF00-2016-E-02936

**Project Type:** ** OTHER **

**Project Name:** Permanente Creek Restoration Project

**Please Note:** The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

**Project Location Map:**




**Project Coordinates:** MULTIPOLYGON (((-122.16865539550781 37.36142550190517, -122.16487884521483 37.280882458555325, -122.03407287597655 37.28170197474228, -122.04093933105469 37.359788198380755, -122.08419799804689 37.359788198380755, -122.16865539550781 37.36142550190517)))

**Project Counties:** San Mateo, CA | Santa Clara, CA | Santa Cruz, CA

# Endangered Species Act Species List

There are a total of 12 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

| **Amphibians** | **Status** | **Has Critical Habitat** | **Condition(s)** |
|---|---|---|---|
| California red-legged frog *(Rana draytonii)*<br>Population: Entire | Threatened | Final designated | |
| California tiger Salamander *(Ambystoma californiense)*<br>Population: U.S.A. (Central CA DPS) | Threatened | Final designated | |
| **Birds** | | | |
| California Clapper rail *(Rallus longirostris obsoletus)*<br>Population: Entire | Endangered | | |
| California Least tern *(Sterna antillarum browni)* | Endangered | | |
| Marbled murrelet *(Brachyramphus marmoratus)*<br>Population: CA, OR, WA | Threatened | Final designated | |
| **Fishes** | | | |
| Delta smelt *(Hypomesus transpacificus)* | Threatened | Final designated | |

| | | | |
|---|---|---|---|
| Population: Entire | | | |
| steelhead *(Oncorhynchus (=salmo) mykiss)*<br>Population: Northern California DPS | Threatened | Final designated | |
| Tidewater goby *(Eucyclogobius newberryi)*<br>Population: Entire | Endangered | Final designated | |
| **Flowering Plants** | | | |
| San Mateo Woolly sunflower *(Eriophyllum latilobum)* | Endangered | | |
| **Insects** | | | |
| Bay Checkerspot butterfly *(Euphydryas editha bayensis)*<br>Population: Entire | Threatened | Final designated | |
| San Bruno Elfin butterfly *(Callophrys mossii bayensis)*<br>Population: Entire | Endangered | | |
| **Reptiles** | | | |
| San Francisco Garter snake *(Thamnophis sirtalis tetrataenia)*<br>Population: Entire | Endangered | | |

# Critical habitats that lie within your project area

The following critical habitats lie fully or partially within your project area.

| Amphibians | Critical Habitat Type |
|---|---|
| California red-legged frog *(Rana draytonii)*<br>Population: Entire | Final designated |

# APPENDIX B

Project Design Drawings

# PERMANENTE CREEK RESTORATION PLAN

## DRAFT
## 70% DESIGN SUBMITTAL

### SHEET INDEX


| | |
|---|---|
| C1 | COVER SHEET |
| C2 | OVERVIEW |
| C3 | EXISTING CHANNEL PROFILE |
| C4 | SHEET LAYOUT OVERVIEW |
| C5 | CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN |
| C6 | CHANNEL WIDENING PLAN (1 OF 5) |
| C7 | CHANNEL WIDENING PLAN (2 OF 5) |
| C8 | CHANNEL WIDENING PLAN (3 OF 5) |
| C9 | SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN |
| C10 | CULVERT #8 PROFILE AND SECTION |
| C11 | SEDIMENT REMOVAL AREA PROFILE AND SECTIONS |
| C12 | CHANNEL WIDENING PLAN (4 OF 5) |
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| C14 | ROCK PILE AREA PLAN |
| C15 | ROCK PILE AREA SECTIONS |
| C16 | MATERIAL REMOVAL AREA PLAN (1 OF 2) |
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| C18 | MATERIAL REMOVAL AREA SECTIONS (1 OF 2) |
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| C20 | ACCESS AND STAGING PLAN (1 OF 2) |
| C21 | ACCESS AND STAGING PLAN (2 OF 2) |
| C22 | DEWATERING DETAILS |
| C23 | MISCELLANEOUS DETAILS |
| C24 | HABITAT LOG DETAILS AND ROCK SPECIFICATIONS |
| C25 | NOTES |

| | |
|---|---|
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| L2 | RIPARIAN PLANTING SECTIONS (2 OF 3) |
| L3 | RIPARIAN PLANTING SECTIONS (3 OF 3) |

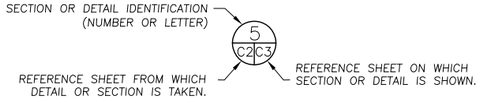
VICINITY MAP
N.T.S. (GOOGLE)

### GENERAL NOTES

1. TOPOGRAPHIC MAPPING WAS PERFORMED BY:
   WATERWAYS CONSULTING, INC.
   509 SWIFT STREET, UNIT A
   SANTA CRUZ, CA 95060
   SURVEY DATES; JUNE THROUGH AUGUST 2013, FEBRUARY THROUGH MAY 2014, MARCH 2015.
2. ELEVATION DATUM: NAVD88 BASED ON A FIELD TIE TO SANTA CLARA VALLEY WATER DISTRICT BENCHMARK ID: BM198 WITH AN ELEVATION OF 478.22'.
3. HORIZONTAL DATUM: NAD83 CALIFORNIA STATE PLANE, ZONE 3.
4. AERIAL PHOTO SOURCE:
   AERIAL PHOTOMAPPING SERVICES
   2929 LARKIN AVENUE
   CLOVIS, CA 93612
   PHOTOGRAPH DATE: JUNE 20, 2013
5. ELEVATIONS AND DISTANCES SHOWN ARE IN FEET AND DECIMALS THEREOF. CONTOUR INTERVAL IS 1 FOOT.
6. THIS IS NOT A BOUNDARY SURVEY. PROPERTY LINES, IF SHOWN, WERE COMPILED FROM RECORD INFORMATION AND FROM FIELD TIES TO EXISTING BOUNDARY MONUMENTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.
7. TREE DIMENSIONS: TRUNK DIAMETERS SHOWN REPRESENT DIAMETER AT BREAST HEIGHT (DBH), MEASURED IN INCHES. DBH IS MEASURED 4.5 FT ABOVE GROUND FOR SINGLE TRUNKS AND TRUNKS THAT SPLIT INTO SEVERAL STEMS CLOSE TO THE GROUND. EACH TRUNK IS SHOWN AT MULTI-STEM TREES. ONLY THE LABEL OF THE DBH OF THE LARGEST TRUNK IS SHOWN FOR DRAWING CLARITY. WHERE TREES FORK NEAR BREAST HEIGHT, TRUNK DIAMETER IS MEASURED AT THE NARROWEST PART OF THE MAIN STEM BELOW THE FORK. FOR TREES ON A SLOPE, BREAST HEIGHT IS REFERENCED FROM THE UPPER SIDE OF THE SLOPE. FOR LEANING TREES, BREAST HEIGHT IS MEASURED ON THE SIDE THAT THE TREE LEANS TOWARD. TREES WITH DBH LESS THAN 8" ARE TYPICALLY NOT SHOWN.

   12"P = 12" DBH PINE
8. TREE SPECIES ARE IDENTIFIED WHEN KNOWN. HOWEVER, FINAL DETERMINATION SHOULD BE MADE BY A QUALIFIED BOTANIST. REFER TO THE LEGEND FOR TREE SPECIES SYMBOLS.
9. SURVEYED TREES INCLUDE:
   A. OAKS (QUERCUS SPP.) 5 INCHES OR LARGER DBH
   B. ALL OTHER TREES 12 INCHES OR LARGER DBH
   C. ALL MULTI-STEM TREES WITH A COMBINED DIAMETER OF 24 INCHES OR LARGER DBH

### SECTION AND DETAIL CONVENTION




### ABBREVIATIONS

| | | | |
|---|---|---|---|
| AVG. | AVERAGE | NTS | NOT TO SCALE |
| CC | CONCRETE | O.C. | ON CENTER |
| CY | CUBIC YARDS | O.D. | RELATIVE COMPACTION |
| DBH | DIAMETER BREST HEIGHT | RSP | ROCK SLOPE PROTECTION |
| DIA. | DIAMETER | SD | STORM DRAIN |
| E | EXISTING | SPK | SPIKE |
| E.G. | EXISTING GROUND | SQ.FT. | SQUARE FOOT |
| ELEV. | ELEVATION | TBD | TO BE DETERMINED |
| DI | DRAINAGE INLET | TYP | TYPICAL |
| FG | FINISHED GRADE | UNK | UNKNOWN |
| FT | FEET | WSE | WATER SURFACE ELEVATION |
| INV | INVERT | YR | YEAR |
| N | NEW | | |

### PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE 70% LEVEL DESIGNS FOR THE CONSTRUCTION OF CHANNEL AND FLOODPLAIN ENHANCEMENTS ON PORTIONS OF PERMANENTE CREEK AT THE PERMANENTE QUARRY PROPERTY IN SANTA CLARA COUNTY, CALIFORNIA.

THE DESIGNS ARE SUBJECT TO CHANGE BASED ON RESOURCE AGENCY COMMENTS, ENVIRONMENTAL REVIEW AND PERMIT ISSUANCE.

### TREE REMOVAL NOTES

1. DBH IS THE DIAMETER MEASURED AT BREAST HEIGHT.
2. WILLOWS TO BE REMOVED SHALL BE SALVAGED PER DETAIL 2, SHT. C23. THIS INCLUDES ALL UNMAPPED WILLOWS. WILLOWS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE PROJECT ARBORIST.
3. ALL OTHER TREES REMOVED DURING CONSTRUCTION SHALL BE SALVAGED WITH ROOTWADS INTACT AND INCORPORATED ON BENCHES AS FLOODPLAIN ROUGHNESS LOGS. BRANCHES SHALL BE PLACED ON FLOODPLAIN BENCHES AND ADJACENT UPPER BANK SLOPES AS SLASH.

### TREE ABBREVIATIONS

| | |
|---|---|
| A | ALDER |
| B | BAY |
| BK | BUCKEYE |
| M | MAPLE |
| O | OAK |
| SYC | SYCAMORE |
| W | WILLOW |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wra
ENVIRONMENTAL CONSULTANTS
LANDSCAPE ARCHITECTS AND PLANNERS
2169-G East Francisco Blvd.
San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

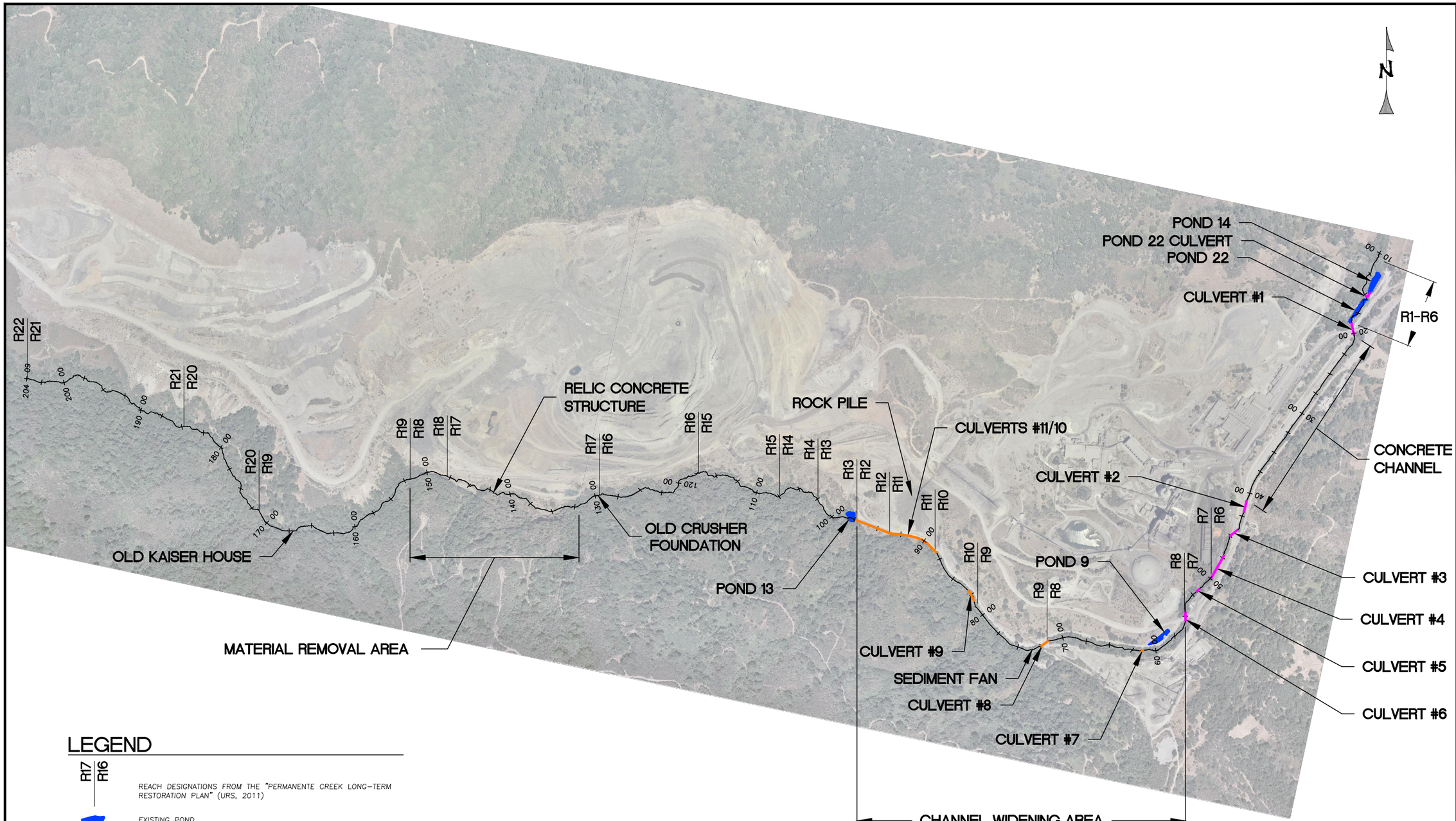

PREPARED AT THE REQUEST OF:
LEHIGH HANSON HEIDELBERG CEMENT GROUP

COVER SHEET

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## LEGEND

- R17 | R16 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- EXISTING POND
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- 70 00 — THALWEG ALIGNMENT 2013

# PROJECT AREA OVERVIEW

SCALE: 1" = 500'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WWW.WATWAYS.COM


PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

OVERVIEW

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

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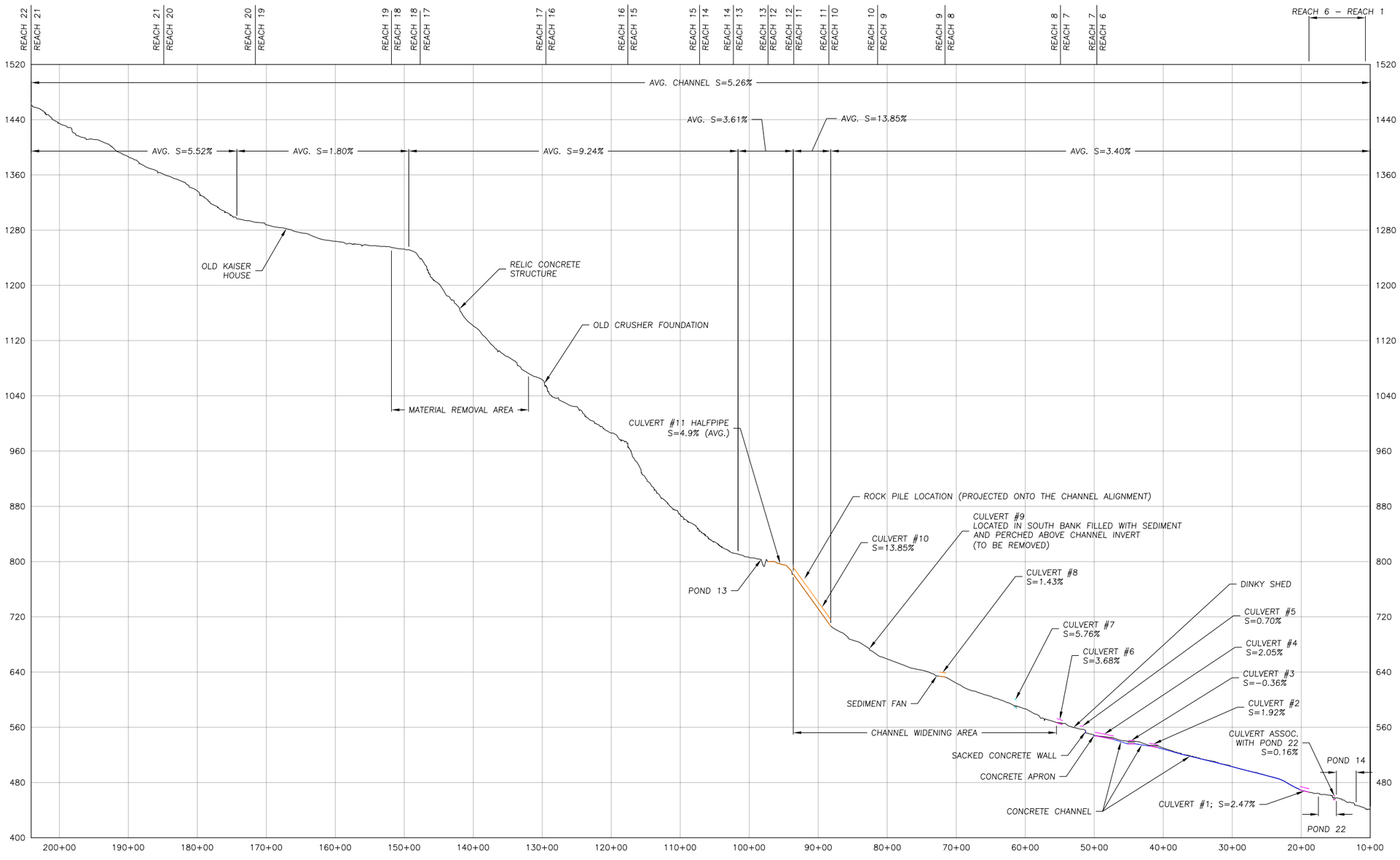


## LEGEND

REACH 7 / REACH 6 — REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

## EXISTING CHANNEL PROFILE

SCALE: H: 1" = 800'; V: 1"=80'


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509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM


PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

EXISTING CHANNEL PROFILE

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

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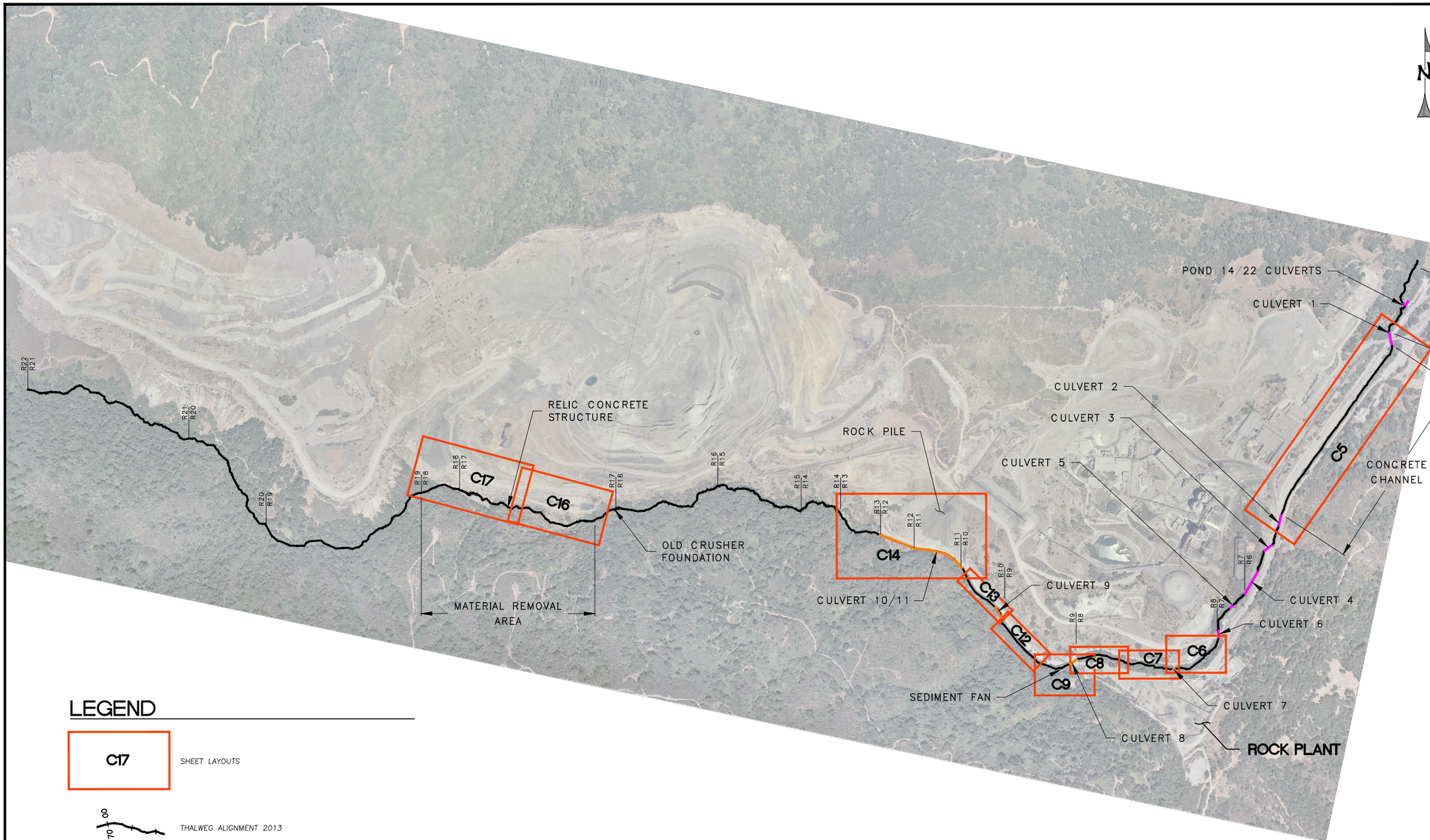



## LEGEND

C17 — SHEET LAYOUTS

00 / 70 — THALWEG ALIGNMENT 2013

EXISTING CULVERT TO BE REMOVED

EXISTING CULVERT TO REMAIN

**SHEET LAYOUT OVERVIEW**

SCALE: 1" = 500'


WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM


PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON HEIDELBERG CEMENT GROUP

SHEET LAYOUT OVERVIEW

PERMANENTE CREEK RESTORATION PLAN

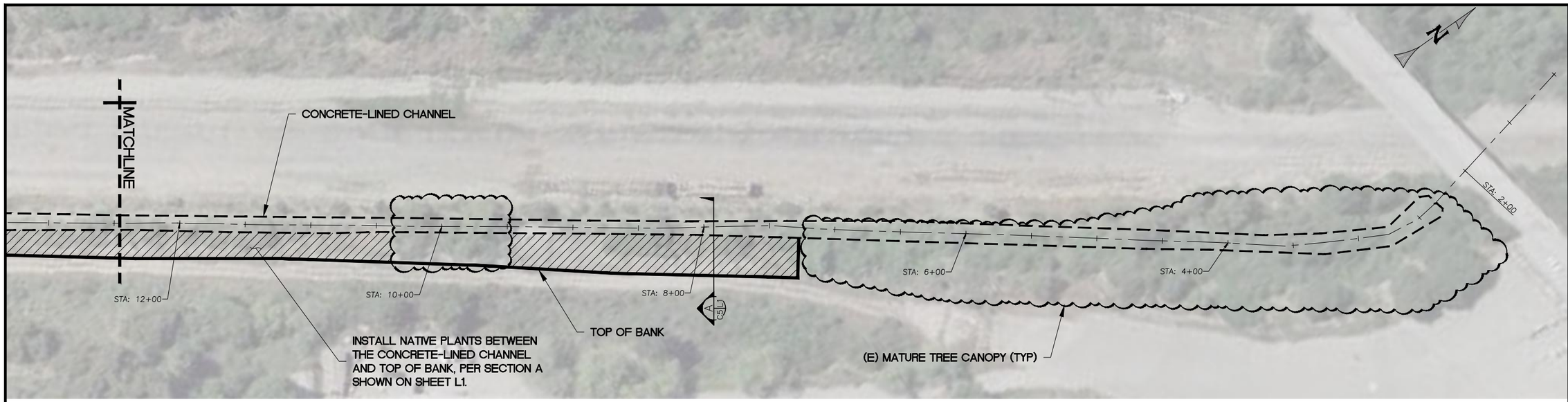
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C4




NOTES:

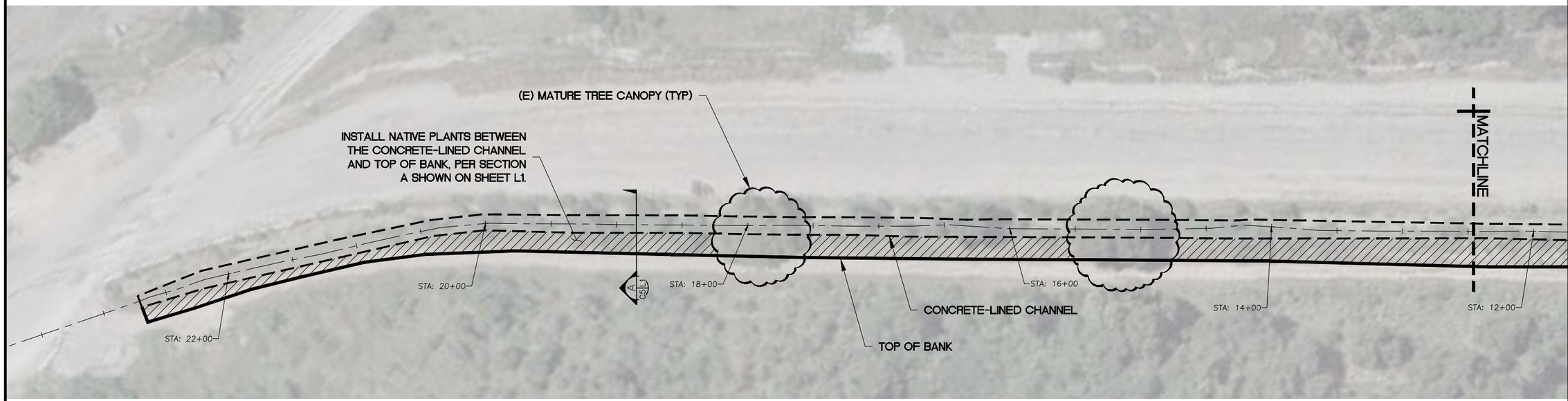
1. ALL EXISTING NATIVE TREES AND SHRUBS SHALL BE PROTECTED IN PLACE. EXISTING PLANT SPECIES INCLUDE, BUT ARE NOT LIMITED TO, PRUNUS ILICIFOLIA, QUERCUS AGRIFOLIA, SALIX LAEVIGATA, SALIX LASIOLEPSIS, AND UMBELLULARIA CALIFORNICA. WEED CONTROL ACTIONS SHALL BE PERFORMED AROUND EXISTING OAK SEEDLINGS, AS DESCRIBED BELOW, TO ENCOURAGE ESTABLISHMENT.
2. A THREE-FOOT DIAMETER AREA SHALL BE CLEARED AND GRUBBED AT EACH PROPOSED PLANTING LOCATION AND AROUND EACH EXISTING OAK SEEDLING. CLEARING AND GRUBBING AROUND OAK SEEDLINGS SHALL OCCUR BY HAND-WEEDING TO AVOID ANY ROOT DISTURBANCE OR PLANT DAMAGE.
3. PLANTING EXCAVATION SHALL NOT OCCUR WITHIN THE DRIP LINE OF EXISTING SHRUBS, WITHIN TEN FEET FROM THE TRUNKS OF EXISTING ESTABLISHED TREES, OR WITHIN FIVE FEET OF EXISTING OAK SEEDLINGS.
4. A QUALIFIED RESTORATION SPECIALIST SHALL CONFIRM THE LOCATION OF PROPOSED PLANTS AND OAK SEEDLINGS PRIOR TO PLANTING AND WEED CONTROL TO CONFIRM AVOIDANCE OF EXISTING VEGETATION.
5. DEPENDING ON THE CONDITION OF EXISTING SOILS, SOIL EXCAVATED FOR PLANTING MAY REQUIRE AMENDMENT WITH GREEN WASTE COMPOST. EXCESS SOIL SHALL BE USED TO FORM A WATERING WELL AROUND THE INSTALLED PLANT.
6. THREE TO FOUR INCHES OF MULCH AND/OR WEED MATS SHALL BE PLACED IN THE CLEARED AND GRUBBED AREA AROUND EACH INSTALLED PLANT OR OAK SEEDLING FOR WEED CONTROL AND MOISTURE RETENTION.

## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: 1" = 40'

LEGEND

PROPOSED REVEGETATION AREA = 0.55 ACRES




## CONCRETE-LINED CHANNEL SOUTHERN BANK PLANTING PLAN

SCALE: H: 1" = 40'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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CONCRETE CHANNEL SOUTHERN BANK PLANTING PLAN

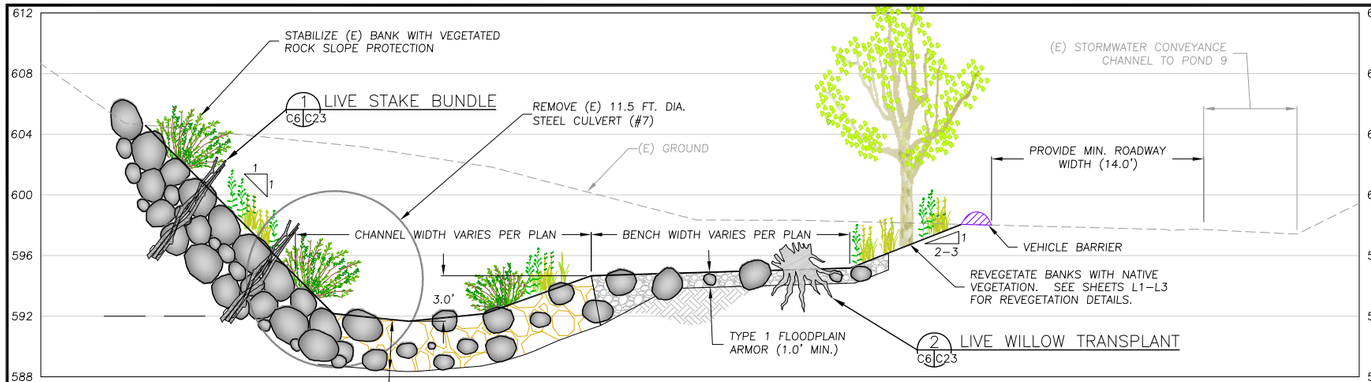
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.Z. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

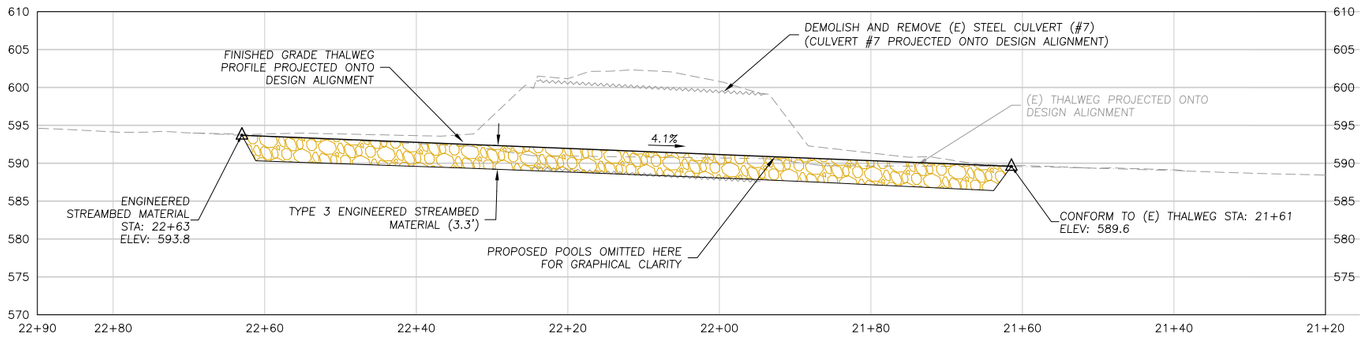
0 1"




## TYPICAL SECTION AT CULVERT #7 (B)

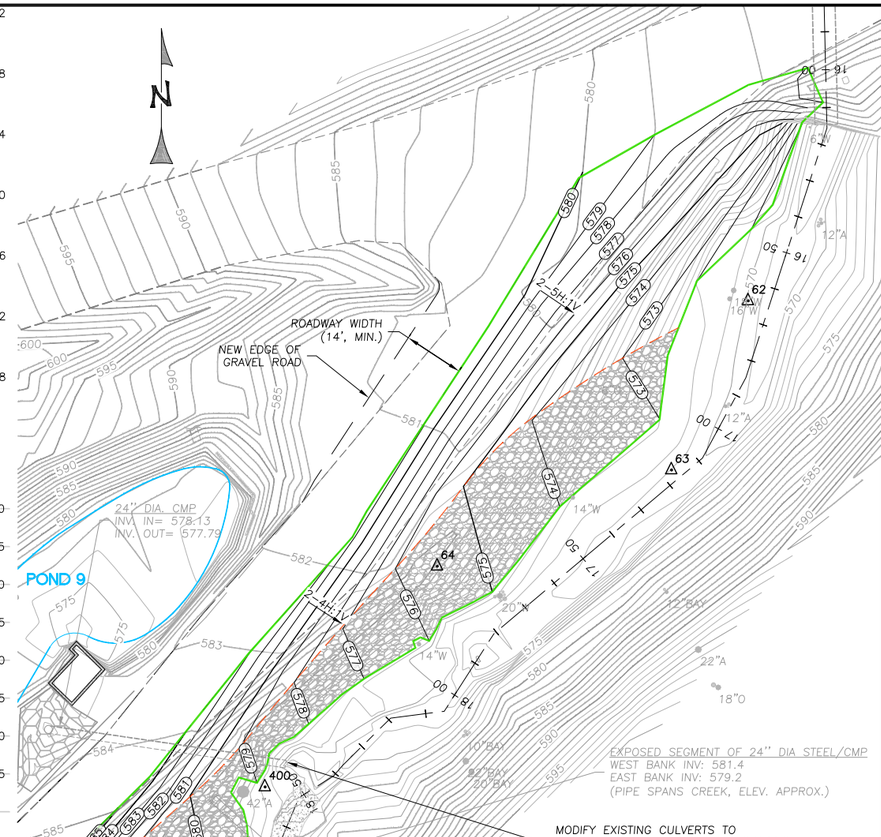
SCALE: 1" = 5'

C6,C7,C6




## CULVERT #7 CHANNEL PROFILE

SCALE: 1" = 10'



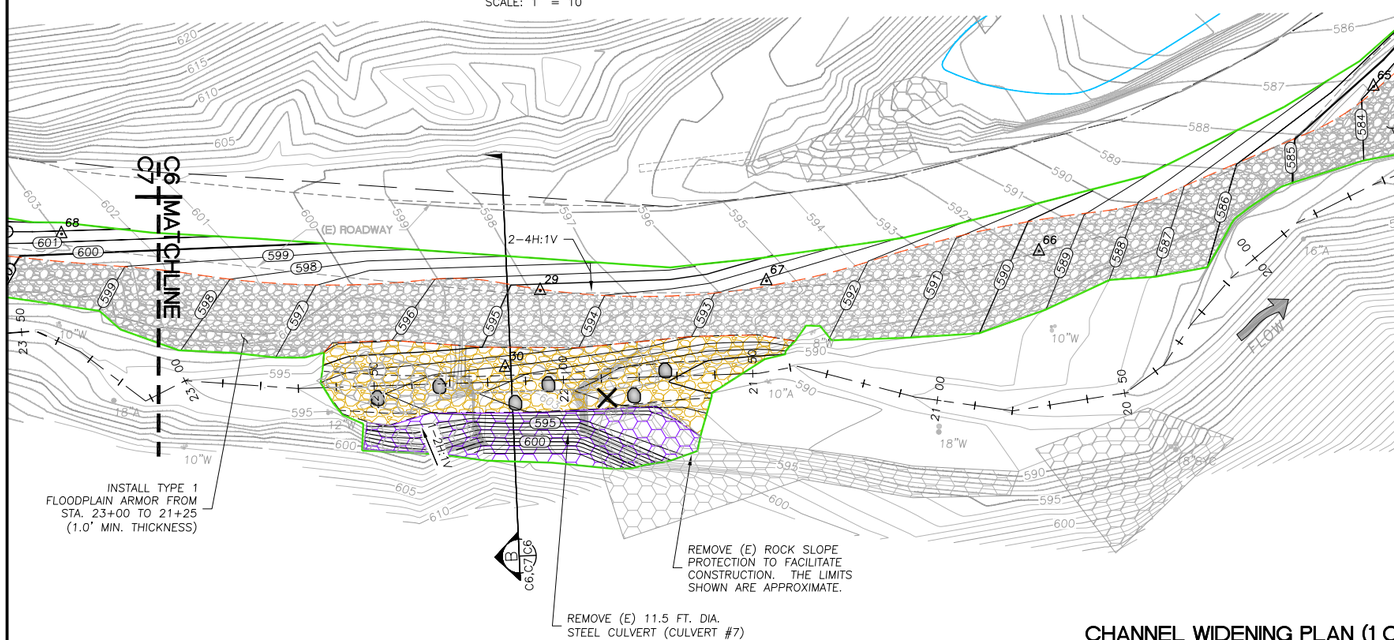

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER (DOUBLE STEM) | 24" | 1 |

NOTE:
THE TREE REMOVAL SUMMARY IS FOR STA. 16+20 TO STA. 23+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION




## CHANNEL WIDENING PLAN (1 OF 5)

SCALE: 1" = 20'

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HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (1 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

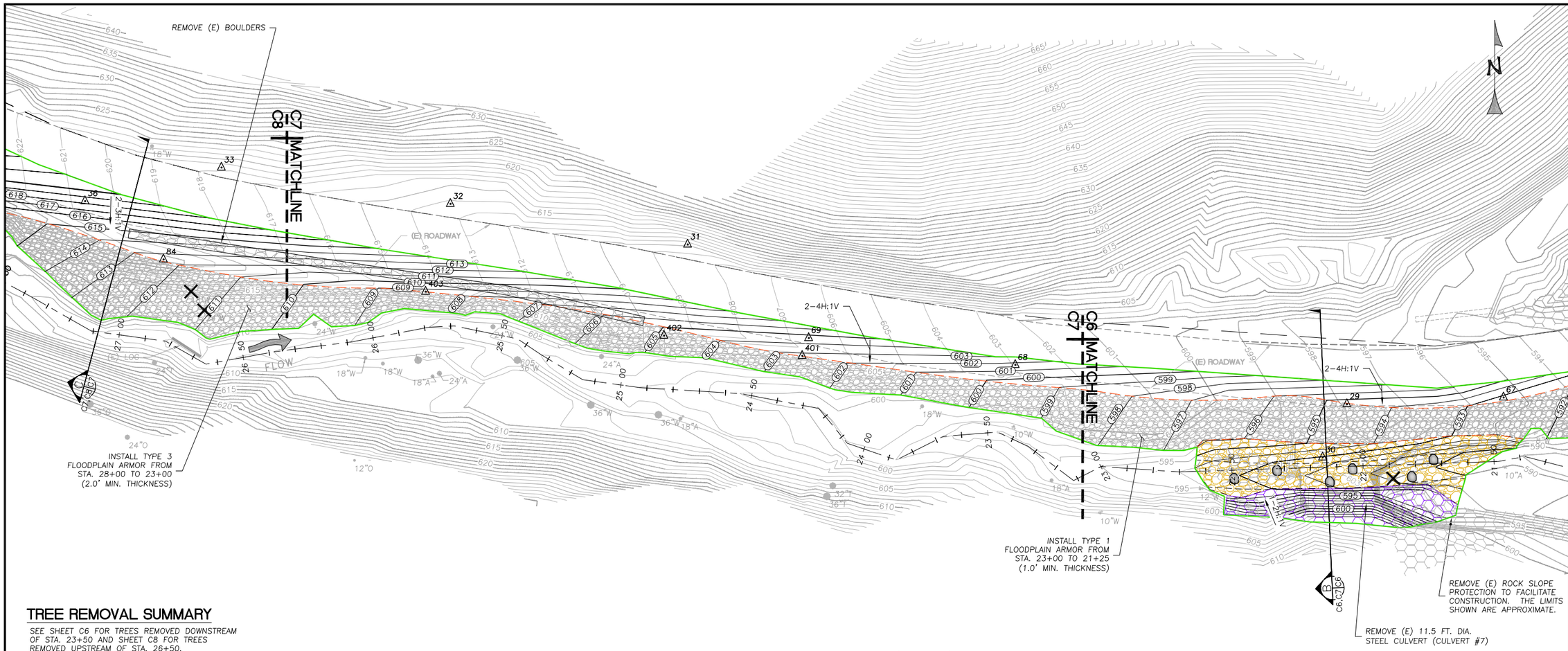
| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

C6

6 OF 25




## TREE REMOVAL SUMMARY

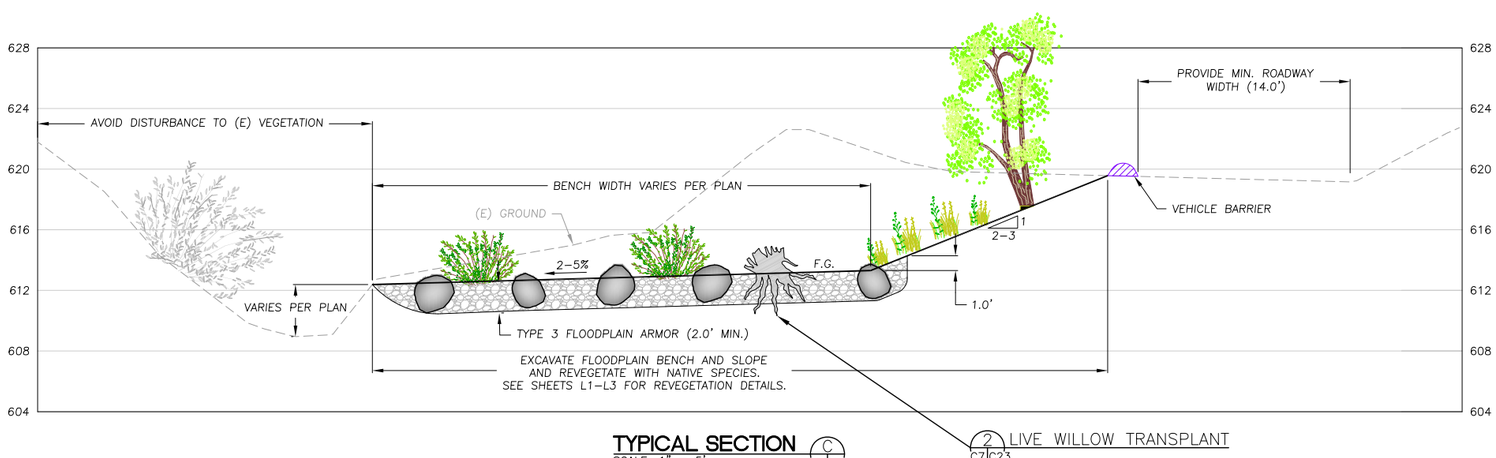
SEE SHEET C6 FOR TREES REMOVED DOWNSTREAM OF STA. 23+50 AND SHEET C8 FOR TREES REMOVED UPSTREAM OF STA. 26+50.

## CHANNEL WIDENING PLAN (2 OF 5)

SCALE: 1" = 20'

## LEGEND

| | |
|---|---|
| △2 | SURVEY CONTROL |
| 8"A | (E) TREE |
| X | (E) TREE TO BE REMOVED |
| 585 586 | (E) CONTOURS |
| 586 585 | PROPOSED CONTOURS |
| | (E) THALWEG ALIGNMENT |
| | (E) EDGE OF DIRT ROAD |
| W | (E) WATER LINE |
| SD | (E) STORM DRAIN LINE |
| | (E) EXPOSED ROCK SLOPE PROTECTION |
| | LIMITS OF GRADING (APPROX.) |
| | EXPANDED FLOODPLAIN BENCH (APPROX.) |
| | ENGINEERED STREAMBED MATERIAL |
| | VEGETATED ROCK SLOPE PROTECTION |




## TYPICAL SECTION

SCALE: 1" = 5'

C C7,C8|C7

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CHANNEL WIDENING PLAN (2 OF 5)

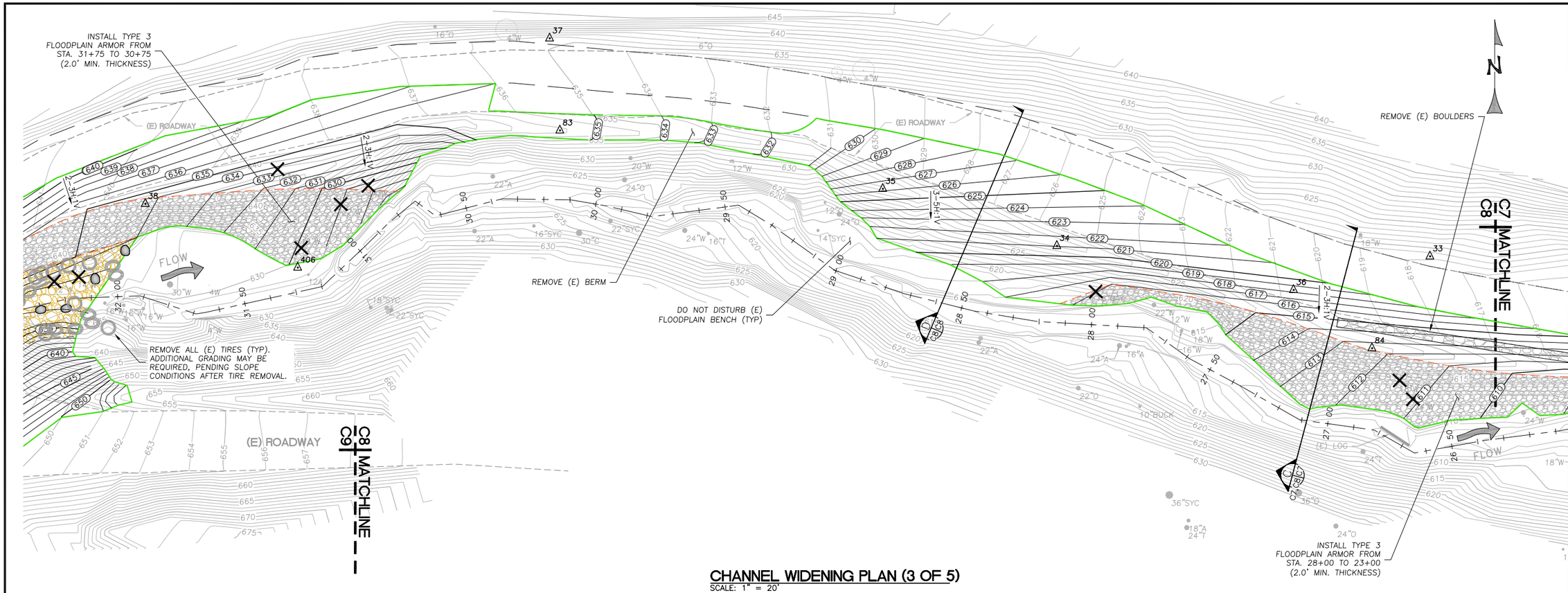
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"




## CHANNEL WIDENING PLAN (3 OF 5)
SCALE: 1" = 20'

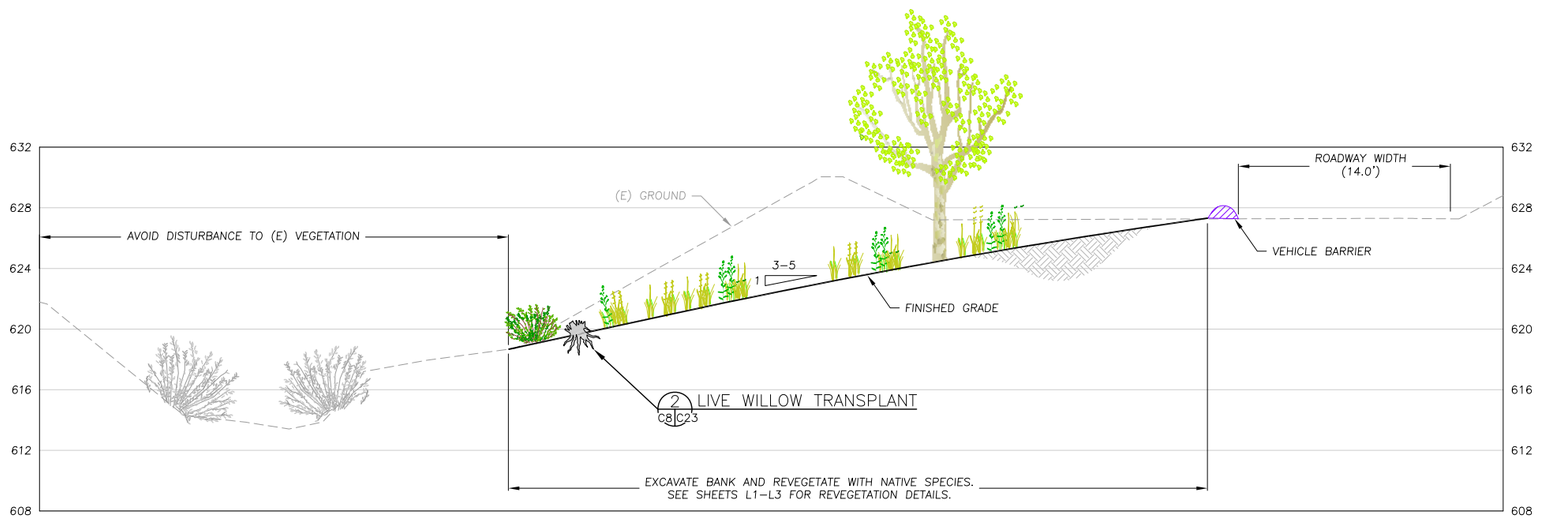
## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| WILLOW | 14" | 1 |
| WILLOW | 18" | 2 |
| WILLOW | 24" | 1 |
| WILLOW | 22" | 1 |
| OAK | 10" | 1 |
| BAY | 16" | 1 |

NOTES:
1. SEE SHEET C9 FOR TREES TO BE REMOVED UPSTREAM OF STA. 31+50. SEE SHEET C7 FOR TREES TO BE REMOVED DOWNSTREAM OF STA. 26+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION




## TYPICAL SECTION
SCALE: 1" = 5'

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CHANNEL WIDENING PLAN (3 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| SYCAMORE | 32" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 18" | 1 |
| BAY | 12" | 1 |
| OAK | 10" | 1 |
| OAK | 8" | 2 |
| OAK | 6" | 1 |

NOTE:
SEE SHEET C8 FOR TREES REMOVED DOWNSTREAM OF STA. 31+50.

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF DIRT ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- RETAINING WALL
- EXPANDED FLOODPLAIN BENCH (APPROX.)
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- (E) TRACTOR TIRE

## SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

SCALE: 1" = 20'

NOTES:
1. BOTTOM OF WALL (BW) GRADES SHOWN ON THIS PLAN REPRESENT FINISHED GRADE AT BOTTOM OF WALL, NOT TOP OF FOOTING ELEVATION.
2. CONTOUR INTERVAL:
   A. 1 FOOT ALONG PERMANENTE CREEK
   B. 5 FEET AT THE SEDIMENT REMOVAL AREA

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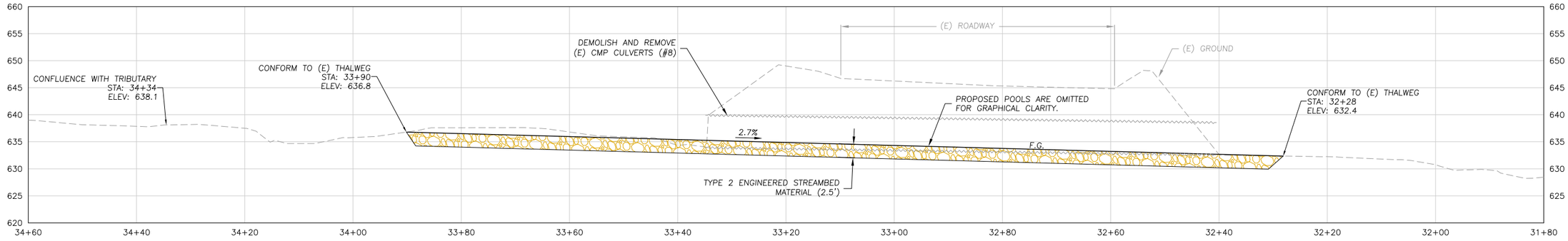
SEDIMENT REMOVAL AREA AND CULVERT #8 PLAN

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

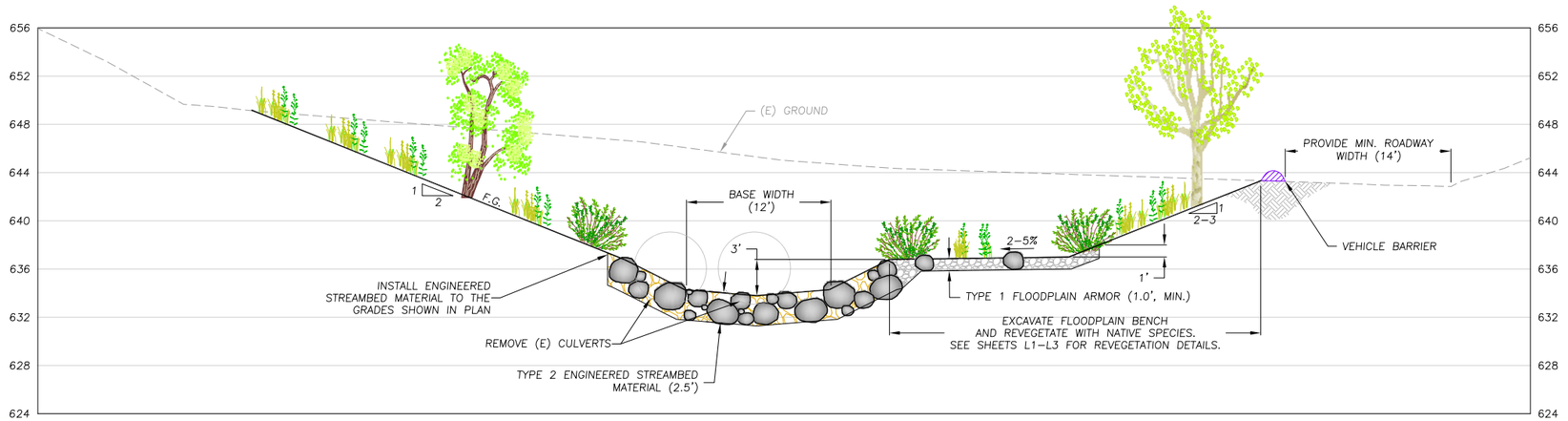
C9 | 9 OF 25




## CULVERT #8 CHANNEL PROFILE

SCALE: 1" = 10'

1 C9|C10




## CULVERT #8 SECTION

SCALE: 1" = 6'

B C9|C10

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HEIDELBERG CEMENT
GROUP

CULVERT #8
PROFILE AND
SECTION

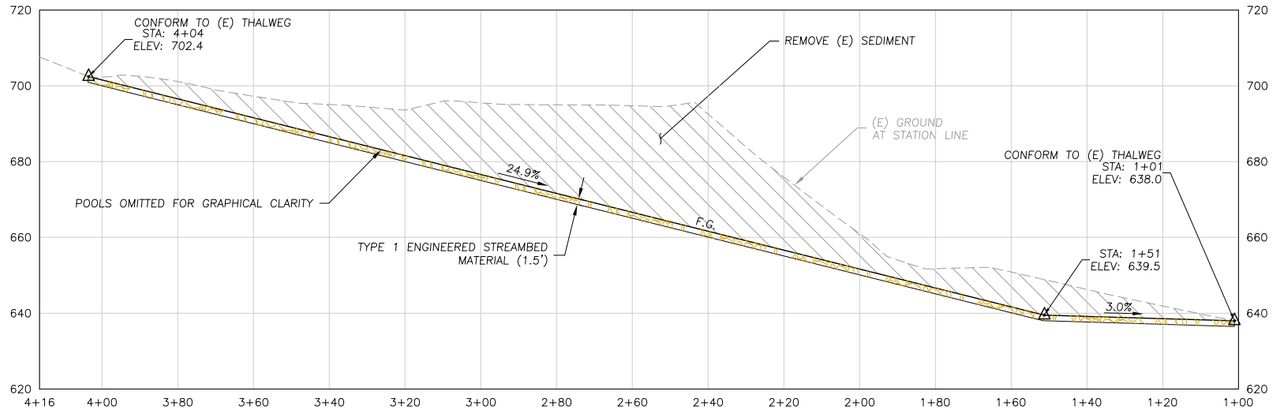
PERMANENTE CREEK
RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

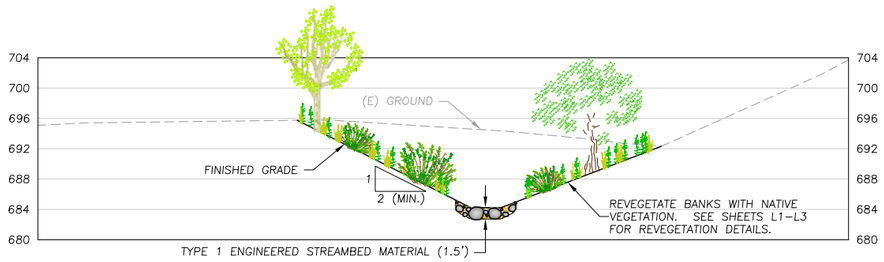
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

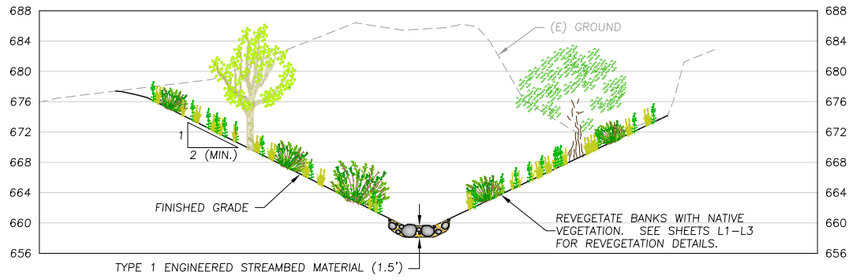



## TRIBUTARY PROFILE
SCALE: 1" = 20'
(2) C9|C11

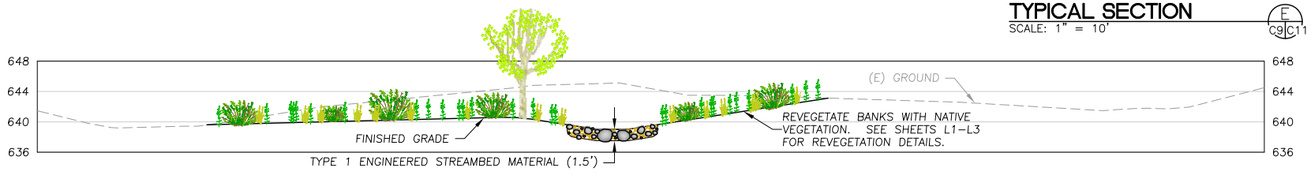
NOTE:
1. FINISHED GRADES SHOWN ARE APPROXIMATE. ALL IMPORTED FILL SHALL BE REMOVED FROM THE CHANNEL BED AND BANKS.
2. CONFORM ENGINEERED STREAMBED MATERIAL TO THE EXISTING CHANNEL AT THE UPSTREAM AND DOWNSTREAM END AS DIRECTED BY THE ENGINEER.



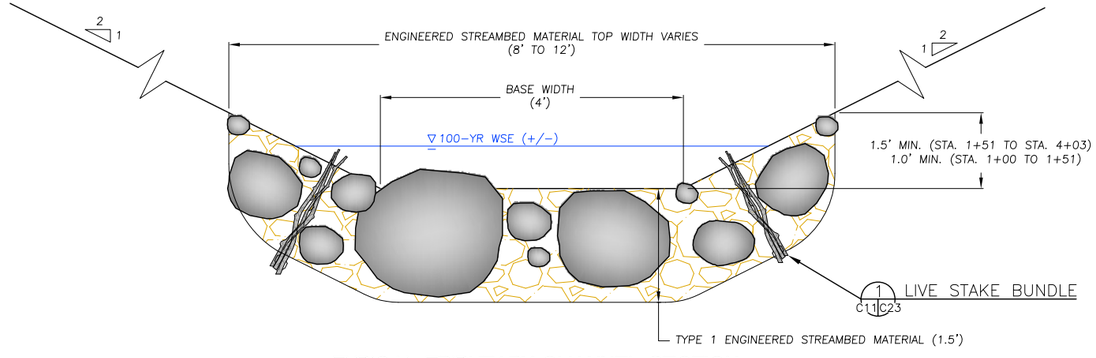

## TYPICAL SECTION
SCALE: 1" = 10'
(D) C9|C11




## TYPICAL SECTION
SCALE: 1" = 10'
(E) C9|C11




## TYPICAL SECTION
SCALE: 1" = 10'
(F) C9|C11




## TYPICAL TRIBUTARY CHANNEL SECTION
SCALE: 1" = 1'

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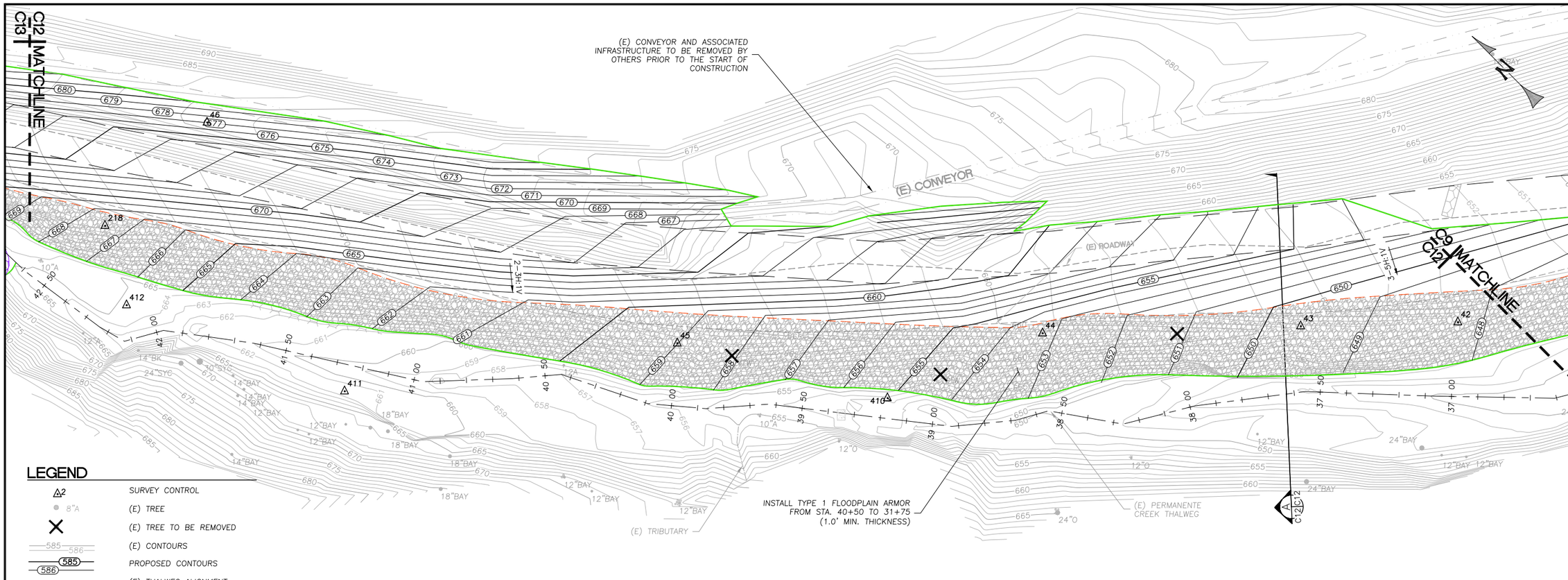
SEDIMENT REMOVAL AREA PROFILE AND SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

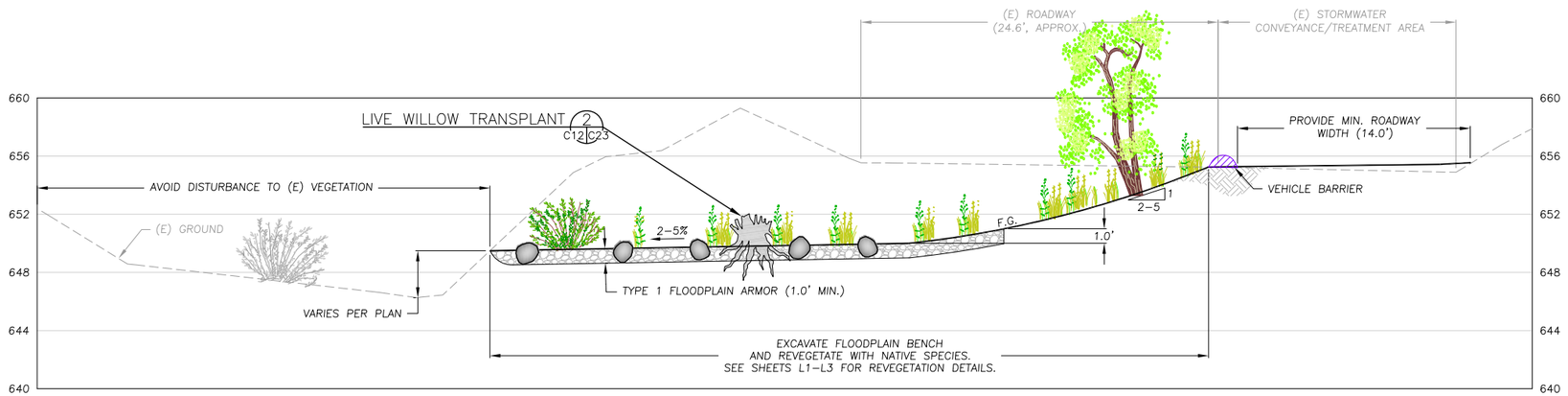
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"




## CHANNEL WIDENING PLAN
SCALE: 1" = 20'

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 18" | 1 |
| WILLOW | 12" | 1 |
| WILLOW | 24" | 1 |




## TYPICAL SECTION
SCALE: 1" = 5'
A C12 C12

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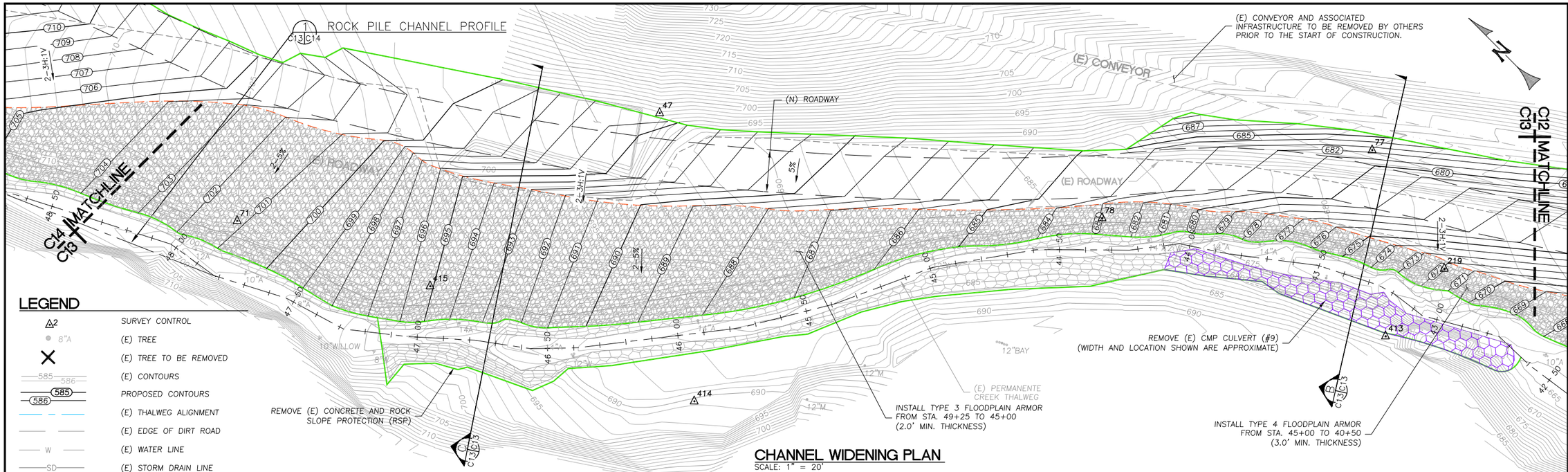
CHANNEL WIDENING PLAN (4 OF 5)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## ROCK PILE CHANNEL PROFILE




## LEGEND

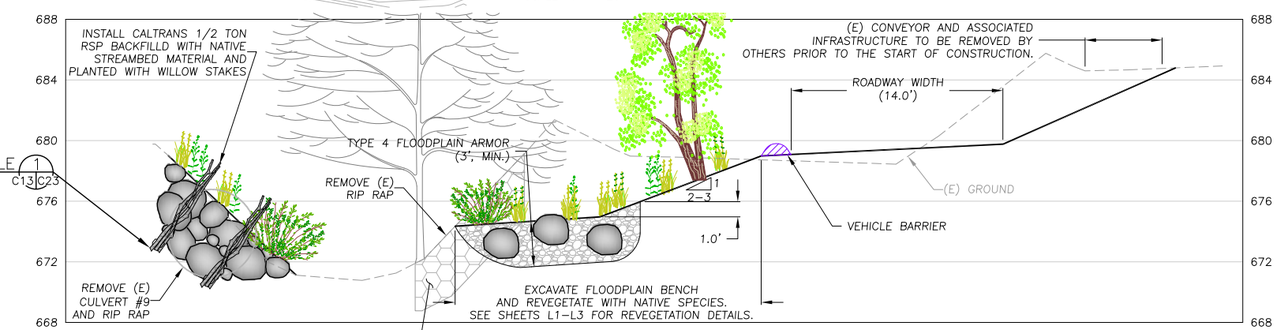
| | |
|---|---|
| △2 | SURVEY CONTROL |
| 8"A | (E) TREE |
| X | (E) TREE TO BE REMOVED |
| 585 586 | (E) CONTOURS |
| 586 | PROPOSED CONTOURS |
| | (E) THALWEG ALIGNMENT |
| | (E) EDGE OF DIRT ROAD |
| W | (E) WATER LINE |
| SD | (E) STORM DRAIN LINE |
| | (E) EXPOSED ROCK SLOPE PROTECTION |
| | LIMITS OF GRADING (APPROX.) |
| | EXPANDED FLOODPLAIN BENCH (APPROX.) |
| | VEGETATED ROCK SLOPE PROTECTION |

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| NONE | N/A | N/A |

## CHANNEL WIDENING PLAN

SCALE: 1" = 20'

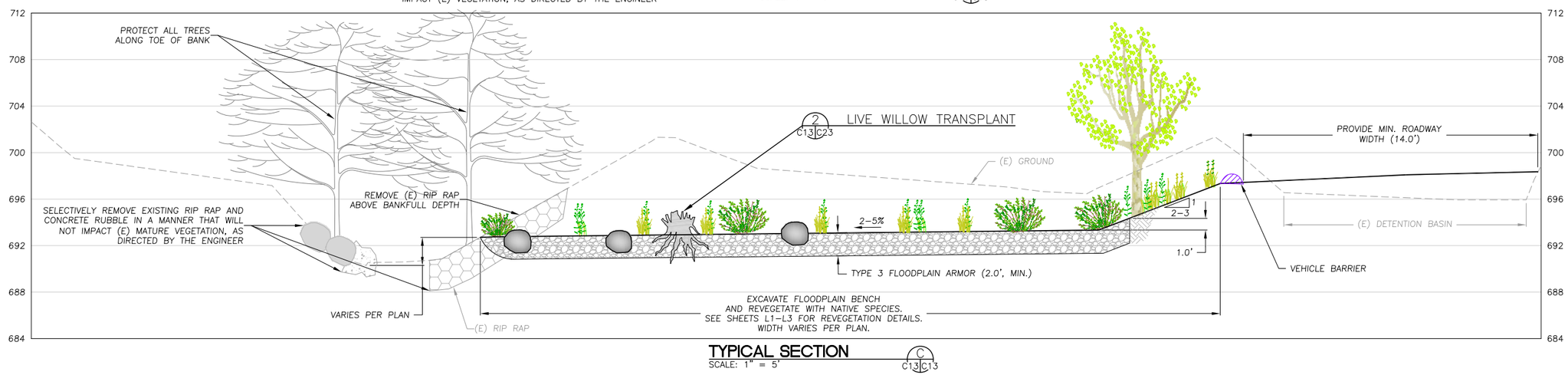



LIVE STAKE BUNDLE 1 C13|C23

## TYPICAL SECTION

SCALE: 1" = 5'

B C13|C13




## TYPICAL SECTION

SCALE: 1" = 5'

C C13|C13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PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

CHANNEL WIDENING PLAN (5 OF 5)

PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

0 1"

NOTE:
THE GRADING PLAN REFLECTS THE LOWER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

MAINTAIN (E) PARKING AREA

POND 13B TO REMAIN

POND 13

LIMITS OF GRADING (APPROX.)

LIMITS OF (E) ROCK PILE (MAY 2011, APPROX.)

(E) ROCK PILE AND INTAKE TO CONVEYOR SYSTEM TO BE REMOVED BY OTHERS PRIOR TO CONSTRUCTION.

(N) ROAD

(E) ROAD

FLOW

REMOVE (E) DAM INCLUDING ALL CONCRETE AND STEEL COMPONENTS

DEMOLISH CULVERT #11 AND ASSOCIATED CONCRETE HEADWALL. BACKFILL AREA AND REVEGETATE WITH NATIVE PLANTS.

NOTE: CHANNEL FLOWLINE TO MEANDER WITHIN CONSTRUCTED CORRIDOR PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15

DEMOLISH CULVERT #10. BACKFILL AREA AND REVEGETATE WITH NATIVE PLANTS. (EXISTING ALIGNMENT ESTIMATED)

FINAL ROAD DRAINAGE DETAILS TO BE DETERMINED.

(E) CONVEYOR, ASSOCIATED INFRASTRUCTURE, AND UTILITIES TO BE REMOVED BY OTHERS PRIOR TO CONSTRUCTION.

CONFORM TO (E) GROUND

C14 MATCHLINE
C13

## LEGEND

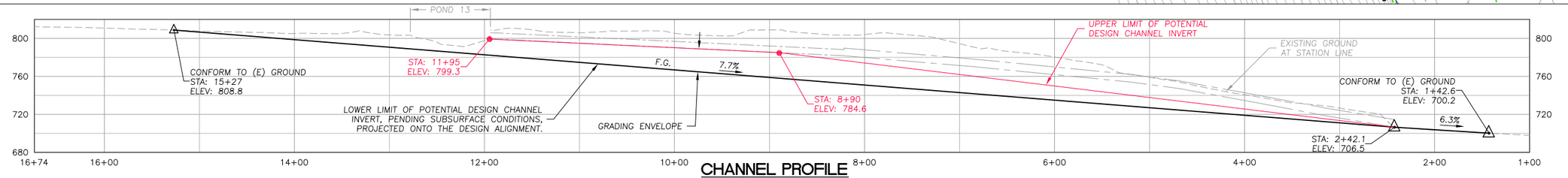
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CULVERT
- (E) ROADWAY
- (E) THALWEG
- PROPOSED THALWEG
- LIMITS OF GRADING

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| ALDER | 10" | 1 |
| ALDER | 12" | 1 |
| MAPLE | 12" | 1 |

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C15, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.

## ROCK PILE AREA PLAN
SCALE: 1" = 50'




## CHANNEL PROFILE
SCALE: 1" = 60'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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

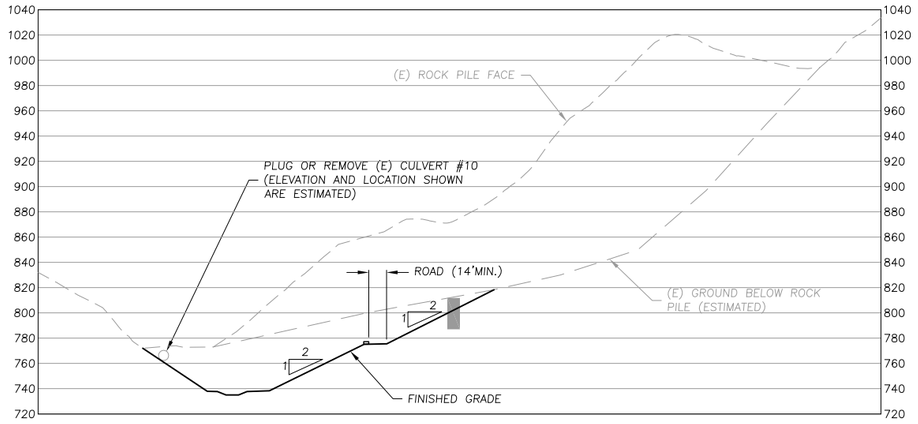
PRELIMINARY
NOT FOR CONSTRUCTION

ROCK PILE AREA PLAN

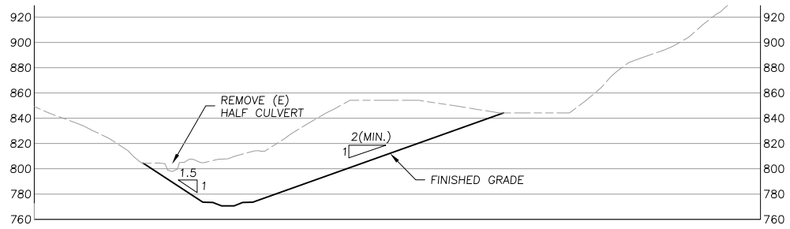
PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.R.S
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

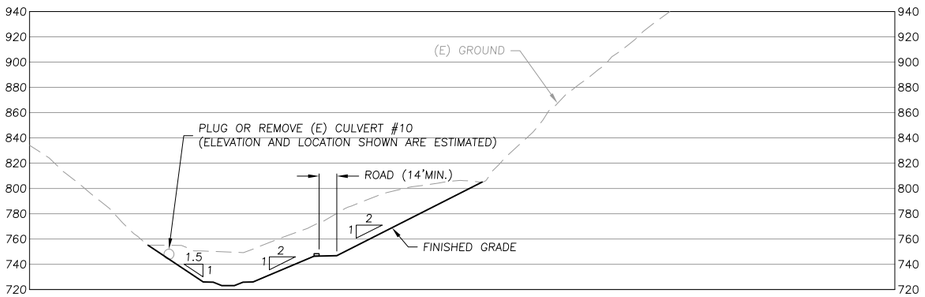
BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS
0 1"



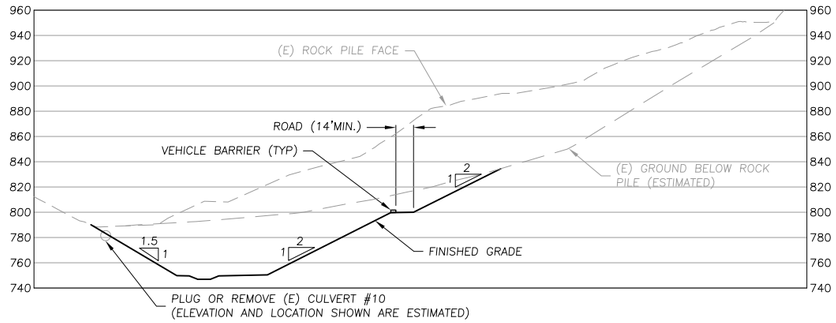

TYPICAL SECTION
SCALE: 1" = 60'
C C14 C15



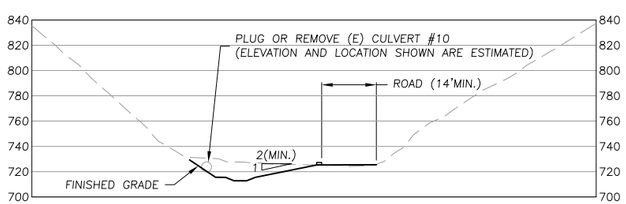

TYPICAL SECTION
SCALE: 1" = 60'
E C14 C15



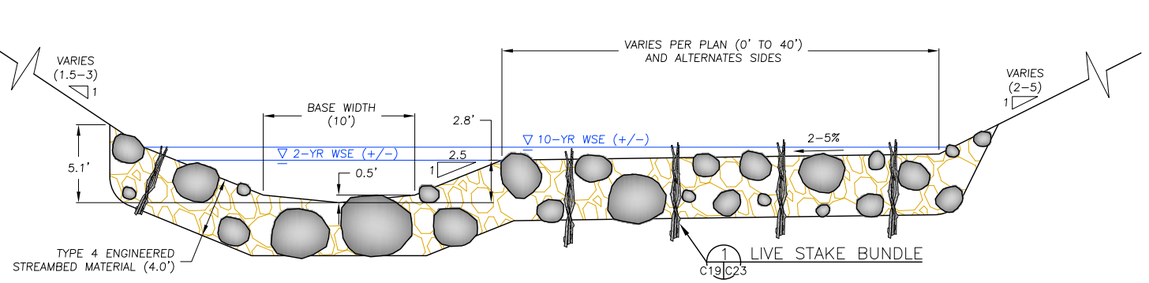

TYPICAL SECTION
SCALE: 1" = 60'
B C14 C15




TYPICAL SECTION
SCALE: 1" = 60'
D C14 C15




TYPICAL SECTION
SCALE: 1" = 60'
A C14 C15




TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'

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HEIDELBERG CEMENT
GROUP

ROCK PILE
AREA
SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.R.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

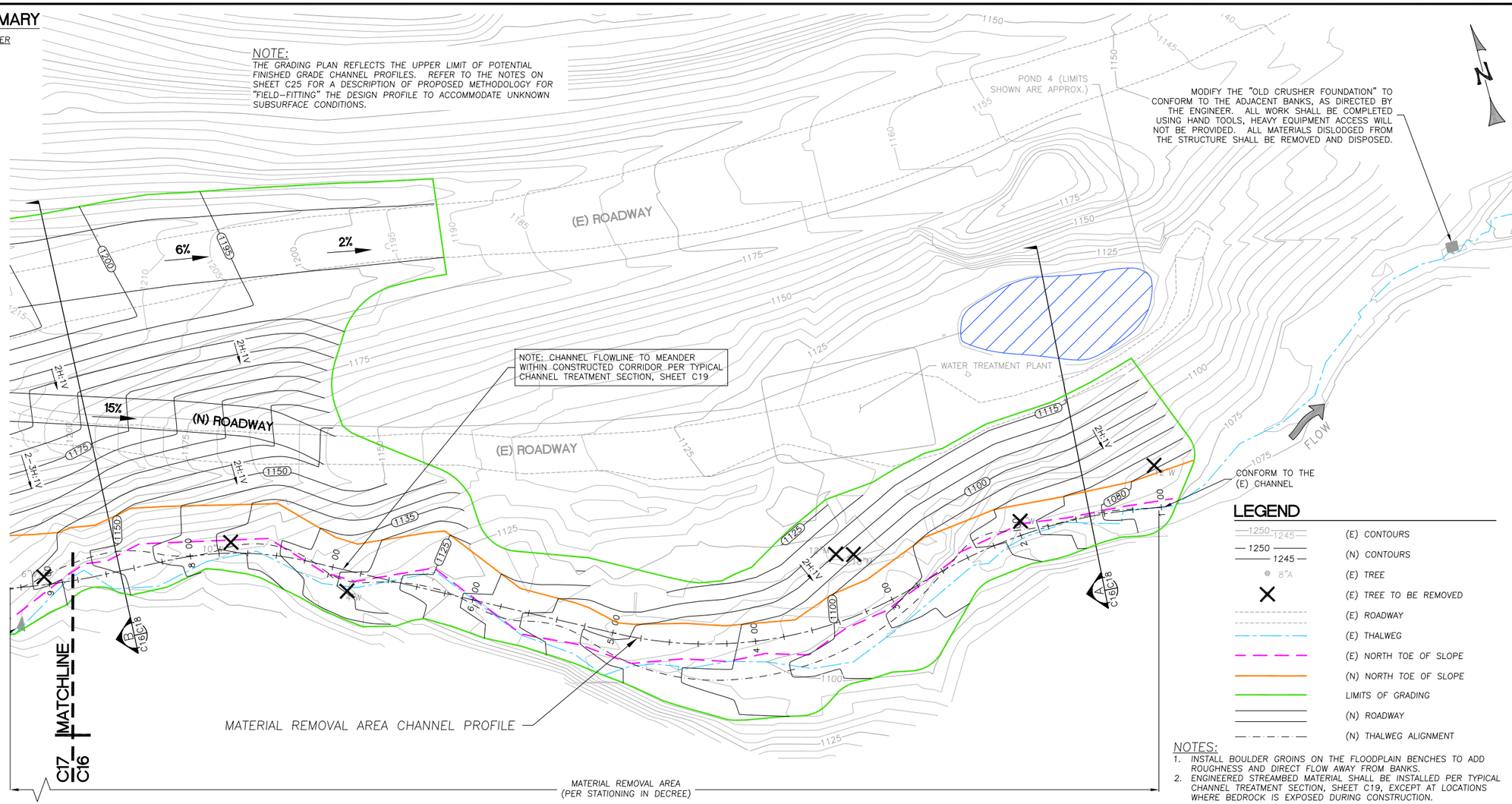
C15

15 OF 25

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| MADRONE | 12" | 1 |
| MADRONE | 18" | 1 |
| WILLOW | 4" | 1 |
| WILLOW | 6" | 2 |
| WILLOW | 10" | 1 |
| WILLOW | 12" | 1 |

NOTE:
THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.

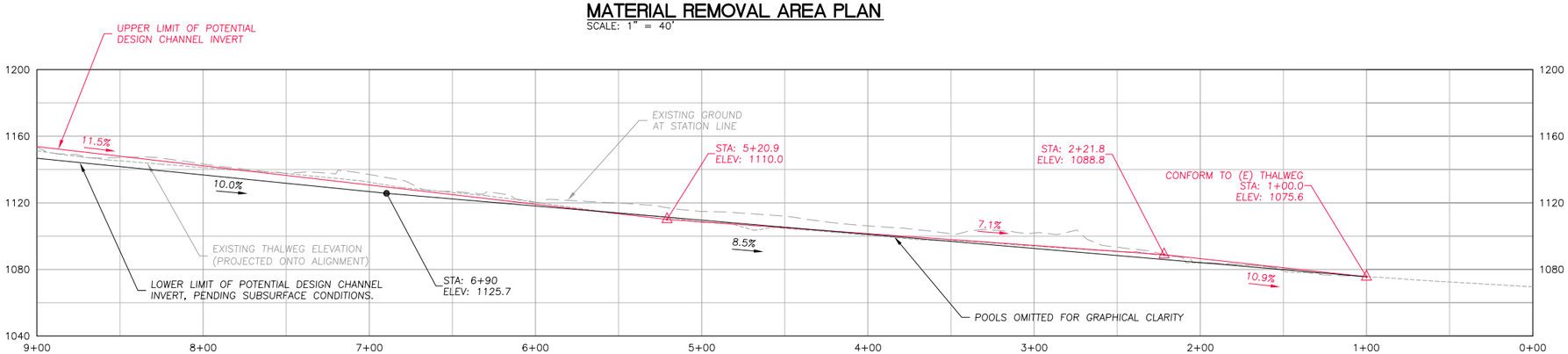



## MATERIAL REMOVAL AREA PLAN
SCALE: 1" = 40'

### LEGEND

- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

NOTES:
1. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.
2. ENGINEERED STREAMBED MATERIAL SHALL BE INSTALLED PER TYPICAL CHANNEL TREATMENT SECTION, SHEET C19, EXCEPT AT LOCATIONS WHERE BEDROCK IS EXPOSED DURING CONSTRUCTION.




## MATERIAL REMOVAL AREA CHANNEL PROFILE
SCALE: 1" = 40'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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (1 OF 2)

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## LEGEND

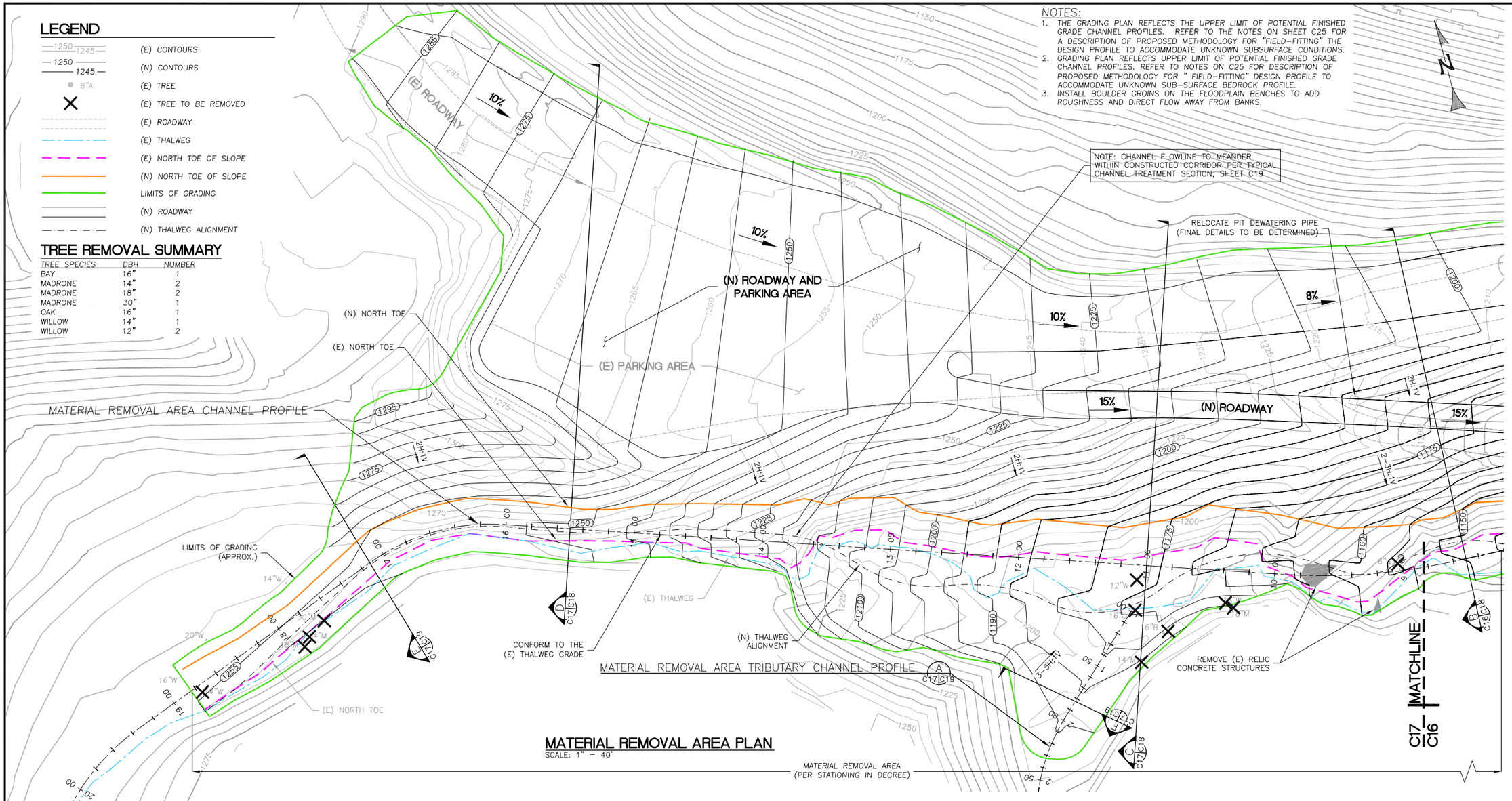
- (E) CONTOURS
- (N) CONTOURS
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) ROADWAY
- (E) THALWEG
- (E) NORTH TOE OF SLOPE
- (N) NORTH TOE OF SLOPE
- LIMITS OF GRADING
- (N) ROADWAY
- (N) THALWEG ALIGNMENT

## TREE REMOVAL SUMMARY

| TREE SPECIES | DBH | NUMBER |
|---|---|---|
| BAY | 16" | 1 |
| MADRONE | 14" | 2 |
| MADRONE | 18" | 2 |
| MADRONE | 30" | 1 |
| OAK | 16" | 1 |
| WILLOW | 14" | 1 |
| WILLOW | 12" | 2 |

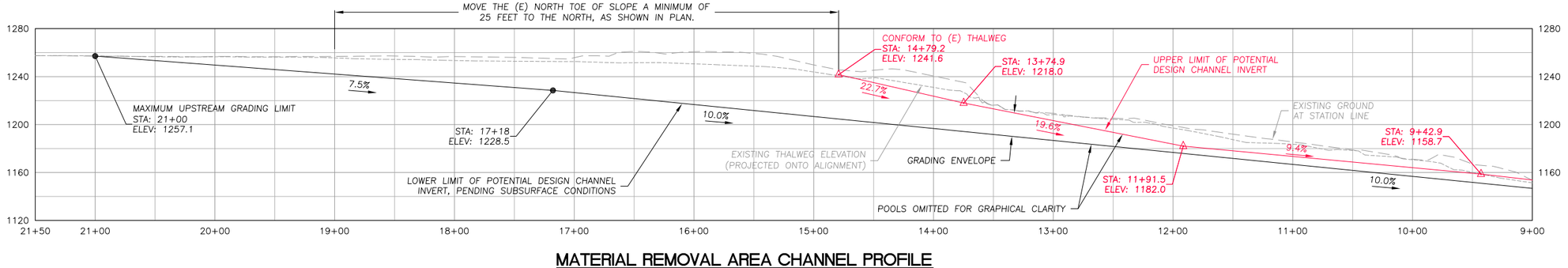
NOTES:

1. THE GRADING PLAN REFLECTS THE UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO THE NOTES ON SHEET C25 FOR A DESCRIPTION OF PROPOSED METHODOLOGY FOR "FIELD-FITTING" THE DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUBSURFACE CONDITIONS.
2. GRADING PLAN REFLECTS UPPER LIMIT OF POTENTIAL FINISHED GRADE CHANNEL PROFILES. REFER TO NOTES ON C25 FOR DESCRIPTION OF PROPOSED METHODOLOGY FOR " FIELD-FITTING" DESIGN PROFILE TO ACCOMMODATE UNKNOWN SUB-SURFACE BEDROCK PROFILE.
3. INSTALL BOULDER GROINS ON THE FLOODPLAIN BENCHES TO ADD ROUGHNESS AND DIRECT FLOW AWAY FROM BANKS.




## MATERIAL REMOVAL AREA PLAN

SCALE: 1" = 40'




## MATERIAL REMOVAL AREA CHANNEL PROFILE

SCALE: 1" = 50'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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA PLAN (2 OF 2)

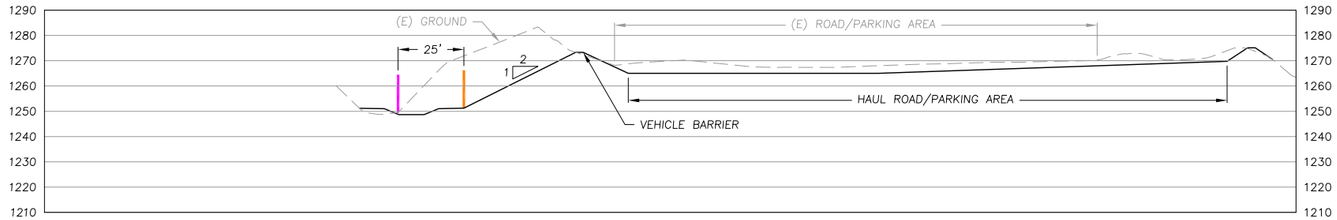
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

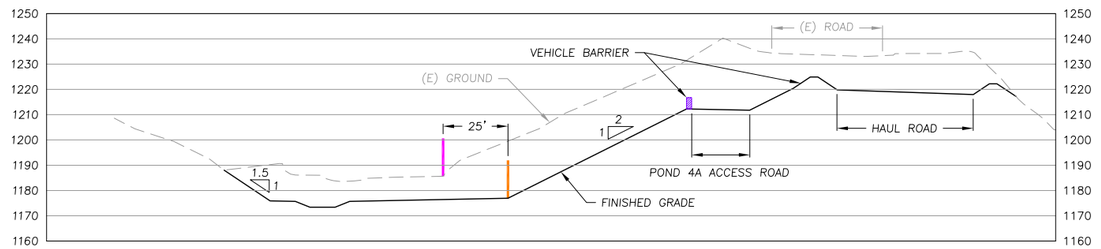
| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

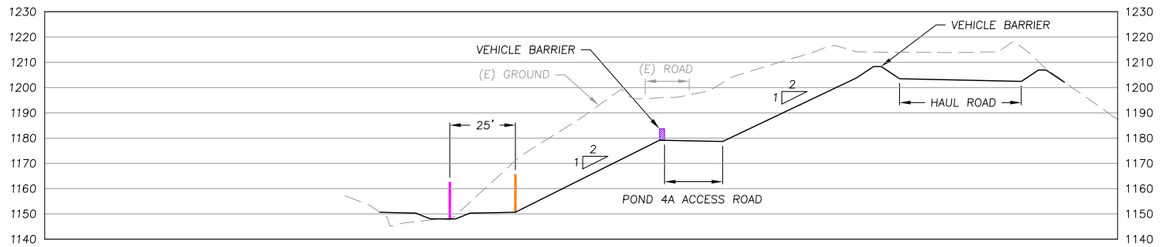
0 1"



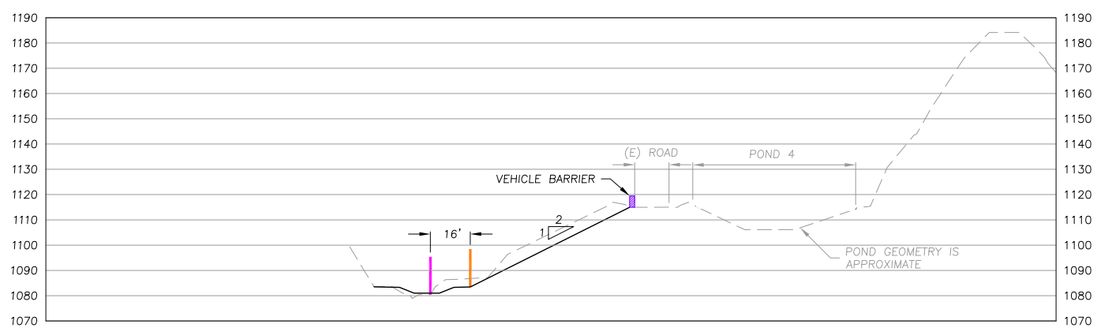

TYPICAL SECTION (D) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (C) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (B) C17 C18
SCALE: 1" = 30'




TYPICAL SECTION (A) C17 C18
SCALE: 1" = 30'

## LEGEND

(E) NORTH SLOPE TOE

PROPOSED NORTH SLOPE TOE

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# MATERIAL REMOVAL AREA SECTIONS (1 OF 2)

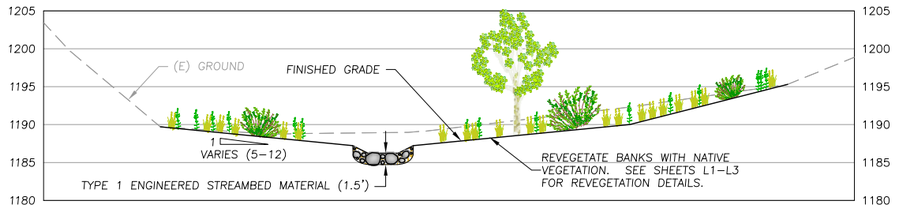
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

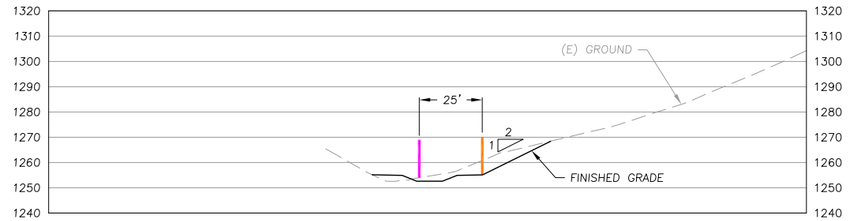
DESIGNED BY: B.M.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C18




TYPICAL SECTION
SCALE: 1" = 10'
F C17|C19

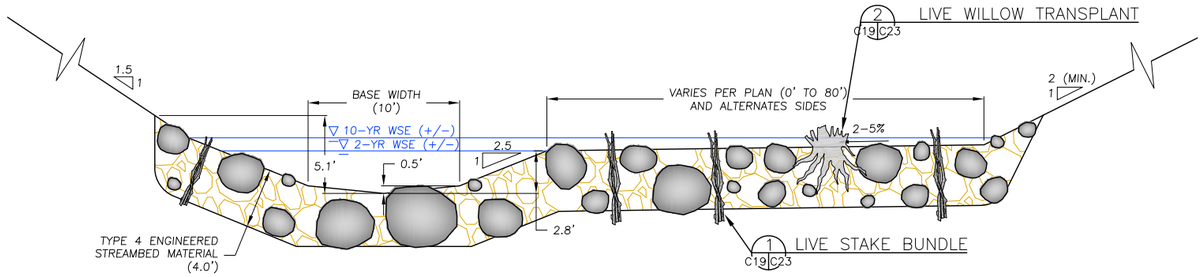



TYPICAL SECTION
SCALE: 1" = 30'
E C17|C19

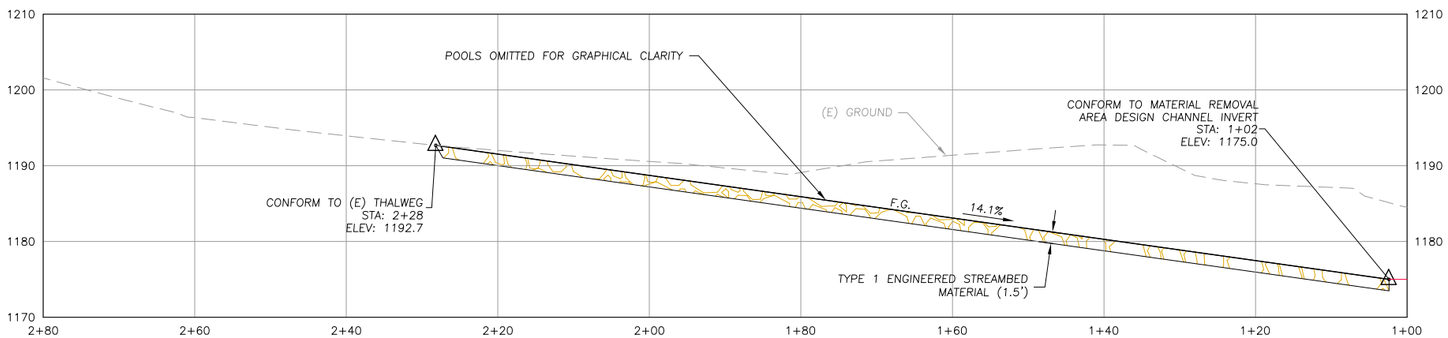
## LEGEND

(E) NORTH SLOPE TOE

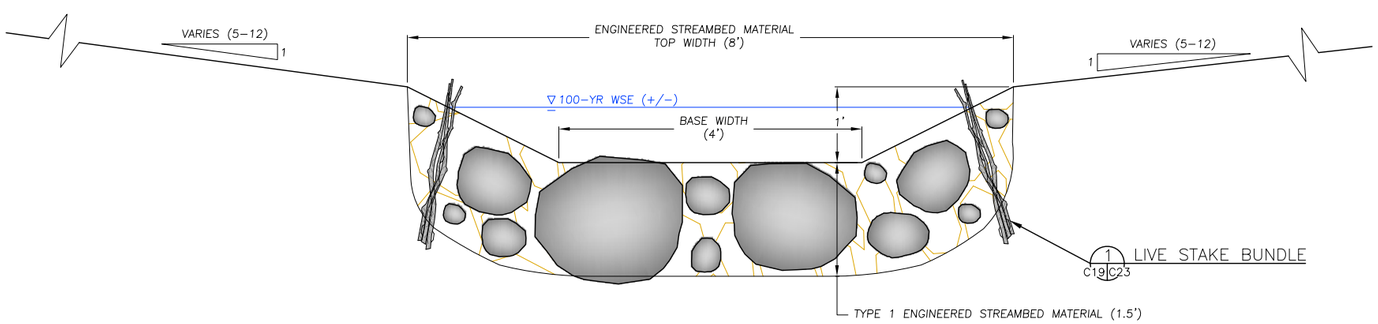
PROPOSED NORTH SLOPE TOE




TYPICAL CHANNEL TREATMENT SECTION
SCALE: 1" = 5'




MATERIAL REMOVAL AREA TRIBUTARY CHANNEL PROFILE
SCALE: 1" = 10'
A C17|C19




TYPICAL TRIBUTARY CHANNEL TREATMENT SECTION
SCALE: 1" = 1'

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

MATERIAL REMOVAL AREA SECTIONS (2 OF 2)

PERMANENTE CREEK RESTORATION PLAN

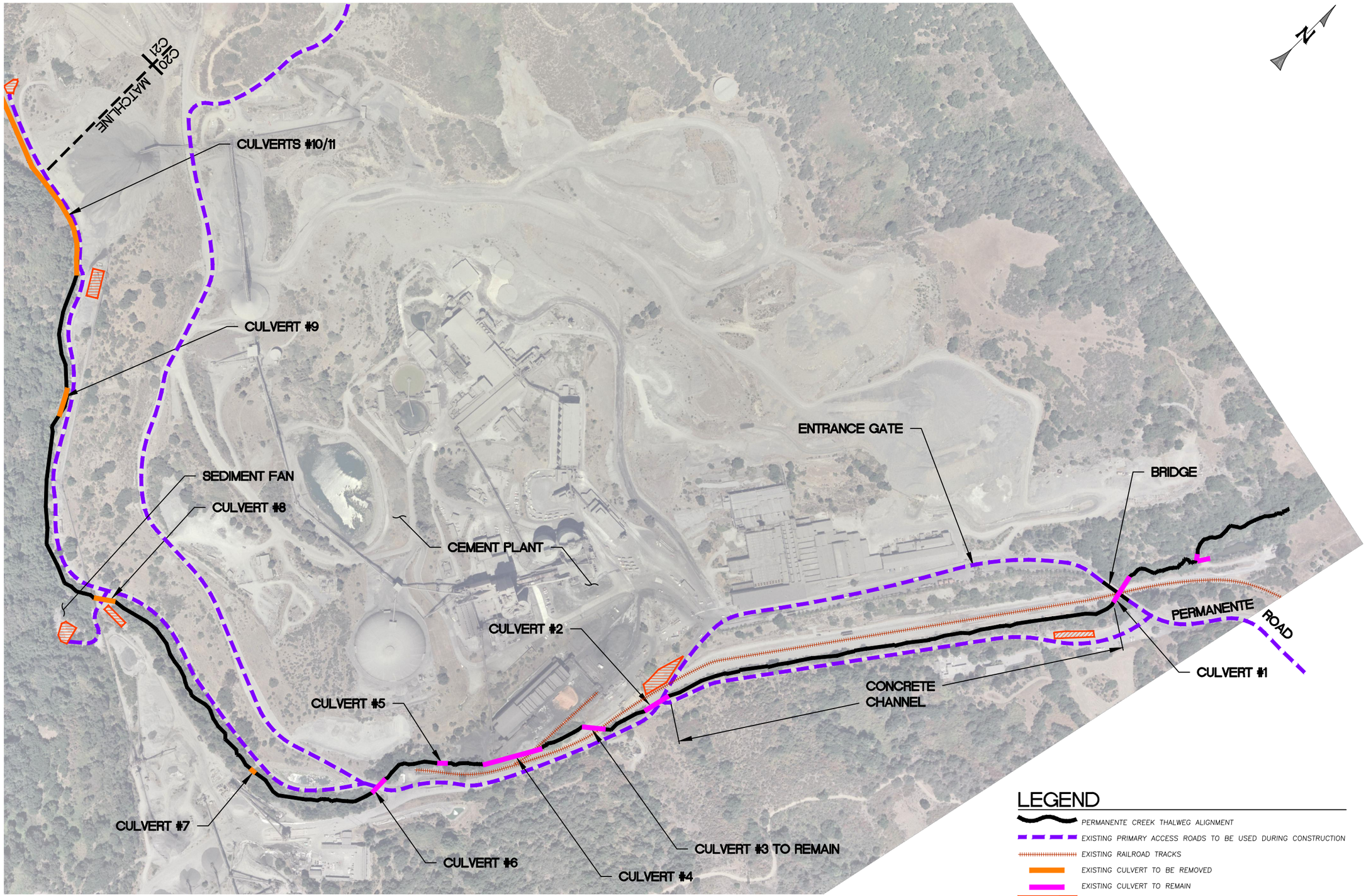
70% DESIGN SUBMITTAL

DESIGNED BY: B.Z.
DRAWN BY: B.M.S.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C19

19 OF 25




ACCESS AND STAGING PLAN
SCALE: 1"=200'

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HEIDELBERG CEMENT
GROUP

ACCESS AND STAGING PLAN (1 OF 2)

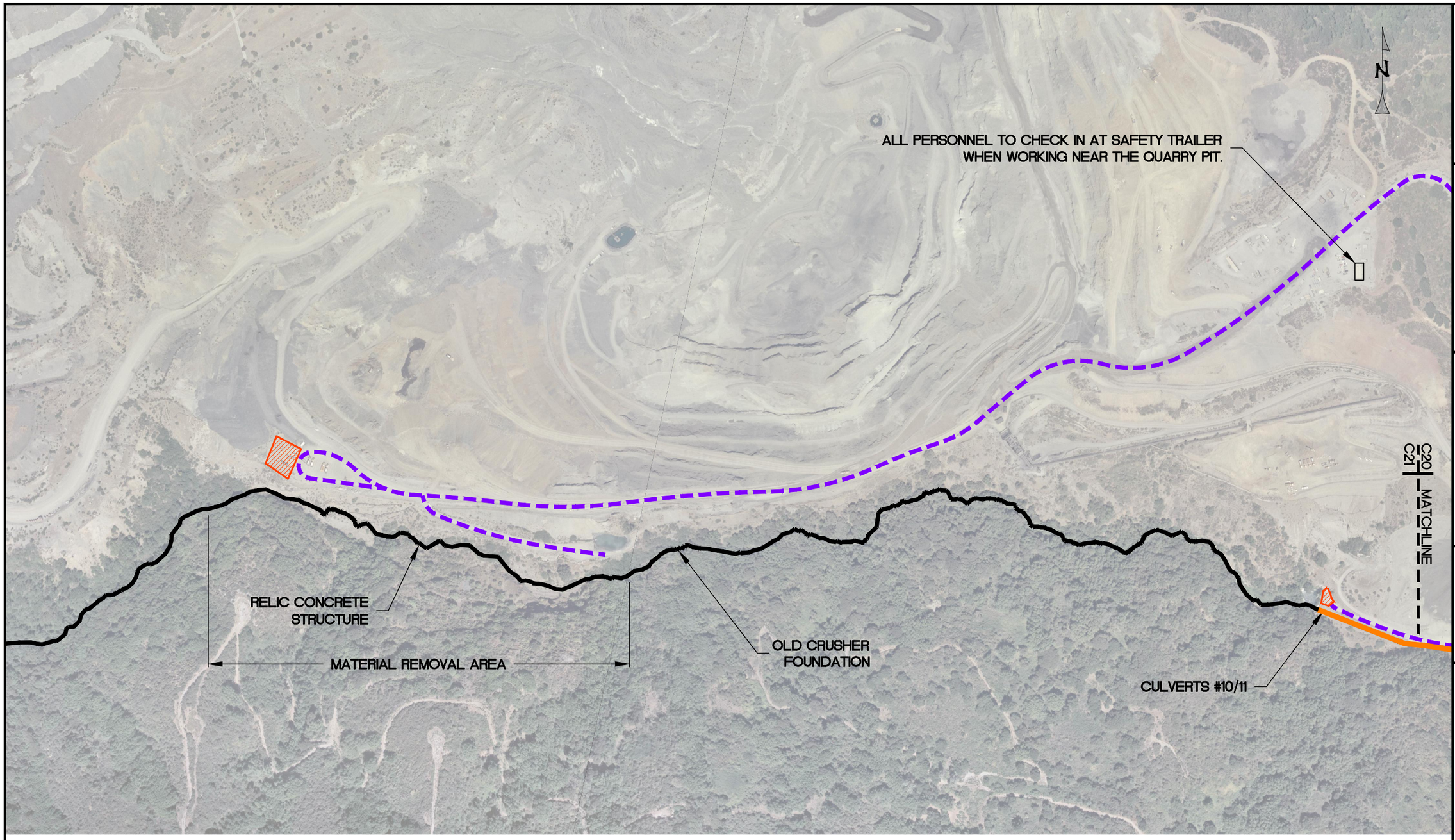
PERMANENTE CREEK RESTORATION PLAN

70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C20




## LEGEND

- PERMANENTE CREEK THALWEG ALIGNMENT
- EXISTING PRIMARY ACCESS ROADS TO BE USED DURING CONSTRUCTION
- EXISTING RAILROAD TRACKS
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN
- STAGING AND STOCKPILE AREAS

## ACCESS AND STAGING PLAN

SCALE: 1" = 200'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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

ACCESS AND STAGING PLAN
(2 OF 2)

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

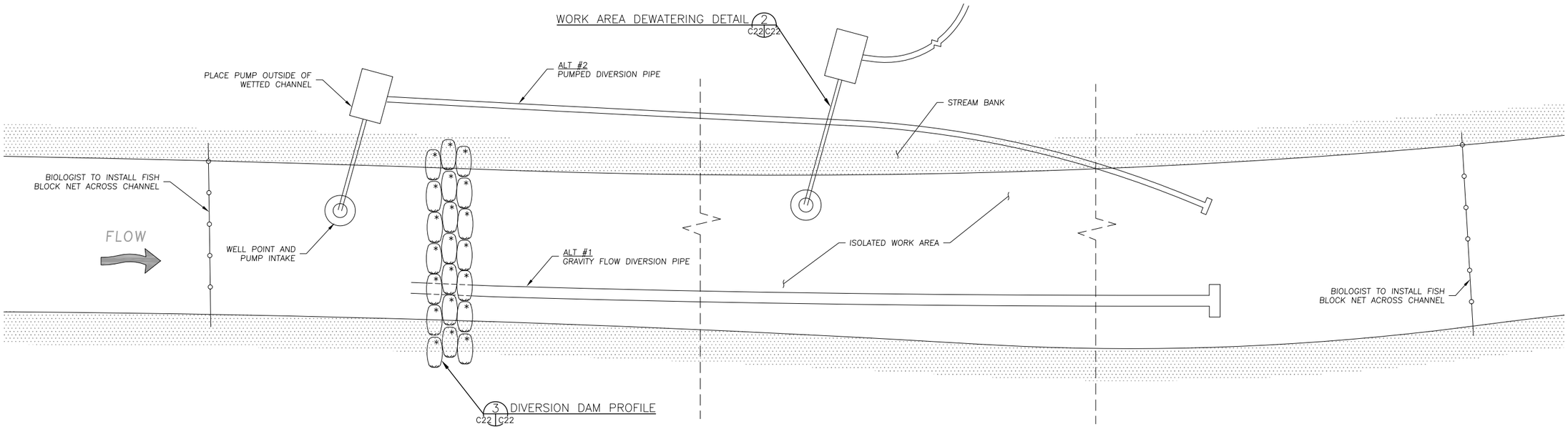
| | |
|---|---|
| DESIGNED BY: | B.M.S. |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS

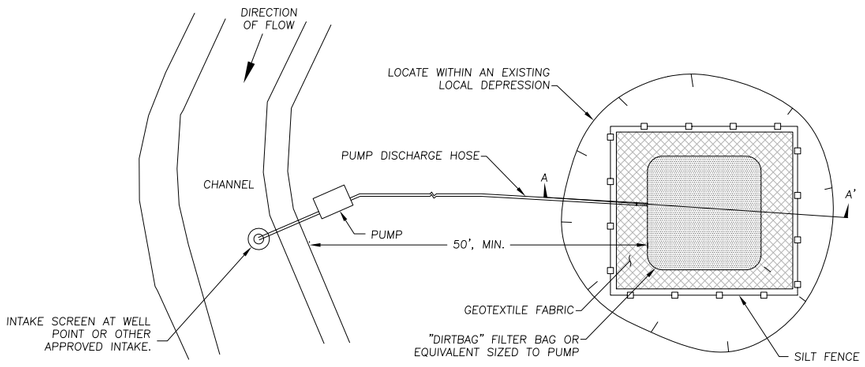
0 1"

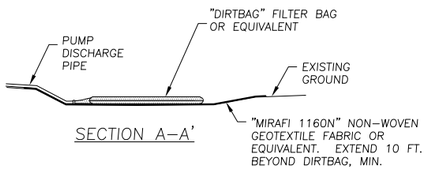
C21

21 OF 25




## TYPICAL DEWATERING PLAN
N.T.S. 1 C22 C22



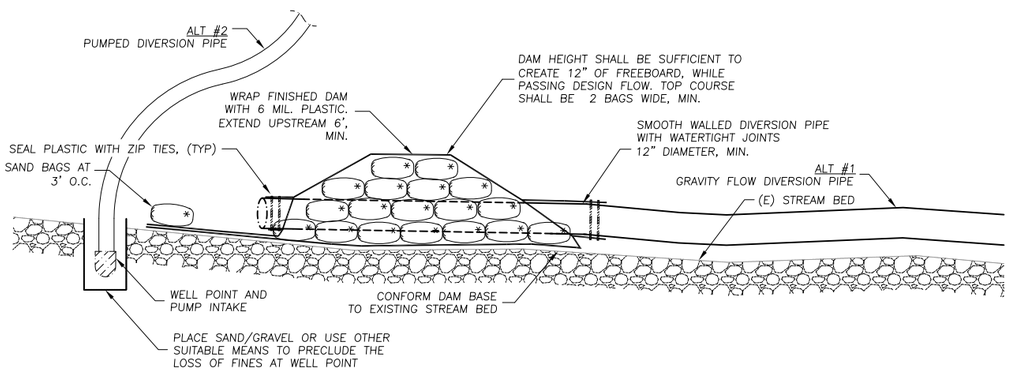




SECTION A–A'

### DEWATERING DISCHARGE AREA NOTES:
1. DEWATERING SHALL COMPLY WITH ALL PROJECT PERMITS.
2. THIS DETAIL REPRESENTS A POTENTIAL OPTION FOR DEWATERING OF WORK AREAS.
3. PROPOSED FILTRATION METHODS WILL BE FIELD–FIT TO EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION, AS APPROVED BY THE ENGINEER.
4. TURBID WATER SHALL BE DISCHARGED AT A LOCATION WHERE THERE IS AN EXISTING DEPRESSION AT A MINIMUM OF 50 FEET FROM THE EXISTING CHANNEL. EXACT LOCATION TO BE APPROVED BY THE ENGINEER. WHERE NATURAL DEPRESSION CANNOT BE FOUND, FILTER BAGS, "BAKER TANKS" OR OTHER APPROVED MEANS SHALL BE EMPLOYED.
5. NO OVERLAND FLOW SHALL BE ALLOWED TO DRAIN FROM A DISCHARGE AREA TO AN EXISTING OR PROPOSED CHANNEL.

## WORK AREA DEWATERING DETAIL
N.T.S. 2 C22 C22

## DIVERSION NOTES
1. THE DIVERSION PLAN SHOWN IS SCHEMATIC. CONTRACTOR SHALL SUBMIT A SITE DIVERSION/DEWATERING PLAN FOR APPROVAL BY THE ENGINEER. THE BASIC REQUIREMENTS OF THE DIVERSION PLAN ARE SPECIFIED IN THE SPECIAL PROVISIONS.
2. THE TYPICAL DEWATERING PLAN SHOWN DEPICTS TWO SEPARATE TYPES OF DIVERSION STRUCTURES TO BE INSTALLED AND MAINTAINED DURING CONSTRUCTION. THESE STRUCTURES MAY BE USED SEPARATELY OR IN TANDEM AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS.
3. DIVERSION PIPES MAY BE RELOCATED DURING CONSTRUCTION.




## DIVERSION DAM PROFILE
N.T.S. 3 C22 C22

NOTE: CONTRACTOR MAY USE ALTERNATE DAM DETAIL, SUBJECT TO APPROVAL OF THE ENGINEER AND THE PERMITTING AGENCIES.

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PRELIMINARY
NOT FOR CONSTRUCTION

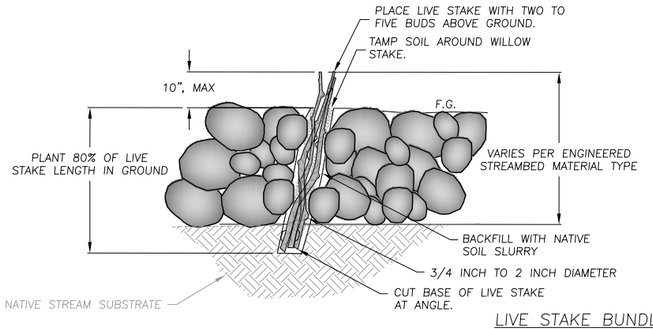
PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

DEWATERING DETAILS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | – |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13–016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

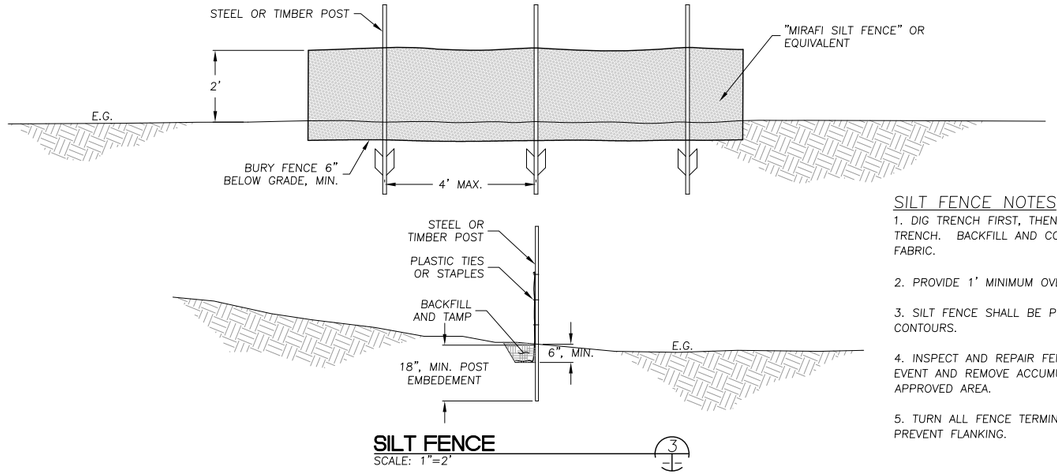



## LIVE STAKE BUNDLE

N.T.S. — 1

### LIVE STAKE BUNDLE NOTES:

1. LIVE STAKE BUNDLES TO BE INSTALLED WITHIN ENGINEERED STREAMBED MATERIAL ON EXCAVATED FLOODPLAINS AND WITHIN FLOODPLAIN ARMOR AT 7' ON-CENTER SPACING.
2. LIVE STAKE BUNDLES SHALL CONTACT NATIVE SOIL.
3. LIVE STAKE BUNDLES TO CONSIST OF LIVE STAKES 3/4"-2" IN DIA. AT THE BASAL END.
4. TOP ENDS OF STAKES SHALL BE BLUNT AND BASAL ENDS SHALL BE ANGLED AT 45 DEGREES.
5. PLACE LIVE STAKE BUNDLES COINCIDENT WITH THE ENGINEERED STREAMBED MATERIAL AND FLOODPLAIN ARMOR.
6. AFTER PLACEMENT, BACKFILL AND WATER-JET ALL VOIDS AROUND LIVE STAKE BUNDLES TO REMOVE AIR POCKETS.
7. AFTER INSTALLATION CLEANLY CUT EACH STAKE TO LEAVE 10" EXPOSED, MAX.

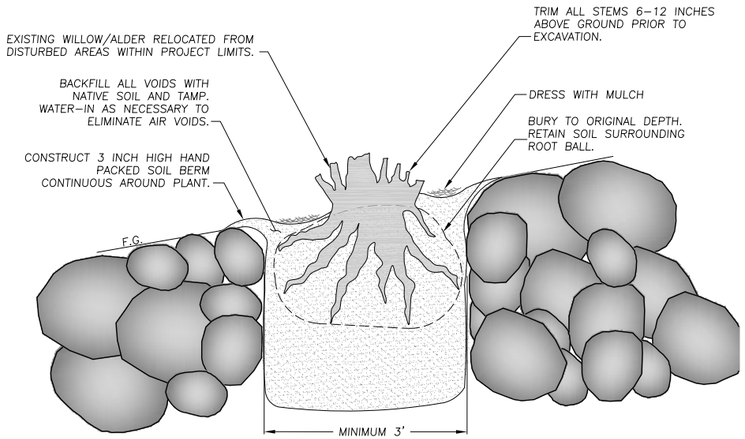



## SILT FENCE

SCALE: 1"=2' — 3

### SILT FENCE NOTES

1. DIG TRENCH FIRST, THEN ERECT FENCE IN TRENCH. BACKFILL AND COMPACT SOIL TO SECURE FABRIC.
2. PROVIDE 1' MINIMUM OVERLAP AT FENCE SPLICES.
3. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS.
4. INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE ACCUMULATED SEDIMENT, TO AN APPROVED AREA.
5. TURN ALL FENCE TERMINATIONS UPSLOPE TO PREVENT FLANKING.

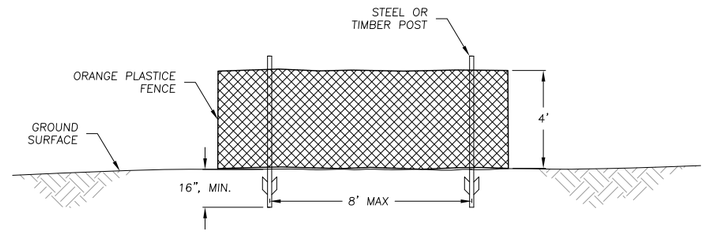



## WILLOW TRANSPLANT DETAIL

SCALE: N.T.S. — 2

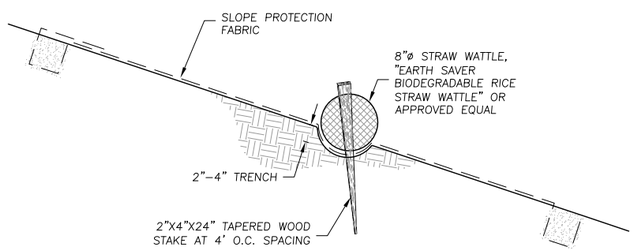
### WILLOW TRANSPLANT NOTES:

1. SALVAGE:
   - 1.1. LIVE SHRUBS TO BE SALVAGED FOR TRANSPLANTING WILL BE FLAGGED IN THE FIELD BY THE ENGINEER.
   - 1.2. PRIOR TO REMOVAL, LOP BRANCHES TO 6-12 INCHES ABOVE THE ROOT CROWN, USING SHARP, CLEAN TOOLS.
   - 1.3. REMOVE THE ROOTWAD AND A MINIMUM EIGHTEEN INCH LAYER (AT SIDES AND BASE) OF ROOTS AND SOIL FROM THE GROUND AND EITHER TRANSPORT DIRECTLY TO THE PROPOSED LOCATION FOR INSTALLATION, OR STORE AS OUTLINED BELOW. PERFORM SALVAGE AND RELOCATION IN SUCH A MANNER AS TO MINIMIZE HANDLING AND ASSOCIATED DISTURBANCE TO THE SOIL BOUND BY THE ROOTS.
   - 1.4. IMMEDIATELY COVER LIVE SHRUBS WITH A SINGLE LAYER OF SATURATED BURLAP TO PREVENT DESICCATION OF THE ROOTS, AND PLACED UNDER SHADE COVERING IF THE LIVE SHRUB IS NOT PLANTED WITHIN FIFTEEN MINUTES OF SALVAGE. CONTRACTOR SHALL MAINTAIN SATURATION OF THE BURLAP AND SOIL MASS UNTIL PLANTED.
   - 1.5. DO NOT STACK LIVE SHRUBS ON TOP OF ONE ANOTHER DURING STORAGE.
   - 1.6. IN NO EVENT SHALL SALVAGED ROOTWADS BE STORED FOR PERIODS EXCEEDING 72 HOURS, WITHOUT PRIOR WRITTEN PERMISSION OF THE ENGINEER.
2. INSTALLATION
   - 2.1. PLACE LIVE SHRUBS AT FLOODPLAIN LOCATIONS FLAGGED IN THE FIELD BY THE ENGINEER.
   - 2.2. PLACE THE EXCAVATED ROOTWAD IN A PRE-PREPARED HOLE. FILL THE HOLE WITH WATER IMMEDIATELY PRIOR TO PLANTING. SCARIFY THE SIDES OF THE PLANTING HOLE PRIOR TO PLANTING.
   - 2.3. REMOVE BURLAP PRIOR TO PLANTING. BACKFILL THE HOLE HALF WAY WITH NATIVE SOIL AND JET WITH WATER TO REMOVE VOIDS AFTER PLACEMENT. CONTINUE TO ADD SOIL AND WATER UNTIL THE SATURATED BACKFILL MATERIAL COVERS THE TOP OF THE ROOT CROWN TO THE APPROXIMATE ORIGINAL DEPTH OF SOIL, PRIOR TO SALVAGE.




## BOUNDARY FENCE DETAIL

SCALE: 1"=3' — 4




## FIBER ROLL

SCALE: 1"=1' — 5

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NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT
GROUP

MISCELLANEOUS DETAILS

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

| | |
|---|---|
| DESIGNED BY: | - |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

C23 — 23 OF 25

## ROCK SPECIFICATIONS

THERE SHALL BE THREE CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
(1) – ENGINEERED STREAMBED MATERIAL
(2) – FLOODPLAIN ARMOR
(3) – ROCK SLOPE PROTECTION (R.S.P.)

ALL IMPORTED ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

1) ROCK SHALL BE RESISTANT TO WEATHERING AND WATER ACTION AND FREE OF ORGANIC OR OTHER UNSUITABLE MATERIAL. DO NOT USE SHALE, ROCK WITH SHALE SEAMS, OR OTHER FISSILE OR FISSURED ROCK THAT MAY BREAK INTO SMALLER PIECES IN THE PROCESS OF HANDLING AND PLACING.
2) ROCK SHALL BE SUB–ROUNDED TO SUB–ANGULAR IN SHAPE.
3) ROCK SHALL BE GRANITE OR HAVE A SPECIFIC GRAVITY EQUAL TO OR GREATER THAN THAT OF GRANITE.
4) COLOR AND TEXTURE SHALL BE CONSTANT THROUGHOUT THE STOCKPILE.

SAMPLES OF ALL IMPORTED ROCK SHALL BE PROVIDED TO THE ENGINEER FOR APPROVAL, PRIOR TO STOCKPILING ON SITE.

INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED AS FOLLOWS:

### 1 – ENGINEERED STREAMBED MATERIAL

ENGINEERED STREAMBED MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

#### TYPE 1 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 18" | 100 |
| 12" | 60–85 |
| 8" | 40–60 |
| 4" | 25–40 |
| 0.6" | 10–20 |
| No. 4 | 5–10 |

#### TYPE 2 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 30" | 100 |
| 24" | 60–85 |
| 12" | 40–60 |
| 4" | 25–40 |
| 0.6" | 10–20 |
| No. 4 | 5–10 |

#### TYPE 3 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 40" | 100 |
| 30" | 60–85 |
| 16" | 40–60 |
| 8" | 25–40 |
| 4" | 15–25 |
| 0.6" | 10–15 |
| No. 4 | 5–10 |

#### TYPE 4 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 48" | 100 |
| 36" | 60–85 |
| 20" | 40–60 |
| 10" | 25–40 |
| 4" | 15–25 |
| 0.6" | 10–15 |
| No. 4 | 5–10 |

A) ENGINEERED STREAMBED MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

### 2 – FLOODPLAIN ARMOR

FLOODPLAIN ARMOR MATERIAL SHALL CONSIST OF SANDS, GRAVELS, COBBLES, AND BOULDERS FREE OF ORGANIC MATTER, AND MEETING THE FOLLOWING GRADATION SPECIFICATIONS (REFER TO DRAWINGS FOR TYPE LOCATIONS):

#### TYPE 1 GRADATION:

TYPE 1 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 1 GRADATION.

#### TYPE 2 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 24" | 100 |
| 18" | 60–85 |
| 12" | 40–60 |
| 6" | 25–40 |
| 3" | 10–25 |
| No. 4 | 5–15 |
| No. 10 | 0–5 |

#### TYPE 3 GRADATION:

| U.S. SIEVE SIZE | PERCENT PASSING (BY WEIGHT) |
|---|---|
| 30" | 100 |
| 24" | 60–85 |
| 18" | 40–60 |
| 6" | 25–40 |
| 3" | 10–25 |
| No. 4 | 5–15 |
| No. 10 | 0–5 |

#### TYPE 4 GRADATION:

TYPE 4 FLOODPLAIN ARMOR SHALL COMPLY WITH THE ENGINEERED STREAMBED MATERIAL TYPE 4 GRADATION.

A) FLOODPLAIN ARMOR MATERIAL SHALL BE PLACED TO THE LINES, GRADES AND DEPTHS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER. UNIFORMLY DISTRIBUTE LARGE STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR EARTH MATERIALS.

B) FOLLOWING PLACEMENT, ROCK SURFACE SHALL BE JETTED WITH WATER TO IMPROVE COMPACTION AND EMBED THE FINES WITHIN THE MIX. JETTING SHALL START AT THE UPSTREAM LIMITS OF PLACEMENT AND PROGRESS DOWNSTREAM. JETTING SHALL CONTINUE UNTIL THE TURBIDITY LEVELS OF RUNOFF PRODUCED FROM THE JETTING PROCESS HAVE REACHED AN ACCEPTABLE LEVEL AS DETERMINED BY THE ENGINEER. ALL SEDIMENT–LADEN RUNOFF GENERATED BY THE JETTING OPERATIONS SHALL BE PUMPED TO A SETTLING TANK OR SIMILAR DEVICE TO REDUCE TURBIDITY TO ACCEPTABLE LEVELS, IN COMPLIANCE WITH PERMIT CONDITIONS, PRIOR TO DISCHARGE TO THE CREEK.

### 3 – ROCK SLOPE PROTECTION

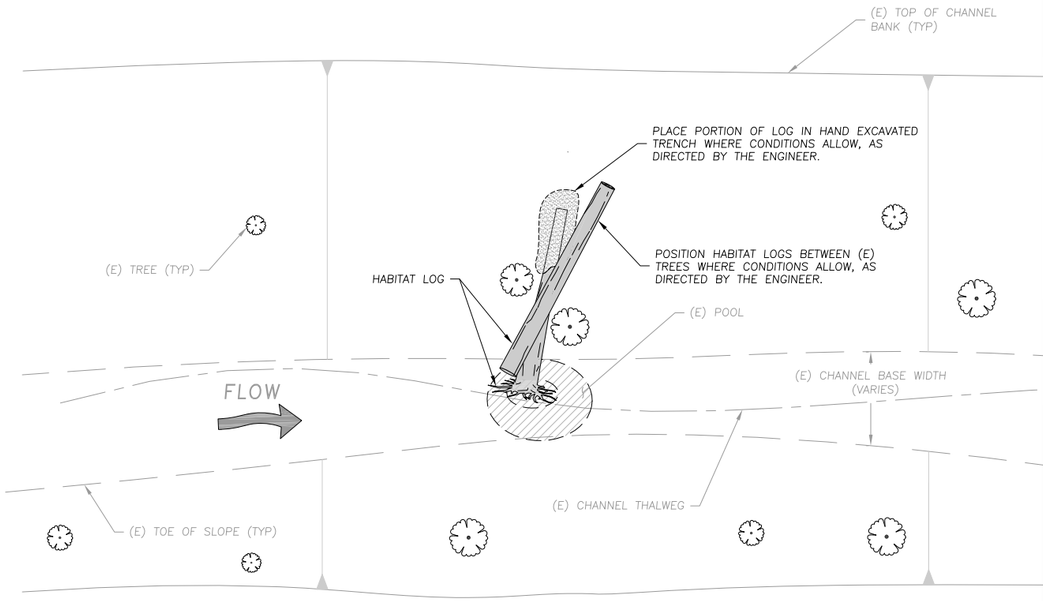
A) ROCK SLOPE PROTECTION SHALL CONFORM TO SECTION 72–2.02 MATERIALS OF THE STANDARD SPECIFICATIONS FOR 1/2 TON ROCK.

B) BACKFILL MATERIAL CONSISTING OF GRANULAR NATIVE STREAMBED MATERIAL SHALL BE USED TO BACKFILL VOIDS WITHIN THE ROCK SLOPE PROTECTION. IF GRANULAR NATIVE MATERIAL IS NOT AVAILABLE CONTRACTOR SHALL BLEND SAND, GRAVELS, AND NATIVE SOILS TO THE SATISFACTION OF THE ENGINEER FOR USE IN BACKFILLING THE RSP VOIDS.

C) BACKFILL MATERIAL SHALL BE PLACED TO MATCH THE FINISHED SURFACE OF THE RSP AND WATER JETTED TO FILL ALL VOIDS, AS DIRECTED BY THE ENGINEER.

ROCK SLOPE PROTECTION FABRIC
1. GEOTEXTILE FABRIC SHALL BE PLACED BELOW ROCK SLOPE PROTECTION.
2. GEOTEXTILE FABRIC SHALL BE NON–WOVEN, GEOTEX 1601, AS MANUFACTURED BY SYNTHETIC INDUSTRIES; OR MIRAFI 1160N, AS MANUFACTURED BY TC MIRAFI; OR APPROVED EQUAL.

INSTALLATION
1. PREPARE SURFACE TO RECEIVE THE GEOTEXTILE TO A RELATIVELY SMOOTH CONDITION, FREE OF OBSTRUCTIONS, DEPRESSIONS, DEBRIS, AND SOFT OR LOW DENSITY POCKETS OF MATERIAL.
2. PLACE AND SECURE A LAYER OF GEOTEXTILE FABRIC BELOW THE FIRST ROCK LAYER. AT THE TIME OF INSTALLATION, THE GEOTEXTILE SHALL BE REJECTED IF IT HAS DEFECTS, RIPS, HOLES, FLAWS, DETERIORATION, OR DAMAGE INCURRED DURING MANUFACTURE, TRANSPORTATION, OR STORAGE.
3. PLACE GEOTEXTILE WITH THE LONG DIMENSION PARALLEL TO FLOW AND LAID SMOOTH AND FREE OF TENSION, STRESS, FOLDS, WRINKLES, OR CREASES.




## HABITAT LOG PLAN
SCALE: 1" = 5'

### HABITAT LOG NOTES:

1. GENERAL

1.1. PLACE TWO HABITAT LOGS AT FOUR LOCATIONS PER REACH IN REACHES R14 TO R16 AND R19 TO R21 (SEE SHEET C2 FOR REACH LOCATIONS).

1.2. HABITAT LOGS SHALL BE LOCALLY SOURCED FROM EXISTING LIVE AND DEAD TREES. TREES TO BE SALVAGE WILL BE FLAGGED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE PROJECT ENGINEER AND ARBORIST. SALVAGE DOWNED TREES WHERE POSSIBLE, PREFERABLY WITH THE ROOTWAD INTACT. IF DOWNED LOGS ARE NOT AVAILABLE, THE PROJECT ARBORIST WILL IDENTIFY TREES TO BE FELLED. LOGS SHALL BE OAK, WILLOW, OR ALDER.

1.3. LOCATIONS FOR HABITAT LOG PLACEMENT WILL BE DETERMINED BY THE ENGINEER AND FISHERIES BIOLOGIST AT THE TIME OF CONSTRUCTION. FINAL LOCATIONS SHALL BE BASED ON LOCAL GEOMORPHIC CONDITIONS AND THE AVAILABILITY OF EXISTING POOLS AND SUITABLE LOGS, MEETING THE CRITERIA BELOW.

1.4. INCORPORATE HABITAT LOGS INTO EXISTING POOLS WHEN LOCALLY AVAILABLE.

2. LOG PLACEMENT AND DIMENSIONS

2.1. HABITAT LOG DESIGNS ARE SHOWN CONCEPTUALLY DUE TO THE INHERENT VARIABILITY OF MATERIAL PROPERTIES. THE DESIGN REQUIRES THAT THE ENGINEER OBSERVE INSTALLATION OF THE HABITAT LOGS TO ENSURE THE INTENT OF THE DESIGN IS MET. OBSERVATIONS WILL INCLUDE LOG SELECTION, PLACEMENT, AND ANCHORING STABILIZATION.

2.2. HABITAT LOGS SHALL BE A MINIMUM OF 12 FT. IN LENGTH AND 1 FT. IN DIAMETER, ALONG THE LENGTH OF THE LOG.

2.3. POSITION HABITAT LOGS BETWEEN EXISTING TREES WITH A PORTION OF THE LOG BURIED IN A TRENCH WHERE CONDITIONS ALLOW. CABLING WILL NOT BE EMPLOYED THEREFORE, LOGS MAY BE MOBILIZED DURING LARGE FLOODING EVENTS.

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PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

HABITAT LOG DETAILS AND ROCK SPECIFICATIONS

PERMANENTE CREEK RESTORATION PLAN
70% DESIGN SUBMITTAL

DESIGNED BY: B.M.Z.
DRAWN BY: B.M.Z.
CHECKED BY: M.W.W.
DATE: 04/27/15
JOB NO.: 13-016

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

## GENERAL NOTES CONTINUED

1. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE MAY 2010 EDITION OF THE STATE OF CALIFORNIA STANDARD SPECIFICATIONS, ISSUED BY THE DEPARTMENT OF TRANSPORTATION (HEREAFTER REFERRED TO AS "STANDARD SPECIFICATIONS").

2. THE ENGINEER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO CONSTRUCTION. THE ENGINEER OR A DESIGNATED REPRESENTATIVE SHALL MONITOR THE CONSTRUCTION PROCESS, AS NECESSARY, TO ENSURE PROPER INSTALLATION PROCEDURES.

3. EXISTING UNDERGROUND UTILITY LOCATIONS:

   A. PRIOR TO BEGINNING WORK, THE CONTRACTOR SHALL CONTACT ALL UTILITIES COMPANIES WITH REGARD TO WORKING OVER, UNDER, OR AROUND EXISTING FACILITIES AND TO OBTAIN INFORMATION REGARDING RESTRICTIONS THAT ARE REQUIRED TO PREVENT DAMAGE TO THE FACILITIES.

   B. LOCATIONS SHOWN ARE COMPILED FROM INFORMATION SUPPLIED BY THE APPROPRIATE UTILITY AGENCIES AND FROM FIELD MEASUREMENTS TO ABOVE GROUND FEATURES READILY VISIBLE AT THE TIME OF SURVEY. LOCATIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND DEPTH OF UNDERGROUND UTILITIES.

   C. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, TRAFFIC SIGNAL EQUIPMENT (BOTH ABOVE GROUND AND BELOW GROUND), STRUCTURES, AND ALL OTHER EXISTING IMPROVEMENTS THROUGHOUT CONSTRUCTION.

   D. PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION, CONTRACTOR SHALL DISCOVER OR VERIFY THE ACTUAL DIMENSIONS, SIZES, MATERIALS, LOCATIONS, AND ELEVATIONS OF ALL EXISTING UTILITIES AND POTHOLE THOSE AREAS WHERE POTENTIAL CONFLICTS ARE LIKELY OR DATA IS OTHERWISE INCOMPLETE.

   E. CONTRACTOR SHALL TAKE APPROPRIATE MEASURES TO PROTECT EXISTING UTILITIES DURING CONSTRUCTION OPERATIONS, AND SHALL BE SOLELY RESPONSIBLE FOR THE COST OF REPAIR/REPLACEMENT OF ANY EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. CONTRACTOR TO CALL UNDERGROUND SERVICE ALERT (1-800-642-2444) TO LOCATE ALL UNDERGROUND UTILITY LINES PRIOR TO COMMENCING CONSTRUCTION.

   F. UPON LEARNING OF THE EXISTENCE AND/OR LOCATIONS OF ANY UNDERGROUND FACILITIES NOT SHOWN OR SHOWN INACCURATELY ON THE PLANS OR NOT PROPERLY MARKED BY THE UTILITY OWNER, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY OWNER AND THE CITY BY TELEPHONE AND IN WRITING.

   G. UTILITY RELOCATIONS REQUIRED FOR THE CONSTRUCTION OF THE PROJECT FACILITIES WILL BE PERFORMED BY THE UTILITY COMPANY, UNLESS OTHERWISE NOTED.

12. SHOULD THE CONTRACTOR DISCOVER ANY DISCREPANCIES BETWEEN THE CONDITIONS EXISTING IN THE FIELD AND THE INFORMATION SHOWN ON THESE DRAWINGS, HE SHALL NOTIFY THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION.

13. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO BE FULLY INFORMED OF AND TO COMPLY WITH ALL LAWS, ORDINANCES, CODES, REQUIREMENTS AND STANDARDS WHICH IN ANY MANNER AFFECT THE COURSE OF CONSTRUCTION OF THIS PROJECT, THOSE ENGAGED OR EMPLOYED IN THE CONSTRUCTION AND THE MATERIALS USED IN THE CONSTRUCTION.

14. ANY TESTS, INSPECTIONS, SPECIAL OR OTHERWISE, THAT ARE REQUIRED BY THE BUILDING CODES, LOCAL BUILDING DEPARTMENTS, OR THESE PLANS, SHALL BE DONE BY AN INDEPENDENT INSPECTION COMPANY. JOB SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE AN OFFICIAL INSPECTION. OBSERVATION AND TESTING SERVICES ARE REQUIRED BY THE GEOTECHNICAL ENGINEER AS OUTLINED IN THE GEOTECHNICAL REPORT. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE THAT THE WORK IS COORDINATED WITH THE GEOTECHNICAL ENGINEER AND THAT REQUIRED TESTS AND INSPECTIONS ARE PERFORMED.

15. PROJECT SCHEDULE: PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL PROVIDE ENGINEER A DETAILED CONSTRUCTION SCHEDULE FOR APPROVAL. THE CONTRACTOR SHALL NOT BEGIN ANY CONSTRUCTION WORK UNTIL THE PROJECT SCHEDULE AND WORK PLAN IS APPROVED BY THE ENGINEER. ALL CONSTRUCTION SHALL BE CLOSELY COORDINATED WITH THE ENGINEER SO THAT THE QUALITY OF WORK CAN BE CHECKED FOR APPROVAL. THE CONTRACTOR SHALL PURSUE WORK IN A CONTINUOUS AND DILIGENT MANNER TO ENSURE A TIMELY COMPLETION OF THE PROJECT.

16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DESIGN, PERMITTING, INSTALLATION, AND MAINTENANCE OF ANY AND ALL TRAFFIC CONTROL MEASURES DEEMED NECESSARY.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR GENERAL SAFETY DURING CONSTRUCTION. ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS AND CODES. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR FURNISHING, INSTALLING, AND MAINTAINING ALL WARNING SIGNS AND DEVICES NECESSARY TO SAFEGUARD THE GENERAL PUBLIC AND THE WORK, AND PROVIDE FOR THE PROPER AND SAFE ROUTING OF VEHICULAR AND PEDESTRIAN TRAFFIC DURING THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE PROVISIONS OF OSHA IN THE CONSTRUCTION PRACTICES FOR ALL EMPLOYEES DIRECTLY ENGAGED IN THE CONSTRUCTION OF THIS PROJECT.

18. CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD DESIGN PROFESSIONAL HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTION LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF DESIGN PROFESSIONAL. NEITHER THE PROFESSIONAL ACTIVITIES OF CONSULTANT NOR THE PRESENCE OF CONSULTANT OR HIS OR HER EMPLOYEES OR SUB-CONSULTANTS AT A CONSTRUCTION SITE SHALL RELIEVE THE CONTRACTOR AND ITS SUBCONTRACTORS OF THEIR RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS, METHODS, SEQUENCE, TECHNIQUES OR PROCEDURES NECESSARY FOR PERFORMING, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND APPLICABLE HEALTH OR SAFETY REQUIREMENTS OF ANY REGULATORY AGENCY OR OF STATE LAW.

19. THE CONTRACTOR SHALL MAINTAIN A CURRENT, COMPLETE, AND ACCURATE RECORD OF ALL AS-BUILT DEVIATIONS FROM THE CONSTRUCTION AS SHOWN ON THESE DRAWINGS AND SPECIFICATIONS, FOR THE PURPOSE OF PROVIDING THE ENGINEER OF RECORD WITH A BASIS FOR THE PREPARATION OF RECORD DRAWINGS.

20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SITE IN A NEAT AND ORDERLY MANNER THROUGHOUT THE CONSTRUCTION PROCESS. ALL MATERIALS SHALL BE STORED WITHIN APPROVED STAGING AREAS.

21. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL SURVEY MONUMENTS OR PROPERTY CORNERS. DISTURBED MONUMENTS SHALL BE RESTORED BACK TO THEIR ORIGINAL LOCATION AND SHALL BE CERTIFIED BY A REGISTERED CIVIL ENGINEER OR LAND SURVEYOR AT THE EXPENSE OF THE CONTRACTOR.

## DEMOLITION NOTES

1. THE REMOVAL OF EXISTING IMPROVEMENTS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 15 OF THE STANDARD SPECIFICATIONS.

2. EXISTING IMPROVEMENTS, ADJACENT PROPERTY, TREES AND PLANTS, UTILITIES AND OTHER FACILITIES THAT ARE NOT REMOVED SHALL BE PROTECTED FROM INJURY OR DAMAGE RESULTING FROM THE CONTRACTOR'S OPERATIONS IN ACCORDANCE WITH SECTION 15.1 OF THE STANDARD SPECIFICATIONS.

## EARTHWORK NOTES

1. GRADING SUMMARY:
   TOTAL CUT VOLUME = 420,000 CY
   TOTAL FILL VOLUME = 5,000 CY

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED AS THE DIFFERENCE BETWEEN EXISTING GROUND AND THE PROPOSED FINISH GRADE, PREPARED FOR PERMITTING PURPOSES ONLY. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED, AS SHOWN ON THE DRAWINGS. THE QUANTITIES HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, AND RECOMPACTION, UNDERGROUND UTILITY AND SUBSTRUCTURE SPOILS AND CONSTRUCTION METHODS. QUANTITIES ARE SUBJECT TO CHANGE, PENDING EXCAVATION AND INSPECTION OF SUBSURFACE CONDITIONS AT THE "ROCK PILE" AND "OVERBURDEN REMOVAL" AREAS, WHICH WILL ULTIMATELY DETERMINE FINISH GRADE AT THESE TWO AREAS.

THE CONTRACTOR SHALL PERFORM AN INDEPENDENT EARTHWORK ESTIMATE FOR THE PURPOSE OF PREPARING BID PRICES FOR EARTHWORK. THE BID PRICE SHALL INCLUDE COSTS FOR ANY NECESSARY IMPORT AND PLACEMENT OF EARTH MATERIALS OR THE EXPORT AND PROPER DISPOSAL OF EXCESS OR UNSUITABLE EARTH MATERIALS.

2. ALL EXCESS SOILS SHALL BE REMOVED TO AN APPROVED DUMP SITE OR DISPOSED OF ON SITE AT A LOCATION TO BE APPROVED BY THE ENGINEER, IN A MANNER THAT WILL NOT CAUSE EROSION,

3. CLEARING AND GRUBBING, SUBGRADE PREPARATION AND EARTHWORK SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 19 OF THE STANDARD SPECIFICATIONS, THESE DRAWINGS, AND THE TECHNICAL SPECIFICATIONS.

4. UNSUITABLE SOIL OR MATERIALS, NOT TO BE INCLUDED IN THE WORK INCLUDE:

   A. ORGANIC MATERIALS SUCH AS PEAT, MULCH, ORGANIC SILT OR SOD.
   B. SOILS CONTAINING EXPANSIVE CLAYS.
   C. MATERIAL CONTAINING EXCESSIVE MOISTURE.
   D. POORLY GRADED COURSE MATERIAL, PARTICLE SIZE IN EXCESS OF 6 INCHES.
   E. MATERIAL WHICH WILL NOT ACHIEVE SPECIFIED DENSITY OR BEARING.

5. FINE GRADING ELEVATIONS AND SLOPES NOT SHOWN SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD TO OBTAIN DRAINAGE IN THE DIRECTION INDICATED. ALL FINAL GRADING SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. THE TOP 6" OF SUBGRADE UNDER ALL PAVED SURFACES SUBJECT TO VEHICULAR USE SHALL BE COMPACTED TO A MINIMUM OF 95% RELATIVE COMPACTION, IN ACCORDANCE WITH ASTM-D1557 STANDARD. ALL OTHER FILL TO BE COMPACTED TO A MINIMUM OF 90% MAXIMUM DENSITY AS DETERMINED BY ASTM-D1557 AND SO CERTIFIED BY TESTS AND REPORTS FROM THE ENGINEER IN CHARGE OF THE GRADING CERTIFICATION.

7. FILL MATERIAL SHALL BE SPREAD IN LIFTS OF APPROXIMATELY 8 INCHES, MOISTENED OR DRIED TO NEAR OPTIMUM MOISTURE CONTENT AND RECOMPACTED. THE MATERIALS FOR ENGINEERED FILL SHALL BE APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER. ANY IMPORTED MATERIALS MUST BE APPROVED BEFORE BEING BROUGHT TO THE SITE. THE MATERIALS USED SHALL BE FREE OF ORGANIC MATTER AND OTHER DELETERIOUS MATERIALS.

8. ALL CONTACT SURFACES BETWEEN ORIGINAL GROUND AND RECOMPACTED FILL SHALL BE EITHER HORIZONTAL OR VERTICAL. ALL ORGANIC MATERIAL SHALL BE REMOVED AND THE REMAINING SURFACE SCARIFIED TO A DEPTH OF AT LEAST 12 INCHES, UNLESS DEEPER EXCAVATION IS REQUIRED BY THE ENGINEER.

## GENERAL EROSION CONTROL NOTES

1. A DETAILED EROSION AND SEDIMENT CONTROL PLAN WILL BE PREPARED BY THE ENGINEER, PRIOR TO FINALIZATION OF THE CONSTRUCTION DOCUMENTS.

2. CONTRACTOR SHALL BE FAMILIAR WITH THE CONDITIONS OF APPROVAL OF ALL REQUIRED PROJECT PERMITS AND SHALL IMPLEMENT ALL REQUIRED BMP'S PRIOR TO COMMENCING GRADING OPERATIONS

3. CONTRACTOR SHALL UTILIZE ONLY THE APPROVED HAUL ROADS AND ACCESS POINTS (AS SHOWN ON THE DRAWINGS) FOR TRANSPORT OF MATERIALS AND EQUIPMENT.

4. BETWEEN OCTOBER 15 AND APRIL 15, EXPOSED SOIL SHALL BE PROTECTED FROM EROSION AT ALL TIMES. DURING CONSTRUCTION, SUCH PROTECTION MAY CONSIST OF MULCHING AND/OR PLANTING OF NATIVE VEGETATION OF ADEQUATE DENSITY. BEFORE COMPLETION OF THE PROJECT, ANY EXPOSED SOIL ON DISTURBED SLOPES SHALL BE PERMANENTLY PROTECTED FROM EROSION.

5. A STANDBY CREW SHALL BE AVAILABLE AT ALL TIMES FOR EMERGENCY WORK THAT MAY BE REQUIRED DURING THE RAINY SEASON (OCTOBER 15 THROUGH APRIL 15). NECESSARY MATERIALS SHALL BE AVAILABLE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES.

6. CONSTRUCT TEMPORARY EROSION CONTROL MEASURES AS SHOWN ON THE DRAWINGS AND/OR AS DIRECTED BY THE ENGINEER TO CONTROL DRAINAGE WHICH HAS BEEN AFFECTED BY GRADING AND/OR TRENCHING OPERATIONS.

7. CONSTRUCT AND MAINTAIN EROSION CONTROL MEASURES TO PREVENT THE DISCHARGE OF EARTHEN MATERIALS TO THE CREEK FROM DISTURBED AREAS UNDER CONSTRUCTION AND FROM COMPLETED CONSTRUCTION AREAS.

8. INSTALL ALL PROTECTIVE DEVICES AT THE END OF EACH WORK DAY WHEN THE FIVE-DAY RAIN PROBABILITY EQUALS OR EXCEEDS 50 PERCENT AS DETERMINED FROM THE NATIONAL WEATHER SERVICE FORECAST OFFICE: WWW.SRH.NOAA.GOV.

9. AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM SEDIMENT CONTROL MEASURES.

10. THE CONTRACTOR IS RESPONSIBLE TO KEEP IN FORCE ALL EROSION CONTROL DEVICES AND TO MODIFY THOSE DEVICES AS SITE PROGRESS DICTATES.

11. THE CONTRACTOR SHALL MONITOR THE EROSION CONTROL DEVICES DURING STORMS AND MODIFY THEM IN ORDER TO PREVENT PROGRESS OF ANY ONGOING EROSION.

12. THE CONTRACTOR SHALL CONTACT THE ENGINEER IN THE EVENT THAT THE EROSION CONTROL PLAN AS DESIGNED REQUIRES ANY SUBSTANTIAL REVISIONS.

## DIVERSION NOTES

1. GENERAL
   1.1. DIVERSION SYSTEMS SHALL BE INSTALLED TO DEWATER THE INDIVIDUAL PROJECT AREAS TO FACILITATE IN-STREAM CONSTRUCTION AND TO REDUCE THE POTENTIAL IMPACTS TO WATER QUALITY DOWNSTREAM OF THE PROJECT SITES.
   1.2. THE CONTRACTOR SHALL CONFIRM THAT A FAVORABLE LONG TERM WEATHER FORECAST (1 WEEK MIN.) IS OBSERVED PRIOR TO PLACEMENT OF DIVERSION STRUCTURE.
   1.3. PRIOR TO PLACEMENT OF DIVERSION STRUCTURE, FISH SHALL BE REMOVED FROM THE DIVERTED REACH, IN ACCORDANCE WITH SECTION 2.
   1.4. DIVERSION SYSTEM INSTALLATION SHALL NORMALLY BEGIN IN THE DOWNSTREAM AREA AND CONTINUE IN AN UPSTREAM DIRECTION. THE FLOW SHALL BE DIVERTED ONLY WHEN THE DIVERSION CONSTRUCTION IS COMPLETE.
   1.5. FOLLOWING ENGINEER'S APPROVAL OF THE COMPLETED WORK, DIVERSION SHALL BE REMOVED IMMEDIATELY, IN AN UPSTREAM DIRECTION.
2. FISH REMOVAL
   2.1. FISH SHALL BE REMOVED FROM THE DIVERTED REACHES BY A QUALIFIED FISHERIES BIOLOGIST, LICENSED FOR SUCH ACTIVITIES BY THE NATIONAL MARINE FISHERIES SERVICE AND THE CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE.
   2.2. BLOCK NETS SHALL BE PROVIDED AND INSTALLED BY THE FISHERIES BIOLOGIST. BLOCK NETS SHALL BE MAINTAINED BY THE CONTRACTOR BOTH UPSTREAM AND DOWNSTREAM OF THE WORK AREA, THROUGHOUT THE PERIOD OF CONSTRUCTION. MAINTENANCE INCLUDES PERIODIC REMOVAL OF ACCUMULATED DEBRIS, AS NECESSARY TO ENSURE FUNCTION. BLOCK NETS SHALL BE REMOVED BY THE FISHERIES BIOLOGIST AFTER THE DIVERSION IS REMOVED AND THE IN CHANNEL WORK AREA IS RE-WATERED.
3. DIVERSION SYSTEM
   3.1. THE CONTRACTOR SHALL INSTALL A TEMPORARY SEALED SANDBAG DAM TO CAPTURE AND DIVERT STREAM FLOW UPSTREAM OF THE PROJECT SITE. THE DAM AND METHOD OF SEALING SHALL BE PLACED AT AN APPROPRIATE DEPTH TO CAPTURE SUBSURFACE STREAM FLOW, AS NEEDED TO DEWATER THE STREAMBED.
   3.2. THE CONTRACTOR SHALL MAINTAIN THE DIVERSION DAM DURING THE COURSE OF CONSTRUCTION WORK.
   3.3. THE DIVERSION STRUCTURE SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS, OR AS DIRECTED BY THE ENGINEER IN THE FIELD.
   3.4. IN THE EVENT OF A SIGNIFICANT STORM, THE CONTRACTOR SHALL BE PREPARED TO TAKE NECESSARY MEASURES TO INSURE SAFE PASSAGE OF STORM WATER FLOW THROUGH THE PROJECT AREA, WITHOUT DAMAGE TO EXISTING STRUCTURES, OR INTRODUCTION OF EXCESSIVE SEDIMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY EROSION CONTROL B.M.P.'S.
4. DEWATERING OF CONSTRUCTION AREAS
   4.1. ANY DEWATERING ACTIVITIES WHICH MAY BE REQUIRED FOR CONSTRUCTION PURPOSES SHALL BE CONDUCTED IN A MANNER WHICH DOES NOT RESULT IN AN EXCEEDANCE OF ANY WATER QUALITY REQUIREMENTS ESTABLISHED BY THE CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD.
   4.2. DISCHARGE OF WATER FROM THE DEWATERED CONSTRUCTION SITE, EITHER BY GRAVITY OR PUMPING, SHALL BE PERFORMED IN A MANNER TO PREVENT EXCESSIVE TURBIDITY FROM ENTERING THE RECEIVING WATERWAYS AND TO PREVENT SCOUR AND EROSION OUTSIDE OF THE CONSTRUCTION SITE. PUMPED WATER SHOULD BE PRE-FILTERED WITH SAND/GRAVEL PACK AROUND SUMPS FOR SUBSURFACE FLOWS AND A SILT FENCE OR HAY BALES AROUND PUMPS FOR SURFACE FLOW. PUMPED WATER SHALL BE DISCHARGED INTO ISOLATED LOCAL DEPRESSIONS, FILTER BAGS, SETTLING (BAKER) TANKS, OR TEMPORARY SEDIMENT BASINS, AS NECESSARY TO MEET WATER QUALITY REQUIREMENTS. WHERE WATER TO BE DISCHARGED INTO THE CREEK WILL CREATE EXCESSIVE TURBIDITY, THE WATER SHALL BE ROUTED THROUGH A SEDIMENT INTERCEPTOR OR OTHER FACILITIES TO REMOVE SEDIMENT FROM WATER.
   4.3. CONTRACTOR SHALL SUPPLY ALL NECESSARY PUMPS, PIPING, FILTERS, SHORING, AND OTHER TOOLS AND MATERIALS NECESSARY FOR DEWATERING.

WATERWAYS CONSULTING INC.
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SANTA CRUZ, CA 95060
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PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

NOTES

PERMANENTE CREEK
RESTORATION PLAN
70% DESIGN SUBMITTAL

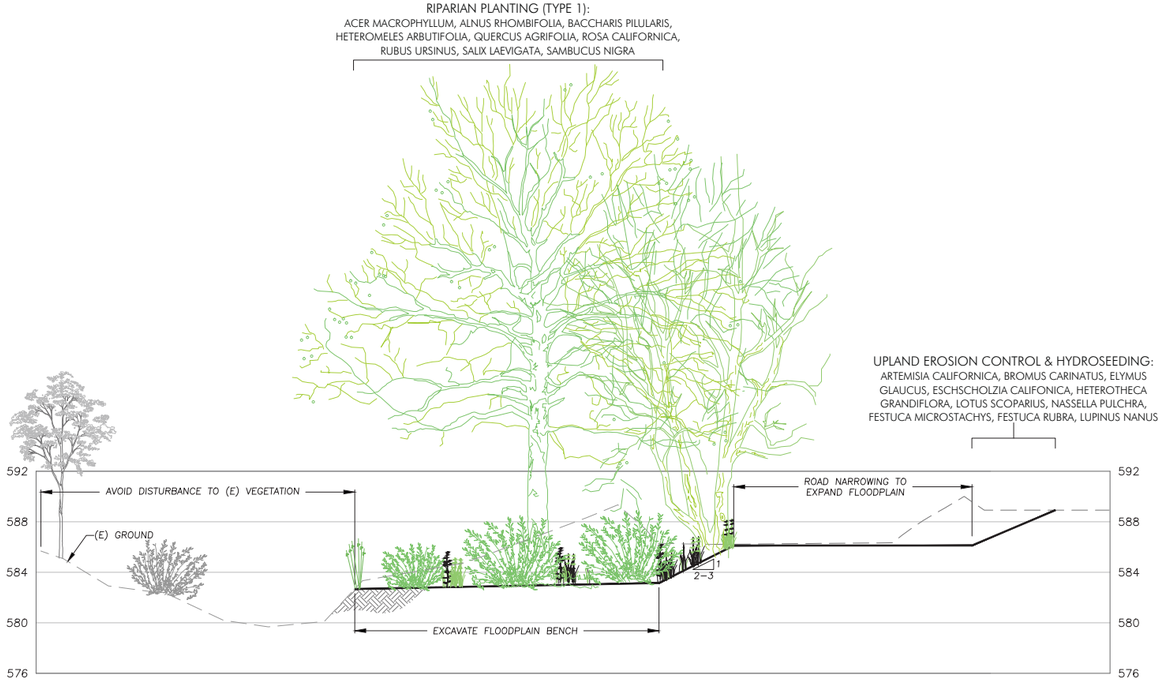
| | |
|---|---|
| DESIGNED BY: | - |
| DRAWN BY: | B.M.S. |
| CHECKED BY: | M.W.W. |
| DATE: | 04/27/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

TYPICAL CONCRETE-LINED CHANNEL BANK PLANTING SECTION A

PER SHEET C5

SCALE: 1" = 10'




TYPICAL CHANNEL WIDENING (ROAD NARROWING) RIPARIAN PLANTING SECTION

STATIONS 16+20 TO 29+20 AND 30+50 TO 49+30: PER SHEETS C6 TO C9, C12 AND C13

SCALE: 1" = 10'

NOTE: WHEREVER POSSIBLE, EXISTING TREES IN THE CHANNEL WIDENING AREA THAT CAN BE SAVED WILL BE FLAGGED BY A BIOLOGIST FOR PROTECTION PRIOR TO GRADING.

## RIPARIAN PLANT LEGEND - TYPE 1

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ACE MAC | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | 16" DEEPOT | 25 | +2.7' AND ABOVE |
| AES CAL | *AESCULUS CALIFORNICA* | CALIFORNIA BUCKEYE | 16" DEEPOT | 15 | +2.7' AND ABOVE. |
| ALN RUB | *ALNUS RHOMBIFOLIA* | WHITE ALDER | 16" DEEPOT | 20 | +2.7' TO +5.0' |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| HET ARB | *HETEROMELES ARBUTIFOLIA* | TOYON | 1 GAL | 8 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16" DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| ROS CAL | *ROSA CALIFORNICA* | CALIFORNIA WILD ROSE | 16" DEEPOT, 1 GAL | 6 | +4.0' AND ABOVE |
| RUB URS | *RUBUS URSINUS* | CALIFORNIA BLACKBERRY | 1 GAL | 5 | +4.0' AND ABOVE |
| SAL LAE | *SALIX LAEVIGATA* | RED WILLOW | POLE CUTTINGS, 16" DEEPOT | 12 | +2.7' TO +6.0' |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +8.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16" DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## RIPARIAN PLANT LEGEND - TYPE 2

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ACE MAC | *ACER MACROPHYLLUM* | BIG LEAF MAPLE | 16" DEEPOT | 25 | +2.3' AND ABOVE |
| ARB MEN | *ARBUTUS MENZESII* | PACIFIC MADRONE | 16" DEEPOT | 12 | +5.0' AND ABOVE |
| ART CAL | *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 1 GAL | 3 | +4.0' AND ABOVE |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16" DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| SAL LAE | *SALIX LAEVIGATA* | RED WILLOW | POLE CUTTINGS, 16" DEEPOT | 12 | +2.3' TO +6.0' |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +6.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16" DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## RIPARIAN PLANT LEGEND - TYPE 3

| SYMBOL | BOTANICAL NAME | COMMON NAME | SIZE | SPACING (OC FEET) | ELEVATION RANGE |
|---|---|---|---|---|---|
| ART CAL | *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 1 GAL | 3 | +4.0' AND ABOVE |
| BAC PIL | *BACCHARIS PILULARIS* | COYOTE BRUSH | 1 GAL | 8 | +4.0' AND ABOVE |
| PRU ILI | *PRUNUS ILICIFOLIA* | HOLLYLEAF CHERRY | 2 GAL | 10 | +4.0' AND ABOVE |
| QUE AGR | *QUERCUS AGRIFOLIA* | COAST LIVE OAK | 16" DEEPOT, 5 GAL | 12 | +4.0' AND ABOVE |
| SAL MEL | *SALVIA MELLIFERA* | BLACK SAGE | 1 GAL | 5 | +6.0' AND ABOVE |
| SAM NIG | *SAMBUCUS NIGRA SSP. CAERULEA* | BLUE ELDERBERRY | 16" DEEPOT, 1 GAL | 10 | +4.0' AND ABOVE |
| UMB CAL | *UMBELLULARIA CALIFORNICA* | CALIFORNIA BAY | 16" DEEPOT, 1 GAL | 12 | +4.0' AND ABOVE |

NOTES:
1. RELATIVE ELEVATION DATUM: THALWEG OF STREAM = 0
2. Q2 WATER LINE IS APPROXIMATELY 2.7' ABOVE THALWEG

## UPLAND HYDROSEED MIX

| BOTANICAL NAME | COMMON NAME | RATE OF APPLICATION PLS LBS / ACRE |
|---|---|---|
| *ARTEMISIA CALIFORNICA* | CALIFORNIA SAGEBRUSH | 0.5 |
| *BROMUS CARINATUS* | CALIFORNIA BROME | 12.0 |
| *ELYMUS GLAUCUS* | BLUE WILDRYE | 10.0 |
| *ESCHSCHOLZIA CALIFORNICA* | CALIFORNIA POPPY | 1.5 |
| *HETEROTHECA GRADIFLORA* | TELEGRAPH WEED | 0.5 |
| *LOTUS SCOPARIUS* | DEERWEED | 3.0 |
| *NASELLA PULCHRA* | PURPLE NEEDLEGRASS | 5.0 |
| *FESTUCA MICROSTACHYS* | THREE WEEKS FESCUE | 6.0 |
| *FESTUCA RUBRA* | RED FESCUE | 5.0 |
| *LUPINUS NANUS* | LUPINE | 4.0 |
| | TOTAL | 47.5 |

wra
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San Rafael, CA 94901
(415) 454-8868 Phone
(415) 454-0129 Fax

PRELIMINARY
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CONSTRUCTION

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

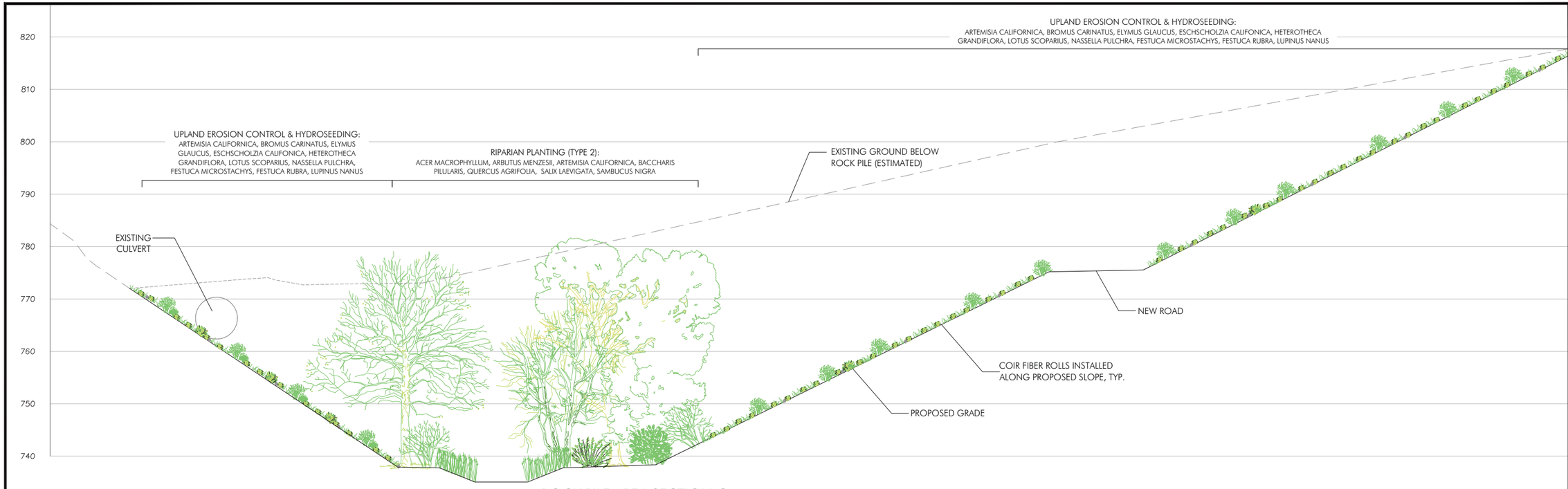
RIPARIAN PLANTING SECTIONS

PERMANENTE CREEK RESTORATION PLAN
70% SUBMITTAL

DESIGNED BY:
DRAWN BY: CES,GMG
CHECKED BY: MWS
DATE: 04/27/15
JOB NO.: 16143–5

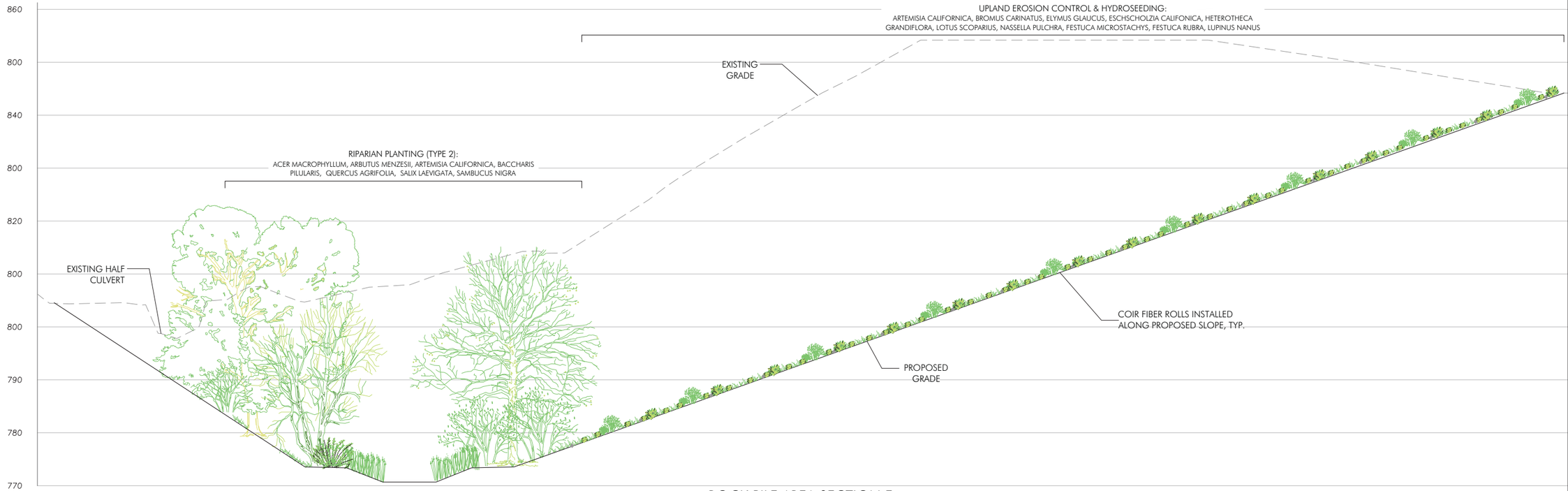
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L1 | 1 OF 3




## ROCK PILE AREA SECTION C

PER SHEET C14 AND C15
SCALE: 1" = 10'




## ROCK PILE AREA SECTION E

PER SHEET C14 AND C15
SCALE: 1" = 10'

wra
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San Rafael, CA 94901
(415) 454-8868 Phone
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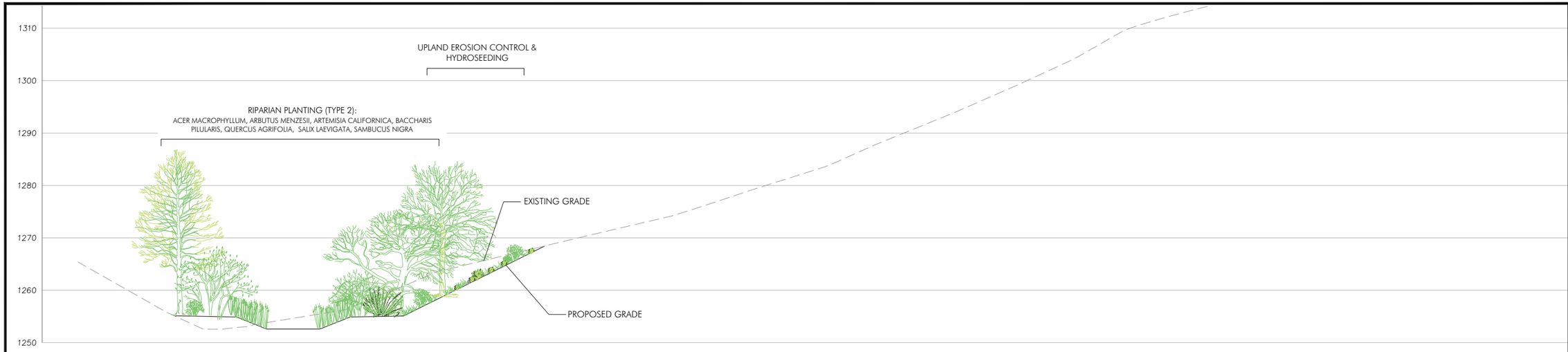
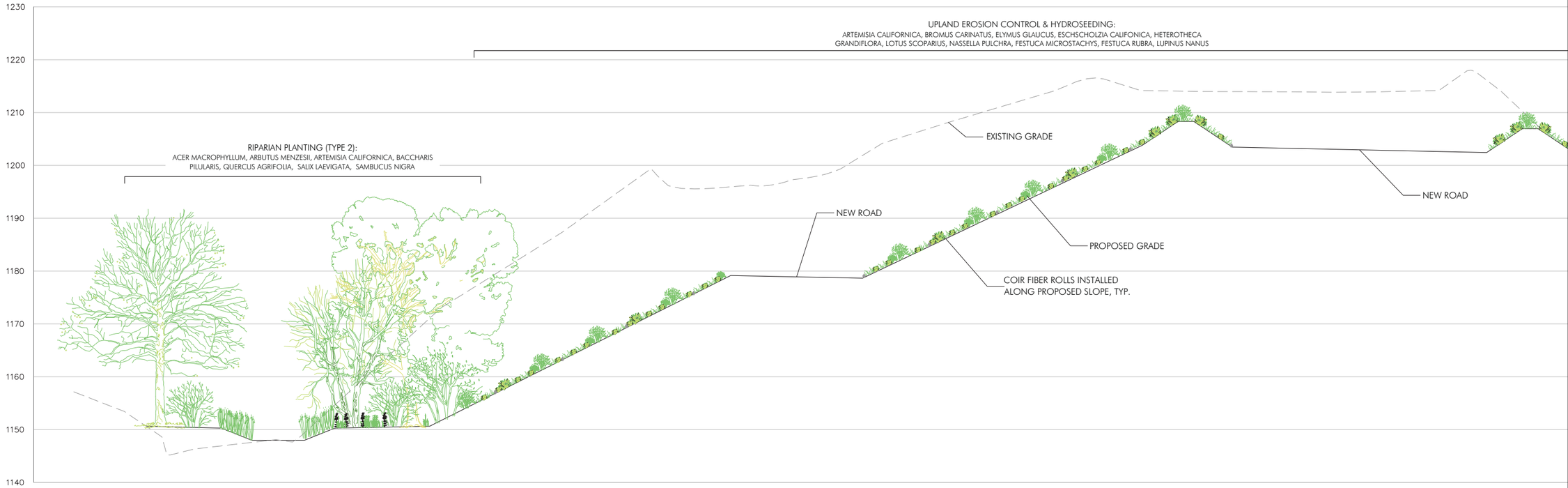
BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L2




## OVERBURDEN REMOVAL AREA SECTION E

PER SHEETS C16 T0 C19
SCALE: 1" = 10'




## OVERBURDEN REMOVAL AREA SECTION B

PER SHEETS C16 TO C19
SCALE: 1" = 10'

wra
ENVIRONMENTAL CONSULTANTS
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San Rafael, CA 94901
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(415) 454-0129 Fax

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RIPARIAN
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SECTIONS

PERMANENTE CREEK
RESTORATION PLAN
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DESIGNED BY:
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JOB NO.: 16143-5

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

L3

# APPENDIX C

Representative Photographs of Aquatic Habitat for
California Red-Legged Frog

View of the canyon Permanente Creek flows through. Photograph taken in the vicinity of Pond 4A.

View of Permanente Creek. Photograph taken in the vicinity of Pond 4A.

**Appendix C** **Representative Photographs**

View of an ephemeral drainage flowing into Permanente Creek.

View of Permanente Creek upstream of T12.

**Appendix C** **Representative Photographs**

View of Permanente Creek and associated riparian vegetation at the downstream reaches of the study area.

View of a channelized portion of Permanente Creek south of Pond 13.

**Appendix C** **Representative Photographs**

View of Pond 20. This feature is used as a settling basin for industrial purposes.

View of Pond 9. This feature is used as a settling basin for industrial purposes.

**Appendix C** **Representative Photographs**

View of Dinky Shed Pond. This feature is used as a settling basin for industrial purposes.

View of Rockpile Basin. Rockpile Basin is used as a settling basin for industrial purposes.

**Appendix C** **Representative Photographs**

View of Pond 17. This feature is used as a settling basin for industrial purposes.

View of Pond 4A. Pond 4A is used as a water treatment basin for industrial purposes.

**Appendix C** **Representative Photographs**

View of the downstream end of Pond 13.

View of the upstream portion of Pond 13.

**Appendix C** **Representative Photographs**

View of Pond 21. This pond is fringed by narrowleaf cattail.

**Appendix C** **Representative Photographs**

# E2. Effects to Waters of the United States (GEI Consultants, Inc., 2021)

# ATTACHMENT B – EFFECTS TO WATERS OF THE UNITED STATES

## REASONS FOR DISCHARGE

Discharge of materials into waters of the United States would be required to achieve the objective of restoring portions of Permanente Creek to a more natural state, in accordance with the proposed creek restoration plan. The materials to be discharged to waters of the United States include materials to restore streambed hydrology, geomorphology, and floodplain hydraulics, and to provide habitat for resident rainbow trout.

### PROPOSED DISCHARGE OF DREDGE AND/OR FILL MATERIAL

The amount and types of material being dredged from, and/or discharged (filled) into, waters of the United States are provided in Table 1.

**Table 1.**
**Volume and Types of Dredge and Fill Material within Waters of the United States for the Proposed Project**

| Project Element | Action | Approximate Volume (cy) | Type of Material |
|---|---|---|---|
| Culvert 7 | Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed. | 143 fill | Engineered streambed material |
| Culvert 8 | Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed. | 180 fill | Engineered streambed material |
| Culvert 9 | Removal of existing culvert and reconstruction/reconfiguration of creek channel and bed. | 264 fill | Engineered streambed material |
| Culvert 10 | Complete removal of (buried) culvert and excavation of creek channel. | 288 cut | Native soil |
| Culvert 11 | Complete removal of (half-pipe) culvert and excavation of creek channel. | 223 cut | Native soil |
| Pond 13 | Removal of dam and reconfiguration of creek channel. | 1,613 cut | Native soil |

Source: Adapted by GEI Consultants, Inc. 2016, based on plans from WRA and Waterways Consulting, Inc. 2015.

### U.S. ARMY CORPS OF ENGINEERS JURISDICTION WITHIN THE PROJECT AREA

A wetland delineation was conducted for the proposed project by AECOM in 2015. The wetland delineation report was sent to the San Francisco District of the U.S. Army Corps of Engineers (USACE) on August 3, 2015. USACE met with AECOM staff on September 10, 2015 to review the delineation at the project site. Revised wetland delineation maps, including changes from the field visit, were sent to USACE on September 17, 2015. Lehigh Hanson is requesting a preliminary jurisdictional determination (PJD) for this project area. USACE confirmed receipt of the revised delineation maps and is in the process of verifying the delineation.

## EFFECTS TO JURISDICTIONAL WATERS OF THE U.S.

USACE jurisdictional acreages potentially affected by the proposed activity was calculated by placing the Computer-Assisted Design (CAD) engineering design information (provided by Waterways Consulting, Inc.) over the wetland delineation ArcGIS layers of the project area.

The proposed project would result in effects to a total of 2.052 acres of waters of the United States (see Figures 1 through 4). Effects to waters are a result of three main activities: native vegetation planting along the south slope (above bank) of the concrete-lined channelized portion of Permanente Creek, as shown on Figure 1; channel widening and reconstruction activities, as shown on Figures 2 and 3; and overburden material removal and stream reconstruction, as shown on Figure 4.

Within the native vegetation planting area, it is anticipated that there will be temporary effects to the concrete-lined portion of Permanente Creek. Approximately 0.43 acre of temporary effects would be a result of the need to use the creek channel for access to facilitate planting along the south slope above the channel. The area is very steep and the channel area is the best vantage to facilitate planting on the most downslope portions of the planting efforts.

The channel widening and stream reconstruction portion of the proposed project activities would have permanent effects to approximately 0.64 acres of non-wetland waters of the United States and 0.077 acre of wetlands. Permanent effects are a result of removal of existing in-stream culverts and replacement of these structures with a deeper and wider channel containing engineered streambed material that will restore stream hydraulics, hydrology, and geomorphology. Five culverts would be removed from the stream channel (Culverts 7, 8, 9, 10, and 11). Culvert removal would comprise excavating out the culverts and any fill materials covering the culverts, re-contouring the stream channel to design parameters, and placing the engineered streambed material on the bed and banks of the newly reconstructed channel. This would result in permanent effects to Permanente Creek due to permanent alteration of the existing channel conditions; however, the activities would not result in the net loss of waters of the United States. With the removal of the culvert, the overall restoration activities would include re-contouring the channel, as just mentioned, and creating a floodplain bench along the north bank of the creek with riparian plantings in the floodplain bench. This work would be done for approximately 4,770 linear feet of the stream channel. As part of this work, a tributary stream (T18) will also be re-contoured and reconstructed to have a more gradual and even slope. Currently, the confluence of the tributary and Permanente Creek is a small floodplain where a wetland (W4) has established. This is the circumstance of the creek channel being narrow and not able to accommodate all of the flows from the current tributary. With the reconstruction work in both channels occurring, it is expected that the wetland will be disturbed as part of the construction activities and once the streams have been restored, the wetland will not be re-established due to post-condition changes in hydrology, hydraulics, and geomorphology of the stream. Again, this will result in permanent effects to the wetland, but would not result in a net loss of waters as the stream channel would be replacing the wetland.

This is also the case for three wetlands (W5, W6, and W7) established on the margin of the existing creek channel within this channel widening area. It is expected that these wetlands will be removed (lost) due to post-condition changes in hydrology, hydraulics, and geomorphology of the stream. However, because there is no direct, physical disturbance anticipated to these wetlands, the effects are considered to be indirect permanent effects and changes. Finally, there is a “pond” at the upper limit of the channel widening area which is really an impoundment of the creek behind a dam. As part of the channel widening restoration design, the dam would be

removed and the “pond” area would be re-contoured and reconstructed as part of the creek channel. This would again result in permanent change to the pond area, resulting in loss of the pond, but not a net loss of waters of the United States.

Within the channel widening area, it is also anticipated that there would be 0.513 acre of temporary effects to non-wetland waters. The temporary effects would be a result of temporary disturbance within the creek channel for access and temporary work space to facilitate the restoration efforts. It is anticipated that the creek channel would be both the work area (for restoration), but because of the terrain, it would also need to be the access area for equipment to enter the channel.

The final area of work is the material removal area. Here overburdened material from historic operations has entered into the creek and is present along the banks and upland slopes adjacent to the creek and has changed the topography in the area significantly. The proposed activities include removal of the overburden material and deposition of the material in the quarry area within the cement plant for future use. Removal of the overburden material would be followed by reconstruction of the stream channel to a more natural profile and revegetation of the banks of the channel. This would result in temporary effects to five non-wetland waters (T6, P14, T7, P15, and T8) to improve the stream channels of these waters. There is also one wetland (W8) on the downstream end of T8, a tributary to Permanente Creek. Like W4, mentioned previously, this wetland would be permanently lost as a result of reconstruction of the tributary and creek stream channels, but there would not be a net loss of waters as the streams would replace the wetland area.

The acreages of effects to waters of the United States for the proposed project are shown in Table 2.

**Table 2.**
**Acreages of Jurisdictional Waters of the United States**
**Affected by the Proposed Project**

| Effect Type | Feature | USACE JD Category[1] | Action | Approximate Acreage |
|---|---|---|---|---|
| **Direct Permanent** | Culvert 7 | RPW | Culvert removal and streambed reconstruction | 0.01 |
| | Culvert 8 | RPW | Culvert removal and streambed reconstruction | 0.01 |
| | Wetland (W4) | Wetland | Loss from excavation and streambed reconstruction | 0.06 |
| | Culvert 9 | RPW | Culvert removal and streambed reconstruction | 0.01 |
| | Culvert 10 | RPW | Culvert removal and streambed reconstruction | 0.04 |
| | Culvert 11 | RPW | Culvert removal and streambed reconstruction | 0.07 |
| | Pond 13 | Impoundment of RPW | Loss from excavation and streambed reconstruction | 0.50 |
| | Wetland (W8) | Wetland | Loss from excavation and streambed reconstruction | 0.01 |
| | | | **Subtotal** | **0.71** |
| **Indirect Permanent** | Wetland (W5) | Wetland | Habitat conversion | 0.01 |
| | Wetland (W6) | Wetland | Habitat conversion | 0.003 |
| | Wetland (W7) | Wetland | Habitat conversion | 0.004 |
| | | | **Subtotal** | **0.017** |
| **Direct Temporary** | P4 | RPW | Temporary disturbance for construction access | 0.43 |
| | P8 | RPW | Temporary disturbance for construction access | 0.26 |
| | T18 | Non-RPW | Streambed reconstruction | 0.01 |
| | P9 | RPW | Temporary disturbance for construction access | 0.09 |
| | P10 | RPW | Existing riprap removal and streambed reconstruction | 0.15 |
| | P12 | RPW | Streambed reconstruction | 0.003 |
| | T6 | Non-RPW | Streambed reconstruction | 0.01 |
| | P14 | RPW | Streambed reconstruction | 0.02 |
| | T7 | Non-RPW | Streambed reconstruction | 0.001 |
| | P15 | RPW | Streambed reconstruction | 0.35 |
| | T8 | Non-RPW | Streambed reconstruction | 0.001 |
| | | | **Subtotal** | **1.325** |
| | | | **Direct Permanent Effects Total** | **0.71** |
| | | | **Indirect Permanent Effects Total** | **0.017** |
| | | | **Direct Temporary Effects Total** | **1.325** |

Source: Adapted by GEI Consultants, Inc. 2016, based on drawings from Waterways Consulting, Inc. 2015.

# AVOIDANCE AND MINIMIZATION MEASURES

Lehigh Hanson would implement the following measures to avoid and minimize impacts to waters of the U.S.

## Avoidance and Containment of Shallow Slumps and/or Fallback of Overburden Material

In all areas requiring the use of excavators for grading (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), Lehigh Hanson and/or its contractor shall begin excavations from the top of slope and proceed downward. Lehigh Hanson and/or its contractor shall begin excavations from the top of slope and proceed downward. Lehigh Hanson and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas where excavations would occur in sloped materials, Lehigh Hanson and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles, wooden shoring systems, wire mesh or other containment measures(s), and Lehigh Hanson and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and approved by a California State registered geotechnical engineer.

## Interim Stormwater Control and Sediment Management

To minimize the discharge of sedimentation and metal constituents, particularly selenium, to watercourses, Lehigh Hanson shall implement the following stormwater and sediment management controls in addition to general best management practices (BMPs) required by the stormwater pollution prevention plan (SWPPP) in active and inactive reclamation areas. Lehigh Hanson shall:

- Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that limestone materials are placed beneath and are covered by non-limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.

- Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.

- Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.

- In areas where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the Permanente Creek Restoration Area and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-

sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, operator training regarding the prevention of triggering debris slides.

- Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.

- Divert all runoff generated from disturbed active and inactive restoration areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways directly entering Permanente Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.

- Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.

- Cover large limestone surfaces associated with restoration activities that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.

- Inspect and maintain BMPs after each qualifying rain event to ensure their integrity.

- Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be corrected immediately.

- Provide adequate erosion control training to all equipment operators, site superintendents, and managers to ensure that stormwater and erosion controls are maintained and remain effective.

- Use only jute netting or other suitable replacement for erosion control in the Permanente Creek Restoration Area; no plastic monofilament shall be used for erosion control or other purposes, as California Red Legged Frogs and other wildlife may become entangled in it.

- Ensure that all stormwater, erosion, and sediment control BMPs are installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist, or landscape architect, an American Institute of Hydrology registered professional hydrologist, or a certified erosion control specialist.

## PROPOSED COMPENSATORY MITIGATION

Although Lehigh Hansen proposes to permanently impact approximately 0.727 acre of waters of the United States (wetland and non-wetland waters combined), the proposed project, as designed, would result in enhancement of the 0.727 acre of waters of the United States resulting in functional lift of the existing jurisdictional acreage. The enhancements include improving the configuration and hydrology of Permanente Creek, removing an impoundment of the creek, removing culverts and restoring the creek bed under the culverts, creating a floodplain bench alongside the creek in select areas, and planting native riparian vegetation along the creek banks. The text of Nationwide Permit 27 states that if the proposed activities result in functional lift of the existing aquatic habitat, no compensatory mitigation is required. Lehigh Hansen believes the restoration effort will result in functional lift in upper Permanente Creek. Therefore, the proposed activities meet the specification of Nationwide Permit 27 and compensatory mitigation is not required for the project.

# ADDITIONAL INFORMATION,

## EFFECTS ON FEDERALLY LISTED SPECIES

The proposed project would result in potential adverse effects to the Federally listed California red-legged frog. A Biological Assessment has been prepared for the species and is included as Attachment D to this application package. The Biological Assessment only addresses USFWS-managed species.

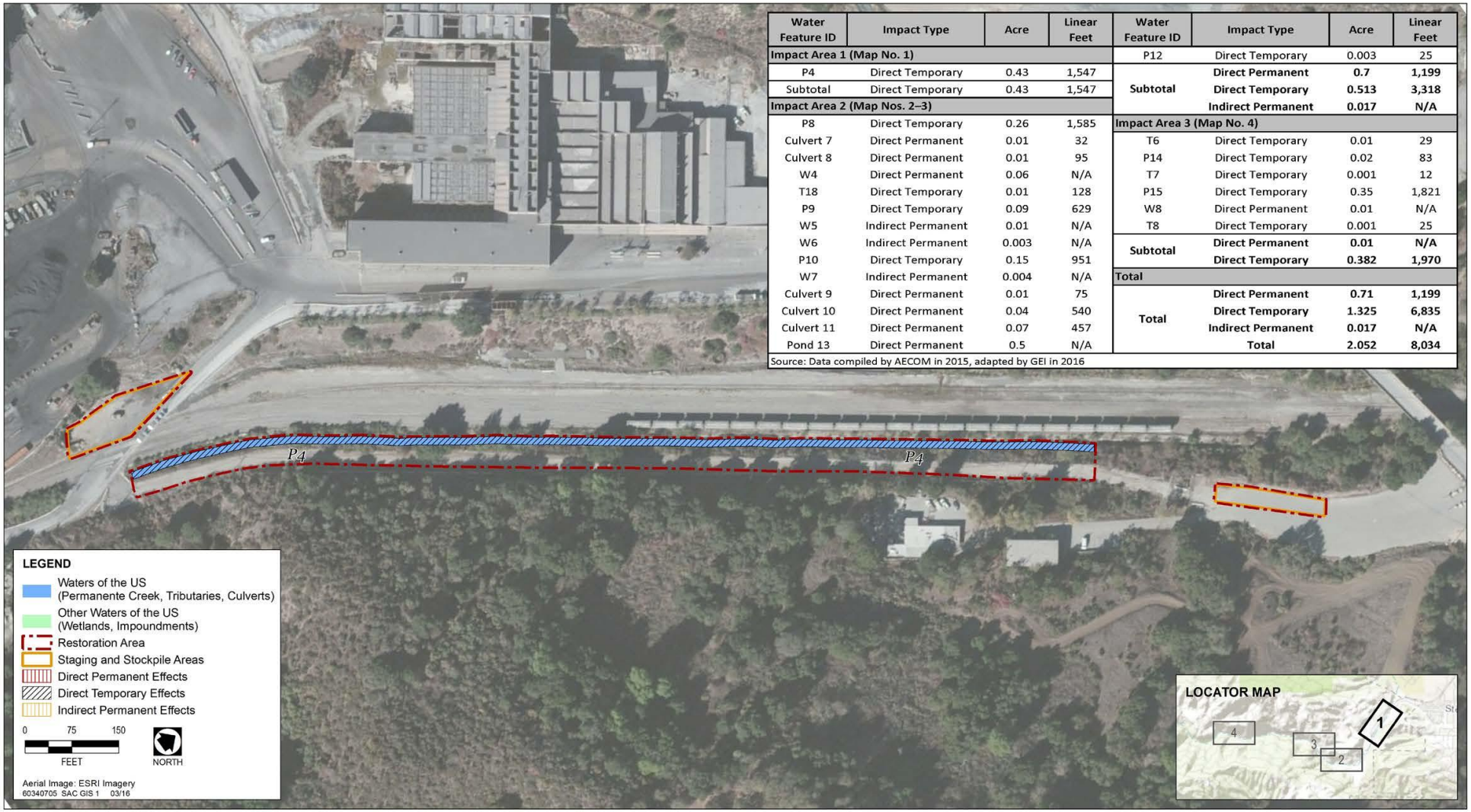
The proposed project location is within a region mapped as Essential Fish Habitat (EFH) for Pacific salmon (specifically *Oncorhynchus kisutch* and *O. tshawytscha*) and critical habitat for Central California Coastal (CCC) steelhead (*O. mykiss irideus*) DPS. These USFWS- and NMFS-managed species cannot access habitat near the project site in upper Permanente Creek because the downstream Permanente Creek Diversion Channel is a highly effective barrier to fish passage since most of the creek's flow culminates in a 10-foot drop at the diversion fish can no longer ascend the stream.

Permanente Creek is a natural channel from its headwater downstream to Heritage Oaks Park, near Portland and Miramonte avenues, where the creek enters a concrete channel and eventually becomes the Permanente Creek Diversion Channel. The channel was built by the Santa Clara Valley Water District in 1959 and runs 1.3 miles to the east until passing into a culvert underneath Highway 85 to Stevens Creek. Virtually all winter flows from upper Permanente Creek are diverted east to Stevens Creek in order to prevent floodwaters from flowing in the original creek channel that runs through urban residential areas.

The diversion channel has altered the course of flow and the total length of Permanente Creek from 13.3 miles (from the headwaters to San Francisco Bay) to 9.3 miles (from the headwaters to the diversion channel’s junction with Stevens Creek just past Highway 85), and has essentially cut off the upper portion of Permanente Creek from the lower reaches. In addition, a combination of lack of flows and significant modification in the lower portion of the creek have degraded fish habitat such that no spawning or rearing habitat exists for these species.

## CULTURAL RESOURCES AND HISTORIC PROPERTIES

The proposed action was analyzed for cultural resources and historic properties and a cultural resources inventory report has been prepared. The final Cultural Resources Inventory Report is included as Attachment E.



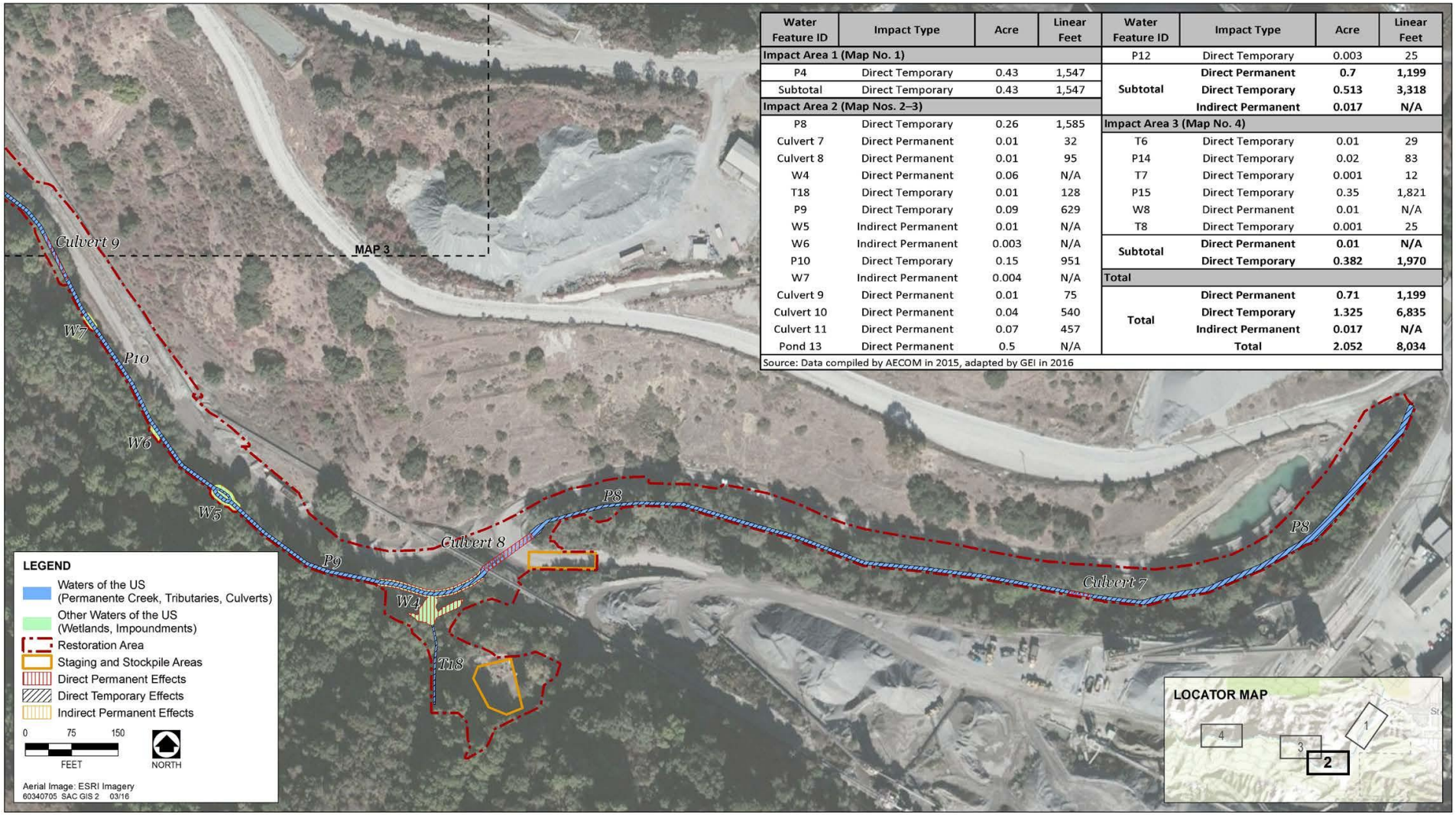

| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| **Impact Area 1 (Map No. 1)** | | | |
| P4 | Direct Temporary | 0.43 | 1,547 |
| Subtotal | Direct Temporary | 0.43 | 1,547 |
| **Impact Area 2 (Map Nos. 2–3)** | | | |
| P8 | Direct Temporary | 0.26 | 1,585 |
| Culvert 7 | Direct Permanent | 0.01 | 32 |
| Culvert 8 | Direct Permanent | 0.01 | 95 |
| W4 | Direct Permanent | 0.06 | N/A |
| T18 | Direct Temporary | 0.01 | 128 |
| P9 | Direct Temporary | 0.09 | 629 |
| W5 | Indirect Permanent | 0.01 | N/A |
| W6 | Indirect Permanent | 0.003 | N/A |
| P10 | Direct Temporary | 0.15 | 951 |
| W7 | Indirect Permanent | 0.004 | N/A |
| Culvert 9 | Direct Permanent | 0.01 | 75 |
| Culvert 10 | Direct Permanent | 0.04 | 540 |
| Culvert 11 | Direct Permanent | 0.07 | 457 |
| Pond 13 | Direct Permanent | 0.5 | N/A |

| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| P12 | Direct Temporary | 0.003 | 25 |
| **Subtotal** | **Direct Permanent** | **0.7** | **1,199** |
| | **Direct Temporary** | **0.513** | **3,318** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| **Impact Area 3 (Map No. 4)** | | | |
| T6 | Direct Temporary | 0.01 | 29 |
| P14 | Direct Temporary | 0.02 | 83 |
| T7 | Direct Temporary | 0.001 | 12 |
| P15 | Direct Temporary | 0.35 | 1,821 |
| W8 | Direct Permanent | 0.01 | N/A |
| T8 | Direct Temporary | 0.001 | 25 |
| **Subtotal** | **Direct Permanent** | **0.01** | **N/A** |
| | **Direct Temporary** | **0.382** | **1,970** |
| **Total** | | | |
| **Total** | **Direct Permanent** | **0.71** | **1,199** |
| | **Direct Temporary** | **1.325** | **6,835** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| | **Total** | **2.052** | **8,034** |

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

**Figure 1. Effects to Waters of the United States Map 1**

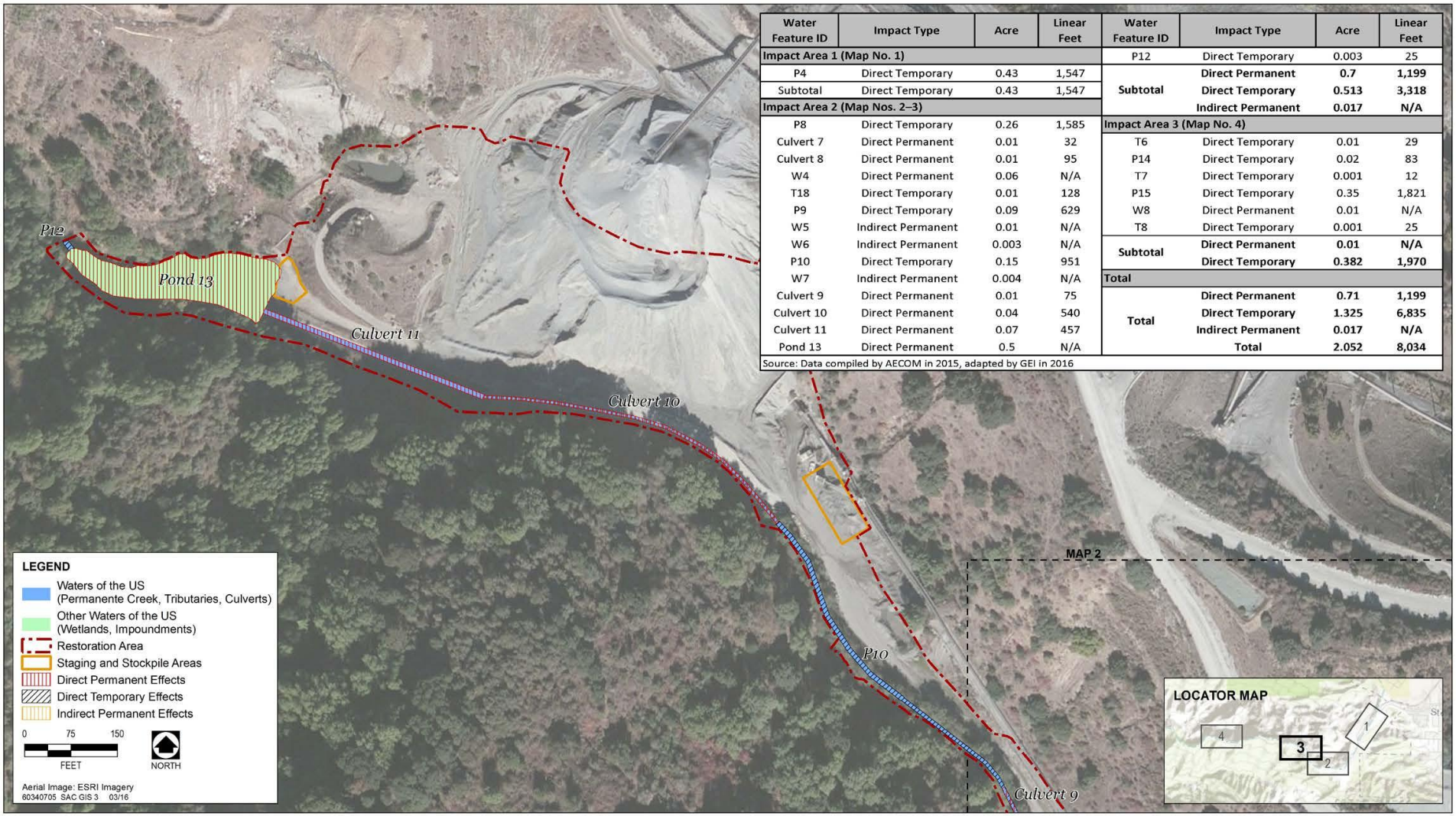



| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| **Impact Area 1 (Map No. 1)** | | | |
| P4 | Direct Temporary | 0.43 | 1,547 |
| Subtotal | Direct Temporary | 0.43 | 1,547 |
| **Impact Area 2 (Map Nos. 2–3)** | | | |
| P8 | Direct Temporary | 0.26 | 1,585 |
| Culvert 7 | Direct Permanent | 0.01 | 32 |
| Culvert 8 | Direct Permanent | 0.01 | 95 |
| W4 | Direct Permanent | 0.06 | N/A |
| T18 | Direct Temporary | 0.01 | 128 |
| P9 | Direct Temporary | 0.09 | 629 |
| W5 | Indirect Permanent | 0.01 | N/A |
| W6 | Indirect Permanent | 0.003 | N/A |
| P10 | Direct Temporary | 0.15 | 951 |
| W7 | Indirect Permanent | 0.004 | N/A |
| Culvert 9 | Direct Permanent | 0.01 | 75 |
| Culvert 10 | Direct Permanent | 0.04 | 540 |
| Culvert 11 | Direct Permanent | 0.07 | 457 |
| Pond 13 | Direct Permanent | 0.5 | N/A |
| P12 | Direct Temporary | 0.003 | 25 |
| **Subtotal** | **Direct Permanent** | **0.7** | **1,199** |
| | **Direct Temporary** | **0.513** | **3,318** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| **Impact Area 3 (Map No. 4)** | | | |
| T6 | Direct Temporary | 0.01 | 29 |
| P14 | Direct Temporary | 0.02 | 83 |
| T7 | Direct Temporary | 0.001 | 12 |
| P15 | Direct Temporary | 0.35 | 1,821 |
| W8 | Direct Permanent | 0.01 | N/A |
| T8 | Direct Temporary | 0.001 | 25 |
| **Subtotal** | **Direct Permanent** | **0.01** | **N/A** |
| | **Direct Temporary** | **0.382** | **1,970** |
| **Total** | | | |
| **Total** | **Direct Permanent** | **0.71** | **1,199** |
| | **Direct Temporary** | **1.325** | **6,835** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| | **Total** | **2.052** | **8,034** |

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

**Figure 2. Effects to Waters of the United States Map 2**



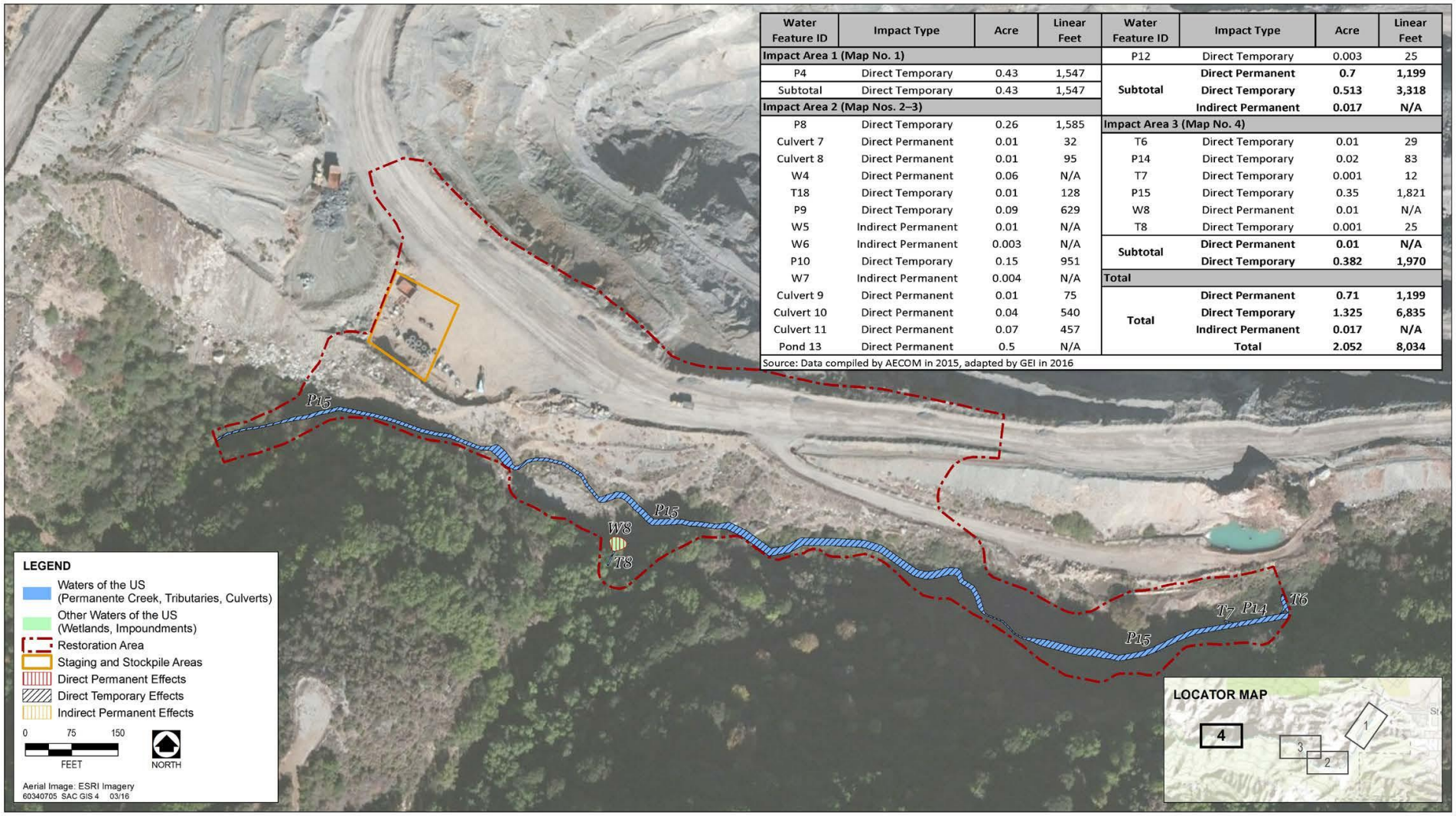

| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| **Impact Area 1 (Map No. 1)** | | | |
| P4 | Direct Temporary | 0.43 | 1,547 |
| Subtotal | Direct Temporary | 0.43 | 1,547 |
| **Impact Area 2 (Map Nos. 2–3)** | | | |
| P8 | Direct Temporary | 0.26 | 1,585 |
| Culvert 7 | Direct Permanent | 0.01 | 32 |
| Culvert 8 | Direct Permanent | 0.01 | 95 |
| W4 | Direct Permanent | 0.06 | N/A |
| T18 | Direct Temporary | 0.01 | 128 |
| P9 | Direct Temporary | 0.09 | 629 |
| W5 | Indirect Permanent | 0.01 | N/A |
| W6 | Indirect Permanent | 0.003 | N/A |
| P10 | Direct Temporary | 0.15 | 951 |
| W7 | Indirect Permanent | 0.004 | N/A |
| Culvert 9 | Direct Permanent | 0.01 | 75 |
| Culvert 10 | Direct Permanent | 0.04 | 540 |
| Culvert 11 | Direct Permanent | 0.07 | 457 |
| Pond 13 | Direct Permanent | 0.5 | N/A |

| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| P12 | Direct Temporary | 0.003 | 25 |
| **Subtotal** | **Direct Permanent** | **0.7** | **1,199** |
| | **Direct Temporary** | **0.513** | **3,318** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| **Impact Area 3 (Map No. 4)** | | | |
| T6 | Direct Temporary | 0.01 | 29 |
| P14 | Direct Temporary | 0.02 | 83 |
| T7 | Direct Temporary | 0.001 | 12 |
| P15 | Direct Temporary | 0.35 | 1,821 |
| W8 | Direct Permanent | 0.01 | N/A |
| T8 | Direct Temporary | 0.001 | 25 |
| **Subtotal** | **Direct Permanent** | **0.01** | **N/A** |
| | **Direct Temporary** | **0.382** | **1,970** |
| **Total** | | | |
| **Total** | **Direct Permanent** | **0.71** | **1,199** |
| | **Direct Temporary** | **1.325** | **6,835** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| | **Total** | **2.052** | **8,034** |

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

Source: AECOM 2015, adapted by GEI Consultants, Inc. 2016

**Figure 3. Effects to Waters of the United States Map 3**




| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| **Impact Area 1 (Map No. 1)** | | | |
| P4 | Direct Temporary | 0.43 | 1,547 |
| Subtotal | Direct Temporary | 0.43 | 1,547 |
| **Impact Area 2 (Map Nos. 2–3)** | | | |
| P8 | Direct Temporary | 0.26 | 1,585 |
| Culvert 7 | Direct Permanent | 0.01 | 32 |
| Culvert 8 | Direct Permanent | 0.01 | 95 |
| W4 | Direct Permanent | 0.06 | N/A |
| T18 | Direct Temporary | 0.01 | 128 |
| P9 | Direct Temporary | 0.09 | 629 |
| W5 | Indirect Permanent | 0.01 | N/A |
| W6 | Indirect Permanent | 0.003 | N/A |
| P10 | Direct Temporary | 0.15 | 951 |
| W7 | Indirect Permanent | 0.004 | N/A |
| Culvert 9 | Direct Permanent | 0.01 | 75 |
| Culvert 10 | Direct Permanent | 0.04 | 540 |
| Culvert 11 | Direct Permanent | 0.07 | 457 |
| Pond 13 | Direct Permanent | 0.5 | N/A |

| Water Feature ID | Impact Type | Acre | Linear Feet |
|---|---|---|---|
| P12 | Direct Temporary | 0.003 | 25 |
| **Subtotal** | **Direct Permanent** | **0.7** | **1,199** |
| | **Direct Temporary** | **0.513** | **3,318** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| **Impact Area 3 (Map No. 4)** | | | |
| T6 | Direct Temporary | 0.01 | 29 |
| P14 | Direct Temporary | 0.02 | 83 |
| T7 | Direct Temporary | 0.001 | 12 |
| P15 | Direct Temporary | 0.35 | 1,821 |
| W8 | Direct Permanent | 0.01 | N/A |
| T8 | Direct Temporary | 0.001 | 25 |
| **Subtotal** | **Direct Permanent** | **0.01** | **N/A** |
| | **Direct Temporary** | **0.382** | **1,970** |
| **Total** | | | |
| **Total** | **Direct Permanent** | **0.71** | **1,199** |
| | **Direct Temporary** | **1.325** | **6,835** |
| | **Indirect Permanent** | **0.017** | **N/A** |
| | **Total** | **2.052** | **8,034** |

Source: Data compiled by AECOM in 2015, adapted by GEI in 2016

**Figure 4. Effects to Waters of the United States Map 4**

# E3. Revegetation Plan (WRA, Inc. September 29, 2017)

ENVIRONMENTAL CONSULTANTS

**TECHNICAL MEMORANDUM**

**PERMANENTE CREEK RESTORATION PLAN: PLANTING PROGRAM**

**September 29, 2017**

## INTRODUCTION

This technical memorandum describes the conceptual planting program that will be a component of the Permanente Creek Restoration Plan. The Riparian Planting Sections (Sheets L1-L3) on the accompanying drawings have been completed in conjunction with the Stream Restoration Plan prepared by Waterways Consulting. The revegetation design is intended to meet the requirements of the Consent Decree between Lehigh Southwest Cement Company and Hanson Permanent Cement, Inc. and the Sierra Club effective June 18, 2013 and amended on February 22, 2016. This work is also informed by the extensive site investigations and pilot revegetation work that has been performed and documented in the Revegetation Plan (WRA 2012) prepared in conjunction with the Reclamation Plan for the facility. This plan was prepared by Megan Stromberg, Landscape Architect (California License 5535).

## RIPARIAN PLANTING

Proposed planting palettes and representative cross sections are provided in the attached drawings. The goal of the planting effort will be to create a native plant dominated habitat within restored sections of the creek that are similar to the surrounding natural areas. The representative cross sections are conceptual at this time, but are sufficient to demonstrate the level of planting needed for agency review and for initial permit applications. Additional detail will be provided as needed to complete the permitting process. Final drawings will be prepared after permit approval.

The north-facing banks along Permanente Creek can support a wider variety of tree and shrub species since they have less solar radiation and higher soil moisture. In addition, some reaches of the creek experience intermittent flows (Reaches 17 through 21) while the reaches below Pond 4A are mostly perennial. These conditions have been considered in the development of the riparian planting palettes. Specific planting plans identifying the best locations for each species will be developed in the final drawings.

Each riparian species was observed within the existing riparian habitat and evaluated for its proximity to the thalweg of the existing creek. Our plant palette tables provide the recommended elevation range above the design thalweg of the creek.

Trees and shrubs will be planted as container plants or seeds in the revegetation areas. Tree and shrub container plantings may require application of a layer of topsoil and/or soil-building materials to ensure adequate space for root development. In addition, irrigation or other watering methods will be included within a final plan as well as erosion control practices while plant materials are becoming established. Plants will be planted at a higher density than is expected at the end of the performance period to account for expected die-off. Replanting in subsequent years may be required to achieve desired stem density and cover. Adaptive management and the results from the Reclamation Plan pilot plantings will be used to determine which tree and shrub species will be planted, the most effective spacing and location, and species to use in replacement plantings if

necessary. The need for herbivory protection for specific vegetation species will be evaluated based on prior planting efforts. Weed mats or several inches of mulch may be placed around planted trees and shrubs to reduce competition and retain moisture.

## UPLAND REVEGETATION AND EROSION CONTROL

A preliminary erosion control stage will be incorporated prior to the riparian revegetation establishment to protect against sediment entering the creek and allow time for plants to establish. Bare surfaces will be covered with native grass, herb, and shrub species via hydroseeding a homogenous slurry of mulch, fertilizer, seed, and a binding agent over the areas to be revegetated. Other appropriate erosion control methods such as slope cross-drains, erosion control matting, and coir fibre rolls will be used. The native seed mix shown in Table 1 includes species that have proven successful in other revegetation efforts on the Permanente Quarry property and is recommended to provide erosion control and initial establishment of native shrubs, grasses and herbaceous species as needed in temporarily disturbed riparian areas. In upland areas, hydroseed with species listed in Table 2 will be applied to areas that have been disturbed.

Table 1. Erosion Control Species for Permanente Creek Riparian Areas

| SCIENTIFIC NAME | COMMON NAME | PURE LIVE SEED (lb / acre) | BULK SEED (lb / acre) |
|---|---|---|---|
| SHRUBS | | | |
| *Artemisia californica* | California sagebrush | 1 | 10 |
| *Baccharis pilularis* | Coyote brush | .1 | 6 |
| *Lotus scoparius* | Deerweed | 1.5 | 2 |
| *Salvia mellifera* | black sage | 1.5 | 4.3 |
| GRASSES AND HERBS | | | |
| *Achillea millefolium* | Yarrow | .75 | 2 |
| *Artemisia douglasiana* | Mugwort | .15 | 1.9 |
| *Bromus carinatus* | California brome | 8 | 10 |
| *Clarkia purpurea ssp. quadrivulnera* | winecup clarkia | 1 | 1 |
| *Elymus glaucus* | blue wildrye | 4.6 | 6 |
| *Heterotheca grandiflora* | telegraph weed | 0.2 | 1 |
| *Lotus purshianus* | Spanish clover | 3 | 3.6 |
| *Plantago erecta* | dotseed plantain | 2.5 | 3 |
| *Sisyrinchium bellum* | western blue-eyed grass | 1 | 1.4 |
| *Vulpia microstachys* | small fescue | 8 | 10 |
| **Total** | | 34.8 | 62.2 |

| Table 2. Upland Erosion Control Hydroseeding Mix. | | |
|---|---|---|
| SCIENTIFIC NAME | COMMON NAME | Rate of application (lb / acre) |
| SHRUBS | | |
| *Artemisia californica* | California sagebrush | 0.5 |
| *Baccharis pilularis* | coyote brush | 0.1 |
| GRASSES AND HERBS | | |
| *Bromus carinatus* | California brome | 12 |
| *Elymus glaucus* | blue wildrye | 10 |
| *Eschscholzia californica* | California poppy | 1.5 |
| *Heterotheca grandiflora* | telegraph weed | 0.5 |
| *Lotus scoparius* | deerweed | 3.0 |
| *Nassella pulchra* | purple needlegrass | 5.0 |
| *Vulpia microstachys* | three weeks fescue | 6.0 |
| *Festuca rubra* | red fescue | 5.0 |
| *Lupines nanus (innoc)* | lupine | 4.0 |
| *Plantago erecta* | plantain | 4.0 |
| **Total** | | **52.6** |

# E4. Temporary Riparian Vegetation Impact Assessment (Waterways Consulting, Inc., August 26, 2022)

# TECHNICAL MEMORANDUM

*To:* Carolina Addison, Lehigh Hanson Inc.

*From:* Waterways Consulting, Inc.

*Date:* August 26, 2022

*Re:* Permanente Creek Restoration Project, Temporary Riparian Vegetation Impact Assessment

## Introduction

This memorandum has been prepared in response to comments provided to the County of Santa Clara on May 13, 2021 by the California Department of Fish and Wildlife (CDFW) in response to the County's Notice of Preparation of the Supplemental Draft Environmental Impact Report for the Permanente Creek Restoration Project (PRCP).[1] The comments are regarding impacts to riparian vegetation associated with implementation of the PRCP included under the "Biological Resources, Long-term Impacts to Riparian Sensitive Community" section of the letter. The relevant paragraph under the "Riparian Vegetation Impacts" subsection has been reproduced below for reference.

> The revised 90% engineering designs appear to indicate that approximately 30 trees will be removed during Project construction. However, only larger trees to be removed were included in the designs (e.g., non-oak trees equal to or greater than 12-inch diameter). Sapling (1-inch to 4-inch diameter) and pole sized (5-inch to 11-inch diameter) trees are important to riparian vegetation structural complexity and habitat succession. Based on the current designs, impacts of the Project to riparian habitat may be underestimated. CDFW recommends that analysis of riparian vegetation impacts include trees less than 12 inches in diameter or based on area calculations for seedlings and saplings and understory vegetation. As discussed in the previous section of this letter, the long-term (e.g., 10-year) post-construction monitoring and adaptive management plan should include monitoring of revegetated areas and include performance standards to ensure establishment or maintenance of riparian habitat.

## Background

Waterways Consulting, Inc. (Waterways) staff completed an evaluation of riparian vegetation within the limits of areas to be impacted during implementation of the PCRP. This included field work to determine the species, size and number of trees and shrubs that will be removed during project construction as outlined below.

## Methods

Waterways walked the extents of each component project area to evaluate riparian impacts during July and August 2022. This included the Channel Widening Area, Rock Pile Area and Material Removal Area. Each project area was broken into multiple smaller areas for determining riparian vegetation impacts as

[1] The subject of the May 13, 2021 letter from CDFW to Mr. Robert Salisbury at the County of Santa Clara is "Permanente Creek Restoration Project, Notice of Preparation of a Supplemental Draft Environmental Impact Report, SCH No. 2021040331, Santa Clara County".

shown on Figures 1-10. Representative sample areas were evaluated where vegetation was very dense, and the findings were proportioned for estimating the impacts for the applicable reach of channel. Where the riparian corridor was reasonably open and Waterways staff were able to traverse a reach of channel, sample areas were not used and the riparian corridor within the limits of proposed grading was evaluated to determine vegetation impacts.

Species and diameter of trees and shrubs observed were recorded on field sheets for each riparian area assessed. Figure 1 provides an overview of the assessment area and Figures 2 - 10 show the limits of each riparian vegetation impact area. The upstream and downstream limits of each area were surveyed using a total station. Individual trees and shrubs were not surveyed as part of this assessment. Trees from the original mapping effort are shown on the drawings.[2] Solid lines shown on the Figures represent the limits of an assessment area. Dashed lines represent the boundary of sample areas within a larger assessment area with the color matching that of the assessment area. The boundary lines fall within the grading limits where an area is devoid of vegetation.

## Results

A table listing the area, species, diameter, and number of trees and shrubs documented in each assessment area is included on the attached Figures. A summary table is included below with the total estimated number of trees and shrubs that will be removed at each component project area and the estimated total for the project. Detailed summary tables that include species and diameter of trees and shrubs that would be removed at each component project area are attached.

**Table 1. Total Number of Trees and Shrubs Removed During Project Implementation**

| Project Location | Number of Trees/Shrubs Removed |
|---|---|
| Channel Widening Area | 271 |
| Rock Pile Area | 49 |
| Material Removal Area | 550 |
| Estimated Project Total = | 870 |

## Conclusion

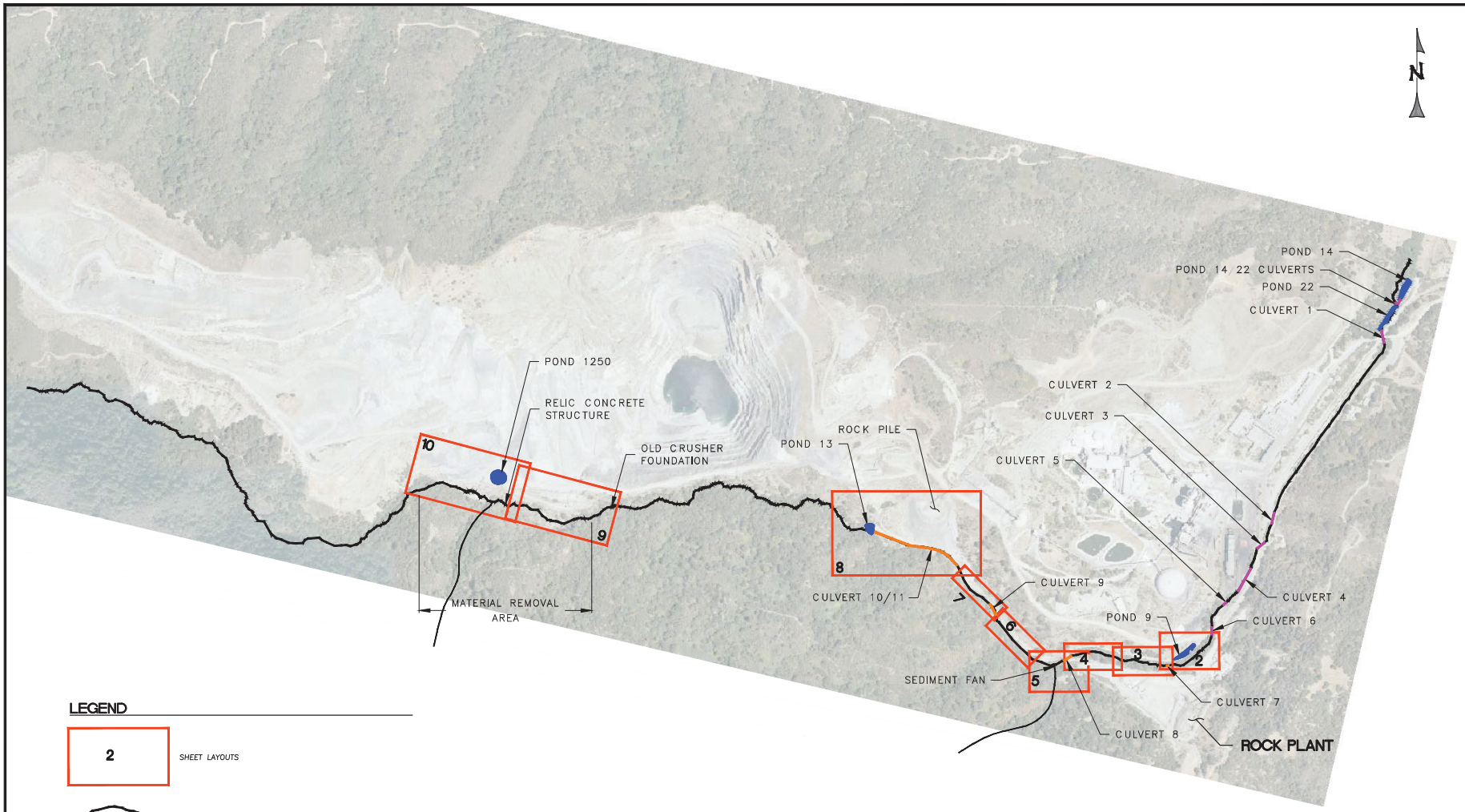
The PCRP includes a robust revegetation effort to reestablish riparian vegetation along the restored channel reaches to help stabilize graded areas, provide cover and establish habitat complexity. While approximately 870 tree and shrubs will be removed during project implementation throughout an area of approximately 5.5 acres, over 7,000 tree and shrubs will be planted to reestablish and expand the riparian corridor along approximately 7.6 acres of restored riparian area.

[2] The trees shown on the Riparian Vegetation Impact Assessment Figures include trees surveyed during mapping efforts completed during 2013-2015. Some trees may have died since the initial mapping effort. Additional trees meeting the survey threshold used during the original mapping efforts may now exist within the mapped areas and are not shown on the figures.

| CHANNEL WIDENING AREA | | |
|---|---|---|
| RIPARIAN VEGETATION IMPACT SUMMARY | | |
| AREA = | 1.55 | ACRE |
| SPECIES | (DIA. IN.) | COUNT |
| ALDER | 0-2 | 5 |
| ALDER | 2-4 | 1 |
| ALDER | 4-8 | 10 |
| ALDER | 8-12 | 5 |
| BAY | 2-4 | 1 |
| BAY | 4-8 | 14 |
| BIG LEAF MAPLE | 2-4 | 6 |
| BIG LEAF MAPLE | 4-8 | 1 |
| BUCKEYE SAPLING | <1 | 5 |
| COFFEEBERRY | 0-2 | 1 |
| ELDERBERRY | 0-2 | 18 |
| ELDERBERRY | 4-6 | 1 |
| MADRONE | 2-4 | 2 |
| OAK | 0-2 | 11 |
| OAK | 2-4 | 5 |
| OAK SAPPLING | <1 | 12 |
| SYCAMORE | 32 | 1 |
| TOYON | 0-2 | 9 |
| WALNUT | 0-2 | 11 |
| WILLOW | 0-4 | 43 |
| WILLOW | 4-8 | 56 |
| WILLOW | 8-12 | 52 |
| WILLOW | 24+ | 1 |
| | TOTAL COUNT = | 271 |

| ROCK PILE AREA<br>RIPARIAN VEGETATION IMPACT SUMMARY | | |
|---|---|---|
| AREA = | 1.11 | ACRE |
| SPECIES | (DIA. IN.) | COUNT |
| BIG LEAF MAPLE | 0-2 | 2 |
| ELDERBERRY | 0-2 | 5 |
| WILLOW | 0-4 | 27 |
| WILLOW | 4-8 | 6 |
| WILLOW | 8-12 | 9 |
| | TOTAL COUNT = | 49 |

| MATERIAL REMOVAL AREA<br>RIPARIAN VEGETATION IMPACT SUMMARY | | |
|---|---|---|
| AREA = | 2.80 | ACRE |
| SPECIES | (DIA. IN.) | COUNT |
| BAY | 0-2 | 25 |
| BAY SAPLING | <1 | 9 |
| BIG LEAF MAPLE SAPLING | <1 | 28 |
| BIG LEAF MAPLE | 1-2 | 29 |
| BIG LEAF MAPLE | 4-6 | 9 |
| BIG LEAF MAPLE | 6-8 | 23 |
| CEANOTHUS | 0-2 | 10 |
| MADRONE | 0-2 | 21 |
| MADRONE | 2-4 | 34 |
| MADRONE | 4-6 | 2 |
| TOYON | 0-2 | 32 |
| WILLOW | 0-4 | 266 |
| WILLOW | 4-8 | 53 |
| WILLOW | 8-12 | 8 |
| | TOTAL COUNT = | 550 |




LEGEND

- 2 — SHEET LAYOUTS
- PERMANENTE CREEK THALWEG ALIGNMENT 2013
- TRIBUTARY (RELEVANT TO PROJECT)
- EXISTING CULVERT TO BE REMOVED
- EXISTING CULVERT TO REMAIN

**SHEET LAYOUT OVERVIEW**
SCALE:1" = 500'

*RIPARIAN IMPACT ASSESSMENT ANALYSIS:*
THESE DRAWINGS HAVE BEEN PREPARED TO ACCOMPANY THE TECHNICAL MEMORANDUM TITLED "PERMANENTE CREEK RESTORATION PROJECT, TEMPORARY RIPARIAN VEGETATION IMPACT ASSESSMENT", DATED 8/26/22, AND ASSIST WITH ESTIMATING TEMPORARY RIPARIAN VEGETATION IMPACTS THAT WOULD OCCUR DURING IMPLEMENTATION OF THE PERMANENTE CREEK RESTORATION PLAN. THE QUANTITY, SIZE AND SPECIES OF EXISTING TREES AND SHRUBS THAT WILL BE REMOVED DURING PROJECT IMPLEMENTATION WERE DOCUMENTED WITHIN THE AREAS SHOWN ON THE FOLLOWING FIGURES. SEE THE REFERENCED TECHNICAL MEMORANDUM FOR A DESCRIPTION OF ASSESSMENT METHODS AND RESULTS.

WATERWAYS CONSULTING INC.
Santa Cruz, CA | waterways.com | Portland, OR

PREPARED AT THE REQUEST OF:
LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# PERMANENTE CREEK RESTORATION PLAN

## RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
1

| RIPARIAN VEGETATION IMPACT AREA #1 | | | |
|---|---|---|---|
| | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA |
| | 1355 SF | 0.03 AC | 9580 SF | 0.22 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | ESTMATED NUMBER WITHIN IMPACT AREA |
| WILLOW | 0–4 | 2 | 14 |
| WILLOW | 4–8 | 3 | 21 |
| WILLOW | 8–12 | 3 | 21 |

## RIPARIAN VEGETATION AREA LEGEND

RIPARIAN VEGETATION IMPACT AREA #1

RIPARIAN VEGETATION IMPACT SAMPLE AREA #1

RIPARIAN VEGETATION IMPACT AREA #2

RIPARIAN VEGETATION IMPACT AREA #1

RIPARIAN VEGETATION IMPACT SAMPLE AREA #1

RIPARIAN VEGETATION IMPACT AREA #2.
SEE FIGURE 3 FOR IMPACT TABLE.

POND 9

CULVERT #6
INV. IN: 566.84
INV. OUT: 565.92

24" DIA. CMP
INV. IN: 578.13
INV. OUT: 577.79

EXPOSED SEGMENT OF 24" DIA STEEL/CMP
WEST BANK INV: 581.4
EAST BANK INV: 579.2
(PIPE SPANS CREEK, ELEV. APPROX.)

EXPOSED BEDROCK

EXPOSED SEGMENT OF CMP

(E) K-RAIL BARRIER
(LOCATION APPROX.)

ROADWAY WITH
VEHICLE BARRIER (20')

ROADWAY

FLOW

## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

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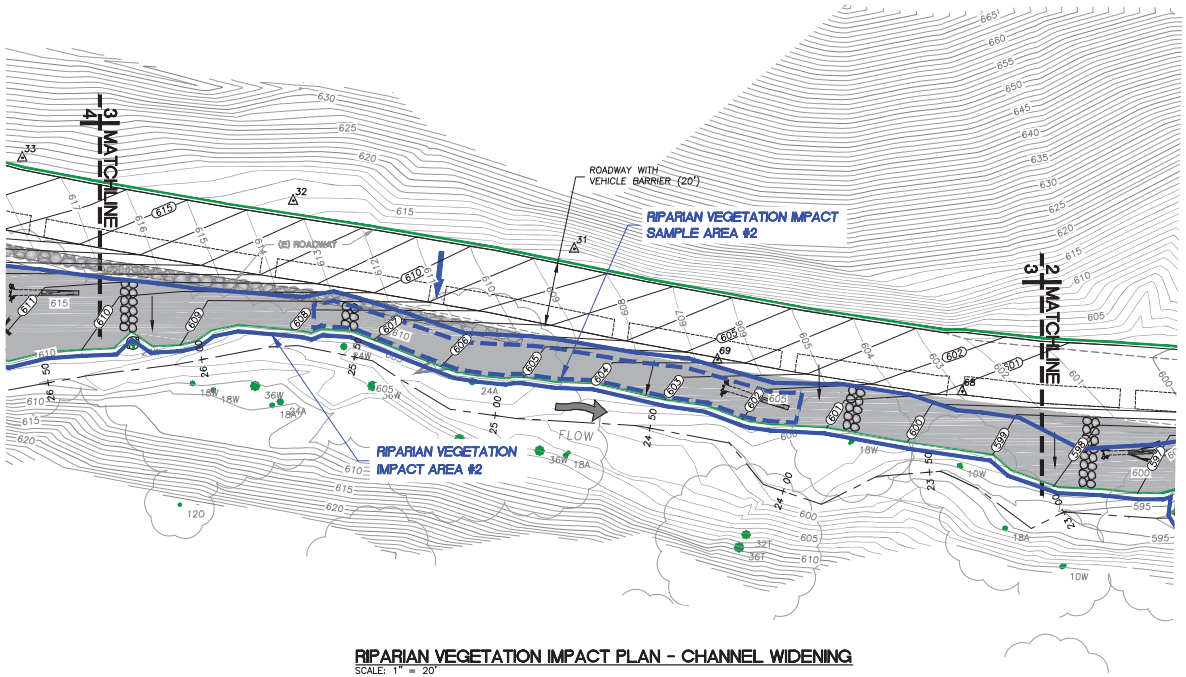
PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE
2




## RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

### LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)

### RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #2
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #2

| RIPARIAN VEGETATION IMPACT AREA #2 | | | | | |
|---|---|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
| | | 1785 SF | 0.04 AC | 9010 SF | 0.21 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| ALDER | 0-2 | 1 | | 5 | |
| ALDER | 4-8 | 2 | | 10 | |
| ALDER | 8-12 | 1 | | 5 | |
| WALNUT | 0-2 | 2 | | 10 | |
| WILLOW | 0-4 | 3 | | 15 | |
| WILLOW | 4-8 | 2 | | 10 | |

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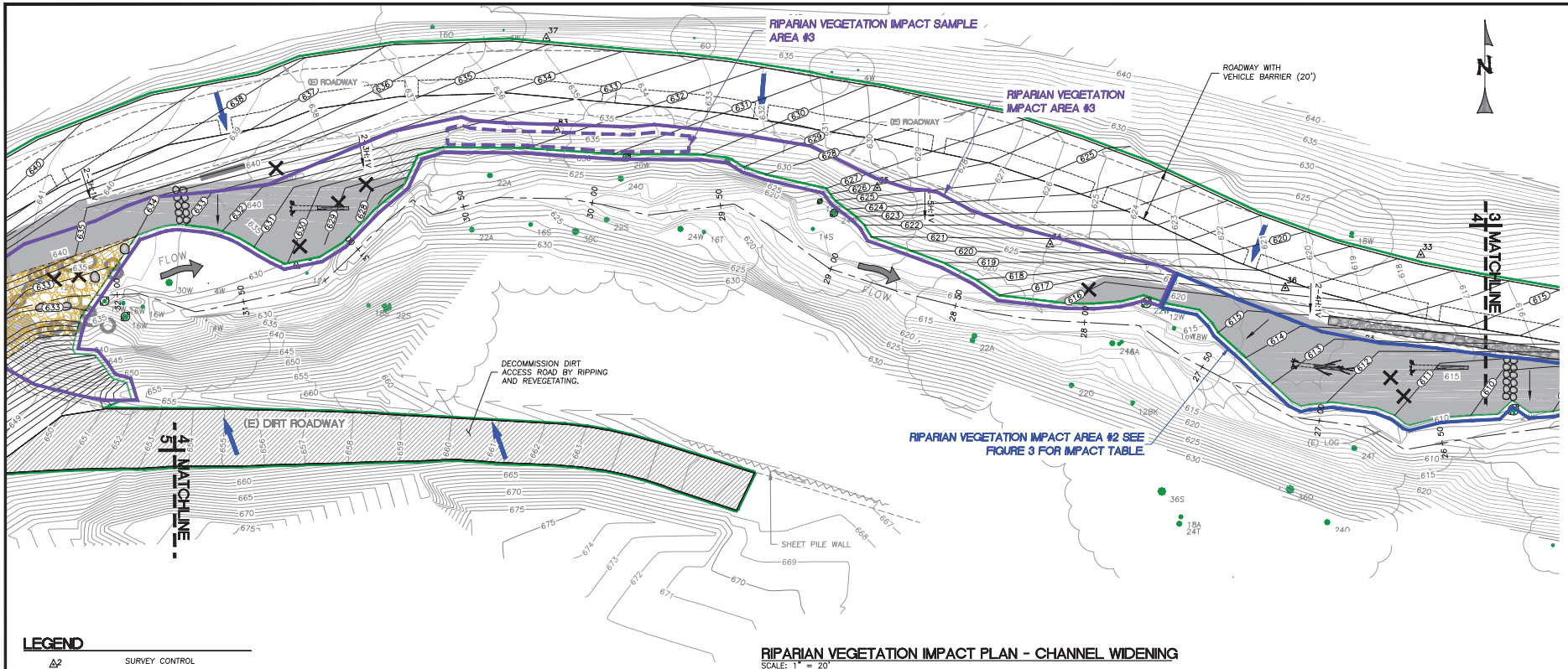
PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
3




## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

## RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #2
- RIPARIAN VEGETATION IMPACT AREA #3
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #3

| RIPARIAN VEGETATION IMPACT AREA #3 | | | | | |
|---|---|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
| | | 800 SF | 0.02 AC | 8670 SF | 0.20 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| BAY | 4-8 | 1 | | 11 | |
| ELDERBERRY | 0-2 | 1 | | 11 | |
| WILLOW | 0-4 | 1 | | 11 | |
| WILLOW | 4-8 | 1 | | 11 | |
| WILLOW | 8-12 | 2 | | 22 | |

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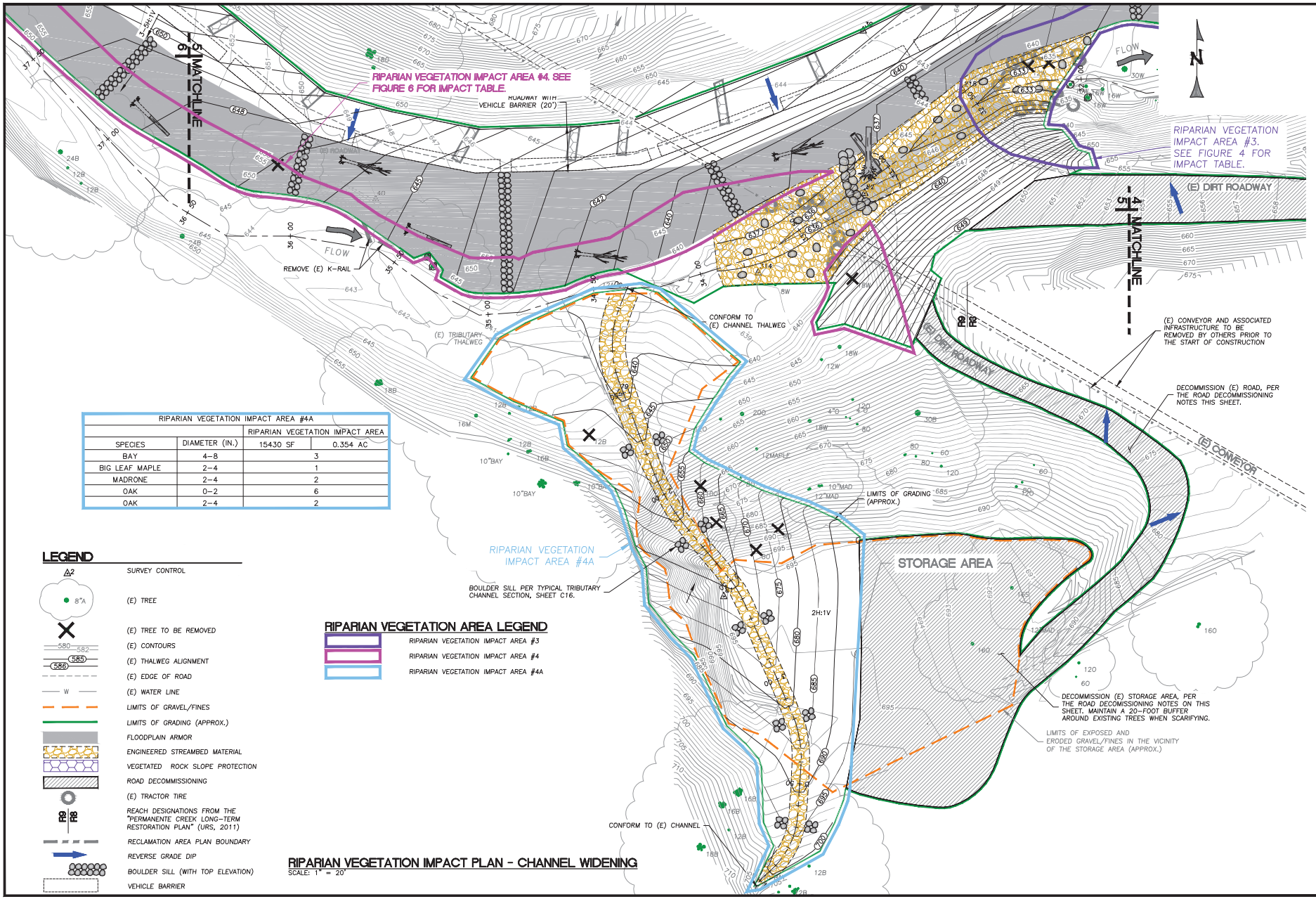
PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
4




| RIPARIAN VEGETATION IMPACT AREA #4A | | | |
|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT AREA | |
| SPECIES | DIAMETER (IN.) | 15430 SF | 0.354 AC |
| BAY | 4–8 | 3 | |
| BIG LEAF MAPLE | 2–4 | 1 | |
| MADRONE | 2–4 | 2 | |
| OAK | 0–2 | 6 | |
| OAK | 2–4 | 2 | |

## LEGEND

- SURVEY CONTROL
- (E) TREE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- LIMITS OF GRAVEL/FINES
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING
- (E) TRACTOR TIRE
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #3
- RIPARIAN VEGETATION IMPACT AREA #4
- RIPARIAN VEGETATION IMPACT AREA #4A

## RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

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PREPARED AT THE REQUEST OF:
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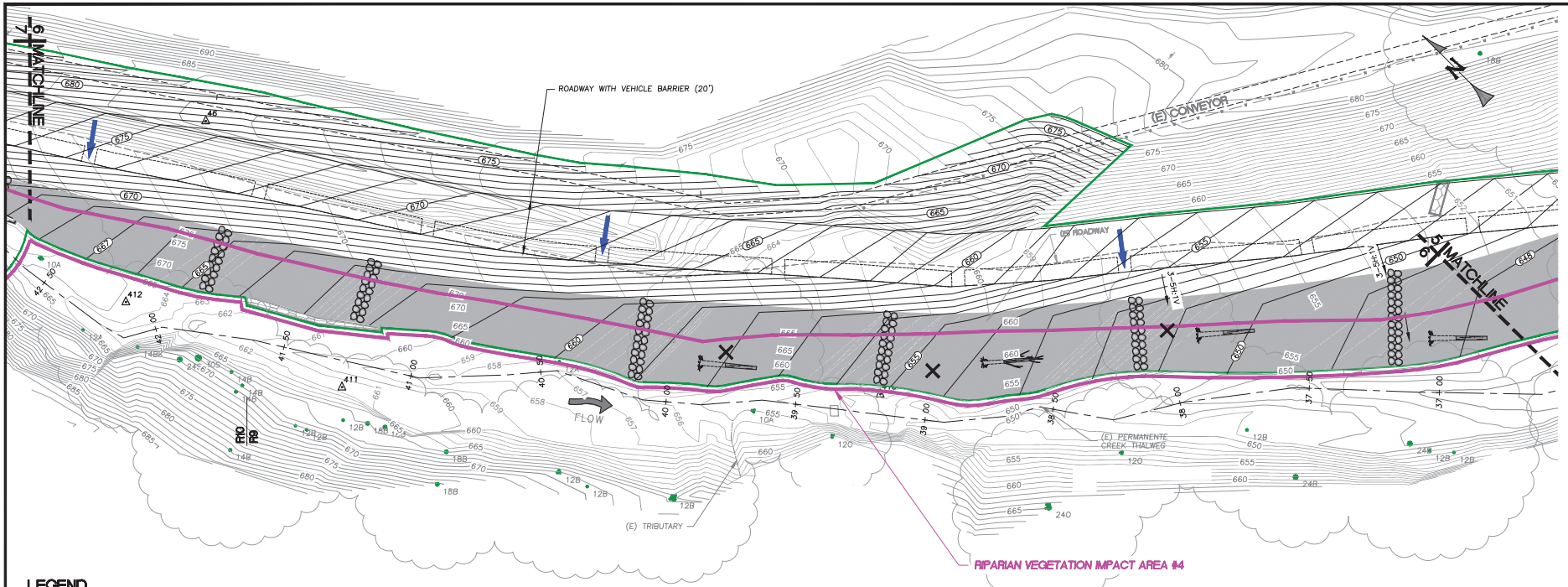
PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
5




## RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING

SCALE: 1" = 20'

### LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- RECLAMATION AREA PLAN BOUNDARY
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

### RIPARIAN VEGETATION AREA LEGEND

RIPARIAN VEGETATION IMPACT AREA #4

| RIPARIAN VEGETATION IMPACT AREA #4 | | | |
|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT AREA | |
| SPECIES | DIAMETER (IN.) | 24,715 SF | 0.57 AC |
| ALDER | 2-4 | 1 | |
| BAY | 2-4 | 1 | |
| BIG LEAF MAPLE | 2-4 | 5 | |
| BIG LEAF MAPLE | 4-8 | 1 | |
| BUCKEYE SAPPLING | 0-2 | 5 | |
| COFFEEBERRY | 0-2 | 1 | |
| ELDERBERRY | 0-2 | 7 | |
| ELDERBERRY | 4-6 | 1 | |
| OAK SAPPLING | <1 | 12 | |
| OAK | 0-2 | 5 | |
| OAK | 2-4 | 3 | |
| SYCAMORE | 32 | 1 | |
| TOYON | 0-2 | 9 | |
| WALNUT | 0-2 | 1 | |
| WILLOW | 0-4 | 3 | |
| WILLOW | 4-8 | 14 | |
| WILLOW | 8-12 | 9 | |
| WILLOW | 24+ | 1 | |

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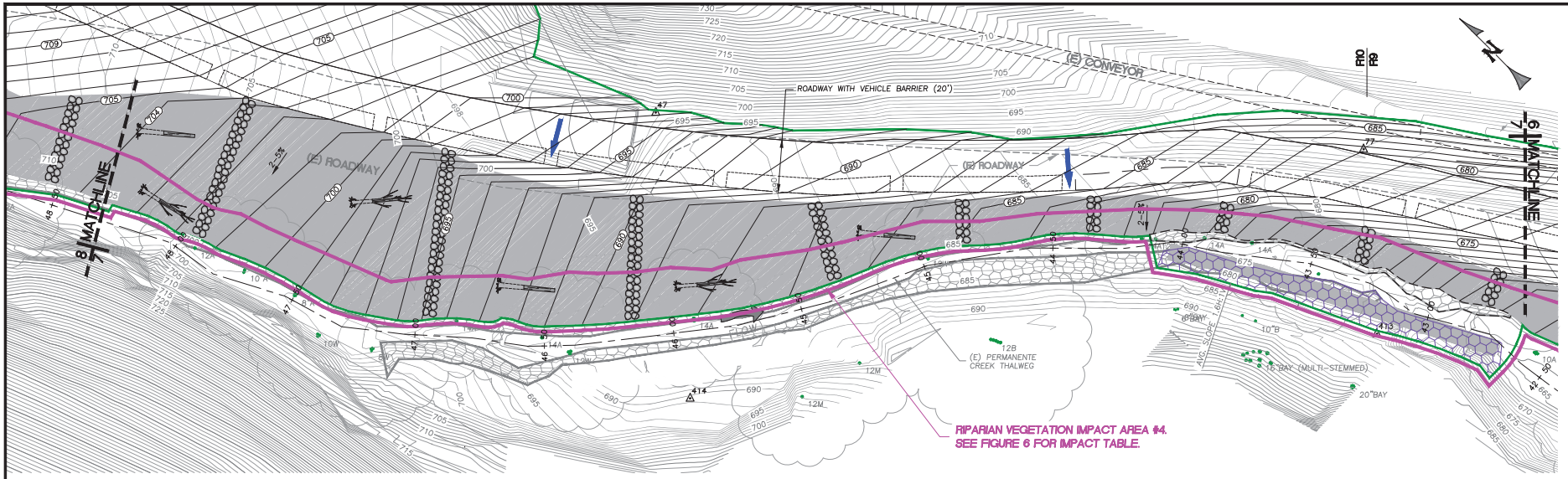
PERMANENTE CREEK RESTORATION PLAN

RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
6




RIPARIAN VEGETATION IMPACT PLAN - CHANNEL WIDENING
SCALE:1" = 20'

## LEGEND

- SURVEY CONTROL
- (E) TREE AND DRIPLINE
- (E) TREE TO BE REMOVED
- (E) CONTOURS
- PROPOSED CONTOURS
- (E) THALWEG ALIGNMENT
- (E) EDGE OF ROAD
- (E) WATER LINE
- (E) STORM DRAIN LINE
- (E) EXPOSED ROCK SLOPE PROTECTION
- LIMITS OF GRADING (APPROX.)
- FLOODPLAIN ARMOR
- ENGINEERED STREAMBED MATERIAL
- VEGETATED ROCK SLOPE PROTECTION
- ROAD DECOMMISSIONING AREA
- REACH DESIGNATIONS FROM THE "PERMANENTE CREEK LONG-TERM RESTORATION PLAN" (URS, 2011)
- REVERSE GRADE DIP
- BOULDER SILL (WITH TOP ELEVATION)
- VEHICLE BARRIER

## RIPARIAN VEGETATION AREA LEGEND

RIPARIAN VEGETATION IMPACT AREA #4

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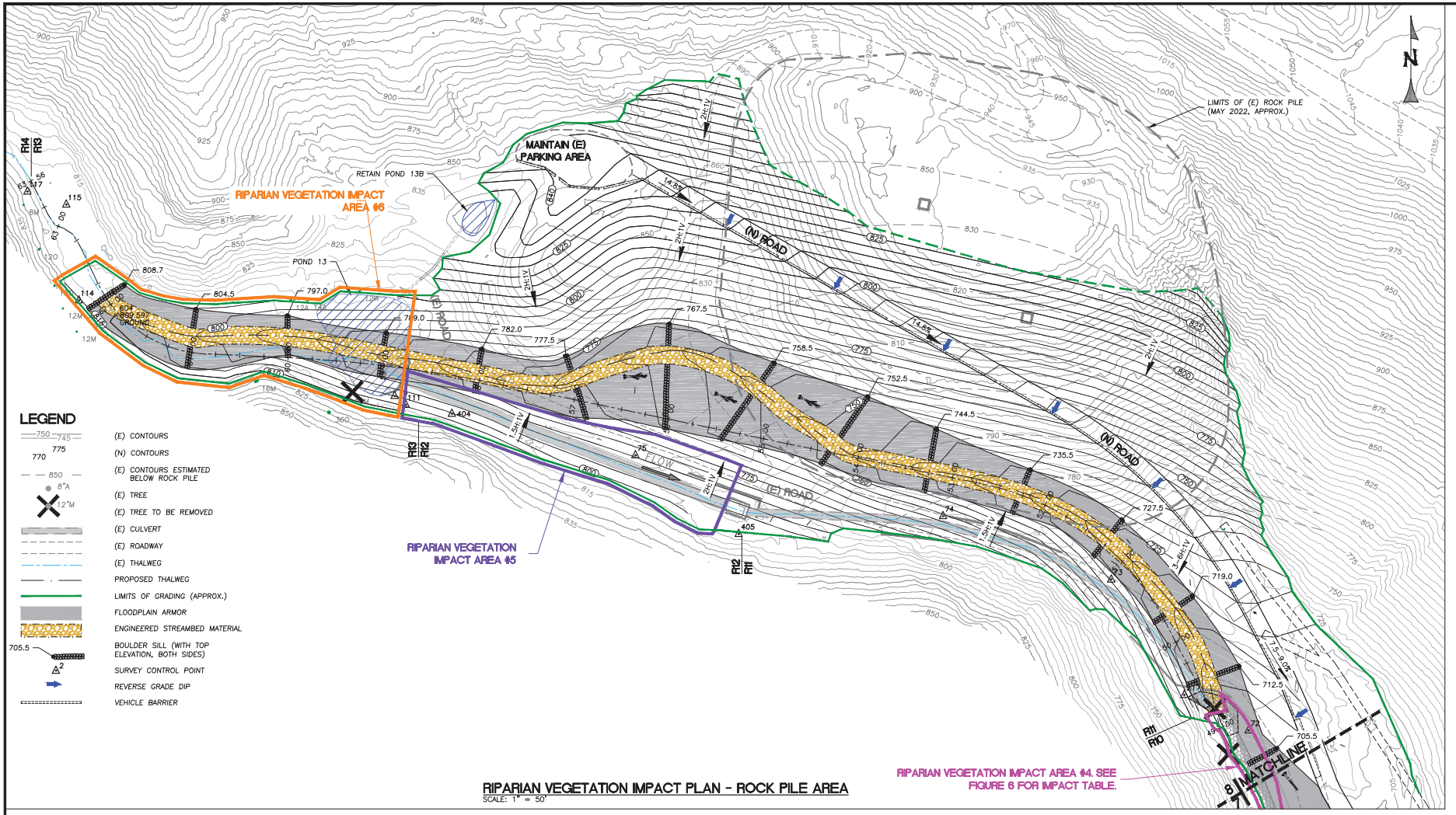
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
7




## RIPARIAN VEGETATION IMPACT PLAN - ROCK PILE AREA

SCALE: 1" = 50'

| RIPARIAN VEGETATION IMPACT AREA #5 | | | |
|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT AREA | |
| SPECIES | DIAMETER (IN.) | 19050 SF | 0.437 AC |
| BIG LEAF MAPLE | 0–2 | 1 | |
| WILLOW | 0–4 | 1 | |

### RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #4
- RIPARIAN VEGETATION IMPACT AREA #5
- RIPARIAN VEGETATION IMPACT AREA #6

| RIPARIAN VEGETATION IMPACT AREA #6 | | | |
|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT AREA | |
| SPECIES | DIAMETER (IN.) | 29200 SF | 0.670 AC |
| BIG LEAF MAPLE | 0–2 | 1 | |
| ELDERBERRY | 0–2 | 5 | |
| WILLOW | 0–4 | 26 | |
| WILLOW | 4–8 | 6 | |
| WILLOW | 8–12 | 9 | |

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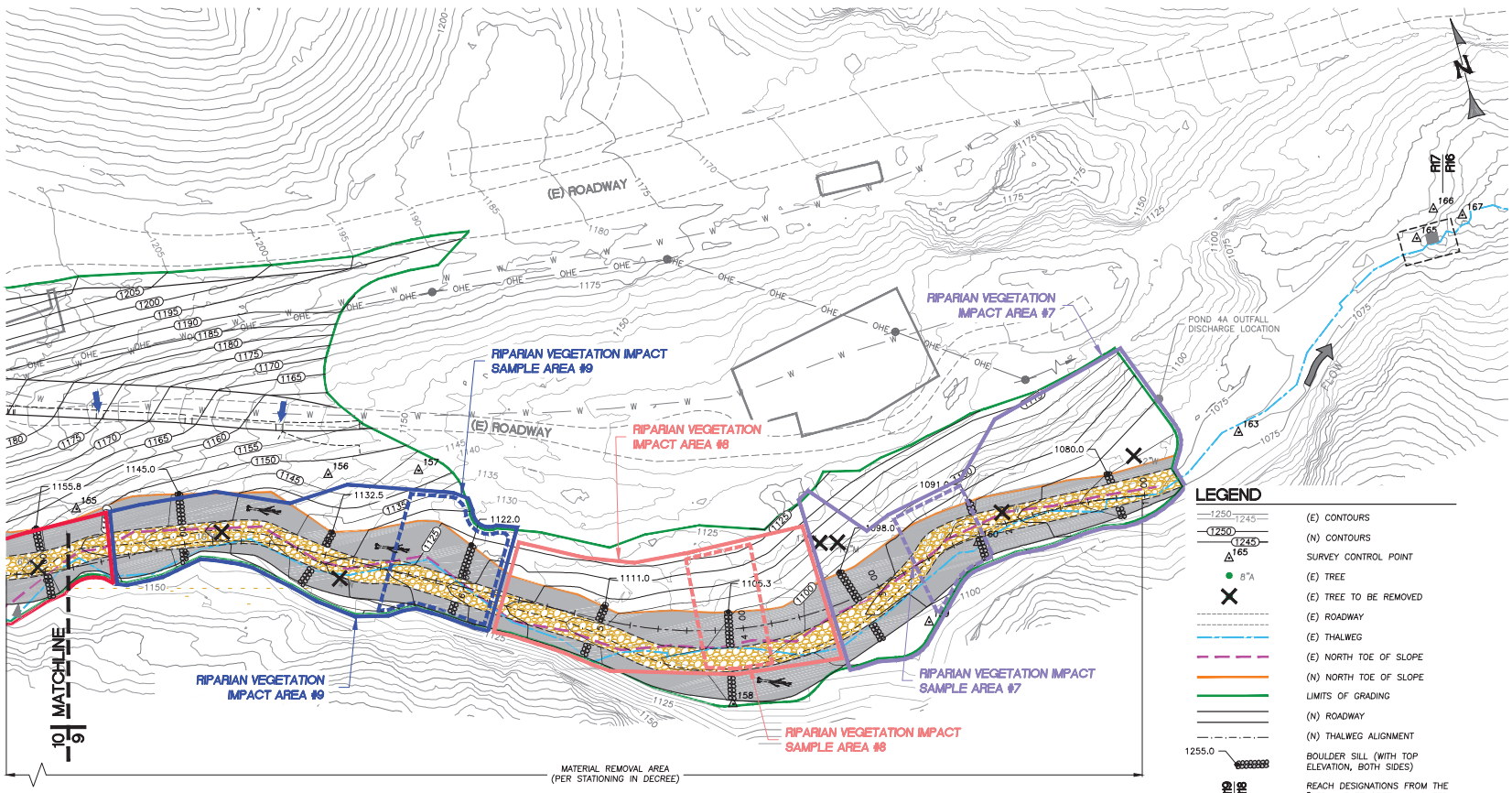
RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
8




## RIPARIAN VEGETATION IMPACT PLAN (1 OF 2) - MATERIAL REMOVAL AREA

SCALE: 1" = 40'

| RIPARIAN VEGETATION IMPACT AREA #7 | | | | | |
|---|---|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
| | | 3495 SF | 0.080 AC | 24540 SF | 0.563 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| BIG LEAF MAPLE | 4–6 | 1 | | 8 | |
| BIG LEAF MAPLE | 6–8 | 3 | | 23 | |
| CEANOTHUS | 0–2 | 1 | | 8 | |
| MADRONE | 2–4 | 1 | | 8 | |
| TOYONE | 0–2 | 3 | | 23 | |
| WILLOW | 0–4 | 6 | | 47 | |

| RIPARIAN VEGETATION IMPACT AREA #8 | | | | | |
|---|---|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
| | | 3,995 SF | 0.091 AC | 18,310 SF | 0.420 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| BAY | 0–2 | 3 | | 14 | |
| BIG LEAF MAPLE | 0–2 | 2 | | 9 | |
| MADRONE | 0–2 | 3 | | 14 | |
| MADRONE | 2–4 | 2 | | 9 | |
| TOYONE | 0–2 | 1 | | 5 | |
| WILLOW | 0–4 | 9 | | 41 | |

| RIPARIAN VEGETATION IMPACT AREA #9 | | | | | |
|---|---|---|---|---|---|
| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
| | | 5,945 SF | 0.136 AC | 18,775 SF | 0.431 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| WILLOW | 0–4 | 24 | | 76 | |
| WILLOW | 4–8 | 9 | | 28 | |

### RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #7
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #7
- RIPARIAN VEGETATION IMPACT AREA #8
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #8
- RIPARIAN VEGETATION IMPACT AREA #9
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #9

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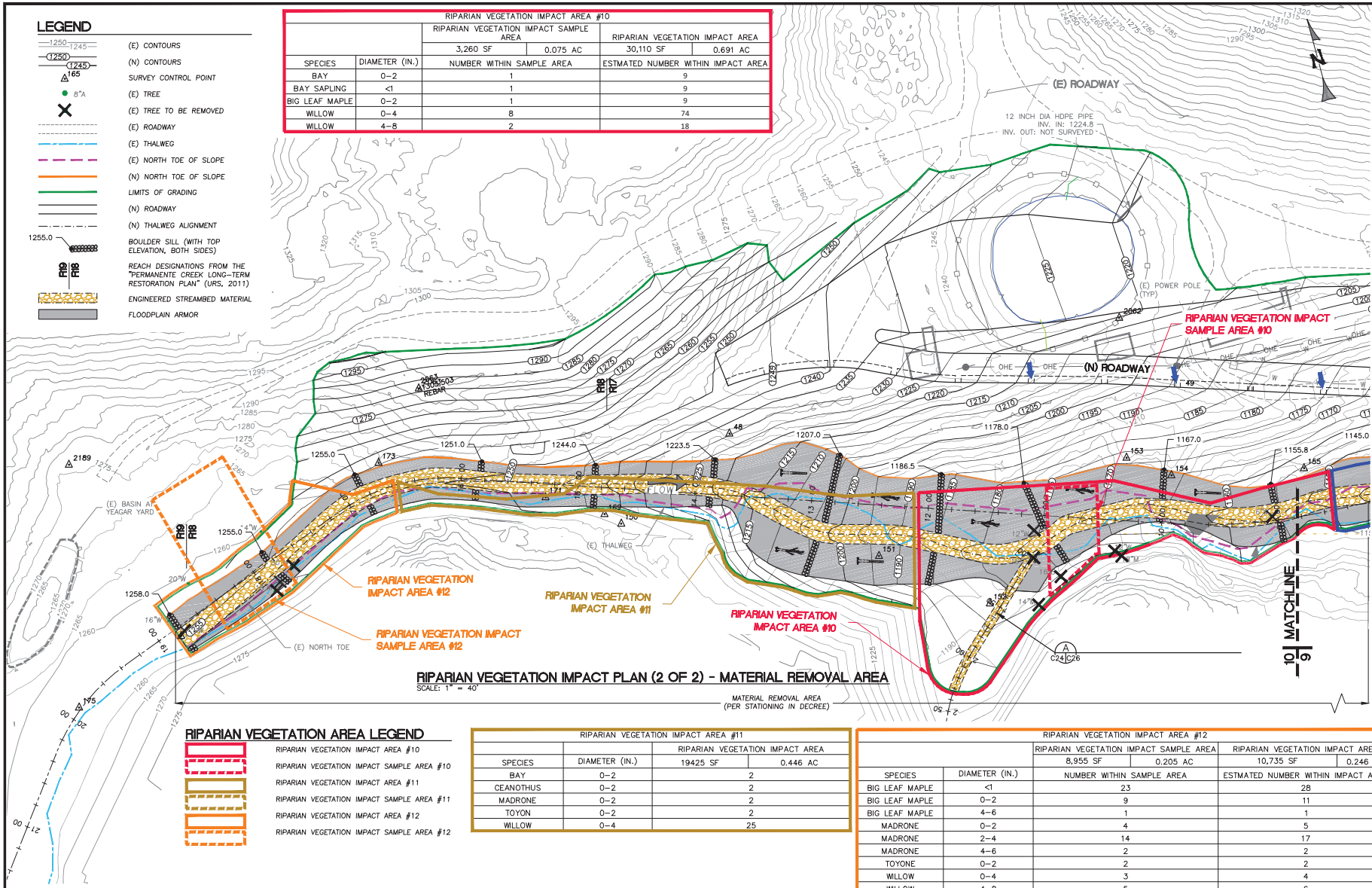
RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

0 1"

FIGURE 9




RIPARIAN VEGETATION IMPACT AREA #10

| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
|---|---|---|---|---|---|
| | | 3,260 SF | 0.075 AC | 30,110 SF | 0.691 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| BAY | 0–2 | 1 | | 9 | |
| BAY SAPLING | <1 | 1 | | 9 | |
| BIG LEAF MAPLE | 0–2 | 1 | | 9 | |
| WILLOW | 0–4 | 8 | | 74 | |
| WILLOW | 4–8 | 2 | | 18 | |

RIPARIAN VEGETATION AREA LEGEND

- RIPARIAN VEGETATION IMPACT AREA #10
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #10
- RIPARIAN VEGETATION IMPACT AREA #11
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #11
- RIPARIAN VEGETATION IMPACT AREA #12
- RIPARIAN VEGETATION IMPACT SAMPLE AREA #12

RIPARIAN VEGETATION IMPACT AREA #11

| | | RIPARIAN VEGETATION IMPACT AREA | |
|---|---|---|---|
| | | 19425 SF | 0.446 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | |
| BAY | 0–2 | 2 | |
| CEANOTHUS | 0–2 | 2 | |
| MADRONE | 0–2 | 2 | |
| TOYON | 0–2 | 2 | |
| WILLOW | 0–4 | 25 | |

RIPARIAN VEGETATION IMPACT AREA #12

| | | RIPARIAN VEGETATION IMPACT SAMPLE AREA | | RIPARIAN VEGETATION IMPACT AREA | |
|---|---|---|---|---|---|
| | | 8,955 SF | 0.205 AC | 10,735 SF | 0.246 AC |
| SPECIES | DIAMETER (IN.) | NUMBER WITHIN SAMPLE AREA | | ESTMATED NUMBER WITHIN IMPACT AREA | |
| BIG LEAF MAPLE | <1 | 23 | | 28 | |
| BIG LEAF MAPLE | 0–2 | 9 | | 11 | |
| BIG LEAF MAPLE | 4–6 | 1 | | 1 | |
| MADRONE | 0–2 | 4 | | 5 | |
| MADRONE | 2–4 | 14 | | 17 | |
| MADRONE | 4–6 | 2 | | 2 | |
| TOYONE | 0–2 | 2 | | 2 | |
| WILLOW | 0–4 | 3 | | 4 | |
| WILLOW | 4–8 | 5 | | 6 | |
| WILLOW | 8–12 | 7 | | 8 | |

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RIPARIAN VEGETATION IMPACT ASSESSMENT

BAR IS ONE INCH ON ORIGINAL DRAWING
ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIGURE
10

# Appendix F

## Energy: Fuel Use Calculations

## SEIR Fuel Use Summary Tables

**2012 EIR**

| Scenario | Diesel | Gasoline |
|---|---|---|
| Baseline Fuel Use | 822,554 | 12,615 |
| Reclamation Plan Amendment Phase 1 Fuel Use | 2,327,866 | 7,933 |
| Maximum Annual Incremental Change | 1,505,312 | -4,682 |
| Percent Incremental Change | 183% | -37% |

**PCRP Fuel Use**

| Scenario | Diesel | Gasoline |
|---|---|---|
| Reclamation Plan Amendment Incremental Change Disclosed in 2012 EIR[a] | 1,505,312 | -4,682 |
| PCRP Fuel Use not Evaluated in the 2012 EIR | 38,077 | 898 |
| Net Fuel Use | 1,543,389 | -3,784 |
| Percent Incremental Change | 2.5% | 19.2% |

## PCRP Construction Fuel Use Estimates

**Total Fuel Use During Contruction**

| Fuel Type | Fuel Consumed (gal/proj) | Fuel Consumed (av. gal/yr) | Gallons Sold in Santa Clara County in 2020 | % Project gallons comp. to Co. gallons |
|---|---|---|---|---|
| Gasoline | 5,388 | 898 | 511,000,000 | 0.00018% |
| Diesel | 228,462 | 38,077 | 71,000,000 | 0.054% |

**Diesel Fuel Use for Off-road Construction Equipment**

| Phase Name | Equipment Type | HP | Units | Hours/day | Days | Total Hours | Use Factor (Gal/hr) | Total Gallons | Applicability Factors | Gallons Covered in SEIR |
|---|---|---|---|---|---|---|---|---|---|---|
| | Concrete/Industrial Saws | 81 | 1 | 0.2 | 132 | 26.4 | 1.75 | 46 | 100% | 46 |
| Concrete Channel | | | | | | | | | | |
| | Excavators | 286 | 1 | 2.9 | 132 | 382.8 | 6.45 | 2,470 | | |
| | Excavators | 108 | 1 | 1.4 | 132 | 184.8 | 1.60 | 295 | | |
| | Off-Highway Trucks | 402 | 1 | 0.3 | 132 | 39.6 | 7.40 | 293 | | |
| | Off-Highway Trucks | 452 | 1 | 5.4 | 132 | 712.8 | 7.40 | 5,274 | | |
| | Off-Highway Trucks | 402 | 1 | 0.1 | 132 | 13.2 | 7.40 | 98 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 132 | 237.6 | 7.40 | 1,758 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.6 | 132 | 79.2 | 7.34 | 582 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.2 | 132 | 26.4 | 5.93 | 157 | | |
| Channel Widening | Rubber Tired Loaders | 110 | 1 | 2.9 | 132 | 382.8 | 1.59 | 610 | | |
| (Phase 1) | Total | | | | | 2,059 | | 11,536 | 89% | 10,267 |
| | Excavators | 286 | 1 | 8.7 | 132 | 1148.4 | 6.46 | 7,420 | | |
| | Excavators | 108 | 1 | 4.3 | 132 | 567.6 | 1.60 | 906 | | |
| | Off-Highway Trucks | 402 | 1 | 0.4 | 132 | 52.8 | 7.39 | 390 | | |
| | Off-Highway Trucks | 452 | 1 | 23 | 132 | 3036 | 7.39 | 22,450 | | |
| | Off-Highway Trucks | 402 | 1 | 0.1 | 132 | 13.2 | 7.39 | 98 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 132 | 237.6 | 7.39 | 1,757 | | |
| | Rollers | 156 | 1 | 0.4 | 132 | 52.8 | 2.79 | 147 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.9 | 132 | 118.8 | 7.34 | 872 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.4 | 132 | 52.8 | 5.94 | 314 | | |
| Rock Pile Area (Phase | Rubber Tired Loaders | 110 | 1 | 1.4 | 132 | 184.8 | 1.59 | 294 | | |
| 1) | Total | | | | | 5,465 | | 34,647 | 89% | 30,836 |
| | Excavators | 286 | 1 | 8.7 | 132 | 1148.4 | 6.46 | 7,422 | | |
| | Excavators | 108 | 1 | 4.3 | 132 | 567.6 | 1.60 | 906 | | |
| | Off-Highway Trucks | 402 | 1 | 0.4 | 132 | 52.8 | 7.40 | 391 | | |
| | Off-Highway Trucks | 452 | 1 | 23 | 132 | 3036 | 7.40 | 22,467 | | |
| | Off-Highway Trucks | 402 | 1 | 0.1 | 132 | 13.2 | 7.40 | 98 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 132 | 237.6 | 7.40 | 1,758 | | |
| | Rollers | 156 | 1 | 0.4 | 132 | 52.8 | 2.79 | 147 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.9 | 132 | 118.8 | 7.33 | 870 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.4 | 132 | 52.8 | 5.94 | 314 | | |
| Rock Pile Area (Phase | Rubber Tired Loaders | 110 | 1 | 1.4 | 132 | 184.8 | 1.59 | 295 | | |
| 2) | Total | | | | | 5,465 | | 34,667 | 89% | 30,854 |
| | Excavators | 286 | 1 | 2.9 | 132 | 382.8 | 6.46 | 2,475 | | |
| | Excavators | 108 | 1 | 1.4 | 132 | 184.8 | 1.60 | 295 | | |
| | Off-Highway Trucks | 402 | 1 | 0.3 | 132 | 39.6 | 7.40 | 293 | | |
| | Off-Highway Trucks | 452 | 1 | 5.4 | 132 | 712.8 | 7.40 | 5,272 | | |
| | Off-Highway Trucks | 402 | 1 | 0.1 | 132 | 13.2 | 7.40 | 98 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 132 | 237.6 | 7.40 | 1,757 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.6 | 132 | 79.2 | 7.33 | 580 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.2 | 132 | 26.4 | 5.94 | 157 | | |
| Channel Widening | Rubber Tired Loaders | 110 | 1 | 2.9 | 132 | 382.8 | 1.59 | 610 | | |
| (Phase 2) | Total | | | | | 2,059 | | 11,537 | 89% | 10,268 |
| Old Crusher | Generator Sets | 84 | 1 | 0.3 | 130 | 39 | 1.75 | 68 | | |
| Foundation | Total | | | | | 39 | | 68 | 0% | 0 |
| | Excavators | 286 | 1 | 7.5 | 130 | 975 | 6.46 | 6,299 | | |
| | Excavators | 108 | 1 | 3.7 | 130 | 481 | 1.60 | 769 | | |
| | Off-Highway Trucks | 402 | 1 | 0.3 | 130 | 39 | 7.39 | 288 | | |
| | Off-Highway Trucks | 452 | 1 | 20.2 | 130 | 2626 | 7.39 | 19,416 | | |
| | Off-Highway Trucks | 402 | 1 | 0.2 | 130 | 26 | 7.39 | 192 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 130 | 234 | 7.39 | 1,730 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.9 | 130 | 117 | 7.32 | 857 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.4 | 130 | 52 | 5.93 | 308 | | |
| Material Removal | Rubber Tired Loaders | 110 | 1 | 1.1 | 130 | 143 | 1.59 | 228 | | |
| Area (Phase 1) | Total | | | | | 4,693 | | 30,087 | 20% | 6,017 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Excavators | 286 | 1 | 7.5 | 131 | 982.5 | 6.46 | 6,348 | | |
| | Excavators | 108 | 1 | 3.7 | 131 | 484.7 | 1.60 | 774 | | |
| | Off-Highway Trucks | 402 | 1 | 0.3 | 131 | 39.3 | 7.40 | 291 | | |
| | Off-Highway Trucks | 452 | 1 | 20 | 131 | 2620 | 7.40 | 19,378 | | |
| | Off-Highway Trucks | 402 | 1 | 0.2 | 131 | 26.2 | 7.40 | 194 | | |
| | Off-Highway Trucks | 402 | 1 | 1.8 | 131 | 235.8 | 7.40 | 1,744 | | |
| | Rubber Tired Dozers | 347 | 1 | 0.9 | 131 | 117.9 | 7.32 | 863 | | |
| | Rubber Tired Loaders | 393 | 1 | 0.4 | 131 | 52.4 | 5.93 | 310 | | |
| Material Removal | Rubber Tired Loaders | 110 | 1 | 1.1 | 131 | 144.1 | 1.60 | 230 | | |
| Area (Phase 2) | Total | | | | | 4,703 | | 30,132 | 20% | 6,026 |
| | | | | | Total Hours | 24,509 | Total | 152,721 | Total | 94,315 |
| fuel use rates derived from the Off-road 2011 model. | | | | | Ave. Gal/hr | 6.23 | Ave. Gal./yr. | 25,453 | Ave. Gal./yr. | 15,719 |

**Fuel Use for Vehicles During Construction**

| Trip Type | Total Miles | Vehicle Type | Fuel Type | miles /gallon | Gallon /project | Ave. Gal. Year |
|---|---|---|---|---|---|---|
| Worker Trips | 91,599 | light-duty vehicles | gasoline | 17 | 5,388 | 898 |
| Vendor Trips | 767,193 | heavy-duty trucks | diesel | 6 | 127,866 | 21,311 |
| Haul Trips | 37,694 | heavy-duty trucks | diesel | 6 | 6,282 | 1,047 |
| Total | 804,887 | | | | 134,148 | 22,358 |

Fuel economy obtained from U.S. Energy Information Administration, 2021.

**Total Worker, Vendor, and Haul Trip Mileage**

| Phases | # of Worker Trips | Worker Trip Distance (mi) | Total Worker Trip Miles | Total # of Vendor Trips | Vendor Trip Distance (mi) | Total Vendor Trip Miles | Total # of Haul Trips | Haul Trip Distance (mi) | Total Haul Trip Miles |
|---|---|---|---|---|---|---|---|---|---|
| Concrete Channel | 1,056 | 10.8 | 11,405 | 3,300 | 6.6 | 21,780 | 2 | 20 | 40 |
| Channel Widening (Phase 1) | 1,584 | 10.8 | 17,107 | 28,512 | 6.6 | 188,179 | 172 | 20 | 3,440 |
| Rock Pile Area (Phase 1) | 2,112 | 10.8 | 22,810 | 28,512 | 6.6 | 188,179 | 740 | 20 | 14,800 |
| Rock Pile Area (Phase 2) | 2,112 | 10.8 | 22,810 | 28,512 | 6.6 | 188,179 | 741 | 20 | 14,820 |
| Channel Widening (Phase 2) | 1,584 | 10.8 | 17,107 | 28,512 | 6.6 | 188,179 | 172 | 20 | 3,440 |
| Old Crusher Foundation | 1,040 | 10.8 | 11,232 | 3,250 | 6.6 | 21,450 | 2 | 20 | 40 |
| Material Removal Area (Phase 1) | 2,080 | 10.8 | 22,464 | 28,080 | 6.6 | 185,328 | 638 | 20 | 12,760 |
| Material Removal Area (Phase 2) | 2,096 | 10.8 | 22,637 | 28,296 | 6.6 | 186,754 | 638 | 20 | 12,760 |
| | | Total | 147,571 | | Total | 1,168,028 | | Total | 62,100 |

**Worker, Vendor, and Haul Trip Mileage Covered In SEIR**

| Phases | Applicability Factors | Worker Trip Miles | Total Vendor Trip Miles | Total Haul Trip Miles |
|---|---|---|---|---|
| Concrete Channel | 100% | 11,405 | 21,780 | 40 |
| Channel Widening (Phase 1) | 89% | 15,253 | 167,781 | 3,067 |
| Rock Pile Area (Phase 1) | 89% | 20,337 | 167,781 | 13,196 |
| Rock Pile Area (Phase 2) | 89% | 20,337 | 167,781 | 13,214 |
| Channel Widening (Phase 2) | 89% | 15,225 | 167,479 | 3,062 |
| Old Crusher Foundation | 0% | 0 | 0 | 0 |
| Material Removal Area (Phase 1) | 20% | 4,493 | 37,066 | 2,552 |
| Material Removal Area (Phase 2) | 20% | 4,549 | 37,526 | 2,564 |
| | Total | 91,599 | 767,193 | 37,694 |
| | Average/year | 15,266 | 127,866 | 6,282 |

## Offroad 2011 Fuel Consumption Factors

| Calendar Year | Equipment Type | HP Bin | BSFC (lbs/yr) | Activity (hrs/yr) | BSFC (gal/hr)* |
|---|---|---|---|---|---|
| 2024 | Excavators | 120 | 2382474.55 | 209941.9666 | 1.60 |
| 2024 | Excavators | 175 | 5017341.45 | 244930.297 | 2.88 |
| 2024 | Excavators | 500 | 10563913.4 | 230487.3669 | 6.45 |
| 2024 | Off-Highway Trucks | 120 | 89020.1088 | 7399.999991 | 1.69 |
| 2024 | Off-Highway Trucks | 175 | 1723353.38 | 77681.16287 | 3.12 |
| 2024 | Off-Highway Trucks | 500 | 14993283.4 | 285330.4598 | 7.40 |
| 2024 | Other Construction Equipment | 120 | 1287076.57 | 103494.6561 | 1.75 |
| 2024 | Other Construction Equipment | 175 | 699023.789 | 30229.63231 | 3.26 |
| 2024 | Other Construction Equipment | 500 | 3069645.17 | 55898.36967 | 7.73 |
| 2024 | Rollers | 120 | 1612454.27 | 134256.9613 | 1.69 |
| 2024 | Rollers | 175 | 1667105.86 | 84212.72837 | 2.79 |
| 2024 | Rollers | 500 | 166075.702 | 3557.537695 | 6.57 |
| 2024 | Rubber Tired Dozers | 120 | 216765.534 | 18085.6323 | 1.69 |
| 2024 | Rubber Tired Dozers | 175 | 180777.608 | 8299.258826 | 3.07 |
| 2024 | Rubber Tired Dozers | 500 | 2159941.65 | 41407.77582 | 7.34 |
| 2024 | Rubber Tired Loaders | 120 | 3493355.99 | 308830.4764 | 1.59 |
| 2024 | Rubber Tired Loaders | 175 | 8266086.66 | 416531.0278 | 2.79 |
| 2024 | Rubber Tired Loaders | 500 | 14894333.4 | 353531.5345 | 5.93 |
| 2025 | Excavators | 120 | 2483473.15 | 219145.1416 | 1.60 |
| 2025 | Excavators | 175 | 5238044.58 | 255667.2469 | 2.88 |
| 2025 | Excavators | 500 | 11040631.7 | 240591.1855 | 6.46 |
| 2025 | Off-Highway Trucks | 120 | 92947.0812 | 7724.391991 | 1.69 |
| 2025 | Off-Highway Trucks | 175 | 1797903.89 | 81086.45311 | 3.12 |
| 2025 | Off-Highway Trucks | 500 | 15642289.3 | 297838.4218 | 7.39 |
| 2025 | Other Construction Equipment | 120 | 1345270.34 | 108031.5262 | 1.75 |
| 2025 | Other Construction Equipment | 175 | 730130.585 | 31554.80135 | 3.26 |
| 2025 | Other Construction Equipment | 500 | 3202945.07 | 58348.77291 | 7.73 |
| 2025 | Rollers | 120 | 1682584.19 | 140142.351 | 1.69 |
| 2025 | Rollers | 175 | 1740030.36 | 87904.34127 | 2.79 |
| 2025 | Rollers | 500 | 173237.338 | 3713.48861 | 6.57 |
| 2025 | Rubber Tired Dozers | 120 | 226276.696 | 18878.44776 | 1.69 |
| 2025 | Rubber Tired Dozers | 175 | 188936.716 | 8663.071417 | 3.07 |
| 2025 | Rubber Tired Dozers | 500 | 2253205.11 | 43222.95842 | 7.34 |
| 2025 | Rubber Tired Loaders | 120 | 3647194.69 | 322368.6029 | 1.59 |
| 2025 | Rubber Tired Loaders | 175 | 8630329.36 | 434790.3972 | 2.79 |
| 2025 | Rubber Tired Loaders | 500 | 15568162.8 | 369029.2104 | 5.94 |
| 2026 | Excavators | 120 | 2591442.01 | 228504.9154 | 1.60 |
| 2026 | Excavators | 175 | 5462016.15 | 266586.8939 | 2.88 |

| | | | | | |
|---|---|---|---|---|---|
| 2026 | Excavators | 500 | 11515501.6 | 250866.9282 | 6.46 |
| 2026 | Off-Highway Trucks | 120 | 96944.7147 | 8054.303763 | 1.69 |
| 2026 | Off-Highway Trucks | 175 | 1875190.78 | 84549.68691 | 3.12 |
| 2026 | Off-Highway Trucks | 500 | 16322595.4 | 310559.2161 | 7.40 |
| 2026 | Other Construction Equipment | 120 | 1401498 | 112645.5945 | 1.75 |
| 2026 | Other Construction Equipment | 175 | 761842.783 | 32902.51913 | 3.26 |
| 2026 | Other Construction Equipment | 500 | 3336321.85 | 60840.87158 | 7.72 |
| 2026 | Rollers | 120 | 1755255.54 | 146127.8851 | 1.69 |
| 2026 | Rollers | 175 | 1814559.92 | 91658.7697 | 2.79 |
| 2026 | Rollers | 500 | 180853.245 | 3872.093145 | 6.58 |
| 2026 | Rubber Tired Dozers | 120 | 236020.086 | 19684.75357 | 1.69 |
| 2026 | Rubber Tired Dozers | 175 | 197018.768 | 9033.07455 | 3.07 |
| 2026 | Rubber Tired Dozers | 500 | 2344815.64 | 45069.0277 | 7.33 |
| 2026 | Rubber Tired Loaders | 120 | 3806308.06 | 336137.0907 | 1.59 |
| 2026 | Rubber Tired Loaders | 175 | 9000129.28 | 453360.4633 | 2.80 |
| 2026 | Rubber Tired Loaders | 500 | 16232006.7 | 384790.5908 | 5.94 |
| 2027 | Excavators | 120 | 2700174.9 | 238021.2881 | 1.60 |
| 2027 | Excavators | 175 | 5688373.9 | 277689.2382 | 2.88 |
| 2027 | Excavators | 500 | 11998108.3 | 261314.5948 | 6.46 |
| 2027 | Off-Highway Trucks | 120 | 101013.629 | 8389.735306 | 1.70 |
| 2027 | Off-Highway Trucks | 175 | 1952548.15 | 88070.86426 | 3.12 |
| 2027 | Off-Highway Trucks | 500 | 16993233.6 | 323492.8426 | 7.40 |
| 2027 | Other Construction Equipment | 120 | 1460007.22 | 117336.861 | 1.75 |
| 2027 | Other Construction Equipment | 175 | 793759.437 | 34272.78565 | 3.26 |
| 2027 | Other Construction Equipment | 500 | 3478075.38 | 63374.66569 | 7.73 |
| 2027 | Rollers | 120 | 1828246.75 | 152213.5634 | 1.69 |
| 2027 | Rollers | 175 | 1890065.25 | 95476.01368 | 2.79 |
| 2027 | Rollers | 500 | 188258.554 | 4033.351302 | 6.57 |
| 2027 | Rubber Tired Dozers | 120 | 245776.451 | 20504.54973 | 1.69 |
| 2027 | Rubber Tired Dozers | 175 | 205230.287 | 9409.268225 | 3.07 |
| 2027 | Rubber Tired Dozers | 500 | 2443145.2 | 46945.98367 | 7.33 |
| 2027 | Rubber Tired Loaders | 120 | 3963886.37 | 350135.9398 | 1.59 |
| 2027 | Rubber Tired Loaders | 175 | 9378124.74 | 472241.2262 | 2.80 |
| 2027 | Rubber Tired Loaders | 500 | 16908164.9 | 400815.6757 | 5.94 |
| 2028 | Excavators | 120 | 2811028.33 | 247694.2596 | 1.60 |
| 2028 | Excavators | 175 | 5917846.56 | 288974.2796 | 2.88 |
| 2028 | Excavators | 500 | 12477354.8 | 271934.1854 | 6.46 |
| 2028 | Off-Highway Trucks | 120 | 105633.348 | 8730.68662 | 1.70 |
| 2028 | Off-Highway Trucks | 175 | 2031019.67 | 91649.98515 | 3.12 |
| 2028 | Off-Highway Trucks | 500 | 17677794.3 | 336639.3015 | 7.39 |

| | | | | | |
|---|---|---|---|---|---|
| 2028 | Other Construction Equipment | 120 | 1517051.96 | 122105.3257 | 1.75 |
| 2028 | Other Construction Equipment | 175 | 825898.143 | 35665.6009 | 3.26 |
| 2028 | Other Construction Equipment | 500 | 3621617.41 | 65950.15523 | 7.73 |
| 2028 | Rollers | 120 | 1902839.13 | 158399.3861 | 1.69 |
| 2028 | Rollers | 175 | 1966997.16 | 99356.0732 | 2.79 |
| 2028 | Rollers | 500 | 196008.887 | 4197.26308 | 6.58 |
| 2028 | Rubber Tired Dozers | 120 | 255771.37 | 21337.83623 | 1.69 |
| 2028 | Rubber Tired Dozers | 175 | 213735.32 | 9791.652443 | 3.07 |
| 2028 | Rubber Tired Dozers | 500 | 2541630.05 | 48853.82632 | 7.32 |
| 2028 | Rubber Tired Loaders | 120 | 4126961.76 | 364365.1502 | 1.59 |
| 2028 | Rubber Tired Loaders | 175 | 9759645.79 | 491432.6859 | 2.80 |
| 2028 | Rubber Tired Loaders | 500 | 17575291.8 | 417104.4651 | 5.93 |
| 2029 | Excavators | 120 | 2920609.77 | 257523.8301 | 1.60 |
| 2029 | Excavators | 175 | 6152024.37 | 300442.0183 | 2.88 |
| 2029 | Excavators | 500 | 12974157.2 | 282725.7001 | 6.46 |
| 2029 | Off-Highway Trucks | 120 | 109475.078 | 9077.157706 | 1.70 |
| 2029 | Off-Highway Trucks | 175 | 2112104.61 | 95287.04959 | 3.12 |
| 2029 | Off-Highway Trucks | 500 | 18386173.7 | 349998.5926 | 7.40 |
| 2029 | Other Construction Equipment | 120 | 1577470.61 | 126950.9887 | 1.75 |
| 2029 | Other Construction Equipment | 175 | 858435.117 | 37080.96489 | 3.26 |
| 2029 | Other Construction Equipment | 500 | 3766804.22 | 68567.34022 | 7.73 |
| 2029 | Rollers | 120 | 1978544.96 | 164685.353 | 1.69 |
| 2029 | Rollers | 175 | 2044749.97 | 103298.9483 | 2.79 |
| 2029 | Rollers | 500 | 203736.564 | 4363.828478 | 6.57 |
| 2029 | Rubber Tired Dozers | 120 | 265928.995 | 22184.61308 | 1.69 |
| 2029 | Rubber Tired Dozers | 175 | 221958.579 | 10180.2272 | 3.07 |
| 2029 | Rubber Tired Dozers | 500 | 2639588.94 | 50792.55566 | 7.32 |
| 2029 | Rubber Tired Loaders | 120 | 4293373.85 | 378824.7219 | 1.60 |
| 2029 | Rubber Tired Loaders | 175 | 10154157.7 | 510934.8423 | 2.80 |
| 2029 | Rubber Tired Loaders | 500 | 18249807.6 | 433656.959 | 5.93 |

*There is 1.874 pounds/liter of diesel, and 3.79 liters/gallon.

Fuel use factors for San Francisco Bay Area Air Basin; BSFC = brake specific fuel consumption

# Appendix G
## Geology and Hydrology

# G1. Geotechnical and Geomorphic Assessment of Permanente Creek (Golder Associates, October 21, 2019)

# TECHNICAL MEMORANDUM

**DATE** October 31, 2019 **Project No.** 179018601

**TO** Erika Guerra, Talia Flagan
Lehigh Permanente

**CC** Brent Zacharia, Waterways Consulting, Inc.

**FROM** Robert Humphries; William Fowler, PG 4401, CEG 1401 **EMAIL bfowler@golder.com**

**GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK, LEHIGH HANSON PERMANENTE QUARRY, SANTA CLARA COUNTY, CA**

## 1.0 INTRODUCTION

This technical memorandum provides the results of our geologic and geomorphic assessment of the Permanente Creek Restoration Plan – 90% Level Submittal, Waterways Consulting, Inc., dated 11/15/18 and updated 10/31/19 (the Project). The focus of the study was to determine if there were any specific areas of the proposed project which require further subsurface geotechnical exploration and testing to refine the project restoration design, so as to respond to comments dated February 14, 2019 from the County of Santa Clara Planning Office ("County"). Specifically, this work focused on a field assessment of the proposed alignment and longitudinal gradient of the proposed stream channel and how it compares to existing conditions. Particular attention was placed on the Rock Pile and Material Removal Area and the proposed depth of excavations required and stability of the adjacent creek sideslopes.

The scope of work for our study included a desktop data review, and site reconnaissance and mapping of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design. The work product from our investigation includes a geologic map and cross sections of the project area, along with this technical memorandum. This memorandum includes:

- A brief presentation of the methods applied in this assessment
- A summary of pertinent supporting data from our previous investigations throughout the facility
- A geologic map and a description of the earth materials encountered along Permanente Creek
- A geologic and geomorphic assessment of the Permanente Creek channel profile
- A discussion of these results and their significance to the proposed Permanente Creek Restoration Plan
- Golder Associates Inc.'s (Golder) conclusions and recommendations regarding this assessment



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# 2.0 METHODS

## 2.1 Data Compilation and Review

Golder reviewed available existing data pertaining to the project including aerial photographs, historical USGS topographic and geologic maps, site boring logs, seismic data from previously completed work within the project area, the Waterways 90% plan set, and pertinent site and regional geologic data.

## 2.2 Site Reconnaissance

Golder conducted a site visit over three days from July 25 to 27, 2019. The field team consisted of three primary members, including a fluvial geomorphologist, a geohazards geologist, and a staff geologist. The field team was given a site orientation and tailgate safety briefing by a locally based senior technician with long term familiarity with the site and specific knowledge of creek access points and safety. Creek access is difficult, and locally hazardous, because of very steep terrain, heavy vegetation, and other obstacles such as loose rock, fallen trees, etc. This rugged terrain also severely limits access for drill rigs to many of the reaches of the creek.

Golder communicated with Waterways to discuss our initial opinions and received feedback as to what specific reaches or features needed further study, or have the most uncertainty, with respect to the 90% design effort to focus our field mapping efforts. The field mapping efforts focused on the reaches that include the following two areas: 1) Rockpile and 2) Material Removal Area. Note, however, that the entire project area was traversed on foot by the field reconnaissance team.

## 2.3 Field Mapping

The mapping focused on defining areas of mining disturbance, (e.g., overburden, roads, structures, etc.) versus native slopes and development of geologic cross sections in key locations (e.g., Rockpile and Materials Removal Area). The mapping also identified other pertinent geomorphic features such as native slope angles, natural shallow slides, areas of erosion, sediment accumulation, bedrock exposures, etc.

# 3.0 REGIONAL GEOLOGIC AND GEOMORPHIC SETTING

## 3.1 Bedrock Geologic Units

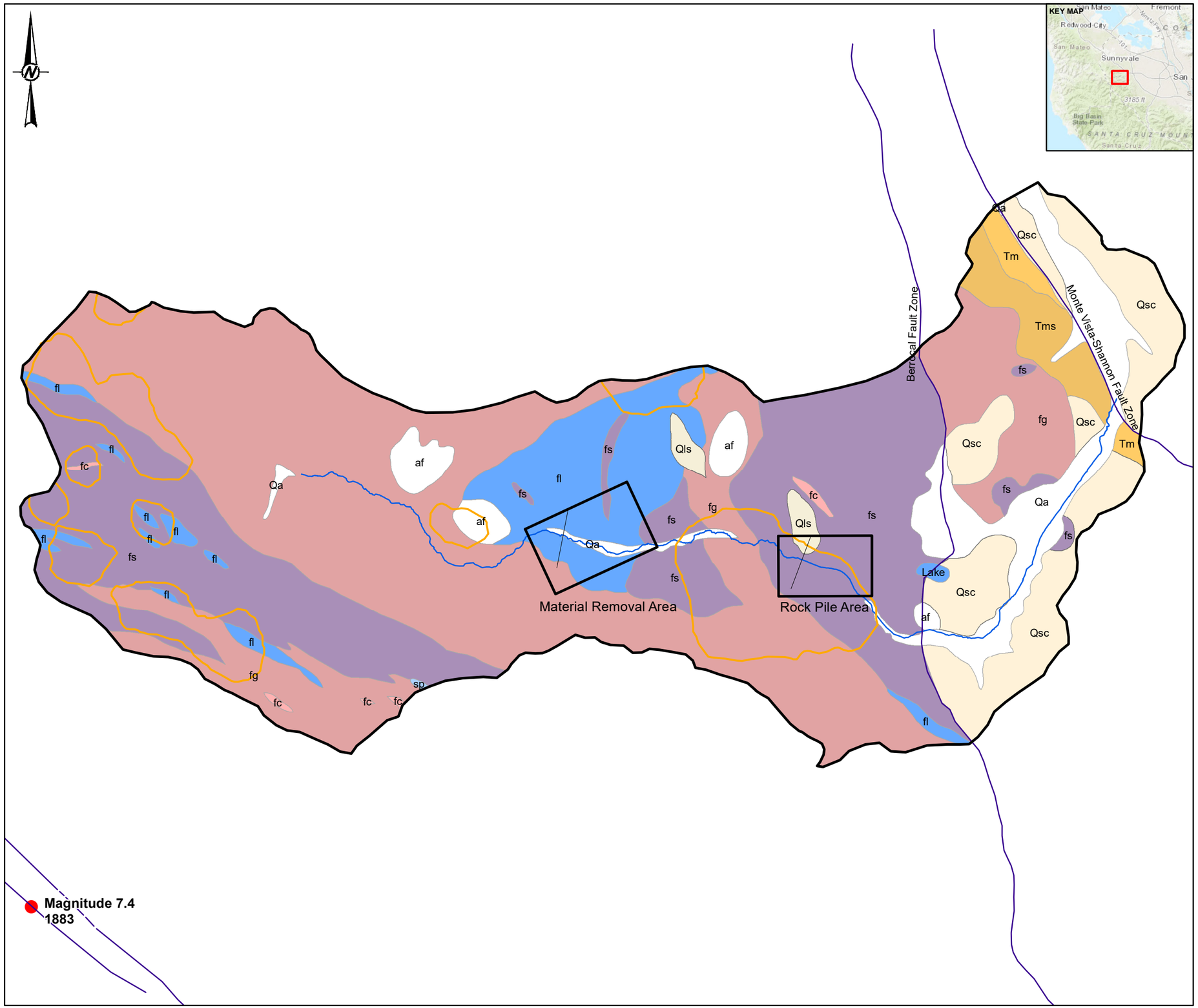
The bedrock materials exposed in the Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone), chert, and limestone. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the Quarry.

Golder has referenced two geologic map sources in our presentation of the geology of the Permanente Creek Basin (Figure 1). One set of maps comes from the Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b), and the other comes from the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have mapped the basin (Brabb 1970, Pulver 1979a and b).

## 3.2 Surficial Geologic Units

### 3.2.1 Overburden and Fill

Many of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden. These are generally described as side-cast fills that mantle existing canyon slopes and fill small




LEGEND

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Mostly Landslides
- Faults
- Earthquake Epicenter Location

**Geologic Units**

**UnitNam**

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

**NOTE(S)**
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

**REFERENCE(S)**

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY


CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK

TITLE
**GEOLOGIC MAP OF PERMANENTE CREEK BASIN**

CONSULTANT
GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

| PROJECT NO. | PHASE | REV. | FIGURE |
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drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness, starting at the Rock Pile Area and continuing up through the Material Removal Area. A large percentage of this material within the Project area will be removed as part of the restoration effort.

The Rock Pile area is comprised of stockpiled material for production. The character of the overburden is variable but generally consists of fine to coarse gravel to angular cobble sized rock fragments. Elsewhere, overburden is a heterogeneous mixture of fines, sand, gravel and cobble sized fragments (i.e., greenstone, graywacke, cherts, and soil materials) but with small percentages of limestone.

### 3.2.2 Alluvium

This includes modern unconsolidated alluvial deposits along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

### 3.2.3 Colluvium

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay.

### 3.2.4 Ancient Natural Landslide Deposits

Several large, ancient landslides have been mapped by various investigators in various areas of the 3,510-acre Lehigh property, and throughout the broader foothill's region (Figure 1). These landslides are generally described as possible old landslides and considered to be early Holocene or possibly late- Pleistocene features. These are naturally occurring landslides that are not related to any modern day mining activities. Along the south flank of Permanente Creek, two large landslides are identified by Sorg and McLaughlin (1975) while Rogers and Armstrong (1973) map only one of the landslide features.

The presence of these ancient landslides, as well as much smaller surficial slides that occur along the canyon walls, and in steep zero-order drainages that report to Permanent Creek, reflects the young, steep geologic terrain that comprises the Santa Cruz Mountains. The relatively thin surficial failures that are common in this terrain are to be expected going forward with this Project both from natural sources—like the zero-order drainages along the south canyon wall—and potentially from restored natural grades once overburden is removed as part of the Project. Note that one of the primary goals of the creek restoration program is to remove specified overburden and fill materials and restore, to the extent practicable, natural slope angles both along the longitudinal profile of the creek and transverse to the creek (i.e., the creek banks).

## 3.3 Faulting and Seismicity

The San Andreas Fault zone is located approximately two miles southwest of the Quarry (Figure 1). The Sargent-Berrocal Fault Zone (SBFZ), part of the Santa Cruz Mountains front-range thrust fault system, parallels the San Andreas to the east and forms the eastern-most structural boundary to the Permanente Terrain.

Near the Quarry, the SBFZ consists of two northwest-trending, sub-parallel faults, namely the northeastern-most Monta Vista Fault Zone and the southwestern-most Berrocal Fault Zone (Sorg and McLaughlin, 1975) (Figure 1).

The Monta Vista Fault Zone is located approximately 1 mile to the northeast of the Quarry. A strand of the Berrocal Fault Zone lies beneath the Permanente Cement Plant area to the south of the EMSA, and extends west to other portions of the Quarry (Mathieson, 1982; Sorg and McLaughlin, 1975).

Using the 2008 Update of the United States National Seismic Hazard Maps (Peterson, et.al., 2008), which incorporates the findings of the Next Generation Attenuation Relation Project, Golder estimates that design peak ground accelerations should be approximately 0.57g for the site.

## 4.0 BASIN GEOMORPHOLOGY

The geomorphology of the Permanente Creek basin is influenced by multiple active geologic processes. The highly active tectonics of the San Andreas Fault and other nearby faults and fault zones result in a high rate of uplift and relatively frequent, high magnitude earthquakes. The tectonic activity has modified both the headwater basins and offsets lower elevations of landscape in juxtaposition to each other. The relatively frequent occurrence of high magnitude earthquakes is likely to have increased magnitude and occurrence of ancient, naturally-occurring landslides within the basin. Additionally, the highly variable rock types, tectonic histories, and geomechanical properties of the accretionary island arc geology of the Franciscan mélange have resulted in highly differential rates of erosion. These differential erosion rates are expressed in the varying morphologic characteristics of the basin.

As an added complexity, the carbonate units of the Franciscan complex have resulted in carbonate-rich water precipitating travertine deposits on the bed and banks of Permanente Creek. These travertine deposits interact with the self-forming step-pools of the steeper portions of the channel and contribute to a repeating cycle of travertine dam formation and breaching (Fuller et al. 2010). Additionally, the subsurface precipitation of travertine in the interstitial voids between sediment grains in sediment deposits increases the intergranular bond strength, making the sediment more resistant to erosion and potentially decreasing the rippability of the material.

In addition to the natural processes interacting with the basin morphology, the long history of mining in the basin has also substantially interacted with the surface processes defining the basin morphology. The very high rate of sediment supplied to the channel, in the form of overburden and fill placed along the margin of the stream channel during the early history of mining (1940s and 1950s), has resulted in aggradation of the channel in lower gradient portions of the channel.

### 4.1 Fault Influence

The drainage basins of the northeast side of the Santa Cruz mountains are characterized by geomorphic features that are controlled by faulting. The features include right-lateral deflected and offset drainages, drainages that follow lineaments, sidehill benches, closed depressions, aligned benches, linear scarps, linear troughs, saddles, and linear vegetation contrasts (Smith 1981).

In the downstream portion of the basin, the Monte Vista-Shannon fault zone defines geomorphic features. These features are believed to have been formed during the Pleistocene and possible Holocene. They include the reverse displacement of lower elevation sediment to higher elevations than those of their original deposition, forming benches, saddles, linear valleys, faceted spurs, scarps, linear range fronts, linear depressions, and associated vegetation contrasts (Bedrossian 1980, Hitchcock et al. 1994).

Similarly, the Jurassic and Cretaceous aged rocks of the Franciscan Complex are thrust over Pliocene and Pleistocene alluvial sediment of the Santa Clara Formation and younger Quaternary deposits (Sorg and

McLaughlin 1975, Wesling and Helley 1989, McLaughlin et al. 1991, Hitchcock et al. 1994). On the site, colluvial deposits are thrust over fluvial gravel of Permanente Creek, indicating late Pleistocene and possible Holocene displacement (Hitchcock et al. 1994).

Hitchcock and Kelson (1999) noted that coseismic deformation associated with the 1989 Loma Prieta earthquake, was coincident with geomorphic features suggestive of faulting along the Monte Vista-Shannon fault zone (Haugerud and Ellen 1990, Hitchcock et al. 1994, Langenheim et al. 1997). This could indicate that repeated localized contraction is in part coincident with the occurrence of Loma Prieta-type earthquakes. This would suggest a recurrence interval of about 400 years (Working Group on California Earthquake Probabilities 1996). Hitchcock et al. (1994) reported a late Pleistocene displacement rate across the Monte Vista fault zone of 0.3 ±0.2 mm/yr.

## 4.2 Hillslopes and Landslide Processes

The Santa Cruz Mountains are a steep and rugged terrain with a long history of landslide activity. The geomorphology of the Permanente Creek basin exhibits a high rate of dynamic change. This high rate of change, termed morphodynamics, is driven by the complex interaction between the dual processes of rapid uplift associated with the compressional tectonics along the San Andreas Fault system (as discussed above) and the relatively weak, easily erodible, and highly variable rocks of the Franciscan Complex.

The resulting topography forms narrow, steep sided, and actively eroding canyons. The Santa Cruz Mountains, and Permanente Creek canyon, are subject to both shallow (e.g., debris flows or “mudslides”) and deep landslides (e.g., large rotational slumps or translational block glides). Average slope angles in the canyon are approximately 25 degrees (or 2H:1V) which is reflective of the natural stability of the highly broken and sheared greenstone and mélange terrane. Steeper slopes, greater than 35 to 40 degrees, are locally observed in areas underlain by more competent limestone and graywacke bedrock but these are the exception.

## 4.3 Geotechnical Background and Considerations

Golder has a long history of geologic and geotechnical investigations at the Permanente Site starting in 2006 and continuing to present. The investigations include (but are not limited to) sector specific investigations of the quarry pitshell including existing landslides, both the EMSA and WMSA overburden stockpiles and foundation conditions, several investigations for updated storm water basins, a new crusher location and foundation, and a proposed water treatment plant location. In summary, we have an extensive library of material properties and corresponding stability analyses and therefore a good understanding of slope behavior for different types of materials and slope angles. Our geotechnical recommendations for slope design, discussed below, are based on this extensive background. A summary of material types and properties based on a number of our previous investigations is included in Appendix A.

From a geotechnical perspective, the proposed project primarily involves excavation and removal of man-made surficial deposits (i.e., overburden and artificial fills) to restore the creek channel and creek banks back to a more natural state. The intent is to remove the man-made surficial materials down to bedrock (or native soils) while minimizing excavations/cuts into bedrock or soil slopes. In general, excavations onto canyon slopes will only be done where the surfaces have been altered or affected by mining activities. Existing natural slopes will not be modified or excavated.

Our geotechnical recommendations for the Project include:

- Rock Slopes: Slopes greater than 20 feet in height in greenstone materials should not exceed slope angles of 2H:1V if possible. Slopes less than 20 feet should perform adequately at 1.5H:1V; however, localized areas of instability may be encountered. Cutslopes in limestone and graywacke greater than 20 feet in height should not exceed 1H:1V and slopes less than 20 feet should be limited to no steeper than 3/4H:1V.
- Fill or Soil Slopes: For planning purposes, permanent slopes comprised of overburden, alluvium, colluvium or other site-derived fill should not exceed 2H:1V.

Earlier versions of the Project included construction of retaining structures, or engineered structural elements, that warranted more detailed geotechnical investigations for design purposes. Retaining structures have been eliminated from the Project (with the exception of the Material Removal Area), and with other modifications, the main geotechnical considerations are limited to recommended slope angles for final slopes of previously filled or otherwise disturbed surfaces.

The Material Removal Area, and the Rock Pile Area, present the largest challenges due to depths of the cuts that are required, and the steep natural terrain underlying and comprising the hillslopes that are overlain by overburden. In some locations along creek banks, it is anticipated that cuts will expose natural surficial materials (i.e., colluvium and slope wash) as opposed to bedrock and may require localized cuts steeper than 2H:1V in order to daylight the cuts into natural slopes.

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). This is discussed in further detail in Section 6.2.

# 5.0 SITE RECONNAISSANCE AND GEOMORPHIC CHARACTERIZATION

The following section provides a summary of our geomorphic observations of the Project. All station references in this report are coincident with that used by Waterways on Sheets C2-C4 in their 90% restoration plan report (2019).

## 5.1 Overview of Permanente Creek Profile

The profile of Permanente Creek can broadly be classified into depositional reaches and bedrock reaches (delineated on Figure 2 as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach. The channel hydraulics are directly coupled to the rate at which water is delivered to the channel.

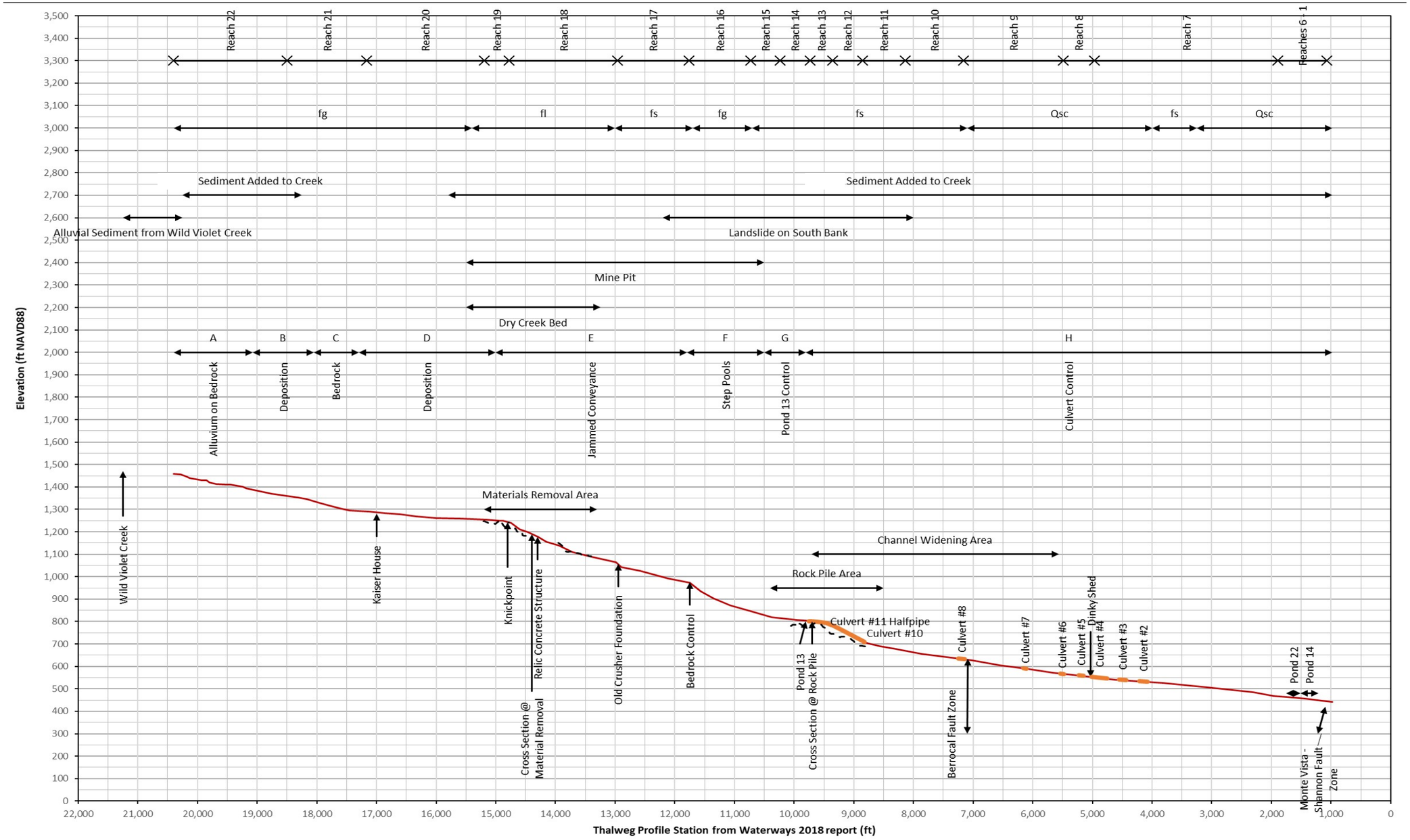


**Figure 2: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).**

### 5.1.1 Reach A: Alluvium on Bedrock

The upstream most portion of the survey channel is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel. The sediment supplied here is likely to come from natural processes and is likely partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch 2007a and b) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the river and may be coupled to the debris flows originating from Wild Violet Creek.

### 5.1.2 Reach B: Deposition

This depositional reach is characterized by a relatively wide, low gradient, flat valley floor that extends for approximately 1,000 feet along the valley axis. In combination with downstream gradient controlled from the Bedrock reach, the sediment load is too great and too coarse for the local hydraulics to transport, resulting in deposition on the valley floor.

### 5.1.3 Reach C: Bedrock Control

The Bedrock controlled reach is relatively short (750 feet) and has a relatively low gradient (<2%), but the narrow bedrock channel maintains hydraulic and sediment continuity through this reach, resulting in a thin alluvial cover on a bedrock channel bed. It appears that this reach only receives sediment from the channel upstream and conveys almost all of this load through to the downstream reach.

### 5.1.4 Reach D: Deposition

This Deposition reach is characterized by the aggradation of sediment on the valley floor and relatively wide flat valley bottom that receives sediment from the upstream reach and the tributaries that confluence with Permanente Creek from the south. The downstream end of this reach is marked by the occurrence of a sharp change in channel gradient associated with a bedrock knickpoint. This portion of the landscape is within the Materials Removal Area. Further discussion of the implications of these features to the restoration plan are discussed in Section 6.

### 5.1.5 Reach E: Jammed Conveyance

The Jammed Conveyance is very steep (>9%), but due to the large quantity of material it receives, and the armoring effect of both the coarse sediment and the relict mining infrastructure within the channel, a large portion of this material remains within the reach. The geomorphic term ‘jammed’ describes steep channels that are clogged with debris (Zimmerman et al. 2010). Natural channels of this gradient are typically not depositional but rather erosional. The debris residing on the bed in this reach is immobile, and the modern channel alignment is constricted between the debris from the north and the south valley wall for much of this reach. The Material Removal Area is contained within the upstream portion of this reach.

### 5.1.6 Reach F: Step Pools

Downstream of the Jammed Conveyance, a large, mapped natural landslide borders the south bank of the river for the entirety of this reach. The large boulders from both mining and natural sources, as well as woody debris, form large, steep step-pools within this reach. Some of these step-pools appear to have been reinforced with travertine deposits, as evidenced by the relict abutment deposits on the channel margins.

### 5.1.7 Reach G: Pond 13 Control

The reach downstream of the Step Pools reach, appears to act as a gradient control. Although this gradient control may be driven by the back-water effect of the small reservoir at Pond 13, data from the Seismic survey indicates that this feature may be reinforced by naturally occurring bedrock ridges within the channel. A local bedrock ridge is present just downstream of Pond 13 (Figure 2).

### 5.1.8 Reach H: Culvert Control

Downstream from Pond 13 the channel is confined within culverts and canals that do not exhibit a morphologic connection to the adjacent landscape.

## 5.2 Geomorphic Observations

### 5.2.1 Knickpoints

In response to the dynamic changes driven by tectonic base level change, upstream propagating waves of erosion have migrated up Permanente Creek. The upstream most location of a given wave is marked by a distinct change in channel gradient, termed a knickpoint. Knickpoints characteristically migrate more rapidly through more easily erodible material, and more slowly through more erosion-resistant material (Whipple 2004).

**Figure 3 - Travertine Deposits**

The upstream most knickpoint with the assessed channel is located at Station 148+00 within the Material Removal Area (Figure 2). This reach is characterized by a relatively low gradient reach upstream of this point and a steep reach downstream. The steep reach downstream is simultaneously receiving and conveying a large quantity of material, typically composed of the finer fraction of the total sediment load, and aggrading the coarser fraction, composed of large boulders.

### 5.2.2 Travertine

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally forming step-pools were reinforced by travertine deposition to form travertine dams (Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

### 5.2.3 Basin Capture

A process termed basin capture can occur whereby drainage networks and flow paths are rearranged through landscape modifying influences of tectonics and surface processes. This process can result in characteristic landscape features like wind gaps, where valley geometry and upstream drainage are mismatched, and fishhooks, where headwater streams exhibit a significant curved alignment where the drainage meets the basin edge. The fishhook morphology is observable in the Permanente Creek basin, and adjacent basins (Figure 4). Evidence of basin capture is significant to the current investigation as the changes in basin area related to basin capture can be associated with a dis-equilibrium between the channel morphology and the sediment regime of the river. More straightforwardly, this implies that the basin used to be bigger, and the current hydrologic regime may not be sufficient to transport the former natural sediment load.

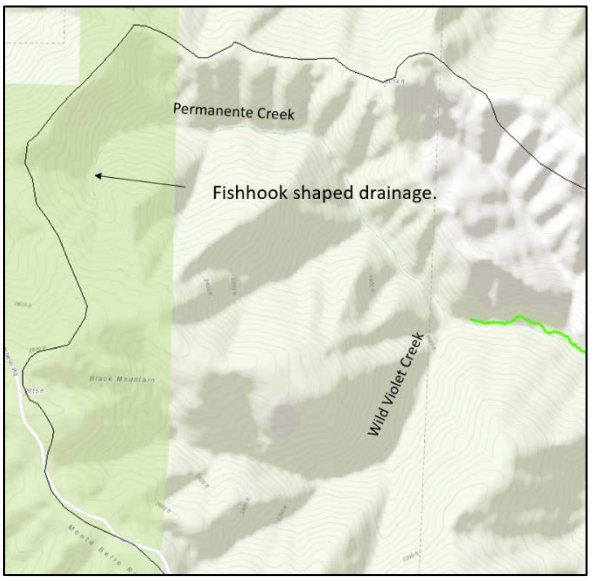


**Figure 4 – Fishhook shaped headwaters**

## 6.0 REVIEW OF RESTORATION DESIGN

This section provides an overview of the Waterways 90% design report (2019) with respect to the design basis and an evaluation of potential geotechnical issues for the Rock Pile and Material Removal Areas.

## 6.1 Geomorphic Design Basis

Waterways has based their geomorphic design on maintaining sediment transport continuity through the constructed reaches and proportionately distributing shear stresses across the channel bed and floodplain areas during floods to maintain a dynamic morphology without destabilizing the landscape. They optimized the design geometry by matching the hydraulics during flooding to the sediment size and transport rate of the channel. Additionally, design geometry incorporated the bankfull width and depth, and pool dimension and spacing relationships, of nearby reference watersheds and analog reaches (URS 2009). Waterways (2019) conducted hydrologic and hydraulic simulations of the restoration design and compared those results to fish passage capability, channel stability, flood conveyance, and sediment transport.

Waterways (2019) design specifications include the following primary elements:

- Engineered Streambed Material (ESM)
- Floodplain Armoring
- Vegetated Rock Slope Protection
- Vegetation Design
- Best Management Practices
- Engineered Woody Debris

- Slope Angle Guidance (Golder 2014)

## 6.2 Material Removal Area Design

**Location:** From Station 150+25 to 130+25

**General Description (Waterways):**

"This area has been modified by the placement of material within and adjacent to the channel… A seismic refraction analysis has been performed to estimate the depth to bedrock, in an effort to gain a clearer understanding of the pre-disturbance site geometry and allow a more informed evaluation of opportunities and constraints to enhancement.

Proposed cuts extend to depths of over thirty feet below existing ground, resulting in profile grades of 7.1% to 22.7%. These grades follow the peaks of the estimated subsurface bedrock profile. Final grades would be determined in the field to best fit bedrock exposures encountered during excavation."

**Design Elements and Objectives:**

- Removal of overburden/fill and a relic concrete structure, and moving the north toe of slope northward 25 feet along the majority of the project area, except near Pond 4A where it will move northward 16 feet;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity; and
- Installation of native vegetation.

### 6.2.1 Evaluation and Discussion of Materials Removal Area

A geologic and a geomorphic map of the Material Removal Area is presented in Figure 5. Longitudinal and thalweg profiles of this area are presented in Figures 6, 7 and 8. In general, both the cross section and long profile indicate that bedrock is close to the surface throughout the Material Removal Area with the exception of a few local areas where depths may be in the range of 15 to 20 ft bgs. The design approach used by Waterways notes that the estimated bedrock contacts as shown are approximate, and that the design will allow for the work to conform to and follow the bedrock surface as it uncovered during excavation.[1] Golder concurs with this general approach and doesn't believe any additional exploration would provide value to the design above and beyond the data provided by the seismic refraction surveys.

[1] It should be noted that where shown on included figures that the bedrock surface as interpreted from seismic refraction data is approximately located and will be field verified during construction.

LEGEND

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Material Removal Area
- BedrockPoints

## Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400
FEET
1 IN = 206 FT

**NOTE(S)**
1. LINE NOTES
2. LINE NOTES
3. LINE NOTES

**REFERENCE(S)**
1. WATERWAYS CONSULTING, INC. 2018. PERMANENTE CREEK RESTORATION PLAN INTERNAL DRAFT 90% LEVEL SUBMITTAL DESIGN BASIS TECHNICAL MEMORANDUM. PREPARED FOR LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. NOVEMBER 5, 2018.
2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: MATERIAL REMOVAL AREA

TITLE
**GEOMORPHIC MAP OF THE MATERIAL REMOVAL AREA**

CONSULTANT
GOLDER

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| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

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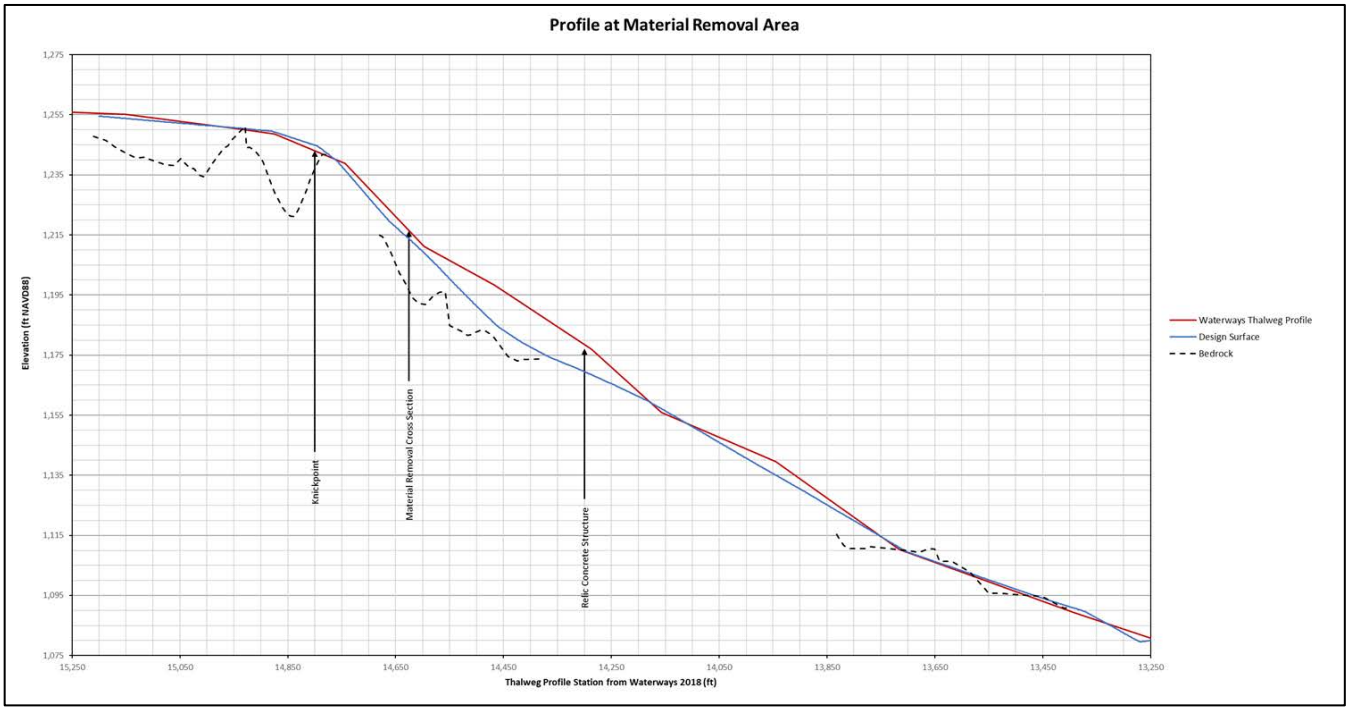



**Figure 6: Profile of Material Removal Area from Station 152+50 to 132+50.**

The following bullet points provide Golder's observations of the design as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- At Station 148+00, bedrock close to the surface is likely the controlling feature of an upstream migrating knickpoint. The design shows the channel invert conforming to knickpoint and then potentially being established on exposed bedrock downstream of the knickpoint. We concur with this design approach. Additional design elements proposed including ESM and other profile control elements such as boulder weirs and sills should help to ensure stability of the knickpoint.
- Between Stations 146+50 and 142+50, the restoration design identifies a large quantity of material for removal from the channel. The relic mining infrastructure may play a role in defining the channel alignment and facilitating an armored surface on some of the debris. The result of the restoration efforts will increase the local gradient within this reach and extend the length of the high-gradient portion of the channel. Sheet C34 of the 2019 plan set provides additional details for Step-pool and cascade channel design segments in this reach to mitigate the local gradient. We concur with this approach and note that field engineering design modifications and follow on monitoring may be necessary to ensure that the post material removal channel geometry is stable.
- Between Stations 138+50 and 134+50, the seismic profiles indicate that bedrock may be encountered below design grade, but as the seismic profile lines were collected adjacent to the channel and not in the thalweg, Golder believes that bedrock may be exposed at relatively shallow depths along the thalweg. We understand that the intent of the design is to construct the channel on exposed bedrock

occurring within the proposed grading envelope and based on our reconnaissance we think this is generally achievable.

- There is a large relic concrete structure located in the left bank of the stream channel five to ten feet above the channel invert (143+00). There is a smaller relic concrete structure located in the channel further downstream. Golder understands that the removal of old mining infrastructure from the channel will increase the connectivity of the channel to the adjacent landscape and also that the relict structures may currently be contributing to the stability of this reach. We understand that weirs and steps will be constructed using material with a minimum size meeting the D50 of the specified material and a boulder sill w/ a minimum size meeting the D84. This design approach is intended to replace any potential stability relic structures are providing.
- The most challenging geologic and geotechnical issue in the Material Removal Area is the presence of the Upper Water Treatment System infrastructure, including the 1250 Pond and associated facilities located along the top of the creek bank and the access road to Permanente Creek. The lifetime of these facilities is uncertain at this time as they are required for on-going operations of the Facility. However, once reclamation is completed, they may no longer be necessary. If the facilities need to be protected during the creek restoration project, a retaining structure (e.g., Mechanically Stabilized Earth wall) will be necessary to maintain the road and the 1250 pond (as shown in Figure 4.0 of Waterways Updated Response Letter to the County dated 3-5-18 shown below). The retaining structure would be required as the design calls for pushing the north bank of the creek approximately 25 further north than current conditions.

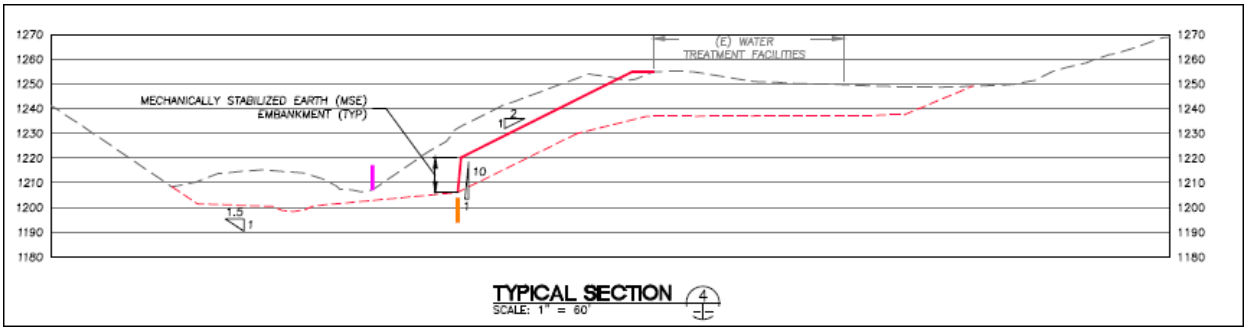



**Figure 7: Typical Section of Potential MSE Wall to protect Water Treatment Facilities**

- If a retaining structure is required, Golder recommends that a geotechnical investigation be performed along the alignment of the wall to verify depth to bedrock and to obtain appropriate design parameters for the design of the wall. However, depending on the timing of the restoration project, a retaining structure may not be necessary and therefore we recommend delaying any further investigation until such time it is needed. Figure 8 illustrates the design surface and bedrock conditions if the slope can be graded back at 2H:1V. This slope configuration meets Golder's general recommendations for cutslopes developed in surficial materials and is considered acceptable.

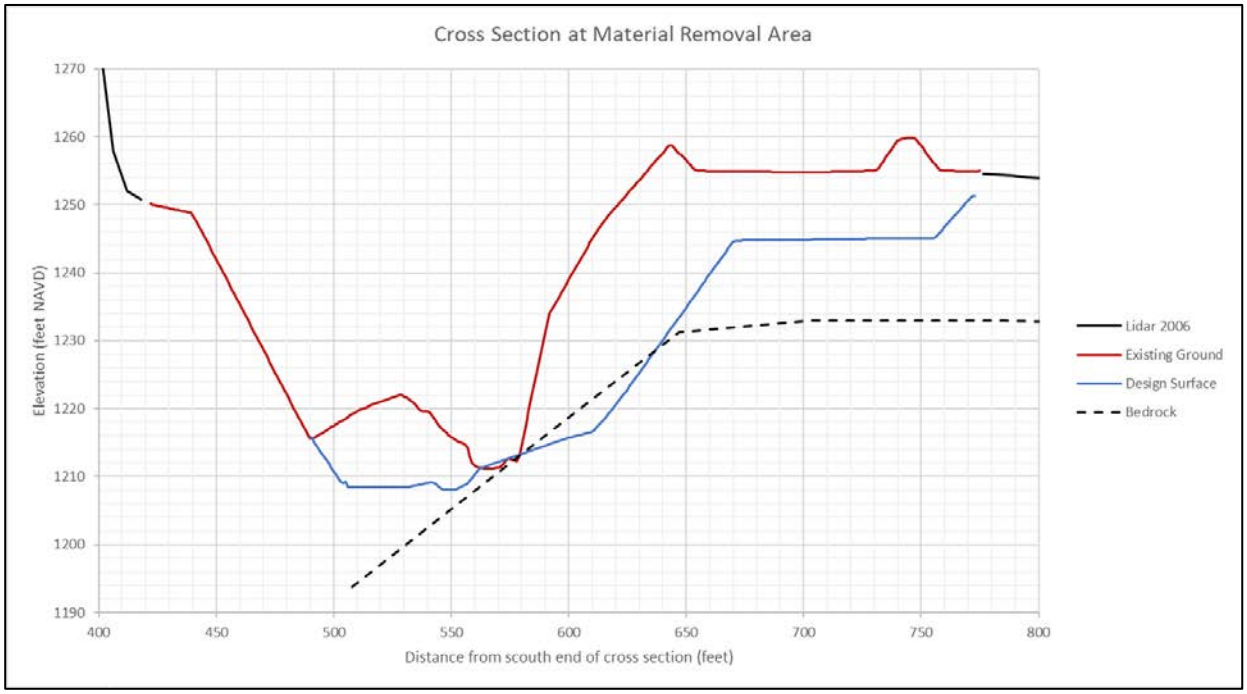



**Figure 8: Cross section at Material Removal Area. Located at Thalweg Profile Station 146+00. Note depth to bedrock is approximate and estimated based on seismic refraction data.**

## 6.3 Rock Pile Area Design

**Location:** From Station 104+50 to 85+50 within the Channel Widening Reach.

**General Description (Waterways 2019):**

"Extensive channel realignment and reconstruction is proposed throughout this area, including removal of Culverts #10 & #11 and the dam at Pond 13…. Cuts approximating thirty to forty feet of depth are required to accomplish this. The grading plan reflects the Lower Limit of Potential Design Channel Invert. The Upper Limit of Potential Design Channel Invert shown in profile has been established as a best fit to bedrock elevations that were estimated using a seismic refraction analysis and geotechnical borings. Final geometry will likely vary somewhat from that shown on the drawings, as necessary to conform to existing bedrock.

The rock pile and associated infrastructure will be removed to accommodate the lowered and widened channel…The slope exposed below the Rock Pile will be inspected by the Geotechnical Engineer or Project Engineering Geologist to evaluate the nature and stability of the exposed material and provide recommendations, as necessary, to ensure geotechnical stability of the slope and access road."

**Design Elements and Objectives:**

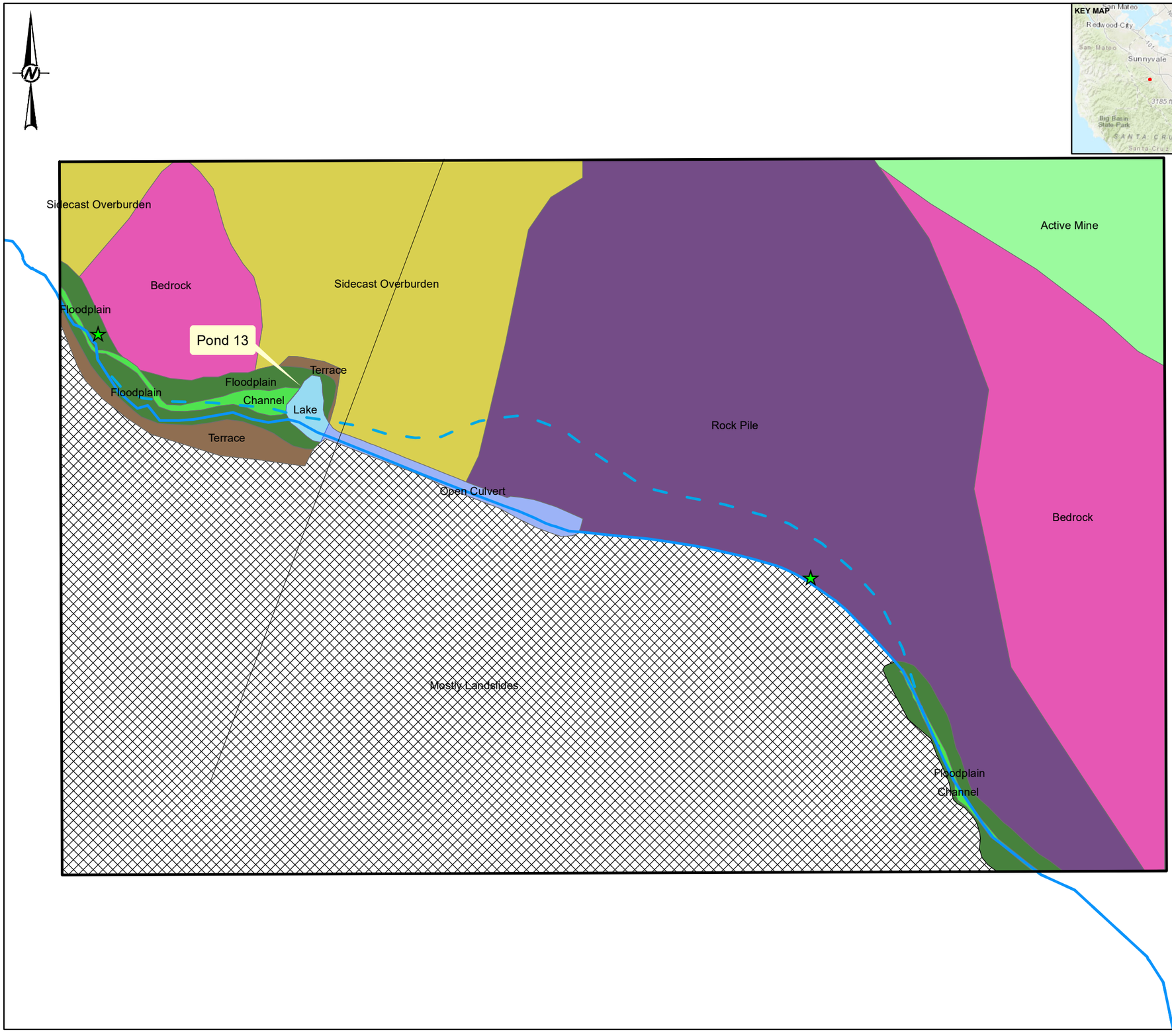
- Removal of concrete road segments and road-related fill material;
- Removal of 930 linear feet of culverts and daylighting of the creek that will help improve ecological complexity;
- Construction of a new channel with floodplain bench areas with habitat elements that will help improve ecological complexity;

- Removal of Rock Pile, retired Rock Plant conveyor system and associated infrastructure;
- Removal of Pond 13 dam/metal infrastructure; and
- Installation of native vegetation.

### 6.3.1 Evaluation and Discussion of Rock Pile Area

A geologic and a geomorphic map of the Rock Pile Area is presented in Figure 9. Cross sections and thalweg profiles of this area are presented in Figures 10 and 11. Appendix B includes Figure 1 from Waterways Updated Response Letter to the County dated March 5, 2018 showing the locations of exploratory borings drilled previously by Golder in the area of the Rockpile restoration work and boring logs. The following discussion provides additional observations of specific design elements as compared to conditions observed in the site reconnaissance and as informed by the seismic refraction survey data.

- In the Rock Pile Area, Golder's comparison of the restoration design with seismic survey results indicates that bedrock ranges from about 5 feet to approximately 25 feet below ground surface with significant relief along the longitudinal profile (Figure 10). As with the Material Removal Area, the design intent will allow for the work to conform to and follow the bedrock surface as it is uncovered during excavation.
- The interpreted depth to top of native alluvium or bedrock for borings along the proposed thalweg (Borings 1101 and 1103) is approximately 25 feet although native surficial materials were likely encountered approximately 5 to 10 feet shallower. Boring 1107, also along the thalweg but near the downstream limit of the area, encountered a concrete structure at approximately 7 feet bgs interpreted as being near original ground surface along the channel thalweg. The remaining borings were drilled upslope of the thalweg to evaluate depths of fill along the toe of the proposed slope. In general, these borings indicate depths of overburden along the toe of the slope in the range of 60 to 70 ft bgs.
- The bedrock surface depicted on Figure 10 is close to the "Upper Limit of Potential Design Channel Invert" as defined by Waterways (based on seismic lines and verification borings), whereas the grading plan included on the design drawings represents the "Lower Limit of Potential Design Channel Invert" to show the maximum extent of potential grading. It is our opinion based on the review of available data that the constructed profile will be close to the "Upper Limit" upstream of Rock Pile Design. In summary, it is our opinion that the design is reasonable, and additional exploration will not provide value to the design above and beyond the data provided by the seismic refraction surveys and previous completed borings.
- The seismic data also identifies a potential former bedrock channel, which extends through the Rock Pile Area that in some locations is north of the proposed thalweg (Figure 11). Golder understands that Waterways has, to the extent possible, re-occupied the historic thalweg; however, extensive grading would be required in some areas to realign the channel and move it further to the north to occupy the historic channel thalweg. We understand that pushing the toe of the slope further north is not considered feasible given that this would require significant flattening of the slope which would impact the extensive infrastructure located at the top of slope including the main access road and the crusher facility. Golder recommends that field engineering design modifications be applied to utilize existing



**LEGEND**

- Areas of Interest
- Permanente Creek
- Design Thalweg
- Cross Section @ Rock Pile Area
- BedrockPoints

## Geomorphic Units

- Active Mine
- Bedrock
- Channel
- Floodplain
- Lake
- Mostly Landslides
- Open Culvert
- Pond 4 Fill
- Rock Pile
- Sidecast Overburden
- Terrace

0 200 400 FEET

1 IN = 145 FT

**NOTE(S)**

1. LINE NOTES
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**REFERENCE(S)**

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2. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)

CLIENT
LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC.

PROJECT
GEOLOGIC AND GEOMORPHIC ASSESSMENT OF PERMANENTE CREEK: ROCK PILE AREA

TITLE
**GEOMORPHIC MAP OF THE ROCK PILE AREA**

CONSULTANT
GOLDER

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| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

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bedrock topography and historic thalweg to the extent possible to meet the desired restoration outcomes.

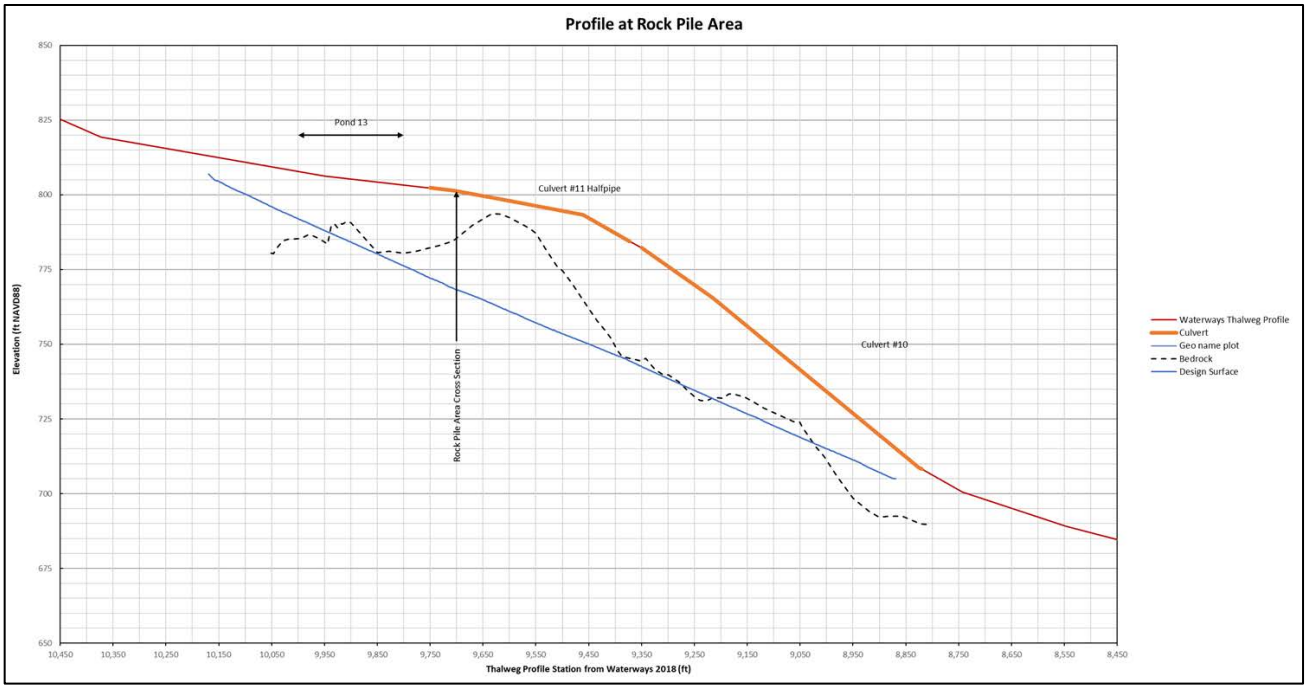



**Figure 10: Profile of Rock Pile Area from Station 104+50 to 84+50.**

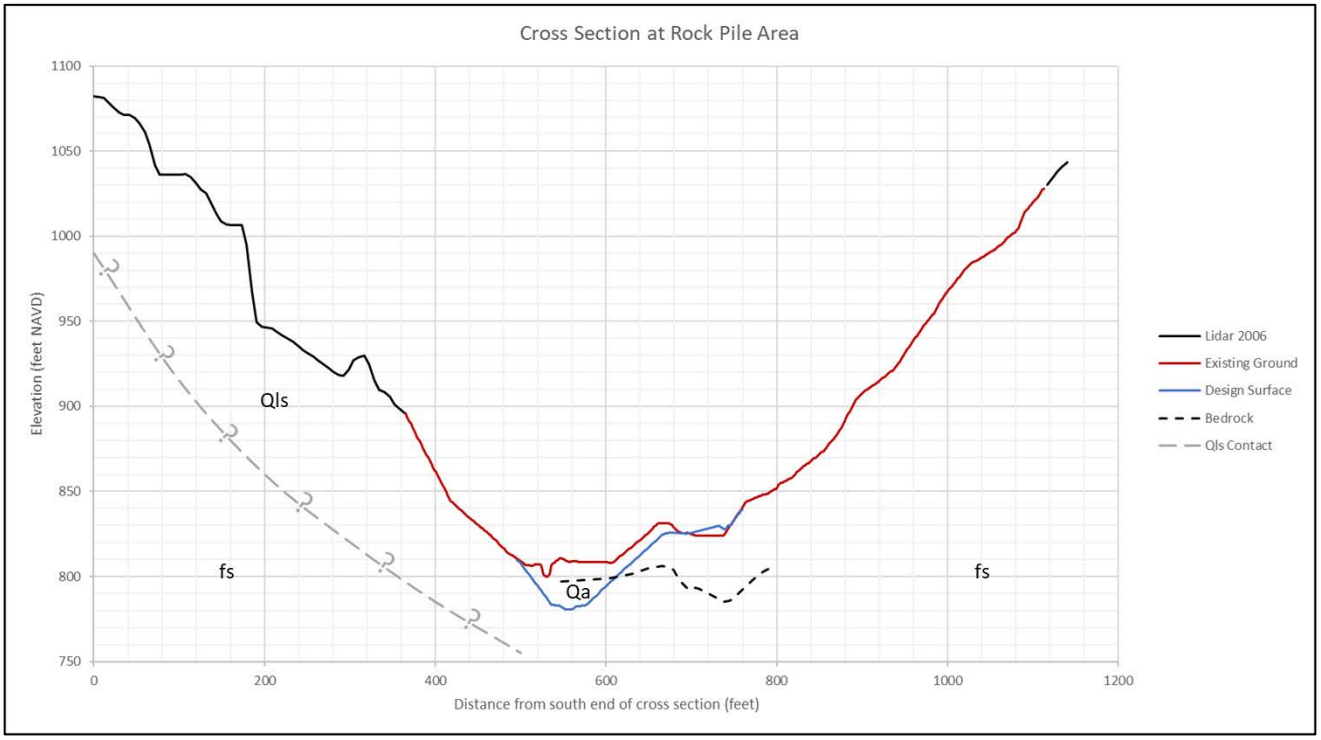



**Figure 11: Cross section at the Rock Pile Area. Located at Thalweg Profile Station 97+00.**

- The removal of the two culverts and creation of a floodplain with an inset channel in this reach will re-establish the lateral connectivity of the channel to the adjacent hillslopes. Reconnecting the channel to the adjacent landscape will have positive benefits as designed by Waterways, but it will also increase the potential for a laterally migrating channel to affect adjacent hillslopes. The north valley wall will consist of the excavated Rock Pile and the south valley wall is defined as a large, ancient landslide based on regional geologic mapping.
- The seismic data indicate that there is a bedrock ridge, oriented perpendicular to the valley axis, located just downstream of Pond 13. It appears that Pond 13, and/or the underlying more resistant bedrock, may be acting as a grade control structure on the reach upstream of Pond 13 (Figure 10).The channel morphology upstream of Pond 13 appears to have adjusted to this local gradient control and has resulted in the aggradation of sediment upstream of Pond 13. We understand that, the channel upstream of Pond 13 will be excavated into the stored sediment and depending on the depth to bedrock, a large proportion of these sediments will be removed as part of the restoration effort. In addition, we understand that grade control will be installed at the upstream limits of work under either Profile scenario.

# 7.0 CONCLUSIONS AND RECOMMENDATIONS

In this section, Golder summarizes the finding of our investigations and provides recommendations to facilitate the implementation of the Restoration Plan (Waterways 2018).

## 7.1 Adaptive Management and Monitoring

In our opinion, the most effective way to ensure a successful project is thorough engineering observation and field fitting of final profiles during excavation activities. This is the best way to achieve the goal of restoring natural profiles while minimizing excavation of native soils or bedrock materials. Note that this is a well-established concept first described and promoted by Karl Terzaghi as the “Observational Method” and was later described in detail by Ralph Peck (1969). The intent of the method is to balance the cost of investigation and design while still achieving a successful project through adaptive management in the field. The method entails designing to the most probable conditions rather than the most unfavorable conditions. Data gaps are filled by detailed observations during construction and designs are modified as needed.

It is important that stakeholders recognize that this is a restoration project, not an engineered stream channel, and this will by necessity entail restoration of new slopes to match previously existing slopes. This will require slope angles which, in some cases, may evidence stability just like the existing natural slopes. In our opinion, additional subsurface exploration will not alter this fundamental concept or improve the project outcome. Rather, it is understood by the Project team that shallow slides and/or erosion may occur on restored natural slopes.

## 7.2 Evolution of Design

The plan set is in general conformance with the applicable geotechnical recommendations as outlined in our “Preliminary Geotechnical Recommendations for Conceptual Level Permanente Creek Restoration Plans” dated April 28, 2014 (Golder 2014). We note that several structural construction elements that were part of the original project design in 2014 have been eliminated from the 2019 plan set. With the exception of a possible MSE wall in the Material Removal Area, structural elements such as gabions or retaining walls, which would warrant more detailed subsurface investigation and testing, are no longer part of the project.

## 7.3 Field Observations and Adaptive Management

As stated in the Field Engineering Notes section of the project plan notes (Sheet C28) stability of hillsides may necessitate:

- Field engineering and a field directed construction approach, i.e., field observations and adaptive design as discussed above
- Final geometries to be directed in the field by the Project Engineer to account for unanticipated subsurface conditions
- Flexibility with respect to final gradients and defined “grading envelopes” for channel gradients
- A narrowing of floodplain widths in areas where the final design profile approaches the lower limit of the grading envelope
- Slope benching to reduce slope angles and lengths in areas of disturbed terrain, and to control surface runoff and erosion while vegetation is established

We concur with the above recommendations, and the Field Engineering Notes in general, with respect to addressing and minimizing potential slope instabilities. We further recommend that the Project Geotechnical Engineer or Project Engineering Geologist inspect all interim and final cutslopes as the project progresses such that any potential areas of concern can be identified early in the process and remedial measures developed, if required.

## 7.4 Material Removal Area

The Material Removal Area may require a retaining structure, depending on timing of the creek restoration project with respect to site operations, to preserve infrastructure and access associated with the Upper Water Treatment System (UTS). Our understanding is that Waterways is recommending that work at the Material Removal Area is sequenced to occur after other portions of the project are constructed if the treatment facilities and Pond 1250 need to remain in place at the start of project implementation. Work would start with the Channel Widening Area and generally proceed upstream. The second phase of work would include the Rock Pile Area. The final stage of work would include the Material Removal Area.

If the MSE wall is required, then Golder recommends a geotechnical investigation be completed to prepare final design and construction plans. Based on the above construction sequence, there will adequate time to plan, permit and implement this investigation even after the project has started.

## 7.5 Rock Pile Area

The main geotechnical challenge for the proposed project is likely related to the Rock Pile Area which entails a reach of the creek where culverts will be removed, and a large stockpile of aggregate materials placed along the margin of the creek and up onto the hillside to a height in excess of 200 vertical feet. The estimated thickness of the rock pile ranges up to 100 feet. Estimated natural slopes angles underneath and above the rock pile are shown as steep as 1H:1V. We recommend inspection of these slopes by the Project Engineering Geologist or Geotechnical Engineer following the removals to evaluate the geologic conditions and stability of the exposed materials. If the removals expose bedrock, stability of the slopes should be adequate. However, if the cut leaves significant thicknesses of overburden in place, potential localized slope instability may be encountered. Golder

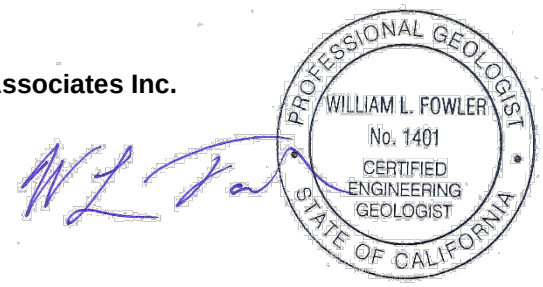
recommends that Lehigh and Waterways have contingency plans in place to design and implement remedial measures such as:

- Additional localized removals of loose or unstable materials
- Slope laybacks and benching
- Engineered drainage controls
- Buttresses or slope sections comprised of compacted rockfill

## 7.6 Travertine Deposits

The deposition of travertine between clasts in step-pools and dam-like structures, as well as deposited sediment that is accessed by the channel flow is likely to have increased the apparent strength of localized areas of alluvial materials along the channel. This cementation may make the removal of this material more difficult than anticipated and may play a role in long term channel stability. Golder recommends that this cemented material be left in place wherever possible to augment the restoration design.

**Golder Associates Inc.**




William L. Fowler, PG, CEG *Dated: 10/31/19*
*Senior Program Leader/Principal*

https://golderassociates-my.sharepoint.com/personal/bfowler_golder_com/documents/permanente/creek restoration/perm creek recon_final_wlf_10-31-19 r4.docx

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# Appendix A

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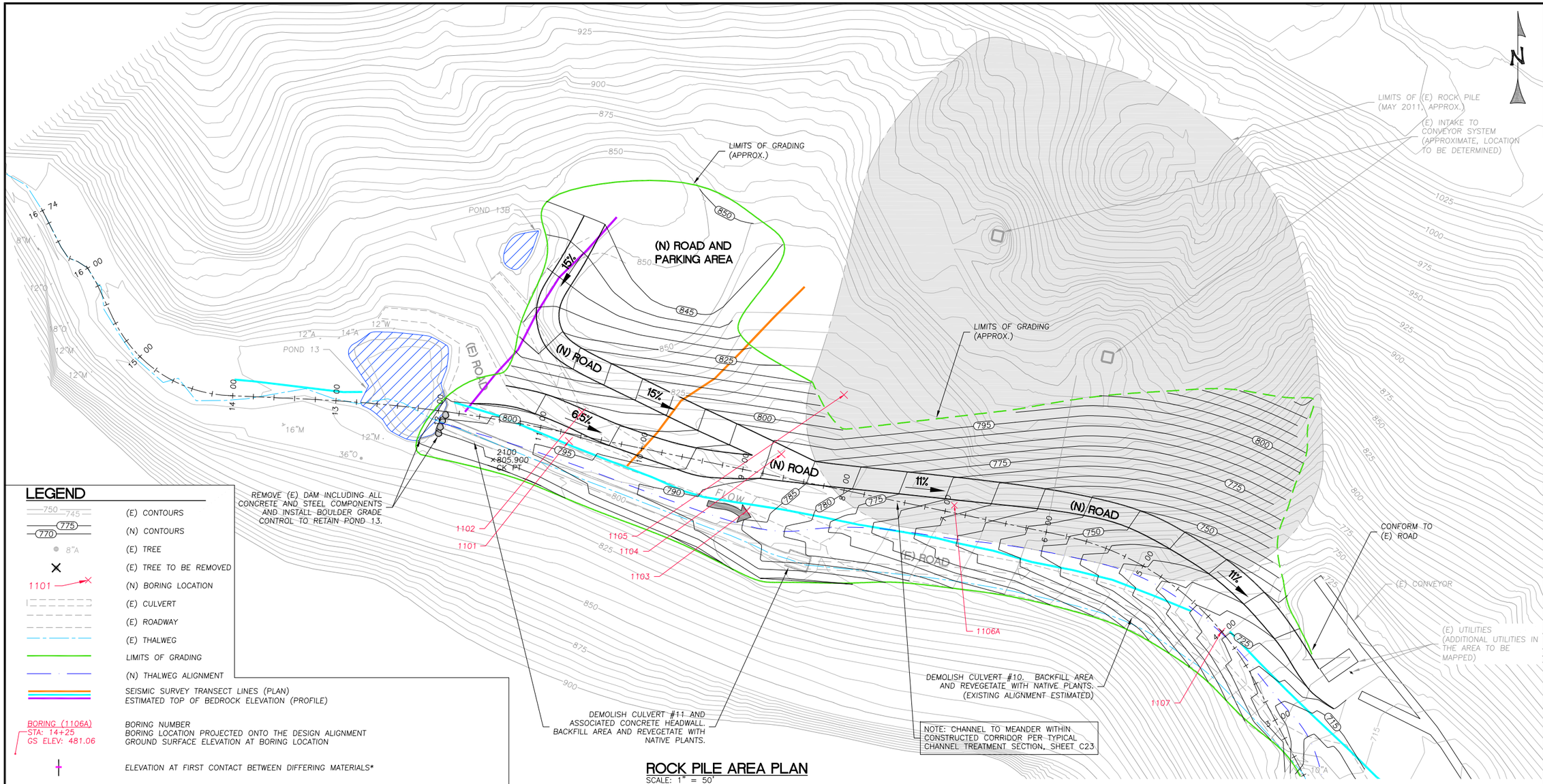
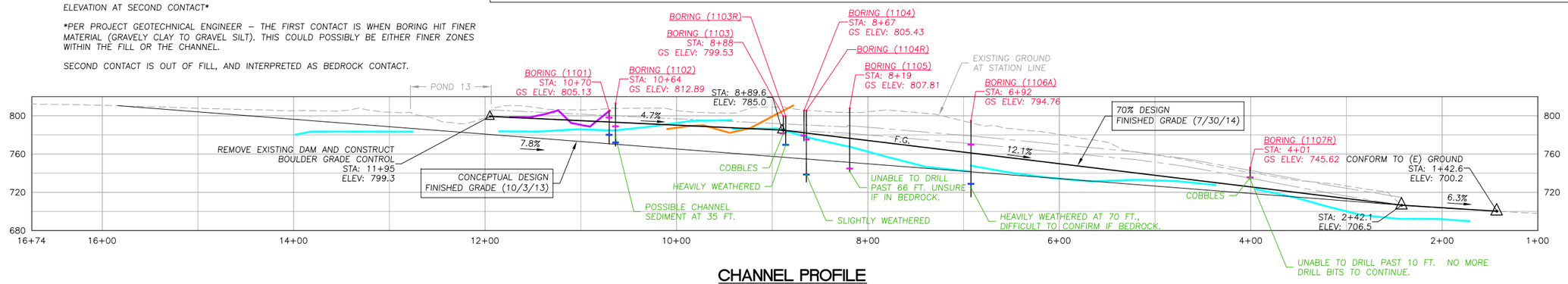
# Appendix B




## ROCK PILE AREA PLAN
SCALE: 1" = 50'




## CHANNEL PROFILE
SCALE: 1" = 60'

WATERWAYS CONSULTING INC.
509A SWIFT ST.
SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

PRELIMINARY

NOT FOR CONSTRUCTION

PREPARED AT THE REQUEST OF:

LEHIGH HANSON
HEIDELBERG CEMENT GROUP

# ROCK PILE AREA SEISMIC STUDY AND BORING RESULTS

# PERMANENTE CREEK RESTORATION PLAN

## SUBSURFACE BORING LOCATIONS

| | |
|---|---|
| DESIGNED BY: | B.Z. |
| DRAWN BY: | B.M.S |
| CHECKED BY: | M.W.W. |
| DATE: | 03/10/15 |
| JOB NO.: | 13-016 |

BAR IS ONE INCH ON ORIGINAL DRAWING, ADJUST SCALES FOR REDUCED PLOTS
0 1"

FIG. 1

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1101



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1101 is located on road (furthest east location). Estimated depth of bedrock with seismic line is about 25 feet.

**REMARKS CONTINUED** Possible pond sediment at ~7 feet and weathered bedrock at ~25 feet.

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SANDY SILT, subangular to subrounded sand and gravel, low plastic fines; brown; moist. |
| | | | 5 | | |
| | | CH | 10 | | (NATIVE possible pond sediment; CH) gravelly CLAY, medium to high plastic fines, fine subangular gravel, some coarse sand; dark brownish-gray; mosit. |
| | | | 15 | | gravel decreases with depth |
| | | | 20 | | |
| | | | 25 | | at 25 feet: driller notice material is a little harder |
| SS | 18/18 | CL | 30 | | (NATIVE; CL) gravelly CLAY, angular to subangular gravel, some FeOx staining, weathered Franciscan clasts; dark gray; moist. |
| | | GM | | | (NATIVE; GM) SILTY GRAVEL, angular to subangular, low to medium plastic fines, weathered Franciscan bedrock; dark gray; moist to wet. |
| | 12/18 | | 35 | | Bottom of borehole at 35.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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Telephone:

# BORING NUMBER 1102



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1102 is located on road above 1101. Drilled through fill and hit clay at ~19 feet and possibly weathered Franciscan at ~41 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; SM) gravelly SILTY SAND, fine sand, subangular to subrounded gravel; brown; dry to moist. |
| | | | 5 | | |
| | | | 10 | | at 10-15 feet: increase in gravel, fine to coarse angular to subangular gravel; whitish-brown. |
| | | SM | 15 | | |
| | 0/18 | | 20 | | at 19 feet: driller noticed softer material; attempted a drive sample (no recovery) |
| | | CL | 25 | | (FILL; CL) gravelly SILTY CLAY, fine subangular to subrounded gravel, some coarse sand; grayish-brown; moist. |
| | | GM | 30 | | (FILL; GM) SILTY GRAVEL, angular to subangular gravel, some sand; wet. |
| | | CH | 35 | | (NATIVE; CH) CLAY, possible channel sediment, medium to high plastic fines. |
| | 18/18 | GM | 40 | | (NATIVE; GM) sandy SILTY GRAVEL, possible channel sediment. |
| | | ML | | | (NATIVE; ML) sandy gravelly SILT, low to medium plastic fines, weathered Franciscan bedrock; brownish-gray. |

Bottom of borehole at 45.0 feet.

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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Telephone:

# BORING NUMBER 1103



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1103 is located on road. Hit cobbles at 18 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; dark grayish-brown; moist. |
| | | SM | 5 | | (FILL; SM) gravelly SILTY SAND, fine sand, low plastic fines, subangular to subrounded gravel; brown; moist. |
| | | ML | 10 | | (FILL; ML) gravelly sandy SILT, low to medium plastic fines; dark brown; moist. |
| | | GM | 15 | | (FILL; GM) SILTY GRAVEL and COBBLES, angular to subangular; whitish-brown.<br>unable to drill past 18 feet; possibly stuck on a boulder |
| | | | | | Bottom of borehole at 18.0 feet. |

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Telephone:

# BORING NUMBER 1103R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1103R is 3 feet east of 1103. Hit weathered Franciscan bedrock at ~25-30 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | 0 | | (FILL; ML) gravelly SILT, low plastic fines, subangular to subrounded gravel, some fine sand; light brown to brown; moist. |
| | | SM | 5 | | (FILL; SM) gravelly SILTY SAND, fine sand, low to medium plastic fines, subangular to subrounded gravel; brown to dark brown; moist. |
| | | ML | 10 | | (FILL, ML) gravelly sandy SILT, angular to subangular gravel, weathered Franciscan clasts; brown. |
| | | CL-ML | 15 | | (NATIVE; CL-ML) gravelly SILT to gravelly CLAY, angular to subangular gravel, weathered Franciscan bedrock; reddish-orangish-brownish-gray; moist to wet. |
| | | | 20 | | |
| | | | 25 | | |
| | | | 30 | | Bottom of borehole at 30.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

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# BORING NUMBER 1104



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1104 is located on rockpile. Hit cobbles at 32 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; ML) gravelly sandy SILT, low to medium plastic fines, subangular to subrounded gravel; gray; moist. |
| | | ML | 5 | | color change to light grayish-brown |
| | | | 10 | | color change to light brown |
| | | CL-ML | 15 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, medium plastic fines, subangular to subrounded gravel, trace coarse sand; brown; moist. |
| | | GM | 20 | | (FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel, some coarse angular sand; tannish-whitish-brown; moist. |
| | | | 25 | | at 26 feet: driller noticed material became more stiff |
| | 18/18 | CL-ML | 30 | | (FILL; ML-CL) gravelly CLAY to gravelly SILT, medium plastic fines, fine subangular to subrounded gravel, some fine sand, weathered; dark brownish-gray; moist. |
| | 3/12 | | | | at 32 feet: hard material; unable to drill any further. |
| | | | | | Bottom of borehole at 33.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1104R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1104R is 3 feet east of 1104. Possibly hit weathered Franciscan bedrock at about 67 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | | 0 | | (FILL; ML) gravelly sandy SILT, low plastic fines, angular to subangular gravel; grayish-brown; moist. |
| | | ML | 5 | | |
| | | | 10 | | at 9 ' color changes to light brown |
| | | | 15 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines; brown; moist. |
| | | CL-ML | 20 | | |
| | | | 25 | | (FILL; GM-ML) SILTY GRAVEL to gravelly SILT, low plastic fines, angular gravel; tanish-brown; moist. |
| | | GM | 30 | | |
| | | | 35 | | (FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. |
| | | CL-ML | | | at 35' color changes to reddish-brown |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/12/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/12/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | CL-ML | 45 | | (FILL: ML-CL) gravelly SILT to gravelly CLAY, subangular to subrounded gravel; brown to reddish-brown; moist. *(continued)* |
| | | ML | 50 | | (FILL; ML) gravelly SILT, low plastic fines, coarse subangular to angular gravel; brown; moist. |
| | | CL-ML | 55 | | (FILL; ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, angular to subangular gravel; brown; moist. |
| | | GM | 60 | | (FILL; GM) SILTY GRAVEL, low plastic fines, fine subangular gravel; light tanish-brown; moist. |
| | | | 65 | | at 67 feet: driller notices a change in drilling |
| | | GM | 70 | | (NATIVE; GM-SM) sandy GRAVEL to gravely SAND, low plastic fines, weathered Franciscan clasts; brownish-gray to greenish-gray; moist to wet. |
| | | CL | 75 | | (NATIVE; CL) CLAY, slightly weathered Franciscan; dark gray; moist to wet. |
| | | | | | Bottom of borehole at 75.0 feet. |

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Telephone:

# BORING NUMBER 1105



**PROJECT NUMBER** 1302968-01
**PROJECT NAME** Lehigh Rockpile Drill
**LOCATION** Cupertino, CA
**DRILLING METHOD** HSA
**GROUND ELEVATION**
**TOP OF CASING** ----
**LOGGED BY** LF

**DATE STARTED** 2/13/15
**DATE COMPLETED** 2/13/15
**CASING TYPE/DIAMETER** ----
**SCREEN TYPE/SLOT** ----
**GRAVEL PACK TYPE** ----
**GROUT TYPE/QUANTITY** ----
**DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1105 is located on rockpile (most North on Figure). Hit clay at ~63 feet, unable to drill past 66 feet.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 0 | | (FILL, GM) SILTY GRAVEL, angular to subangular; light to dark gray. |
| | | CL-ML | 5 | | (FILL; CL-ML) gravelly sandy CLAY to sandy SILT, medium plastic fines, medium to coarse sand, subangular gravel; dark gray; moist. |
| | | ML | 10 | | (FILL; ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse sand; brown; moist. |
| | | GM | 20 | | (FILL, GM) SILTY GRAVEL, fine to coarse angular to subangular gravel, low plastic fines; whitish-brown; moist. |
| | | ML | 30 | | (FILL; ML) gravelly SILT, low to medium plastic fines, subangular gravel; brown; moist. |
| | | ML | 35 | | (FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist.<br><br>at 35 feet: driller noticed material became more stiff; drill bit became hot and started smoking. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | | | (FILL; ML) gravelly SILT, low plastic fines, angular to subangular gravel, some coarse angular to subangular sand, slightly weathered Franciscan clasts; reddish-orangish-brown; moist. *(continued)* |
| | | | 45 | | (FILL; ML) gravelly SILT, low plastic fines, anuglar to subangular gravel; brown; moist. |
| | | ML | 50 | | |
| | | | 55 | | |
| | | | 60 | | (FILL; ML-SM) gravelly sandy SILT, low plastic fines, fine to coarse sand, subangular to subrounded gravel; brown; moist. |
| | | SM-ML | | | |
| | | CH | | | (NATIVE; CH) gravelly CLAY, possible pond sediment, medium to high plastic fines, subangular to subrounded gravel, some coarse subangular sand; brown to dark brownish-gray to black; moist. |
| SS | 3/6 5/6 | | 65 | | |
| | | CL-ML | | | (NATIVE; ML-CL) CLAYEY SILT to SILTY CLAY, possible pond sediment, low plastic fines, some fine sand, trace coarse subangular sand; light brownish-gray mottled dark gray. |
| | | | | | Bottom of borehole at 66.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1106A



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1106A location is downslope on rockpile (east of previous boreholes). Driller notes gravel at ~18 feet.

**REMARKS CONTINUED** Possible pond sediment at ~25 feet. Possibly hit weathered Franciscan bedrock at ~66 feet.

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 0–10 | | (FILL; GM) sandy SILTY GRAVEL, angular to subangular gravel, low plastic fines, fine to coarse sand; brown; moist. |
| | | GP | 10–15 | | (FILL; GP) poorly graded GRAVEL, coarse subangular gravel, some silt; brown; moist. |
| | | GM | 15–20 | | (FILL; GM-GC) SILTY GRAVEL to CLAYEY GRAVEL, low plastic fines, subangular gravel; brown; moist. |
| | | SM | 20–25 | | (FILL; SM) SILTY SAND, fine sand, low plastic fines, some medium to coarse subangular sand, some fine to coarse subangular gravel; brown; moist. |
| | | CL-ML | 25–35 | | (FILL/COLLUVIUM (?); ML-CL) gravelly SILT to gravelly CLAY, low to medium plastic fines, fine to coarse subangular gravel; brown; moist. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1106A



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | ML | | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine subangular gravel; brown; moist. |
| | | ML | 45 | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low palstic fines, fine subangular gravel, some fine to coarse subangular sand; brown; moist. |
| | | GM | 50 | | (FILL/COLLUVIUM (?); GM) SILTY GRAVEL, fine angular to subangular gravel, low plastic fines, some coarse subangular gravel; brown; moist. |
| | | ML | 55 | | |
| | | | 60 | | (FILL/COLLUVIUM (?); ML) gravelly SILT, low plastic fines, fine to coarse subangular gravel, some coarse subangular sand; brown; moist |
| SS | 12/18 | | 65 | | |
| | | SM | | | (NATIVE; SM/GP) SILTY SAND and GRAVEL, heavily weathered; wet. |
| | | CL-ML | | | (NATIVE; ML-CL) gravelly SILT to gravelly CLAY, heavily weathered, possibly Franciscan bedrock; wet. |
| SS | 6/18 | | 70 | | (NATIVE; GM) sandy SILTY GRAVEL, fine to coarse angular to subangular gravel, possibly Franciscan bedrock; brown and dark green; wet. |
| | | GM | | | |
| SS | 12/18 | | 75 | | (NATIVE; SM) gravelly SILTY SAND, fine to coarse sand, low plastic fines, angular to subangular gravel, weathered, possibly Franciscan bedrock; reddish-brown mottled brown; wet. |
| | | SM | | | |
| SS | 3/80 | | 80 | | Bottom of borehole at 80.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1107



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1107 is located on rockpile (most East on Figure). Hit a burried retaining wall at 7 feet and can't drill further.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 5 | | (FILL; ML-GM) gravelly SILT to SILTY GRAVEL, low plastic fines, fine to coarse angular to subangular gravel, some coarse angular to subangular sand; dark gray; moist. |
| | | | | | at 7 feet: hit retaining well; can't drill futher. |
| | | | | | Bottom of borehole at 7.0 feet. |

Golder Associates, Inc.

Telephone:

# BORING NUMBER 1107R



**PROJECT NUMBER** 1302968-01 **DATE STARTED** 2/13/15

**PROJECT NAME** Lehigh Rockpile Drill **DATE COMPLETED** 2/13/15

**LOCATION** Cupertino, CA **CASING TYPE/DIAMETER** ----

**DRILLING METHOD** HSA **SCREEN TYPE/SLOT** ----

**GROUND ELEVATION** **GRAVEL PACK TYPE** ----

**TOP OF CASING** ---- **GROUT TYPE/QUANTITY** ----

**LOGGED BY** LF **DRILLING COMPANY** Gregg Drilling

**REMARKS** Borehole 1107R is 3 feet east of 1107. Hit cobbles 10 feet and unable to drill past.

**REMARKS CONTINUED**

| SAMPLING METHOD | Recovery (ft) | USCS | DEPTH (ft. BGL) | GRAPHIC LOG | LITHOLOGIC DESCRIPTION |
|---|---|---|---|---|---|
| | | GM | 5 | | (FILL; GM) SILTY GRAVEL, coarse subangular gravel; dark gray; moist. |
| | | | 10 | | at 10 feet: stuck on cobble; can't drill further. |
| | | | | | Bottom of borehole at 10.0 feet. |

LEHIGH ROCKPILE TEMPLATE GINT STD US LAB_LEHIGHROCKPILEDRILL.GPJ LOG A EWNN01.GDT 3/20/15

# G2. Slope Stability Analyses (Golder Associates, July 22, 2021)

GOLDER
MEMBER OF WSP

# TECHNICAL MEMORANDUM

**DATE** July 22, 2021 **Project No.** 179018610

**TO** Erika Guerra
Lehigh Hanson

**FROM** Robert Paul C. Erickson, PE; William L. Fowler, PG, CEG **EMAIL robertpaul_erickson@golder.com, bill_fowler@golder.com**

**RE: SLOPE STABILITY ANALYSES, PERMANENTE CREEK RESTORATION PLAN, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC. PERMANENTE QUARRY, CUPERTINO, CALIFORNIA**

Ms. Guerra,

Golder Associates Inc. (Golder) is submitting this technical memorandum to Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our slope stability analyses of the proposed Rock Pile and mining overburden removal to the design finished grade related to Permanente Creek Restoration Plan, herein referred to as the Restoration Plan (Waterways, 2018)[1], at the Permanente Quarry in Cupertino, California. This work was performed in support of our response to comments dated June 25, 2021 compiled by ESA and submitted to the County of Santa Clara regarding the Permanente Creek Restoration Plan (PCRP).

The following sections provide a brief description of the analyses that were performed, the results and conclusions, and relevant slope stability analyses model outputs are provided as Attachment 1.

## 1.0 MODEL DEVELOPMENT

Golder analyzed cross-section C-C', shown on Sheets 19 and 21 of the Restoration Plan, 90% design submittal (Waterways, 2019). This cross-section location is considered critical for slope stability because it consists of, nominally, the greatest height of the rockpile overburden material (250 feet measured from toe to crest) and captures the steepest inclinations of both the existing rockpile (approximately 1.1H to 1.2H:1V) and underlying native metabasalt (aka greenstone) (approximately 1H: 1V). The geometry of the existing site conditions is based on topographic data per a survey collected by Lehigh in May 2011. The Restoration Plan provides additional information regarding the interpretation of the depth to the underlying native bedrock. The topographic data provided to Golder was truncated at the existing haul road on the north side of the creek at approximately elevation 1070 feet (El. 1070), therefore, model geometry north of the haul road was estimated based on measurements from Google Earth.

In lieu of piezometer data along cross-section C-C', Golder assumed a phreatic surface based on our understanding of the general subsurface water conditions along the south rim of the quarry as informed by long

[1] Waterways Consulting, Inc. 2019. Permanente Creek Restoration Plan Grading Plan 90% Design. Santa Clara County Grading Permit Submittal, October 31, 2019.

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term installation and data collection from vibrating wire piezometers installed between the quarry and Permanente Creek. The analyses performed here assumed the depth to water is approximately 75 feet below the existing haul road and declines through the native bedrock to a depth of approximately 20 feet below the existing culvert in the creek (near original creek thalweg elevation).

## 2.0 ANALYSES

Golder performed 2-dimensional, limit equilibrium slope stability analysis along cross-section C-C' using Slide2 Modeler, Version 9.012[2]. The analyses presented here used Spencer's method of analysis because it satisfies static horizontal and vertical equilibrium as well as moment equilibrium. These analyses evaluated circular failures only because the interpretation of the subsurface conditions indicate a block type failure is unlikely (i.e., no weak horizontal stratum). Critical slip surfaces and corresponding FOS were evaluated for local failures through upper and lower portions of the respective slopes as well as global failures that span from the ultimate crest to ultimate toe of the final slope configuration.

Golder analyzed the following four cases for slope stability:

1. The existing rockpile overburden given existing conditions.
2. The interpreted native bedrock following excavation and removal of the rockpile overburden and underlying thin surficial deposits.
3. The interpreted native bedrock surface in the creek bottom following excavation to the expected upper limit of the design finished subgrade of the creek per the Restoration Plan.
4. The interpreted native bedrock surface in the creek bottom following excavation to the expected lower limit of the design finished subgrade of the creek per the Restoration Plan.

As a limited sensitivity analysis, Golder evaluated each of the above four cases considering the assume phreatic surface described in Section 1 as well as under dry conditions to bracket the range of factors of safety (FOS).

## 3.0 GEOTECHNICAL PARAMETERS

The geotechnical parameters used in slope stability analyses are summarized in Table 1 and described below.

**Table 1: Summary of Geotechnical Parameters**

| Material | Unit Weight (pcf) | Cohesion (psf) | Effective Friction Angle (degrees) |
|---|---|---|---|
| Rockpile Overburden | 125 | 0 | 40 |
| Metabasalt/Greenstone | 165 | 6,480 | 30 |

Notes: pcf = pounds per cubic foot
psf = pounds per square foot

[2] Rocscience Inc. 2020. Slide 2 Modeler, 2D Limit Equilibrium Analysis for Slopes. Build Version 9.012. Build date December 11, 2020.

Golder assumed the rockpile overburden has a unit weight of 125 pounds per cubic foot (pcf) with 0 cohesion and an effective friction angle ($\Phi$') of 40 degrees. Its assumed friction angle corresponds to the rockpile's angle of repose and these assumed shear strength parameters yield a minimum static FOS of 1.0 which is reasonable considering the rockpile has performed well and appears stable since its placement.

Numerous previous analyses were performed by Golder[3] to back calculate, test, and develop shear strength parameters for the native greenstone at the site. These investigations and analyses determined the characteristics of the greenstone vary across the site with poorer quality greenstone generally observed in the northern portion of the quarry and better-quality rock located along the southern and southeastern portions of the site. The best geologic analog for the Rock Pile area is the nearby southern quarry rim which is located about 1500 feet west-northwest of the Rock Pile. The two areas are on trend with respect to the structural fabric of the quarry, and it is our opinion that they likely are underlain by the same general package of Franciscan bedrock comprised of a mixture of metabasalt and graywacke with associated interlayered limestone blocks.

Golder performed a detailed investigation and analyses of the south quarry area for the purpose of final pitslope design in 2008. The results of this work are included as Chapter 9 of our geotechnical report published in support of the updated 2011 Reclamation Plan. Four coreholes were installed in the south quarry rim and approximately 1500 feet of core were recovered and analyzed. Rock mass properties used for the pitslope design were developed from geotechnical core logging, point load testing, and laboratory testing of the core. Mohr-Coulomb strengths for the rock units were estimated from Hoek-Brown strengths using the computer program RocData, by Rocscience. Based on this previous work, Golder assumed the metabasalt/greenstone unit has a unit weight of 165 pounds per cubic foot (pcf) with 45 psi cohesion and an effective friction angle ($\Phi$') of 30 degrees.

## 4.0 RESULTS

The results of slope stability analyses are summarized in Table 2 and relevant model outputs are provided as Attachment 1.

[3] Golder Associates Inc. 2011. Geotechnical Evaluations and Design Recommendations (Revised), Permanente Quarry Reclamation Plan Update, Santa Clara County, California. December 2011.

**Table 2: Summary of Slope Stability Analyses**

| Case | Failure Mode | FOS | |
|---|---|---|---|
| | | Hypothetical Dry Conditions | Assumed Phreatic Surface |
| 1 – Existing Conditions | Upper Slope | 1.13 | 1.13 |
| | Lower Slope | 1.15 | 1.15 |
| | Global | 1.37 | 1.37 |
| 2 – Excavate Rockpile | Local (Upper Slope) | 2.09 | 1.98 |
| | Global | 2.32 | 2.05 |
| 3 – Excavate to Upper Limit of Finished Grade | Local (Upper Slope) | 2.09 | 1.97 |
| | Lower Slope | 5.58 | 5.13 |
| | Global | 2.14 | 1.87 |
| 4 – Excavation to Lower Limit of Finished Grade | Local (Upper Slope) | 2.09 | 1.98 |
| | Lower Slope | 4.92 | 4.37 |
| | Global | 2.13 | 1.83 |

## 5.0 CONCLUSIONS AND CONSIDERATIONS

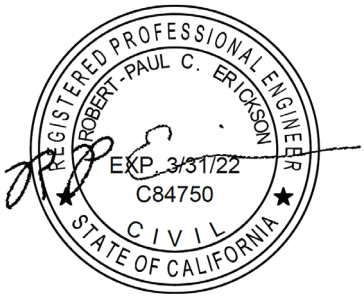
The results of the analyses presented here indicate the proposed excavation of the existing rockpile as well as excavation to both the upper and lower limits of the finished subgrade of the creek per the Restoration Plan will exceed a static FOS of 1.8. These conclusions are based on the interpreted extent of the native metabasalt/greenstone beneath the rockpile as described in the Restoration Plan, the condition (and corresponding geotechnical parameters) of the native metabasalt/greenstone Golder assumed for the analyses, and the phreatic surface Golder assumed for the analyses.

As outlined in our response to comments, and our previous documents published in support of the Permanente Creek Restoration Plan, a qualified professional engineer or geologist is required to inspect and map the native bedrock that is exposed beneath the rockpile overburden to confirm, or modify, the assumptions made to perform these analyses. If the observed conditions are different than those assumed here, additional analyses may be required.

## 6.0 CLOSING

Please contact the undersigned if you have questions or require clarifications regarding the information provided in this memorandum.

**Golder Associates Inc.**




Robert Paul C. Erickson, PE
*Senior Consultant*
RPCE/WLF/rpce

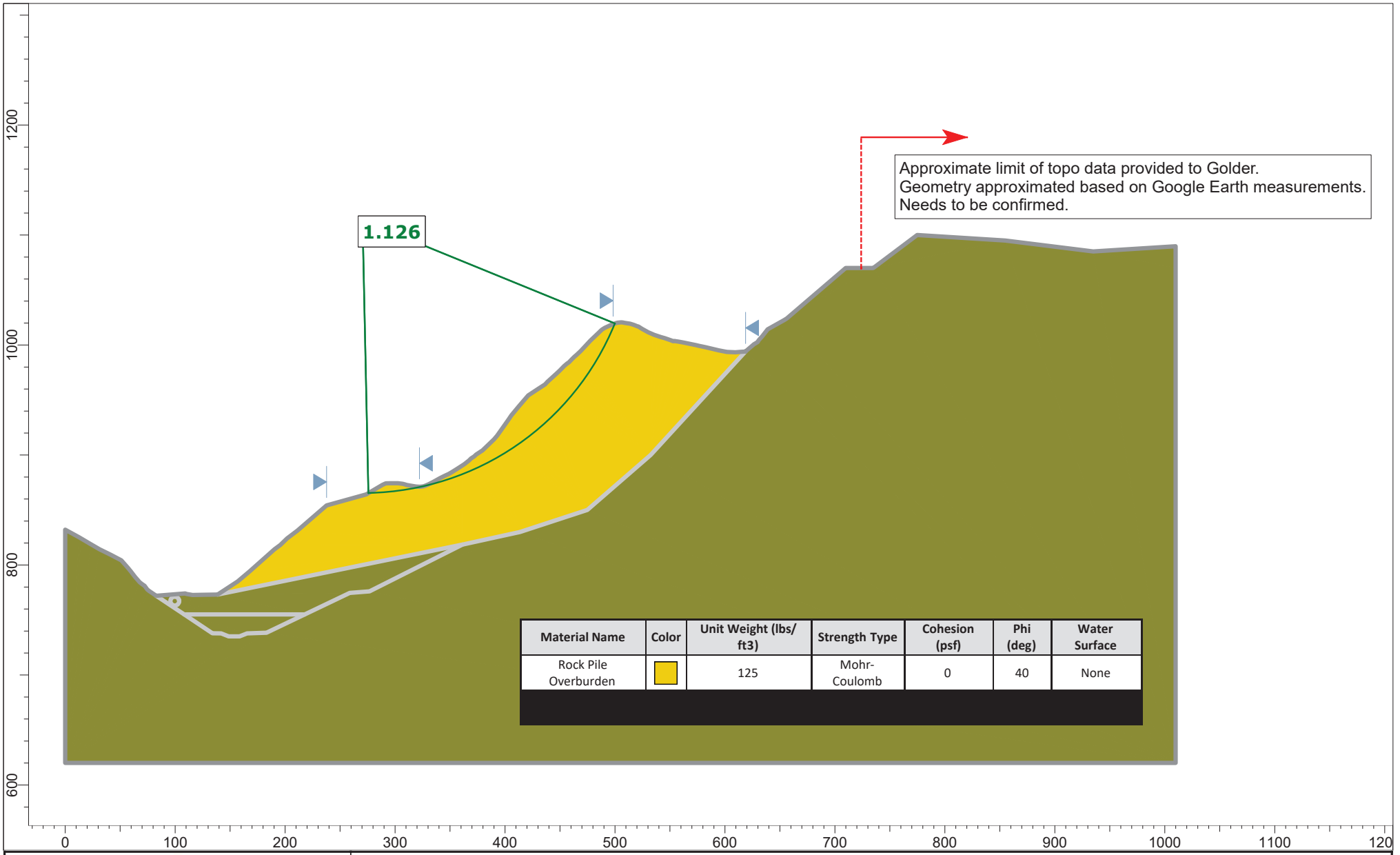
William L. Fowler, PG, CEG
*Principal Engineering Geologist*

Attachments: Attachment 1 – Slope Stability Analyses Model Outputs

https://golderassociates.sharepoint.com/sites/0637109940-lehighpermgwmonitoring-ca/shared documents/creek restoration/lehigh permanente creek restoration slope stability memo - 20210722.docx

**ATTACHMENT 1**

# Slope Stability Analyses Model Outputs




| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

| | | | |
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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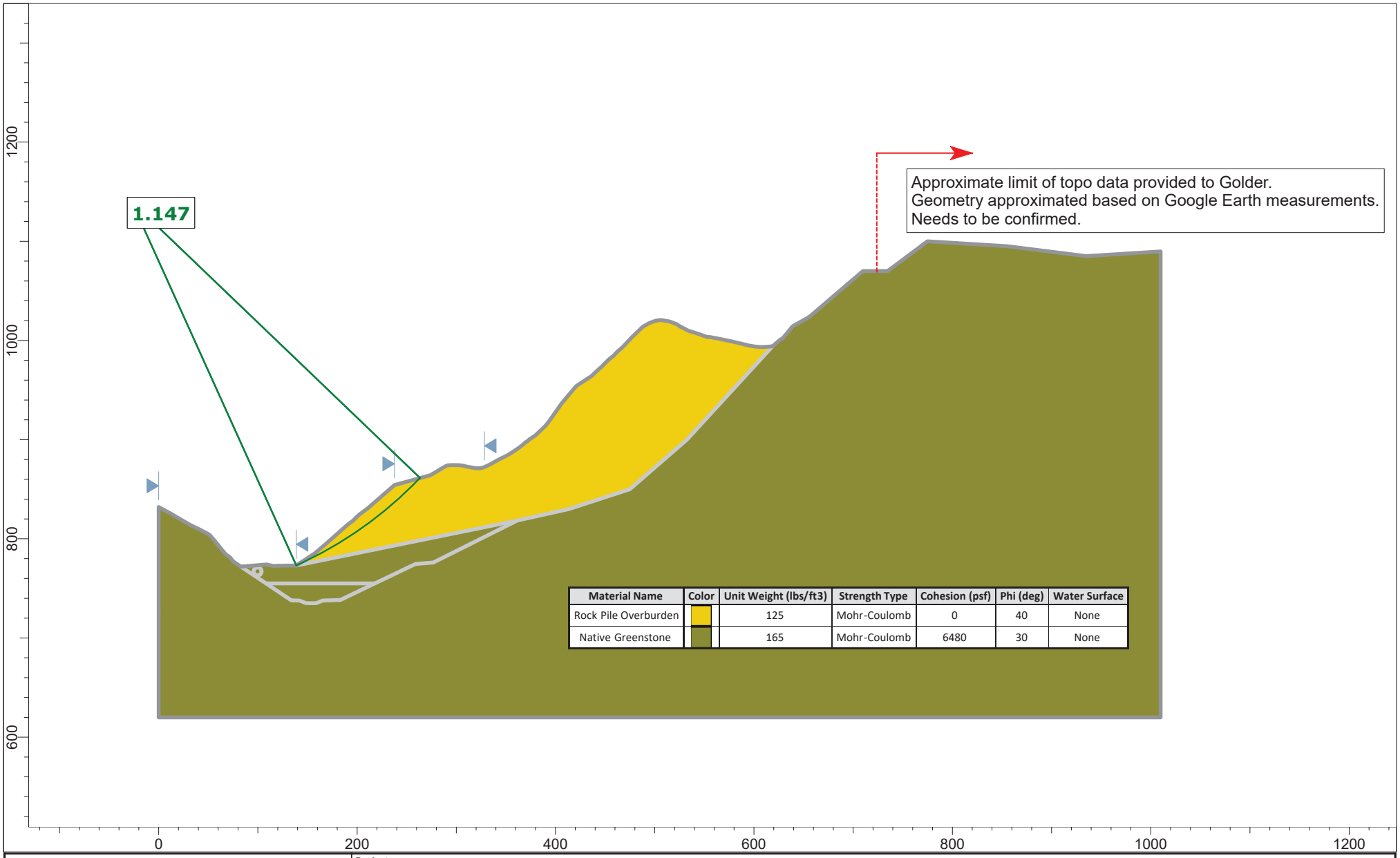


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

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SLIDEINTERPRET 9.012

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| Analysis Description | | | |
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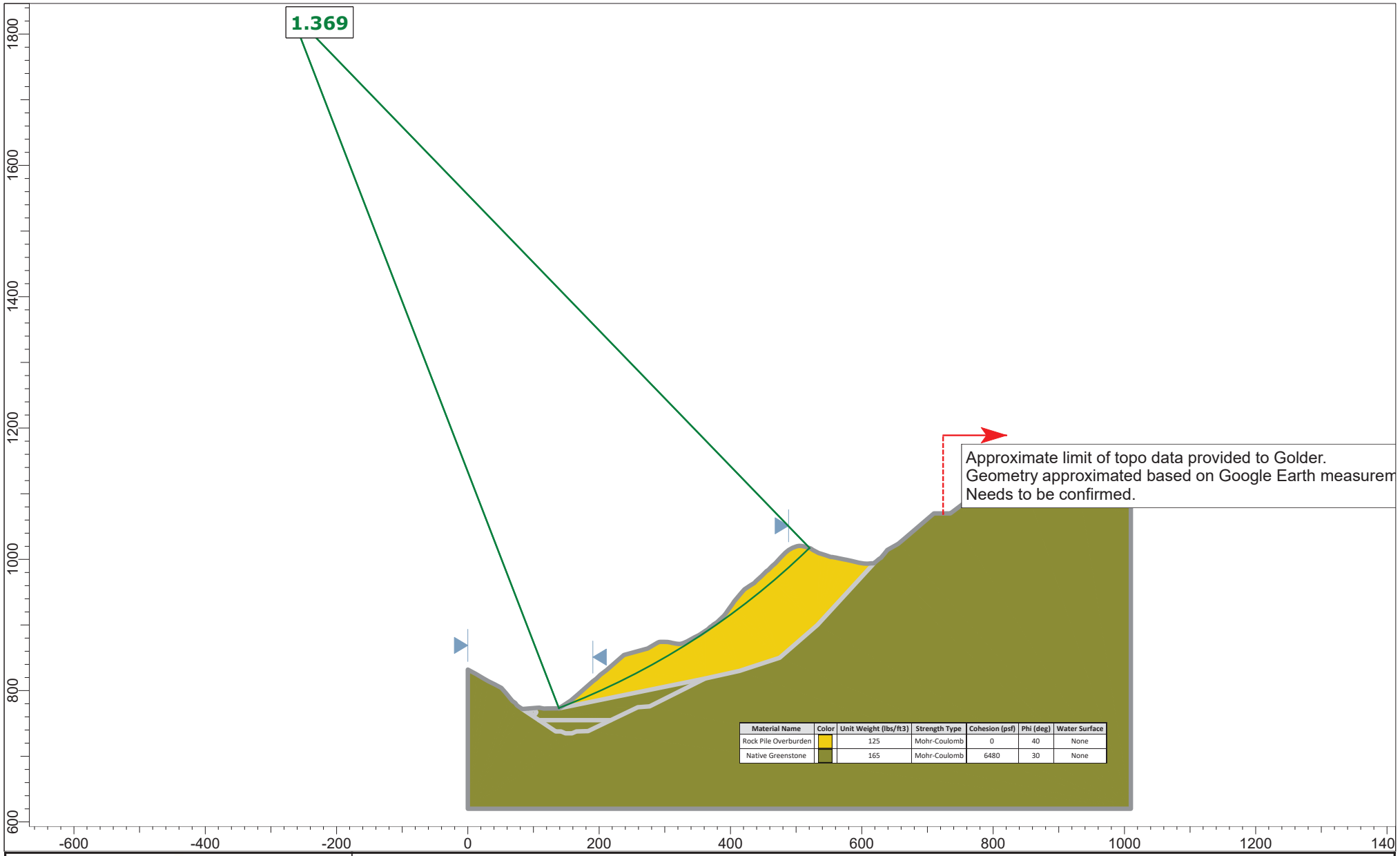


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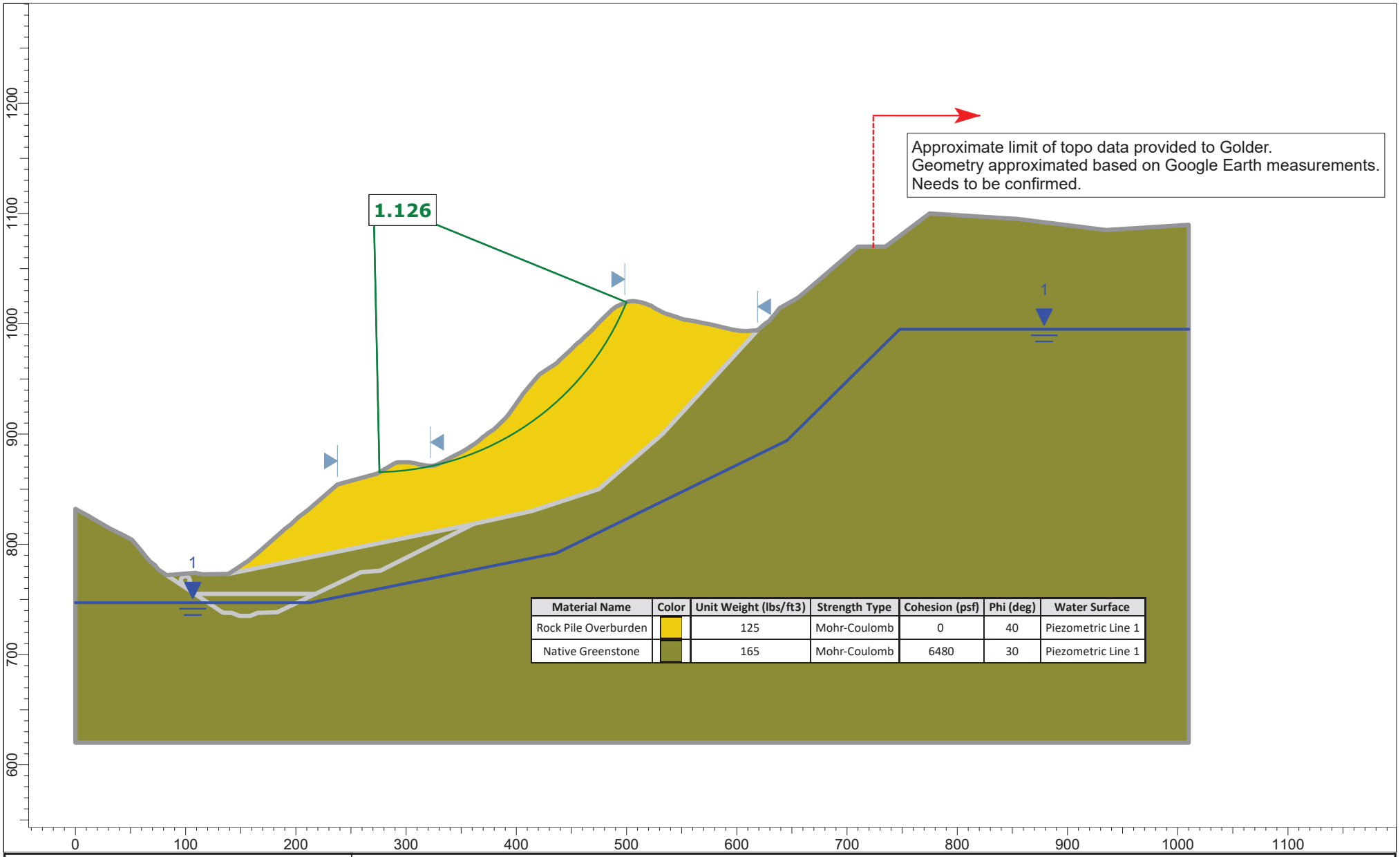


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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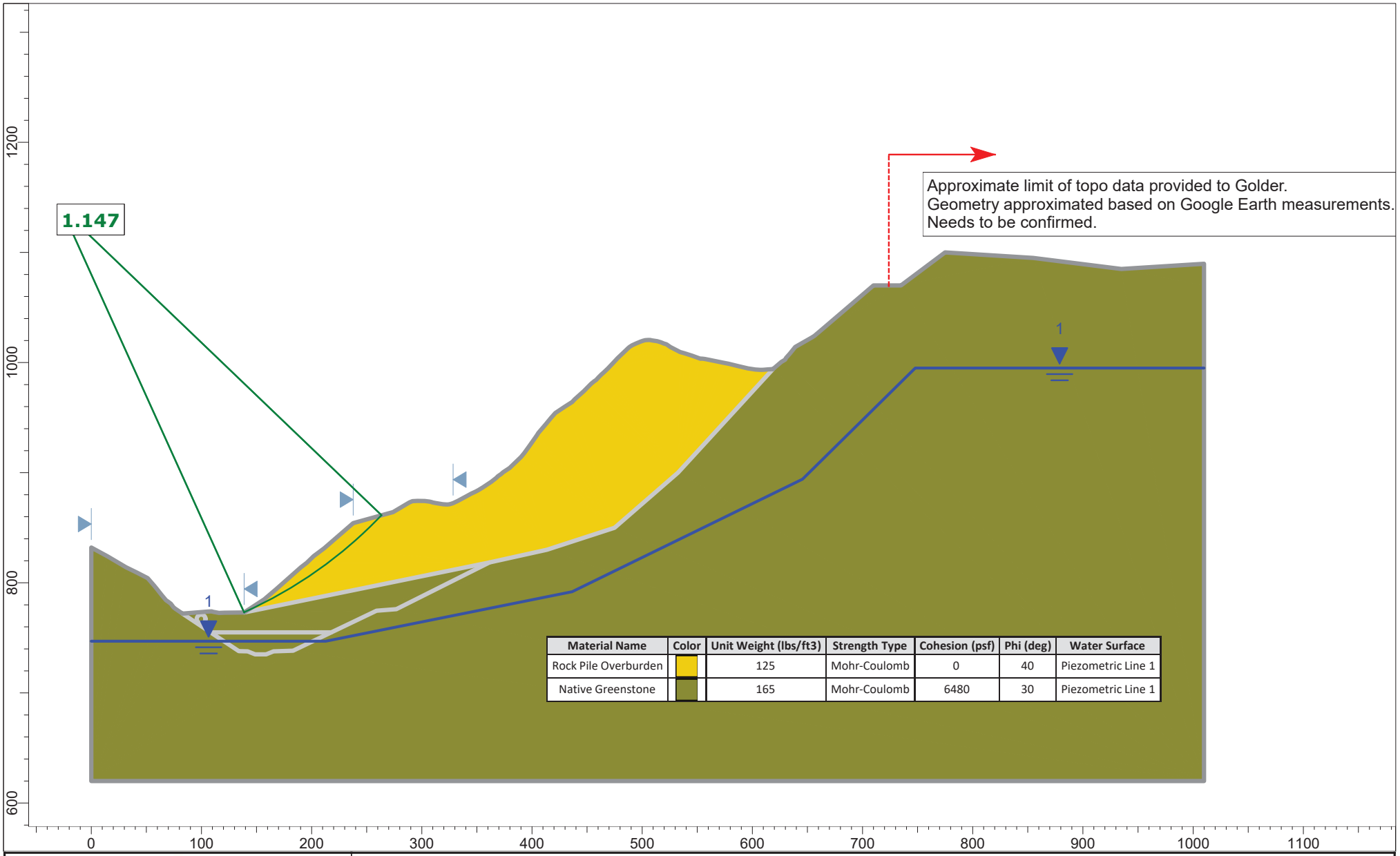


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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| *Project* | SLIDE - An Interactive Slope Stability Program | | |
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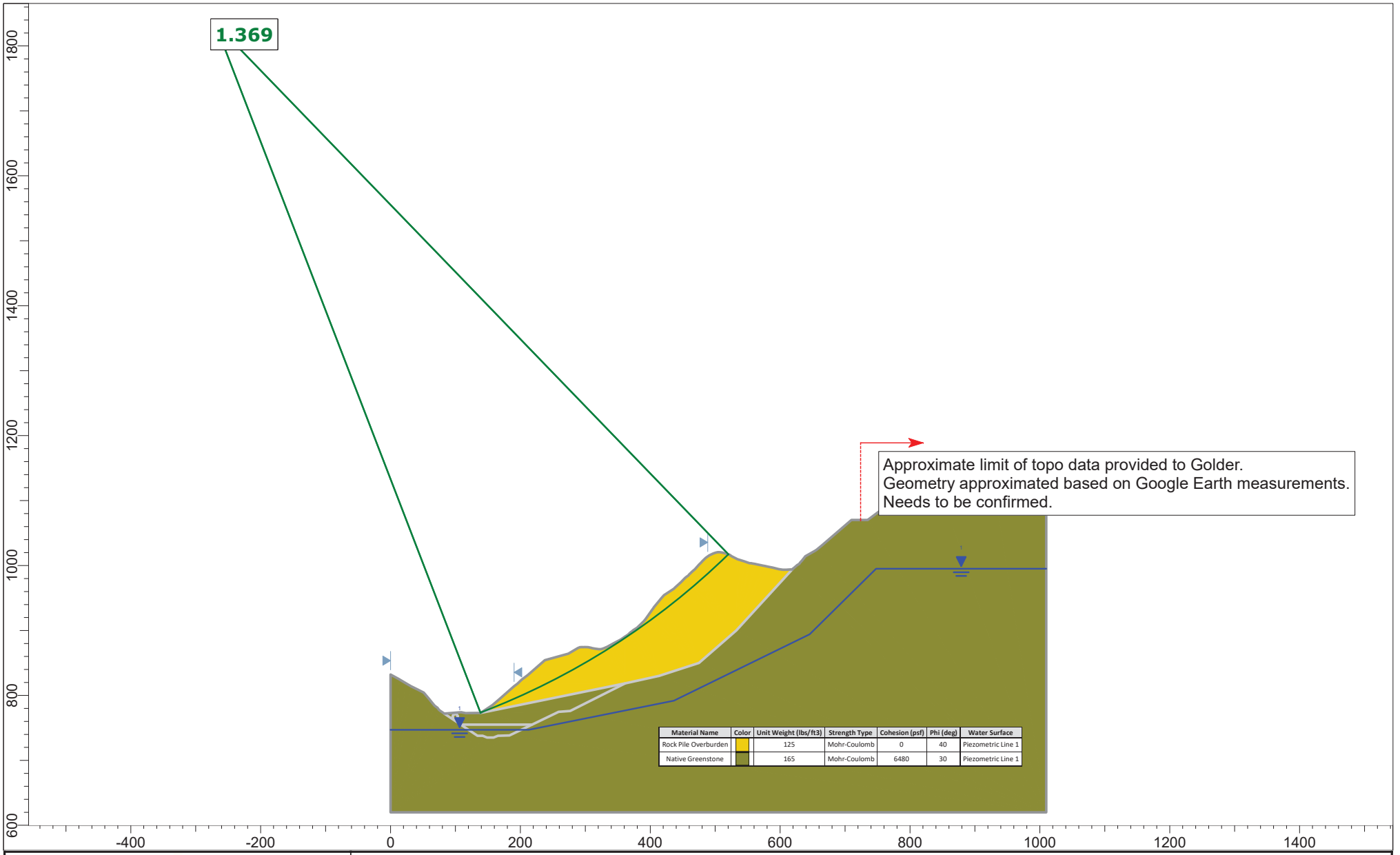


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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SLIDEINTERPRET 9.012

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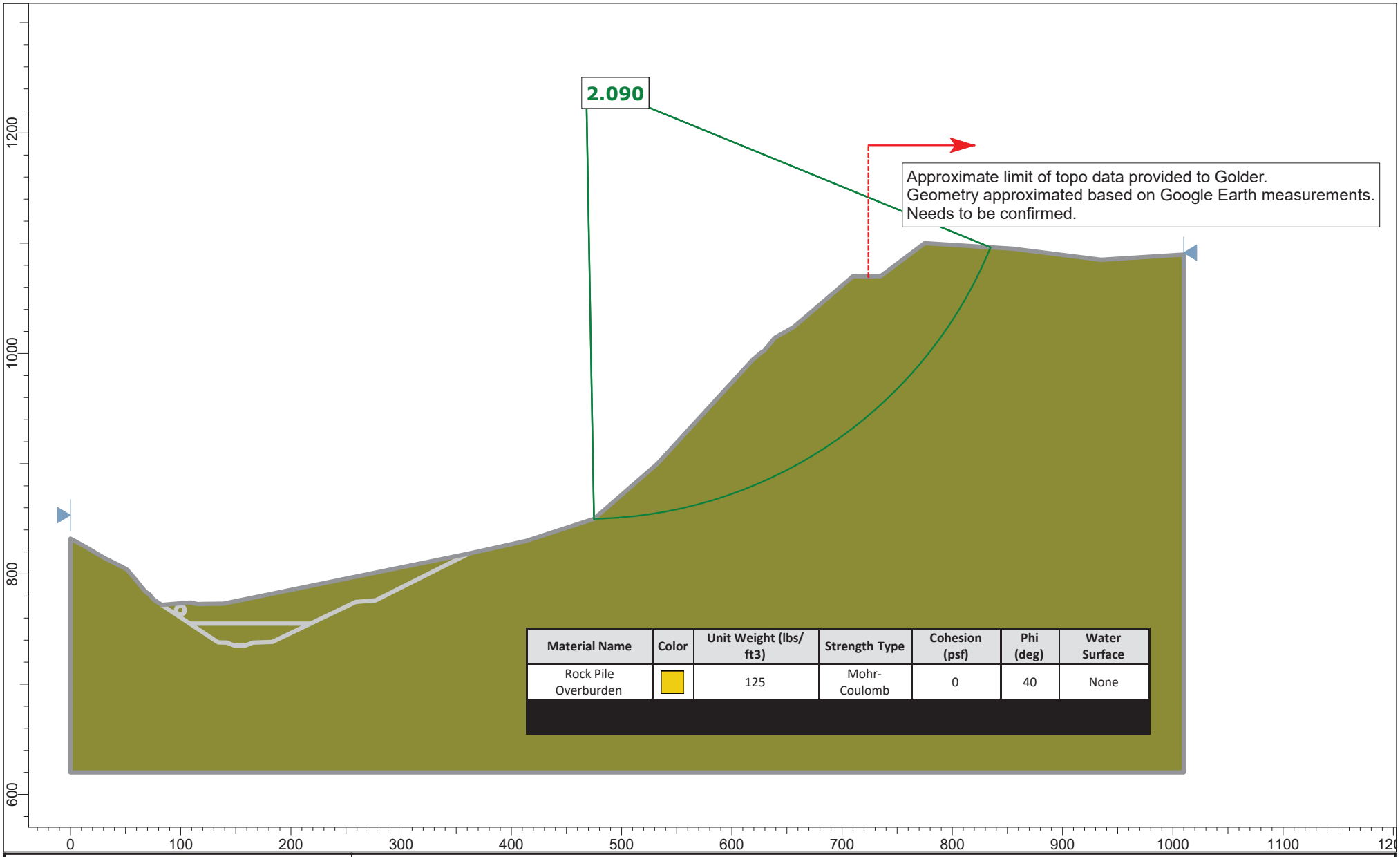


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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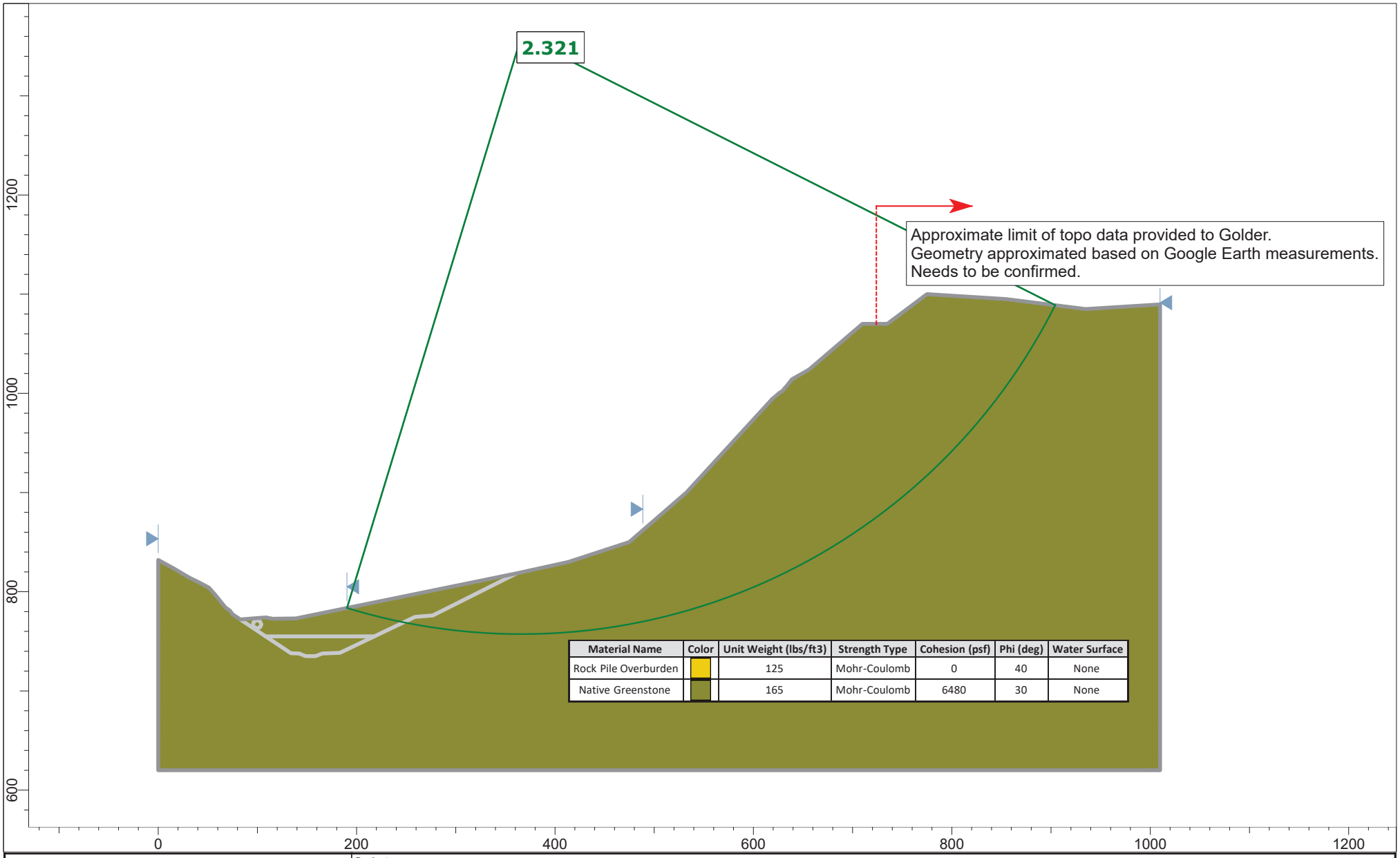


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

GOLDER

SLIDEINTERPRET 9.012

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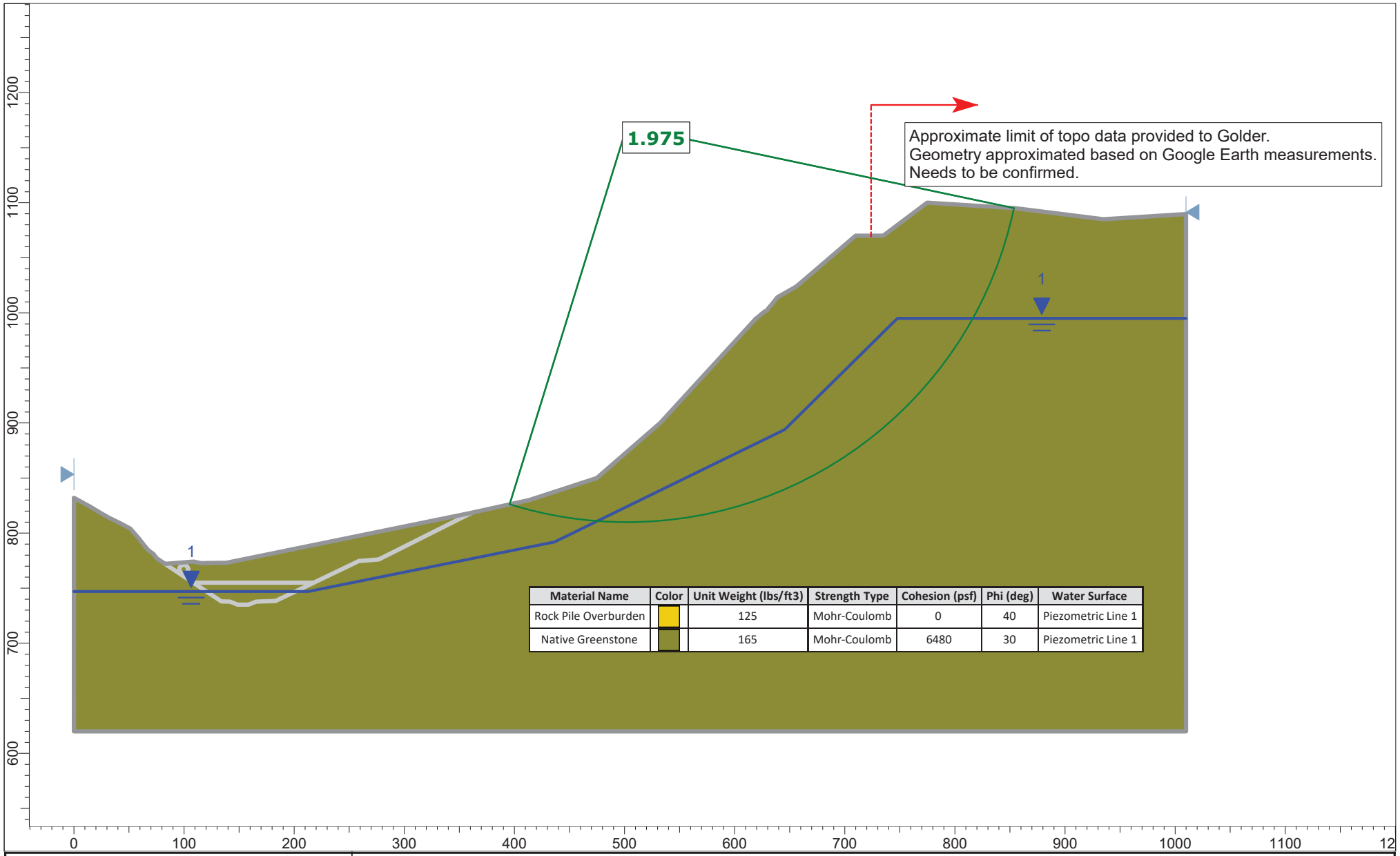


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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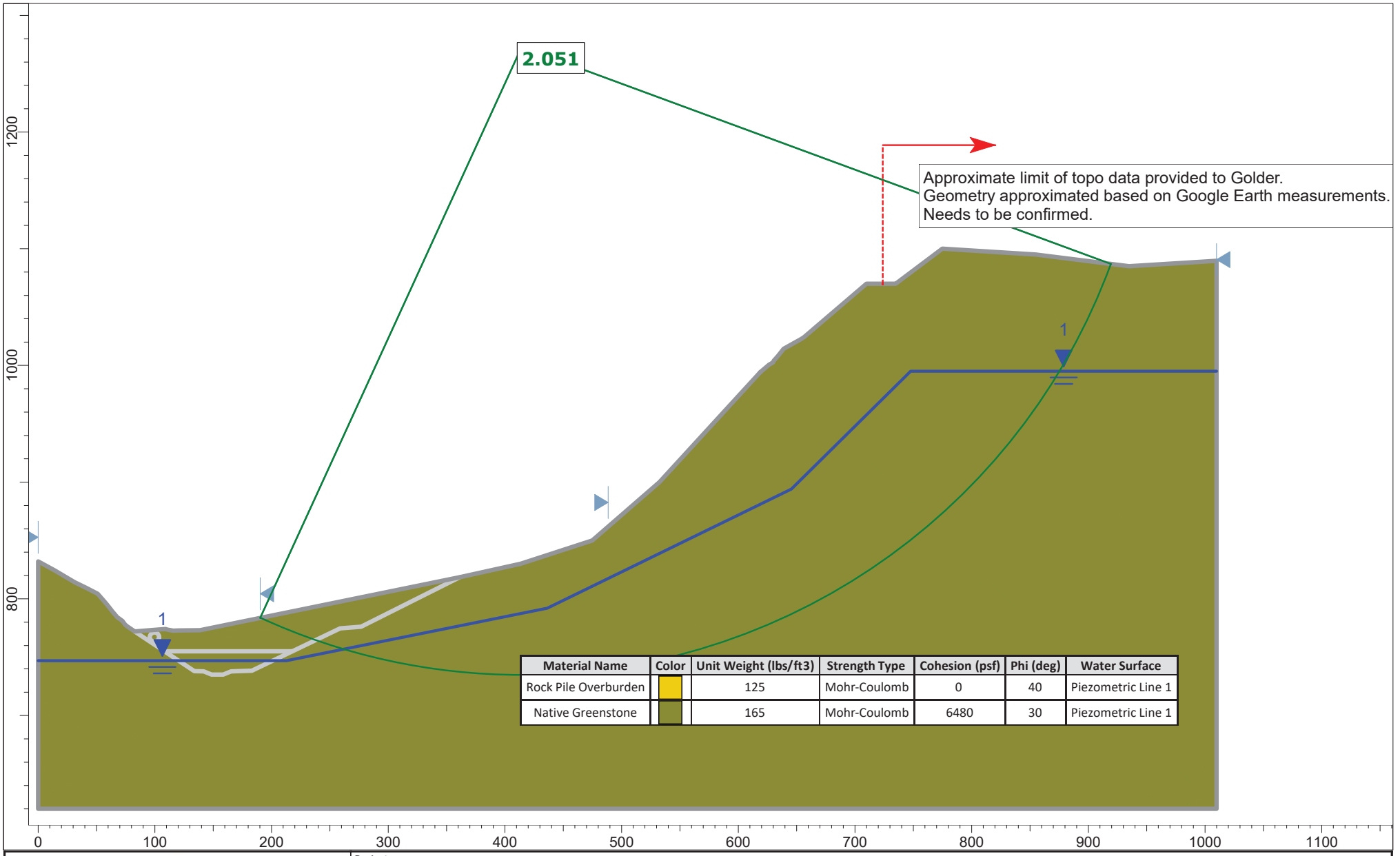


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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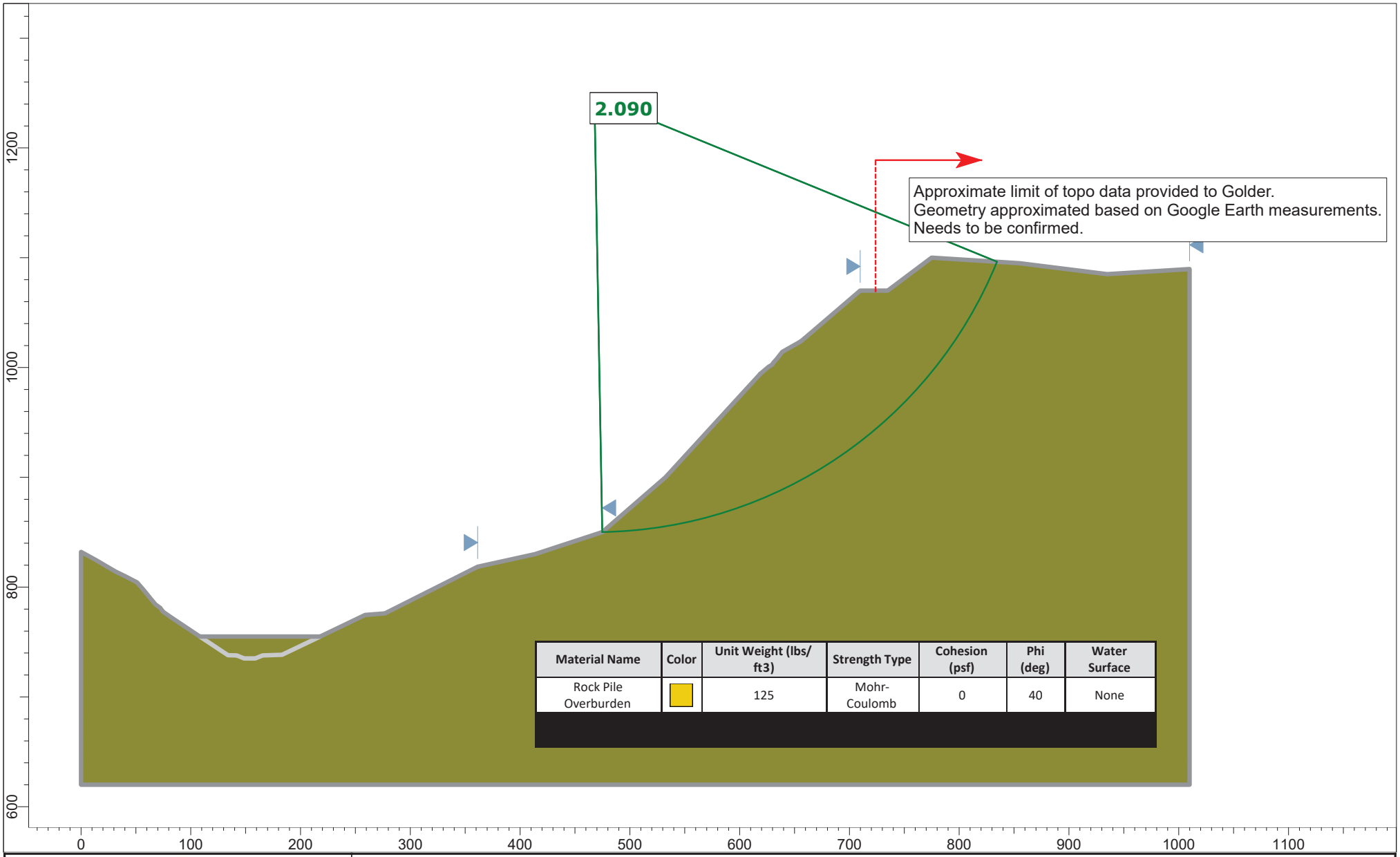
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1361 | *Company* |
| *Date* | 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1450 | *Company* |
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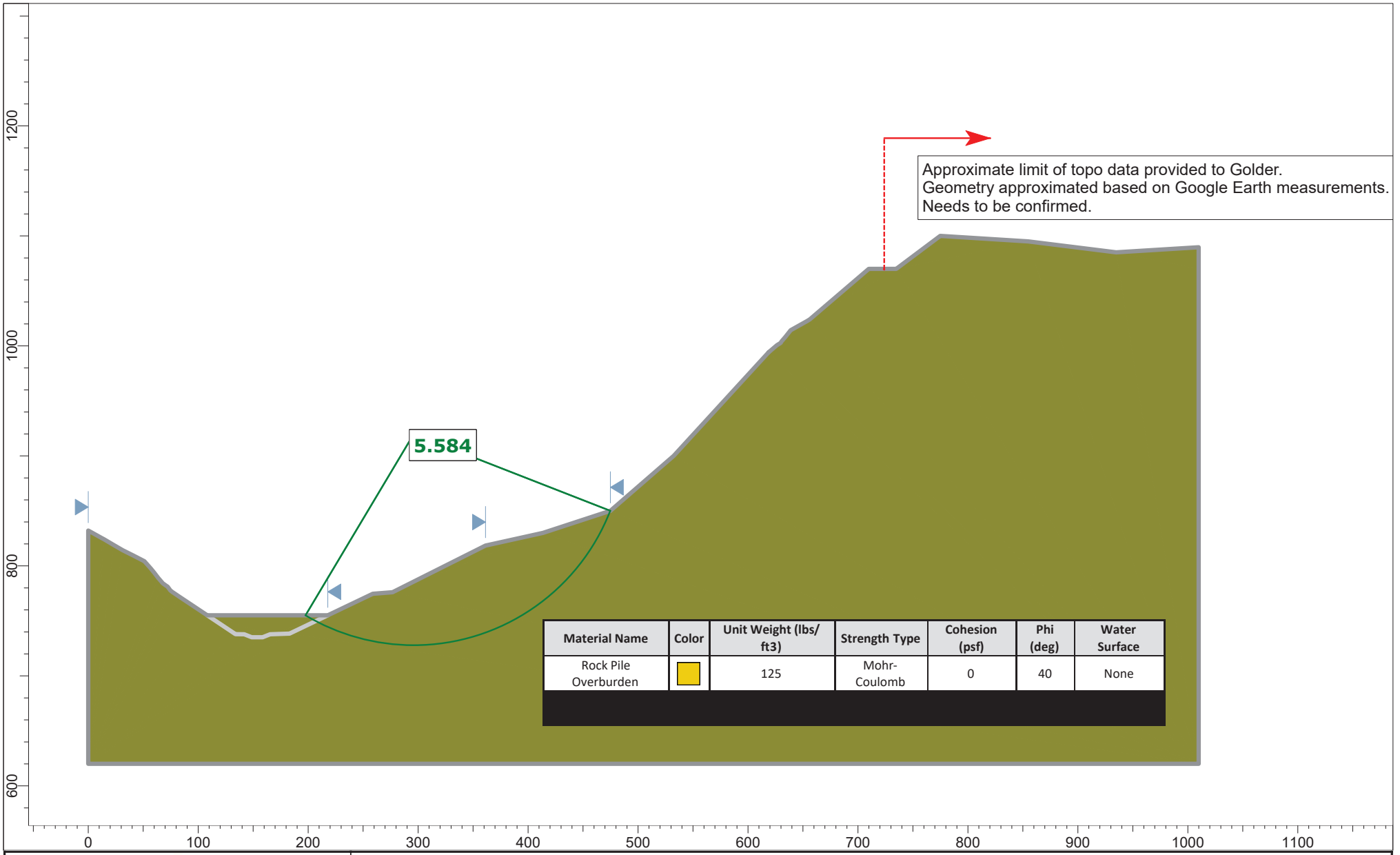


| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|
| *Project* SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | |
| *Drawn By* | *Scale* 1:1444 | *Company* |
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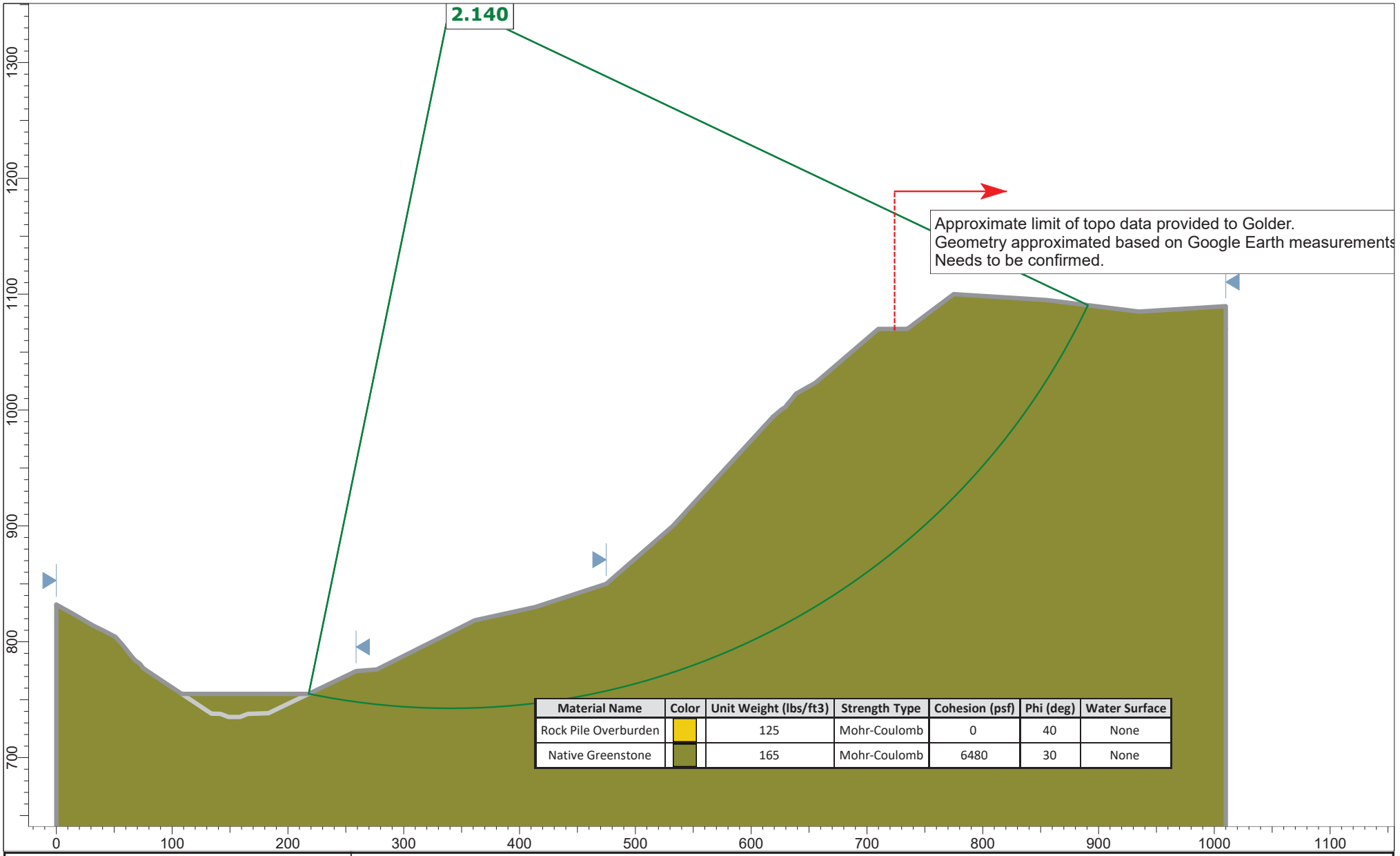


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1373 | *Company* |
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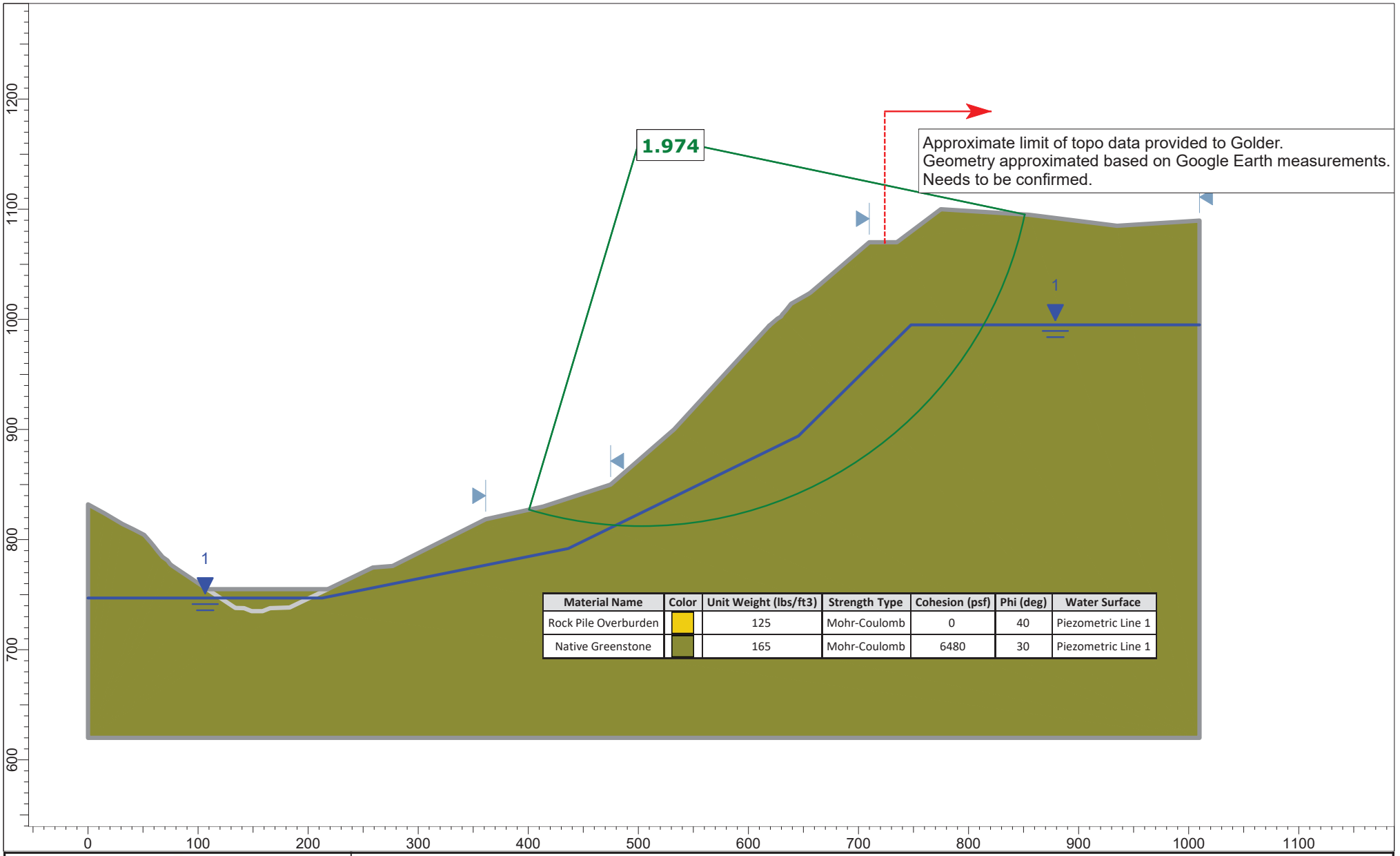


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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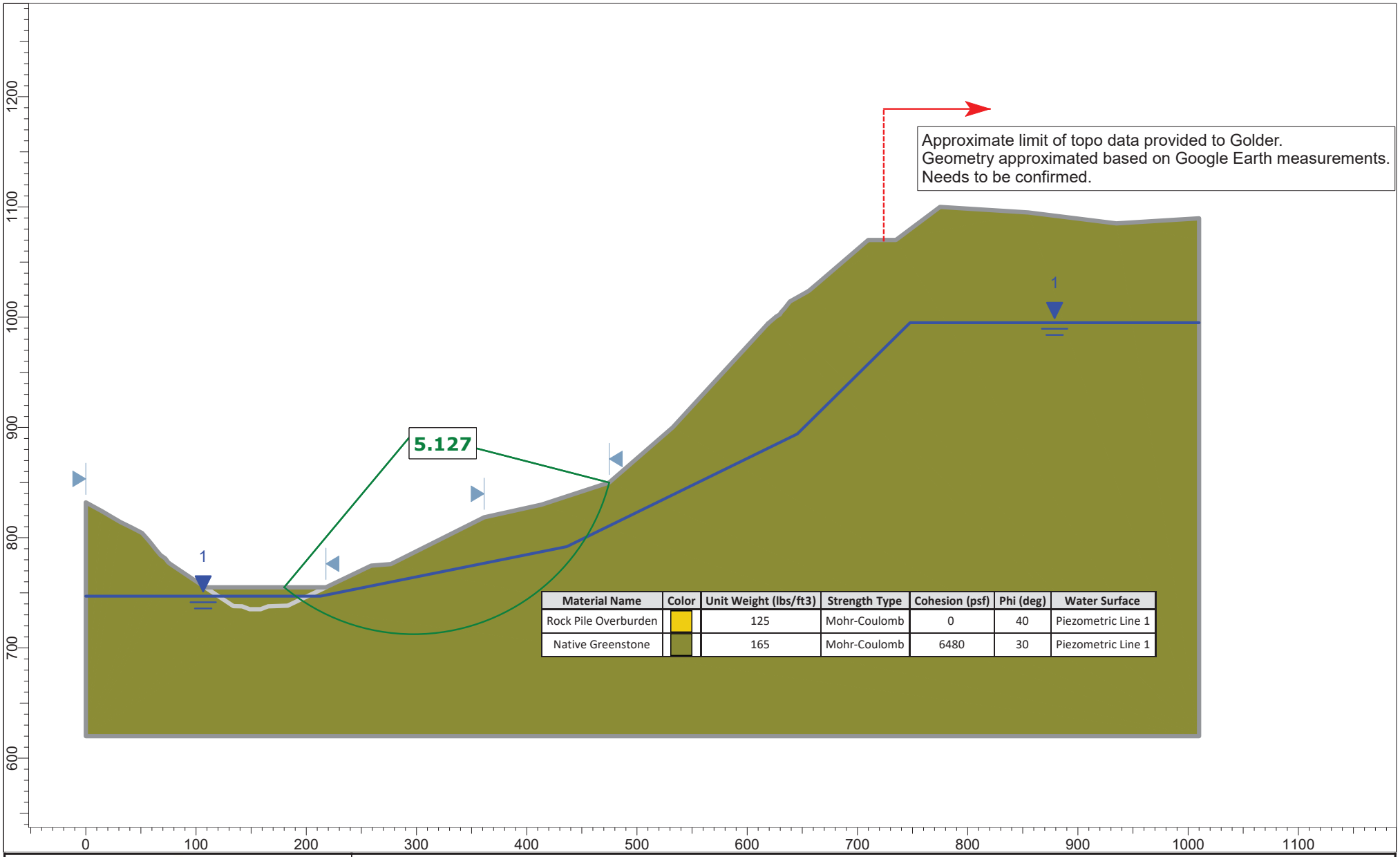
| *Date* | 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
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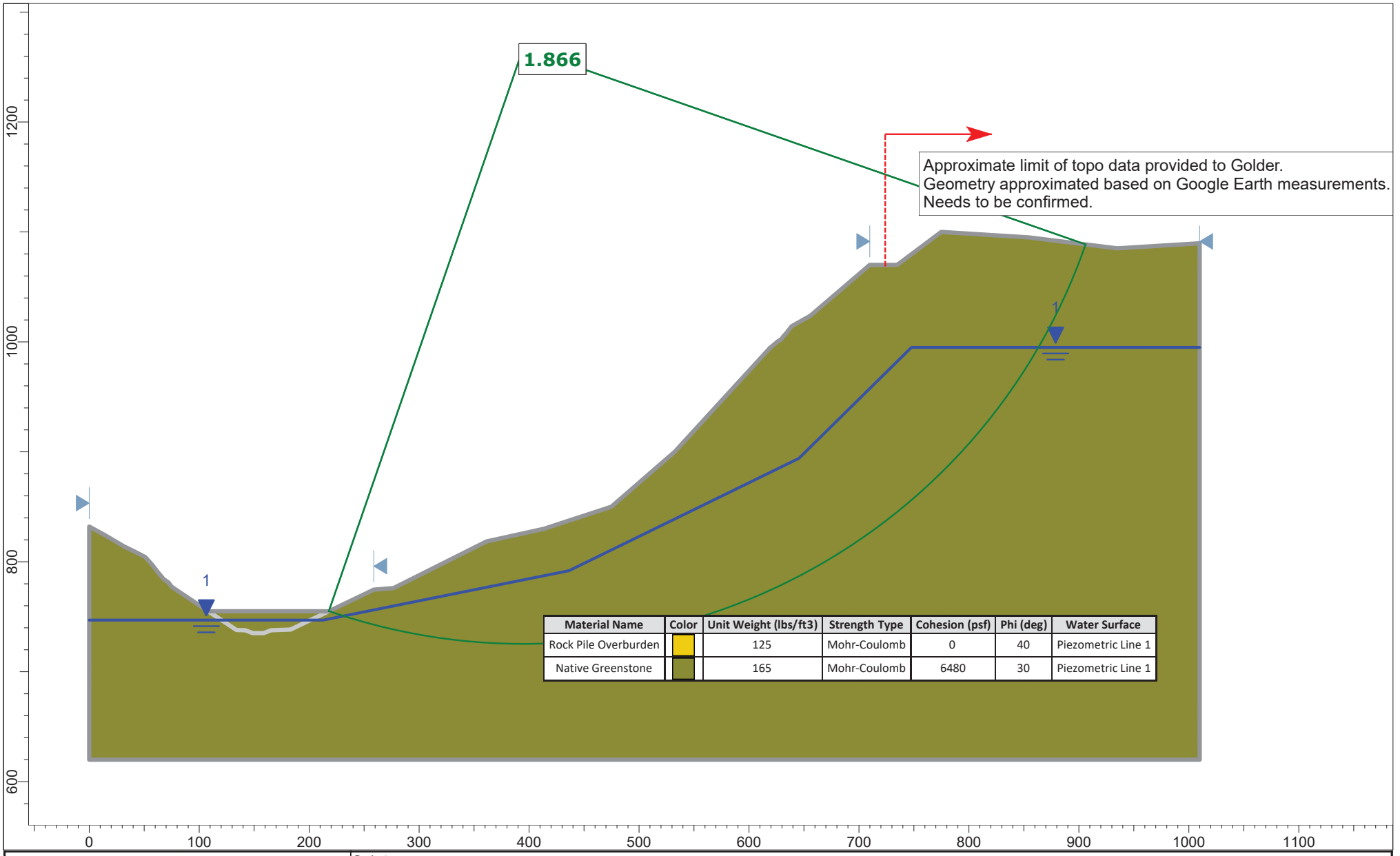


| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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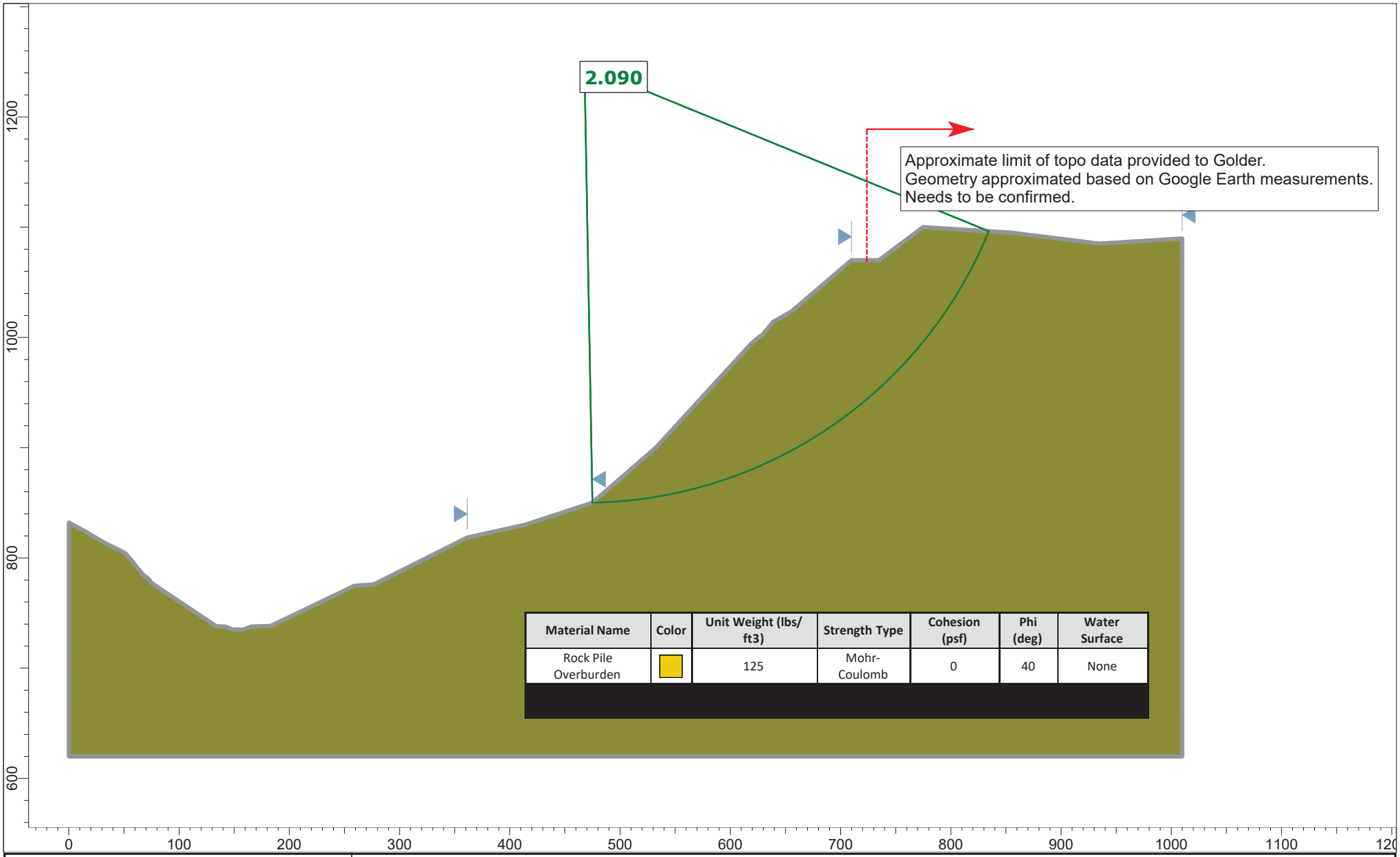
| Project | SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | | |
| Drawn By | | Scale 1:1444 | Company |
| Date | 7/9/2021, 4:25:49 PM | | File Name Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

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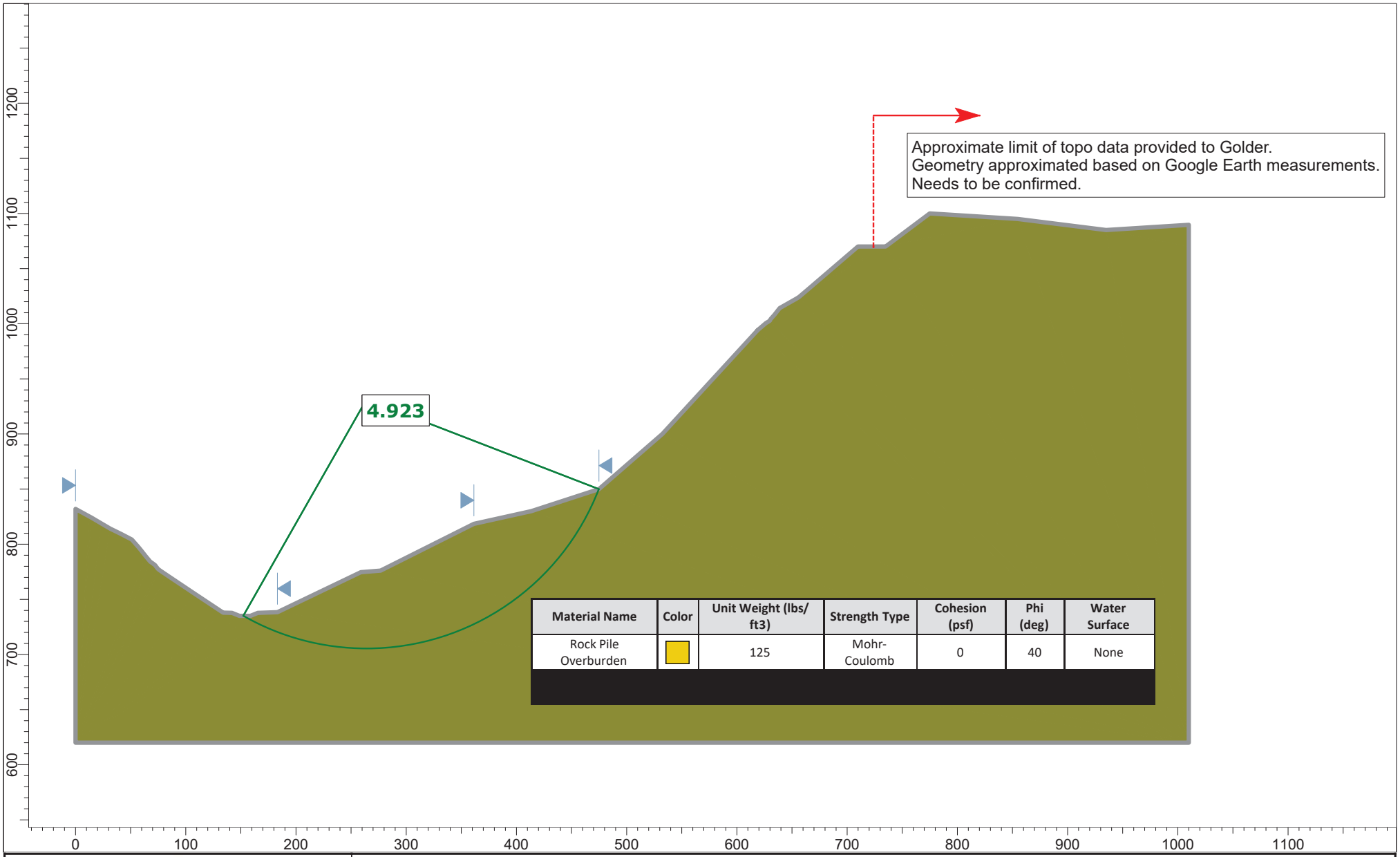
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1444 | *Company* |
| *Date* | 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |

GOLDER

SLIDEINTERPRET 9.012

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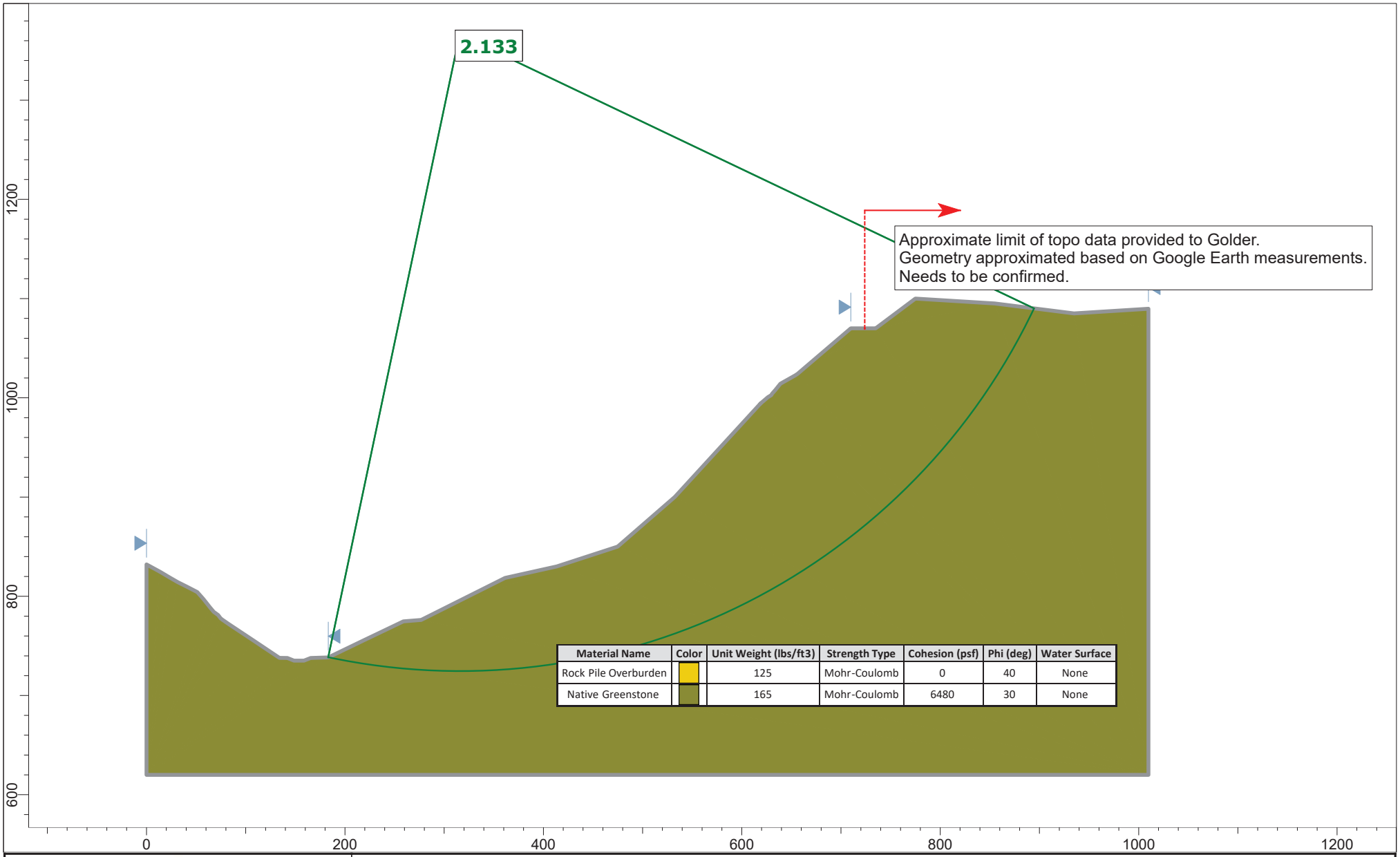
|---|---|---|---|
| Project | SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | | |
| Drawn By | | Scale 1:1444 | Company |
| Date | 7/9/2021, 4:25:49 PM | | File Name Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | None |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | None |

GOLDER

SLIDEINTERPRET 9.012

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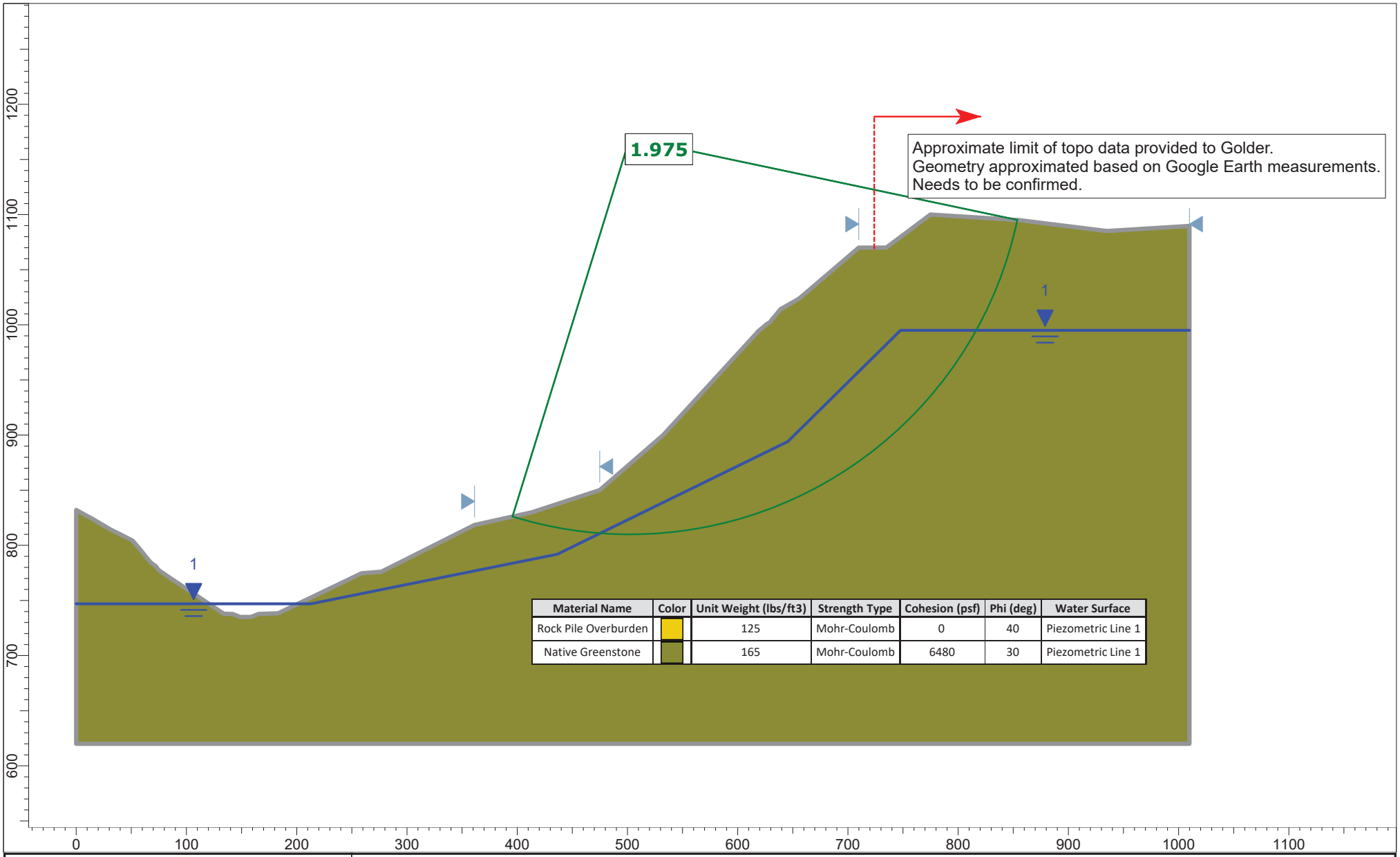
|---|---|---|---|
| Project | SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | | |
| Drawn By | | Scale 1:1605 | Company |
| Date | 7/9/2021, 4:25:49 PM | | File Name Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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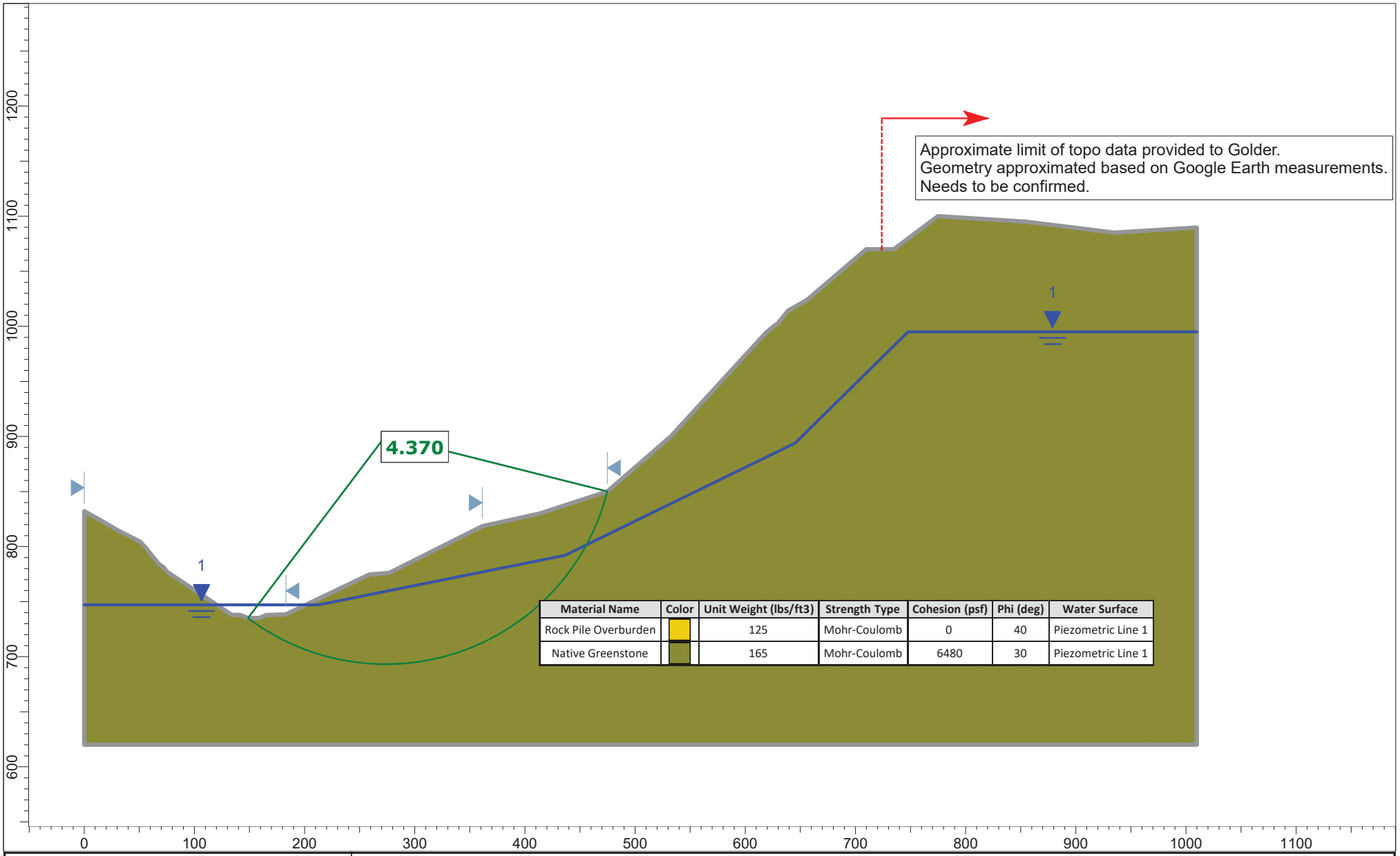
|---|---|---|
| *Project* SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | |
| *Drawn By* | *Scale* 1:1444 | *Company* |
| *Date* 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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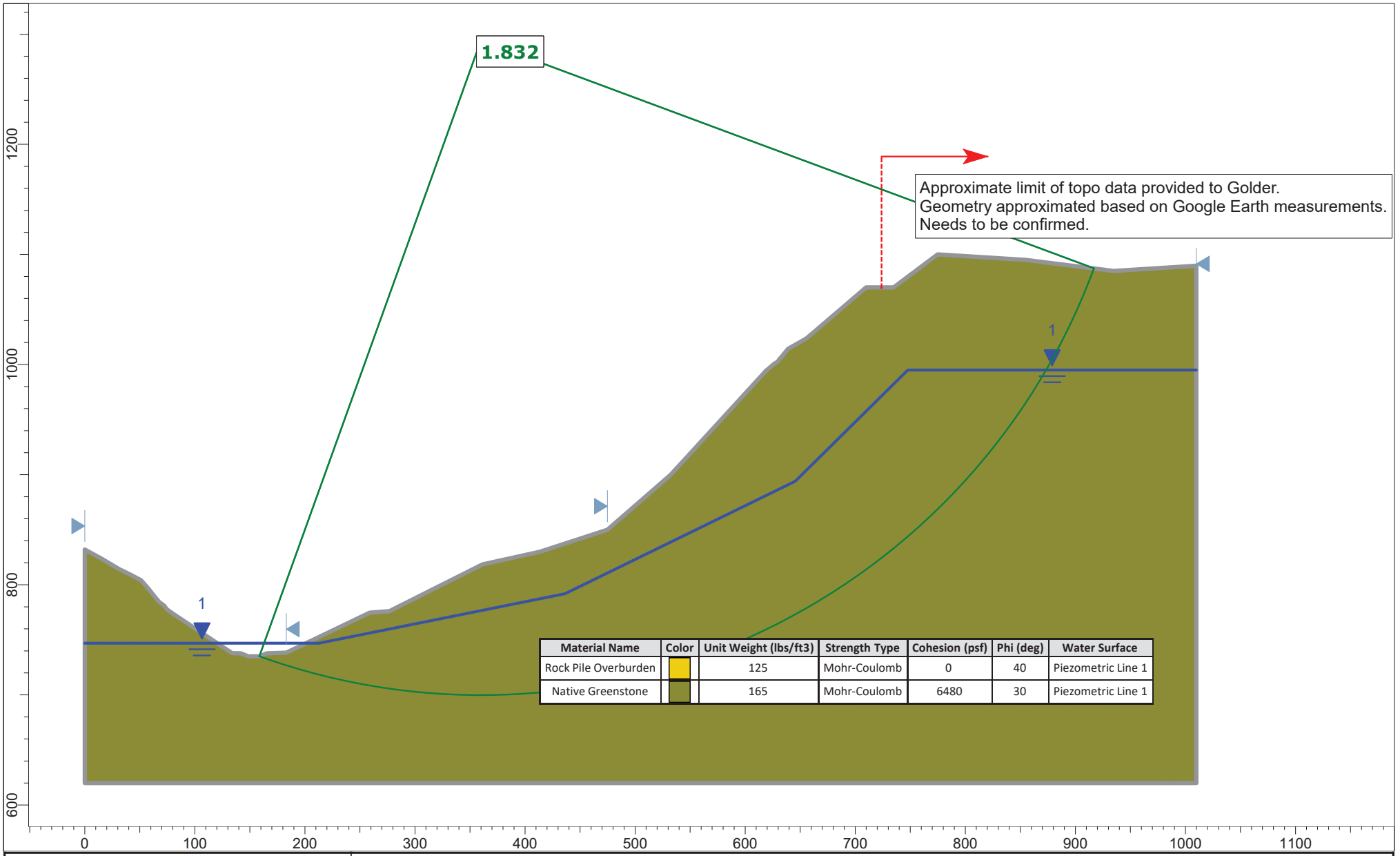
|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1444 | *Company* |
| *Date* | 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |




| Material Name | Color | Unit Weight (lbs/ft3) | Strength Type | Cohesion (psf) | Phi (deg) | Water Surface |
|---|---|---|---|---|---|---|
| Rock Pile Overburden | | 125 | Mohr-Coulomb | 0 | 40 | Piezometric Line 1 |
| Native Greenstone | | 165 | Mohr-Coulomb | 6480 | 30 | Piezometric Line 1 |

GOLDER

SLIDEINTERPRET 9.012

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|---|---|---|---|
| *Project* | SLIDE - An Interactive Slope Stability Program | | |
| *Analysis Description* | | | |
| *Drawn By* | | *Scale* 1:1444 | *Company* |
| *Date* | 7/9/2021, 4:25:49 PM | | *File Name* Section C-C'_20210715.slmd |

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

**Description:**
Soil and sediment material that is generated from maintenance projects conducted at the Lehigh Permanente Facility (Site) will be sampled, analyzed, and managed according to this standard operating procedure (SOP). This document is intended to provide instructions to adequately manage soil and sediment from maintenance operations by specifying screening guidelines, testing requirements, and placement to conform to applicable Federal, State and Local regulations.

**Regulatory Framework:**
The San Francisco Bay Regional Water Quality Control Board (Water Board) issued Waste Discharge Requirements, Order No. R2-2018-0028, (WDRs) to Lehigh for the Permanente Facility. The WDR regulates discharges to land and governs wastes and activities that generate waste at the site that have the potential to impact groundwater and hydrogeologically connected surface waters. Operations and maintenance of Waste Management Units (WMUs) at the Facility, including the Eastern Material Storage Area (EMSA) and Western Material Storage Area (WMSA), must be conducted in accordance to California Code of Regulations (CCR) 27 (Title 27), section 13263 of the California Water Code (CWC) and the approved plans required by Waste Discharge Requirement Order No. R2-2018-0028. The purpose of the procedures set forth herein is to ensure that material placement resulting from soil and sediment removal from maintenance operations is consistent with the requirements established by the WDRs.

- **Responsibility**— Environmental Department
- **Applicability**— Sampling and sediment of creek sediment originated from culvert cleanout activities
- **Affected Area**— Culverts in Permanente Creek
- **Frequency**— As needed
- **Attachments**— Attachment A – Environmental Screening Levels
- **Safety**—Basic Plant mandated PPE is required

**Procedure:**
Soil or sediment samples will be collected by Lehigh personnel and sent to laboratory for analysis. Samples will be analyzed for parameters listed on Table 1 and results compared against the most recent, applicable Water Board's Tier 1 Environmental Screening Levels (ESLs) for soils and groundwater as modified (Attachment A contains the 2019 ESLs for metals, the primary constituents of concern), as described below.

The documentation required includes:

1. Reports of removed material volume, date of removal, and location
2. Field data sheets and testing results
3. Temporary storage location, including survey coordinates, if needed
4. Final placement location, including survey coordinates

5. Report with December Self-Monitoring Report.

**Sampling Guidelines:**

Samples will be collected and analyzed in a manner sufficient to characterize the material. Sampling and laboratory analysis will be conducted in compliance with the following requirements:

1. All analysis will be performed in accordance with EPA and California approved methods
2. Analysis of samples will be completed and reported by an analytical laboratory accredited by the California State Environmental Laboratory Accreditation Program and the National Environmental Laboratory Accreditation Program;
3. The laboratory detection limits for Modified Waste Extraction Test (WET) results must be below the applicable Tier 1 ESLs for groundwater;
4. The laboratory reporting limits will be reported on a dry-weight basis; and
5. The results of the laboratory analysis will be reported in a standard laboratory data package, including a summary of the quality control and quality assurance sample results and chain of custody documentation.

Discrete soil samples will be collected unless regulatory approval is obtained for collection of composite samples for a specific project or if the project is greater than acres (Table 2). Samples will be collected with dedicated sampling equipment (e.g., plastic scoops) when possible. Any non-dedicated sampling equipment will be decontaminated between sampling locations. Field data sheets documenting sampling collection date, time, location, personnel, weather conditions, and sample identification will be completed. Each sample will be logged on a chain-of-custody record, which will accompany the samples through collection and delivery to the analytical laboratory. Table 1 includes the analytical parameters and sampling schedule.

**Table 1: Laboratory Analytical Parameters**

| Analysis | EPA Analytical Method | Frequency |
|---|---|---|
| California Title 22 Metals (TTLC) | USEPA 6010B, 6020B, and/or 7471A | All |
| Modified WET California Title 22 Metals with DI Water | USEPA 6010B, 6020B, 1631E and/or 7471A | As necessary per TTLC results; minimum 1 out of 4 samples |
| VOCs | USEPA 82600/624 | 1 of 10 samples; minimum 1 sample per project |

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

| Analysis | EPA Analytical Method | Frequency |
|---|---|---|
| SVOCs | USEPA 8270/625/SIM | 1 of 10 samples; minimum 1 sample per project |
| PCBs and Pesticides (surface water only) | USEPA 8080/8081/608 | 1 of 10 samples; minimum 1 sample per project |
| TPH as diesel, motor oil, and gasoline | EPA 8015 | 1 of 10 samples; minimum 1 sample per project |
| Cyanide | EPA 335.4/10-204-00 | 1 of 10 samples; minimum 1 sample per project |

All samples will be analyzed for total metals via TTLC and a subset for leachability per the modified WET procedure. The WET results will be used to determine if metal concentrations in the soil or sediment have the potential to leach to groundwater. The WET results will be compared to the modified Tier 1 ESLs for groundwater. An additional subset of samples will be analyzed for other potential constituents of concern. These parameters, as well as the TTLC metal results, will be compared to the Tier 1 ESLs for soil.

The sampling schedule varies depending on the volume of soil or sediment to be displaced as part of the maintenance project. The frequency is listed on Table 2 and is based on the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) Information Advisory Clean Imported Fill Material Fact Sheet (https://dtsc.ca.gov/information-advisory-clean-imported-fill-material-fact-sheet).

**Table 2: Sampling Frequency for Evaluation of Material**

| **Area of Individual Area** | **Sampling Requirements per Area** |
|---|---|
| 2 acres or less | Minimum of 4 samples |
| 2 to 4 acres | Minimum of 1 sample every ½ acre |
| Greater than 10 acres | Minimum of 8 samples with 4 subsamples per location |
| **Volume of Stockpiled Material** | **Samples per Volume** |
| Up to 1,000 cubic yards | 1 sample per 250 cubic yards |
| 1,000 to 5,000 cubic yards | 4 samples for first 1000 cubic yards +1 sample per each additional 500 cubic yards |

| | |
|---|---|
| Greater than 5,000 cubic yards | 12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards |

**Results Evaluation and Material Placement:**

The sampling results will be tabulated and reviewed. Based on the findings, the following scenarios will be followed.

1. If the results are below applicable Tier 1 ESLs, the removed soil and sediment material may be considered for backfill or cover material on site with regulatory notification and approval.
2. If the metal concentrations do not meet the applicable Tier 1 ESLs, but are below TTLC and/or STLC thresholds, additional characterization may be completed to determine the appropriate placement based on the following:
    a. If the material is determined to be a Group B mining waste similar to the material already present in the WMUs, the material will be placed and managed within a WMU (e.g., WMSA) in accordance with the Operations, Maintenance, and Contingency (OM&C) Plan.
    b. If the material is characteristically distinct from the Group B waste present in the WMUs, contains concentrations above applicable Tier 1 ESLs, and concentrations below TTLC and/or STLC thresholds, Lehigh will consult with the Water Board regarding the management and potential on and offsite disposal of these materials.
3. While not anticipated, if the results are above TTLC and/or STLC thresholds, the WATER BOARD will be notified and additional characterization will be completed to confirm the results and aid in determining appropriate management and disposal options. Upon completion of the additional characterization, Lehigh will seek the Water Board's concurrence on the management and disposal of these materials.

***Dewatering Analysis and Placement Requirements:***

1. Dewatering – If dewatering is conducted, additional characterization of the material may be conducted after dewatering has been implemented and soil is no longer saturated.
2. The water from the dewatering operations will be collected and sent to the on-site water treatment system(s) via the reclaim water system.
3. The soil or sediment will be moved to a selected dewatering location if necessary. Once the material is dewatered and characterized, the material will be managed and disposed of as appropriate based on this SOP.

# Sampling, Analysis, and Management Plan for Soil and Sediment Material from Maintenance Projects

Attachment A: Screening Values

| Metal | CAS No. | Tier 1 ESL Soil (mg/kg) | TTLC (mg/kg) | Tier 1 ESL Groundwater (µg/L)* | STLC (µg/L) |
|---|---|---|---|---|---|
| | | Total Metal | | WET Results | |
| Antimony | 7440-36-0 | 11 | 500 | 6.0 | 1500 |
| Arsenic | 7440-38-2 | 0.067**** | 50 | 10**** | 500 |
| Barium | 7440-39-3 | 390 | 10000 | 1000 | 100000 |
| Beryllium | 7440-41-7 | 5.0 | 75 | 2.7 | 75 |
| Cadmium | 7440-43-9 | 1.9 | 100 | 0.25 | 1000 |
| Chromium | 7440-47-3 | 160 | 2500 | 50.0 | 5000*** |
| Cobalt | 7440-48-4 | 23 | 8000 | 3.0 | 80000 |
| Copper | 7440-50-8 | 180 | 2500 | 3.1 | 25000 |
| Lead | 7439-92-1 | 32 | 1000 | 2.5 | 5000 |
| Mercury | 7439-97-6 | 13 | 20 | 0.025 | 200 |
| Molybdenum | 7439-98-7 | 6.9 | 3500 | 100 | 350000 |
| Nickel | 7440-02-0 | 86 | 2000 | 8.2 | 20000 |
| Selenium | 7782-49-2 | 2.4 | 100 | 5.0** | 1000 |
| Silver | 7440-22-4 | 25 | 500 | 0.19 | 5000 |
| Thallium | 7440-28-0 | 0.78 | 700 | 2.0 | 7000 |
| Vanadium | 7440-62-2 | 18 | 2400 | 19 | 24000 |
| Zinc | 7440-66-6 | 340 | 5000 | 81 | 250000 |

Notes:

ESLs based on January 2019 (Rev. 1) Water Board ESL Workbook Tier 1 values for soil and groundwater unless otherwise noted.

* DI WET results to be compared to Tier 1 GW ESL.

** Freshwater Ecotox used instead of Saltwater Ecotox for the Aquatic Habitat Goal that comprises the GW Tier 1 ESL for selenium.

*** If the soluble chromium as determined by the TCLP is less than 5mg/L, and the soluble chromium as determined by the STLC test equals or exceeds 560mg/L, and the waste is not otherwise identified as a RCRA hazardous waste, then the waste is a non-RCRA hazardous waste.

**** Arsenic background levels are known to be above these screening levels.

# G3. Water Quality Evaluation (Golder Associates, August 26, 2022)

# TECHNICAL MEMORANDUM

**DATE** August 26, 2022 **Project No.** 31405507

**TO** Carolina Addison
Lehigh Hanson, Inc.

**FROM** George Wegmann, PG, CHg;
Bill Fowler, PG, CEG **EMAIL** **gwegmann@wsp.com**

**WATER QUALITY EVALUATION, PERMANENTE CREEK RESTORATION PROJECT, LEHIGH SOUTHWEST CEMENT COMPANY AND HANSON PERMANENTE CEMENT, INC., PERMANENTE QUARRY, CUPERTINO, CALIFORNIA**

## 1.0 INTRODUCTION

Golder Associates USA Inc. (Golder), a member of WSP, prepared this memorandum for Lehigh Southwest Cement Company and Hanson Permanente Cement, Inc. (Lehigh) to present the results of our assessment regarding the significance of potential water related impacts associated with specific elements of the proposed Permanente Creek Restoration Project (PCRP) adjacent to the Permanente Cement Plant and North Quarry (Permanente Site). The specific elements include:

- The type of onsite material(s) used for backfill or other restoration-related activities where those materials that may come in contact with the Permanente Creek watercourse, and recommendations related thereto;
- Expected geology of the restored creek channel that will come in contact with the Permanente Creek watercourse.

This evaluation is based on available geochemical characterization data and the conceptual site geochemical model prepared in accordance with applicable permits for the Permanente Site (*e.g.,* San Francisco Regional Water Quality Control Board (Water Board) Order No. R2-2018-002 (WDRs), and additional information or studies prepared in response to Water Code section 13267 Orders or as part of, site operations and reclamation-related activities. The scope of work for this evaluation included (1) a desktop data review of previous studies, (2) summarizing more recent rock unit characterization and creek sediment sampling, and (3) completing a site reconnaissance of the project area to evaluate the geologic conditions in conjunction with the proposed restoration design.

## 1.1 Background

The Permanente Site is located in Santa Clara County, California, west of the City of Cupertino. In response to a Cleanup and Abatement Order issued by the Water Board (Order No. 99-018) and as a result of a 2016 Amended Consent Decree entered into by Lehigh and the Sierra Club, Lehigh has committed to undertake the PCRP. Details regarding the scope of the PCRP are set forth in 2016 Amended Consent Decree and the 90% design documents prepared by Lehigh's consultant, Waterways, which were recently updated to incorporate regulatory agency and Santa Clara County comments to date, and submitted to the County on August 26, 2022 (90% Design drawings). The portion of Permanente Creek involved in the PCRP is located south/southeast of the Permanente Site, and the project involves, among other activities, removing material/sediment from Permanente Creek, laying back slopes, widening reaches, and ensuring stream bank stability and ecological/geomorphic function.

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The headwaters of Permanente Creek are located approximately 2 miles west/southwest of the Permanente Site. Approximately 4.2 miles of Permanente Creek are adjacent or traverse through Lehigh's Permanente Site in a south/south-eastern/eastern "L" shaped direction, portions of which are included in the PCRP, including stretches of the Creek upstream of the Cement Plant that have been re-aligned into an open culverted channel or placed in underground culverts, or are subject to dam infrastructure (Pond 13). Flow in Permanente Creek continues in an eastern direction as it leaves the Permanente Site, flowing through the highly urbanized area Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay. The downstream hydrology of the Permanente Creek watershed has been substantially altered for flood protection purposes.

The Cement Plant and North Quarry at the Permanente Site have been operational since 1939 and has been a major source of cement for Santa Clara County. The facility contains two mining waste rock (also called "overburden") storage areas, the East Material Storage Area (EMSA) and West Material Storage Area (WMSA), largely comprised of soil and rocks excavated from the North Quarry, some of which may be accessed for onsite use as part of the PCRP as backfill. The North Quarry sits between the two storage areas, while the Cement Plant is located southwest of the EMSA (Attachment A, Figure 1).

## 1.2 Regional Geologic Setting

Most of the Site is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage. The eastern portion of the Site, including portions of the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation, which in turn overlie the Franciscan bedrock. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek, and relatively shallow surficial deposits comprised of soil and colluvium. The Miocene-age Monterey Formation lies just east of the Site in fault contact with the Franciscan basement rocks along the Monte Vista Fault System.

### 1.2.1 Bedrock Geologic Units

The bedrock materials exposed in the North Quarry are part of the Permanente Terrane of the Franciscan Assemblage. The Franciscan Assemblage is comprised of highly deformed and variably metamorphosed, marine sedimentary rocks with submarine basalt (greenstone) and limestone and, to a lesser extent, graywacke. The Franciscan is considered a tectonic mélange that was formed in the subduction zone between the Pacific tectonic plate and the North American plate. This plate boundary is now a transform, strike-slip plate boundary defined by the San Andreas Fault zone located about two miles southwest of the North Quarry. The Franciscan Complex contains complexly deformed marine sedimentary rocks and basalt, which were metamorphosed and altered during subduction and subsequent thrust faulting. The Santa Clara Formation, a late Tertiary-Pleistocene assemblage of conglomerate, sandstone, siltstone, and claystone sits unconformably on the Franciscan Complex in the eastern portion of the site. Surficial deposits of unconsolidated alluvial deposits, fill material, colluvium, landslide deposits, and surface soils overlie the bedrock units.

The geology of the Permanente Creek Basin is shown on Figure 2 (Attachment A) based on our site reconnaissance and two main geologic map sources: Cupertino and Mindego Hills quadrangles (Dibblee and Minch 2007a and b); and the San Francisco Bay Landslide Mapping Team (USGS 1997). Previous researchers have also mapped the basin (Brabb 1970, Pulver 1979a and b).

### 1.2.2 Surficial Geologic Units

Some of the south-facing slopes that flank Permanente Creek are mantled with varying thicknesses of overburden, which is a heterogeneous mixture of fines, sand, gravel and cobble-sized fragments (*i.e.,* greenstone, graywacke, and soil materials) but with small percentages of limestone. This same overburden

comprises most of the WMSA and EMSA. Regarding the south-facing slopes, they are generally described as side-cast fills that mantle existing canyon slopes and fill small drainages and swales that formerly reported to Permanente Creek. The overburden deposits are of highly variable thickness and exist adjacent to the Rock Pile Area[1] (see 90% Design drawings at Sheet C19) and Material Removal Area (see 90% Design drawings at Sheets C23 & C24); this material will be removed and relocated as part of the PCRP.

Modern unconsolidated alluvial deposits are present along the active stream channel of Permanente Creek. These deposits are comprised of a poorly sorted mixture of cobbles, gravels, sand, silt and clay. Deposits range from a few inches thick in the upper reaches of the watershed where erosion has cut the channel down into bedrock over thousands of years, to tens of feet thick where the channel widens and deepens as it approaches the flatter terrain of the Santa Clara Valley.

Colluvial and slope wash deposits are common throughout the steep terrain of the Santa Cruz Mountains. In general, the natural slopes in the region are overlain with approximately one to two feet of soil and colluvial materials, which thicken to several feet or more in the larger natural swales in the region. Colluvium is generally described as predominantly clayey sand with gravel to clayey gravel, with some gravelly clay. The alluvial and colluvial deposits contain a mixture of fines, sand, gravel and cobble-sized fragments (*i.e.*, greenstone, graywacke, and soil materials) but with small percentages of limestone.

### 1.2.3 Creek Bed Geology Summary

Most of the PCRP area is underlain by complexly deformed and faulted rocks of the Franciscan Assemblage as depicted on Figure 2 (Attachment A). The eastern portion of the project area, including portions by the Cement Plant and the EMSA, are underlain by Plio-Pleistocene rocks of the Santa Clara Formation. Overlying the bedrock are modern alluvial deposits associated with Permanente Creek (restricted to the eastern portion of the property), and relatively shallow surficial deposits comprised of soil and colluvium.

Figure 3 (Attachment A) depicts the profile of Permanente Creek, which can broadly be classified into depositional reaches and bedrock reaches (delineated as Reach A, Reach B, etc.). The processes that define these reaches are the rate that sediment is supplied to the channel and the rate at which the channel can convey the supplied sediment. The rate of sediment supply is controlled by hillslope processes and the rate that sediment is delivered to the channel. The rate of sediment transport is controlled by the channel geometry and the hydraulic characteristics of the reach.

The furthest upstream portion of Permanente Creek, upstream of the PCRP area, is characterized by alluvium in the form of travertine reinforced step pool morphology that partially covers a bedrock channel that is comprised of greenstone and limestone. The sediment supplied here is likely to come from natural processes and is partially supplied from an alluvial fan originating from Wild Violet Creek. Carbonate-rich water percolates from the south bank of the channel in this reach, indicating that the source of the carbonate-rich spring is likely within the Wild Violet drainage. Geologic maps (Dibblee and Minch) indicate that the limestone unit of the Franciscan complex outcrops within the Wild Violet drainage. The debris from this alluvial fan is being transported downstream and has deposited small terraces along both valley walls. These terraces are possibly abandoned by the modern hydraulic regime of the Creek and may be coupled to the debris flows originating from Wild Violet Creek.

Travertine is a form of limestone precipitate that forms when calcium carbonate-rich water undergoes changes that cause the mineral to transition from solution to a solid state. This transition is largely controlled by physical

[1] The Rock Pile area is comprised of stockpiled material for aggregate production, which is ongoing. The character of the Rock Pile is variable but generally consists of fine to coarse-grained gravel to angular cobble-sized rock fragments of limestone.

processes, such as changes in pressure, temperature, or pH, but it can be influenced by biological processes and hydraulic variability as well (Fuller, et al. 2010). Golder observed two types of travertine formation in Permanente Creek. One in which stalactites grew out of the southern stream bank downstream of the confluence with Wild Violet Creek, and the other along large portions of the channel where naturally formed step-pools were reinforced by travertine deposition to form travertine dams (Attachment A, Figure 3). These dams display a history of repeated formation and breaching, as evidenced by the clasts of travertine conglomerate from older dams being incorporated into modern dams, as well as the relict abutments of older travertine dams remaining on the channel margins. This natural process has been taking place throughout geologic time along Permanente Creek.

The primary geologic units within the PCRP area are mainly greenstone (including shear zones) and the Santa Clara Formation. Greenstone bedrock is present at Reaches 10-17 and 20-22 and Santa Clara Formation bedrock along reaches 1-9 (Attachment A, Figure 3). Limestone bedrock is present along Reaches 18 and 19, including south of the creek, and comprises less than 15% of the bedrock present along the PCRP area. Importantly, with regard to the material removal activities planned to occur in Reach 18, the bedrock surface within the creek channel has been unaltered by historical site activities (*i.e.,* no mining activities have occurred in the creek), and the PCRP activities will follow the contours of natural bedrock, and will not alter or change the bedrock surface or its profile as part of restoration construction activities (see 90% Design drawings at Sheet C23). The focus of the Project along the limestone bedrock reaches will be to remove loose material mantled on top of the bedrock.

# 2.0 DATA SUMMARY

## 2.1 Material Characterization

Historical mining activities have contributed surficial materials to Permanente Creek in addition to deposition from naturally occurring geologic and geomorphic processes. As part of site operations, regulatory efforts, and reclamation-related activities, a geochemical dataset has been compiled since 2008 to characterize the predominate Permanente Quarry rock types. The data includes work completed as part of the development of National Pollutant Discharge Elimination System (NPDES) permitting[2] and WDRs[3,4] as follows: (1) analysis on acid rock drainage (ARD) potential by acid base accounting (ABA) testing methods, (2) chemical and mineralogical composition by quantitative X-Ray Diffraction (XRD) and, (3) Total Threshold Limit Concentration (TTLC) and leaching potential via the California modified waste extraction test (WET) with deionized water and wall washing samples. The results have been previously summarized in several reports, including the Permanente Site's Conceptual Site Model (CSM) Update prepared in accordance with the WDRs,[5] and are discussed below along with supplemental information.

Golder previously completed sampling and testing of the following major units: limestone, greenstone, graywacke, Santa Clara Formation, and undisturbed soil/colluvium as summarized in the CSM Update.[6] In summary:

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[2] NPDES No. CA0030210, Regional Water Board Order No. R2-2019-0024, previously Order No. R2-2014-0010, as amended by Order No. R2-2017-0030.

3 SLR, 2014, EMSA and WMSA Material Characterization, Permanente Quarry, Santa Clara, California.

4 Golder Associates, August 2014, WMSA and EMSA Runoff and Seep Investigation Report, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA

5 Golder Associates, 2020, CSM Update and Proposed SMP, Lehigh Southwest Cement Company and Quarry, 24001 Stevens Creek Boulevard, Cupertino, CA. June 2020.

[6] Golder Associates, 2020 CSM Update and SMP, Lehigh Permanente. December 2020.

- No acid rock drainage potential was identified in the tested samples as would be expected based on the carbonate nature of the rock.
- The leachate testing indicates that greenstone and graywacke are not a significant source of metals.
- Greenstone samples reported higher leachate nickel concentrations as compared to limestone; however, the concentrations are below the San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs) based on the California primary maximum contaminant for Freshwater Aquatic levels.
- Molybdenum and selenium leachate concentrations were generally greater in limestone samples compared to the other samples from greenstone and graywacke. Selenium leachate from the limestone has been detected above the Freshwater Aquatic ESL of 5 µg/L consistent with limestone wall washing results.[7]
- The selenium data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium.[8,9]

### 2.1.1 Sequential Leach Testing via Modified WET Method

In 2020, rock samples were analyzed using the modified WET method and were then subjected to four additional cycles of sequential leaching repeating the same method for a total of five leaching cycles to aid in evaluating long-term leachability. Limestone and greenstone, the predominate rock units, were selected for this analysis. The test results were compared to STLC thresholds and ESLs. Full tabulated leaching results are included as Table 1, Attachment B and time-series plots of the sequential leachate concentrations of the different materials is included as Attachment C. The results of the sequential leach testing are summarized as follows:

#### Limestone Samples

- STLC limits were not exceeded for any of the samples.
- Limestone leachate concentrations decreased over the leaching sequence for the following constituents: sulfate, chloride, total alkalinity, bicarbonate, antimony, calcium, magnesium, molybdenum, selenium, and vanadium.
- Limestone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: carbonate, hydroxide, arsenic, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, potassium, silver, sodium, thallium, and zinc.
- Sulfate, calcium, and magnesium concentrations were elevated in leachates from the medium-grade non-weathered limestone sample during leaches 1-3 compared to the other limestone samples.
- Barium leachate concentrations gradually increased for all limestone samples over the leaching period.

#### Greenstone Samples

- STLC limits were not exceeded for any of the samples.
- Greenstone leachate concentrations decreased over the leaching sequence for the following constituents: total alkalinity, bicarbonate, antimony, magnesium, potassium, selenium, and sodium.

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[7] Golder Associates, 2011 Hydrogeologic Investigation, Lehigh Permanente. 2011.

8 Diener, A., Neuman, T., Kramar, U., Schild, D. 2012. Structure of Selenium Incorporated in Pyrite and Machinawite as Determined by XAFS Analysis. Journal of Contaminant Hydrology: 133 (30-39).

9 Presser, T. S. 1994. Geologic Origin and Pathways of Selenium from the California Coast Ranges to the West-Central San Joaquin Valley. Selenium in the Environment.

- Greenstone leachate concentrations were stable or at detection limits over the leaching sequence for the following constituents: chloride, sulfate, carbonate, hydroxide, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, silver, thallium, vanadium, and zinc.
- Total alkalinity, bicarbonate, arsenic, barium, magnesium, potassium, and sodium concentrations were higher in the non-weathered greenstone sample leachate compared to the weathered greenstone sample.
- The vanadium concentration was higher in the weathered greenstone leachate compared to the non-weathered greenstone sample across all leaching cycles.
- Aluminum concentrations in the weathered greenstone sample leachate increased between leaches 1-4 and plateaued after leach 4.

Overall, concentrations generally decrease with each leaching cycle, indicating that readily leachable parameters are depleted within a few flushing cycles and that the short-term metal leaching potential for the materials is low, and below regulatory thresholds. Furthermore, the greenstone samples exhibited less leachable concentrations than the limestone samples.

### 2.1.2 Material Characterization Summary

The leachate results indicate that greenstone and graywacke are not a significant source of metals to water. Limestone material is a potential source of selenium, though the potential is lesser in combined quantities and in a dynamic environment of a moving stream/creek. Specific observations include:

- Greenstone samples reported higher leachate nickel concentrations compared to limestone; however, the concentrations are below ESLs.
- Molybdenum and selenium leachate concentrations were predominantly greater in limestone samples as compared to the samples from greenstone and graywacke.
- Selenium leachate from the limestone was detected several times slightly above the Freshwater Aquatic ESL of 5 µg/L. The generation of leachable selenium decreases with subsequent leach tests.

The data supports the premise that the oxidation of sulfides in the limestone is the primary mechanism of generating leachable selenium—the primary constituent of concern. Following sulfide oxidation, water flow and/or infiltration is the primary transport mechanism for selenium transport. Greenstone and graywacke do not generate leachable materials at levels that would negatively affect groundwater or surface waters. Sampling and geochemical analysis of the greenstone and graywacke indicates a low potential to leach selenium and other metals at levels above surface or ground water quality standards, and that it is suitable to be used as fill material consistent with Water Board/WDR standards.

## 2.2 Background Water Samples and Bedrock Influence on Creek Water Quality

Water quality from the upstream headwaters has been monitored as part of the National Pollutant Discharge Elimination System (NPDES) permit sampling program. The upstream surface water results for selenium are consistently less than 1 ug/L. As noted in Section 1.2, bedrock limestone and associated travertine deposits are present in these areas. The results further support the premise that selenium production from oxidized limestone already present in the creek channel is finite. For this reason, we expect that the PCRP as designed, which proposes to remove material and follow the existing bedrock contours for the restored creek channel grade and elevation, will not contribute to increased in-stream concentrations of constituents of concern.

# 3.0 DISCUSSION AND RECOMMENDATIONS

For areas of the project where fill material is needed, it is recommended that onsite material comprised predominantly of greenstone or graywacke be used where needed for backfill, as both exhibit a low metals leaching potential under natural site conditions. Furthermore, greenstone is the prevalent native material at the Site and already encompasses the majority of the Permanente Creek basin. Based on the available data, we do not expect detrimental water quality impacts from the creek restoration activities (causing exceedance of applicable water quality standards) provided on-site materials adhere to the recommendations herein.

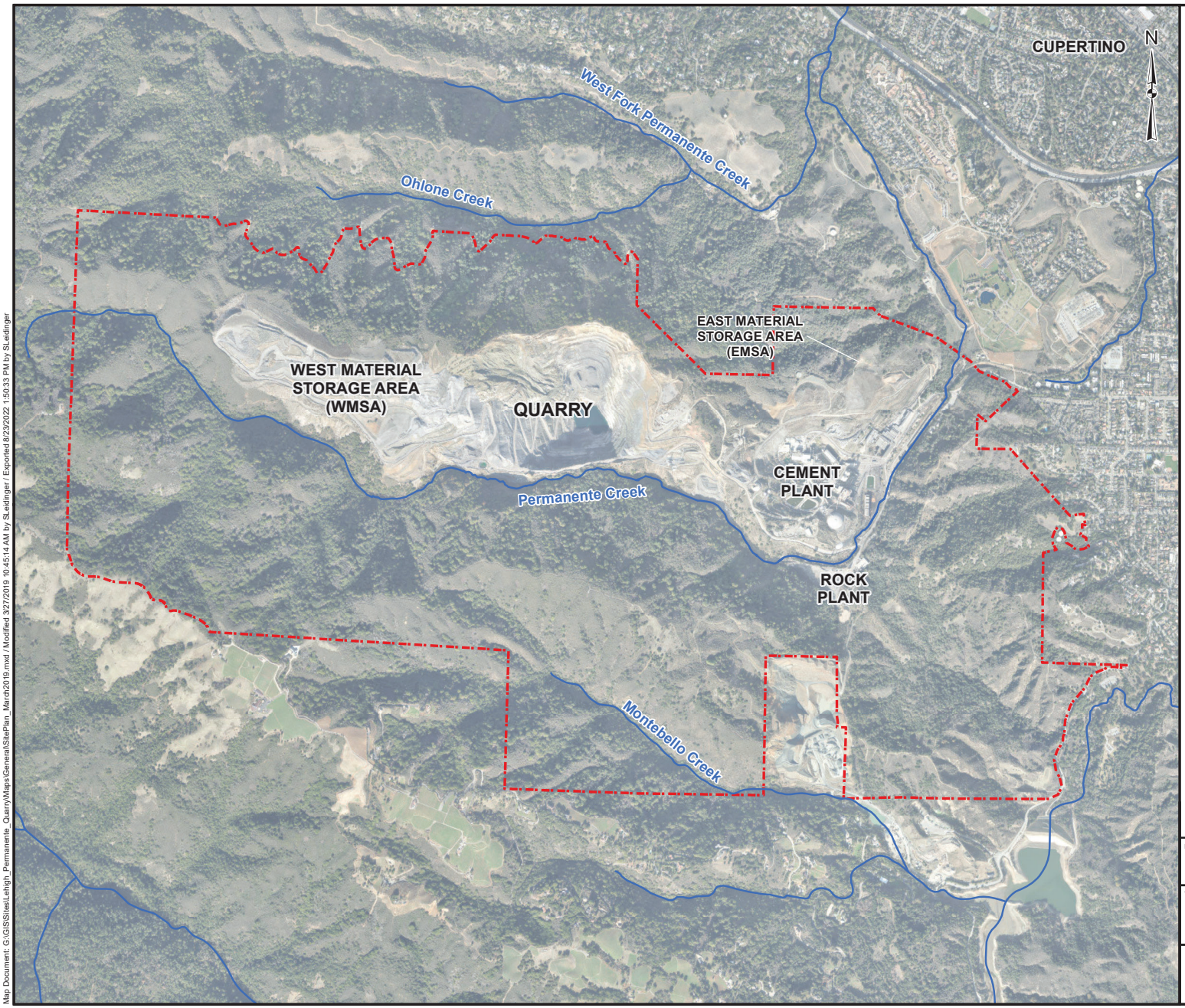
Further, the predominant areas where limestone is to naturally remain, e.g., Reach 18, will consist of non-disturbed bedrock, which, as demonstrated by upstream conditions, is not expected to contribute metals to the water column. Therefore, significant changes in the natural system will not occur and new source material will not be exposed to potentially undergo oxidation and mobilization of selenium based on the limestone bedrock present. As noted in Section 2.3, the water quality upstream of the PCRP is not impaired even though limestone bedrock and travertine deposits are present. As the bedrock surface in Reach 18 is inferred to have been exposed and undisturbed for a similar timeframe as the reaches upstream of the PCRP, impairment to water quality is not expected from the limestone bedrock section. Furthermore, as noted above, the production rate of leachable selenium from limestone decreases as the mobile fraction of selenium is depleted from the system. This process will be further expedited by removing potential sources (e.g., limestone material) via the PCRP, and the PCRP is not expected to interfere with those gains.

Attachments A: Figures 1-3
B: Data Summary Table 1
C: Time-Series Graphs

PCRP_Golder_creek_memo_fnl

**ATTACHMENT A**

# Figures 1-3




## LEGEND

- Stream
- Property Boundary

## NOTES

1) Locations based on conversion from local coordinates or Google Earth placement.

## REFERENCES

1)Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
2)Coordinate System: NAD 1983 StatePlane California III FIPS 0403 Feet
3)

1,200 0 1,200
Feet

PROJECT

PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

TITLE

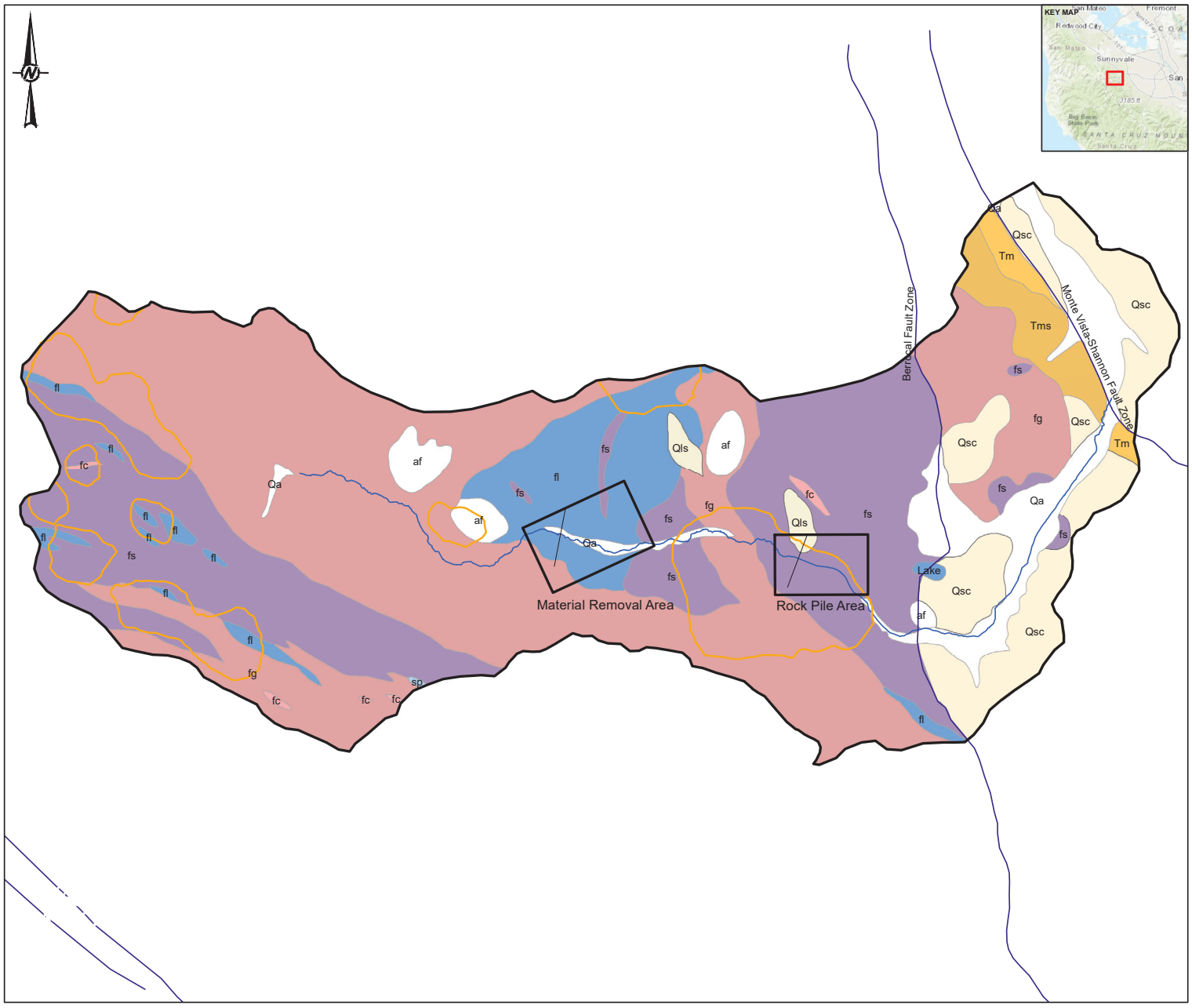
**SITE OVERVIEW**

GOLDER

| | | | | | |
|---|---|---|---|---|---|
| PROJECT No. | | 063-7109 | FILE No. | SitePlan_March2019.mxd | |
| DESIGN | SHL | 10/31/2013 | SCALE: | AS SHOWN | REV. 0 |
| GIS | SHL | 3/27/2019 | | | |
| CHECK | GW | 3/27/2019 | | | |
| REVIEW | GW | 3/27/2019 | | | |

**FIGURE 1**

Map Document: G:\GIS\Sites\Lehigh_Permanente_Quarry\Maps\General\SitePlan_March2019.mxd / Modified 3/27/2019 10:45:14 AM by SLeidinger / Exported 8/23/2022 1:50:33 PM by SLeidinger




**LEGEND**

- Areas of Interest
- Cross Sections
- Permanente Creek
- PermCrkBasin_V2
- Faults

**Geologic Units**

**UnitNam**

- Lake
- af
- Qa
- Qls
- Qsc
- Tm
- Tms
- sp
- fg
- fs
- fc
- fl

0 2,000 4,000

1 IN = 1,667 FT FEET

**NOTE(S)**

**REFERENCE(S)**

1. USGS (LANDSLIDES, 1997; FAULTS, 2000, 2002)
2. CALIFORNIA DIVISION OF MINES AND GEOLOGY (EARTHQUAKES, 1982)
3. WATERWAYS CONSULTING, INC. (PERMANENTE CREEK, 2018)
4. CALIFORNIA DEPARTMENT OF FORESTRY (GEOLOGY AND LANDSLIDES, 1979)
5. COORDINATE SYSTEM: NAD 1983 STATE PLANE CALIFORNIA III (FT)
6. SERVICE LAYER CREDITS: SOURCES: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY

CLIENT
PERMANENTE QUARRY
SANTA CLARA COUNTY, CALIFORNIA

PROJECT

TITLE
**GEOLOGIC MAP OF PERMANENTE CREEK BASIN**

CONSULTANT
WSP GOLDER

| | |
|---|---|
| YYYY-MM-DD | 2019-10-02 |
| DESIGNED | RPH/BVJ |
| PREPARED | RPH/BVJ |
| REVIEWED | BF/CJ/RPH |
| APPROVED | BF |

PROJECT NO. PHASE REV. FIGURE
0 2

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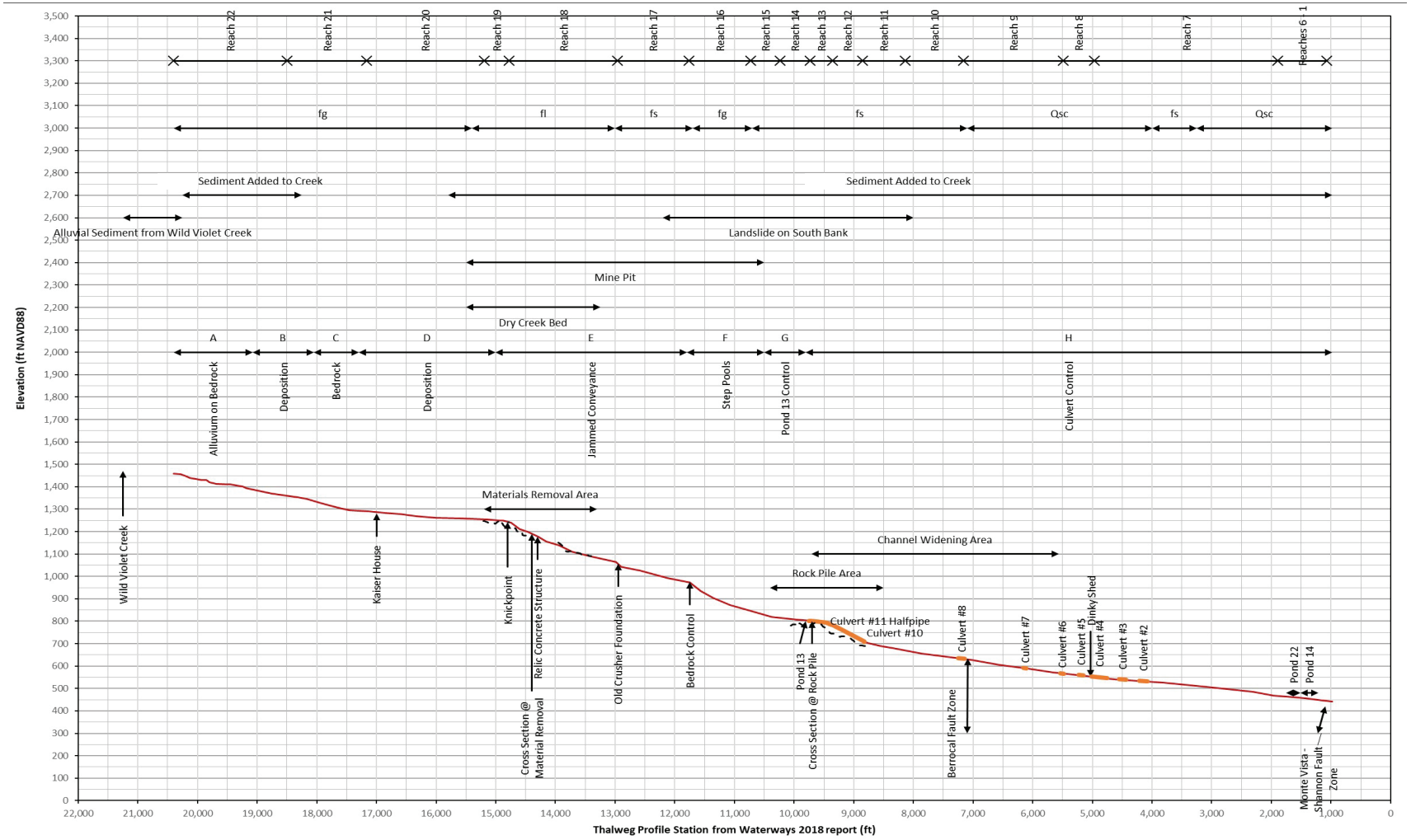



**Figure 3: Permanente Creek Profile with geomorphic and geologic delineations. Stationing from Waterways (2019).**

**ATTACHMENT B**

# Data Summary Table 1

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-1: High-Grade Limestone, Non-Weathered | | | | | B-2: Medium-Grade Limestone, Non-Weathered | | | | | B-3: Low-Grade, Limestone Non-Weathered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | | | | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.0042 | 0.0025 | 0.0018 B | 0.00123 B | 0.0012 B | 0.0057 | 0.0040 | 0.0032 | 0.0026 | 0.0027 | 0.013 | 0.0078 | 0.0052 | 0.0052 | 0.0040 |
| Arsenic | mg/l | 5 | 0.01 | 0.00022 B | 0.00047 B | 0.0003 B | 0.00029 B | <0.001 | 0.00066 B | 0.00088 B | 0.00073 B | 0.00091 B | 0.00080 B | 0.0013 | 0.0011 | 0.00065 B | 0.00073 B | 0.00062 B |
| Barium | mg/l | 100 | 1 | 0.41 | 0.70 | 0.42 | 0.70 | 0.96 | 0.0288 B | 0.11 | 0.13 | 0.27 | 0.45 | 0.15 | 0.29 | 0.17 | 0.32 | 0.45 |
| Beryllium | mg/l | 0.75 | 0.0027 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | 0.00011 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | 0.00157 B | 0.0007 B | 0.00079 B | 0.00079 B | <0.002 | 0.0031 | 0.00062 B | 0.00077 B | 0.0017 B | <0.002 | 0.0028 | 0.00059 B | 0.00138 B | 0.00121 B |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | 0.000209 B | 0.000062 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Copper | mg/l | 25 | 0.009 | 0.0012 B | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | 0.0011 B | <0.002 | <0.002 | <0.002 | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00028 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.0001 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | 0.14 | 0.024 B | 0.020 B | <0.1 | <0.1 | 0.27 | 0.070 B | 0.048 B | 0.026 B | 0.021 B | 1.1 | 0.21 | 0.10 | 0.038 B | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.0017 | 0.00042 B | <0.001 | <0.001 | <0.001 | 0.00099 B | 0.00069 B | <0.001 | <0.001 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.0017 | 0.0019 | 0.0011 | 0.00086 | 0.00080 | 0.0062 | 0.0051 | 0.0044 | 0.0049 | 0.0044 | 0.0085 | 0.0051 | 0.0043 | 0.0039 | 0.0033 |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00011 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.041 | 0.016 | 0.0098 | 0.0097 | 0.0098 | 0.0092 | 0.012 | 0.014 | 0.019 | 0.019 | 0.37 | 0.13 | 0.083 | 0.083 | 0.076 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | | | | | | | | | | | |
| Chloride | mg/l | | | 1.4 B | 2.5 | 0.77 B | 0.58 B | 0.85 B | <2 | 0.53 | 0.56 B | <2 | <2 | 2.3 | 3.6 | <2 | <2 | 0.78 B |
| Sulfate | mg/l | | | 9.0 | 5.9 | 7.9 | 4.4 B | 3.3 B | 212 | 31 | 26 | 9.2 | 7.9 | 22 | 12 | 16 | 9.1 | 4.8 B |
| Total Alkalinity | mg/l | | | 14 B | 17 B | 15 B | 14 B | 14 B | 16 B | 24 | 20 | 16 B | 17 B | 18 B | 23 | 18 B | 18 B | 17 B |
| Bicarbonate ($CaCO_3$) | mg/l | | | 14 B | 17 B | 15 B | 14 B | 14 B | 16 B | 24 | 20 | 16 B | 17 B | 18 B | 23 | 18 B | 18 B | 17 B |
| Carbonate as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL;
As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-4: Non-Cement Grade Limestone, Non-Weathered | | | | | B-5-9: High-Grade Limestone, Weathered | | | | | B-6: Greenstone, Non-Weathered | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | | | | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.0030 | 0.0018 B | 0.0014 B | 0.0012 B | 0.0011 B | 0.0065 | 0.0038 | 0.0025 | 0.0026 | 0.0021 | 0.0030 | 0.00128 B | 0.00085 B | 0.00054 B | 0.00043 B |
| Arsenic | mg/l | 5 | 0.01 | 0.0002 B | 0.00031 B | <0.001 | 0.00023 B | <0.001 | 0.00047 B | 0.00069 B | 0.00039 B | 0.00054 B | 0.00046 B | 0.0026 | 0.0029 | 0.0021 | 0.0021 | 0.0017 |
| Barium | mg/l | 100 | 1 | 0.13 | 0.40 | 0.26 | 0.44 | 0.60 | 0.20 | 0.38 | 0.21 | 0.39 | 0.63 | 0.11 | 0.11 | 0.099 | 0.11 | 0.10 |
| Beryllium | mg/l | 0.75 | 0.0027 | 0.000082 B | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | 0.0007 B | <0.002 | <0.002 | <0.002 | <0.002 | 0.0026 | <0.002 | 0.00111 B | 0.00108 B | <0.002 | <0.002 | <0.002 | 0.00114 B | <0.002 |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | 0.00005 B | 0.000092 B | <0.00025 | <0.00025 | 0.000057 B | <0.00025 | <0.00025 | <0.00025 | 0.000059 B | <0.00025 | 0.000051 B | 0.000063 B | 0.00027 | 0.000066 B |
| Copper | mg/l | 25 | 0.009 | <0.002 | 0.0017 B | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | 0.00086 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00015 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.23 | 0.067 B | 0.044 B | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 | 0.00071 B | <0.001 | <0.001 | 0.0012 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.0013 | 0.0011 | 0.00092 | 0.00082 | 0.00077 | 0.0040 | 0.0035 | 0.0029 | 0.0028 | 0.0027 | 0.00054 | 0.00017 B | 0.00018 B | <0.00025 | <0.00025 |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | 0.00011 B | <0.0005 | 0.0005 B | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.0046 | 0.00161 B | 0.0022 | 0.0022 | 0.0023 | 0.036 | 0.016 | 0.012 | 0.014 | 0.015 | 0.013 | 0.012 | 0.0095 | 0.0095 | 0.0090 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | | | | | | | | | | | |
| Chloride | mg/l | | | 2.1 | 3.5 | 0.88 B | 1.1 B | 1.1 B | 1.35 B | 2.8 | <2 | <2 | 0.84 B | <2 | <2 | <2 | <2 | <2 |
| Sulfate | mg/l | | | 25 | 9.3 | 12 | 7.4 | 5.2 | 16 | 9.0 | 13 | 7.8 | 4.4 B | 12 | 6.6 | 4.9 B | 2.7 B | 1.7 B |
| Total Alkalinity | mg/l | | | 15 B | 22 | 16 B | 16 B | 16 B | 17 B | 22 | 17 B | 16 B | 17 B | 27 | 22 | 21 | 18 B | 17 B |
| Bicarbonate ($CaCO_3$) | mg/l | | | 15 B | 22 | 16 B | 16 B | 16 B | 17 B | 22 | 17 B | 16 B | 17 B | 27 | 22 | 21 | 18 B | 17 B |
| Carbonate as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 | <20 |

Notes:

Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

**Table 1: Sequential WET Extraction Chemistry**

| Analyte | Units | STLC Regulatory Limit | ESL | B-7-10: Greenstone, Weathered | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Leach Initial | Leach 1 | Leach 2 | Leach 3 | Leach 4 |
| ***Dissolved Metals*** | | | | | | | | |
| Antimony | mg/l | 15 | 0.006 | 0.00065 B | <0.002 | <0.002 | <0.002 | <0.002 |
| Arsenic | mg/l | 5 | 0.01 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Barium | mg/l | 100 | 1 | 0.029 B | 0.0247 B | 0.028 B | 0.026 B | 0.0226 B |
| Beryllium | mg/l | 0.75 | 0.0027 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Cadmium | mg/l | 1 | 0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 | <0.00025 |
| Chromium | mg/l | 5 | 0.05 | <0.002 | <0.002 | <0.002 | 0.00058 B | <0.002 |
| Cobalt | mg/l | 80 | 0.003 | <0.00025 | 0.000067 B | 0.000051 B | 0.00011 B | 0.000087 B |
| Copper | mg/l | 25 | 0.009 | 0.00133 B | <0.002 | <0.002 | 0.0013 B | <0.002 |
| Lead | mg/l | 5 | 0.0025 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | 0.00018 B |
| Mercury | mg/l | 0.2 | 0.000025 | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Molybdenum | mg/l | 350 | 0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 |
| Nickel | mg/l | 20 | 0.052* | <0.001 | <0.001 | <0.001 | <0.001 | <0.001 |
| Selenium | mg/l | 1 | 0.005* | 0.00021 B | 0.00013 B | <0.00025 | <0.00025 | 0.00014 B |
| Silver | mg/l | 5 | 0.00019 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Thallium | mg/l | 7 | 0.002 | <0.0005 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Vanadium | mg/l | 24 | 0.019 | 0.016 | 0.019 | 0.013 | 0.014 | 0.013 |
| Zinc | mg/l | 250 | 0.081 | <0.015 | <0.015 | <0.015 | <0.015 | <0.015 |
| ***Wet Chemistry*** | | | | | | | | |
| Chloride | mg/l | | | <2 | <2 | <2 | <2 | <2 |
| Sulfate | mg/l | | | 4.8 B | 1.4 B | 1.3 B | <5 | <5 |
| Total Alkalinity | mg/l | | | 24 | 22 | 22 | 21 | 20 |
| Bicarbonate ($CaCO_3$) | mg/l | | | 22 | 20 B | 21 | 18 B | 18 B |
| Carbonate as $CaCO_3$ | mg/l | | | 2.3 B | 2.5 B | <20 | 2.4 B | 2.2 B |
| Hydroxide as $CaCO_3$ | mg/l | | | <20 | <20 | <20 | <20 | <20 |

Notes:

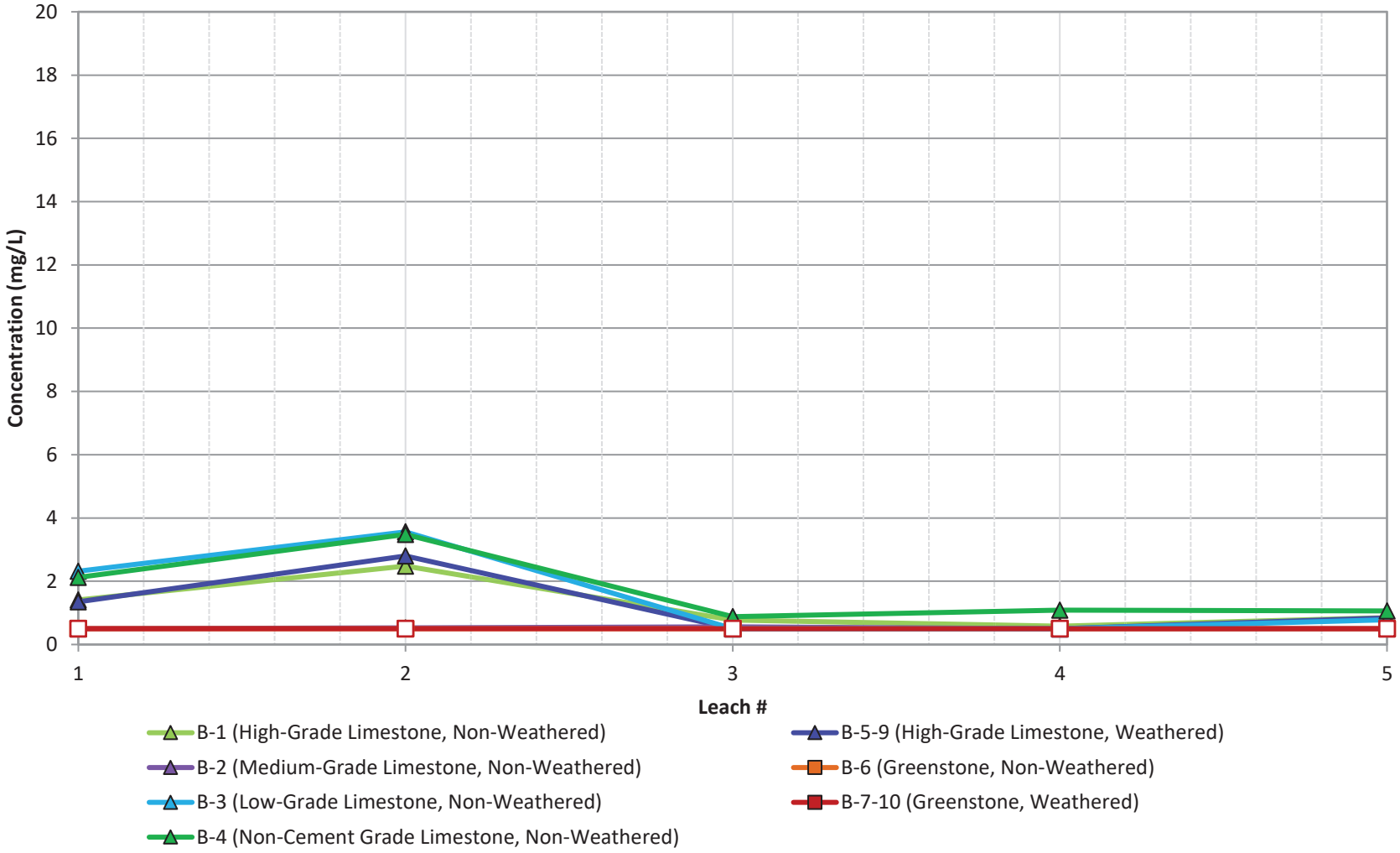
Soluble Threshold Limit Concentrations (STLC) as per California Code of Regulations Title 22, Section 66261.24(2)(A) ESL listed is lower of freshwater aquatic or primary MCL; As is based on background level.

* = the ESL and surface water quality objective (California Toxics Rule, 40 CFR section 131.38) are the same.

B = estimated value, below laboratory reporting limit; mg/l = milligrams per Liter

**ATTACHMENT C**

# Time-Series Graphs

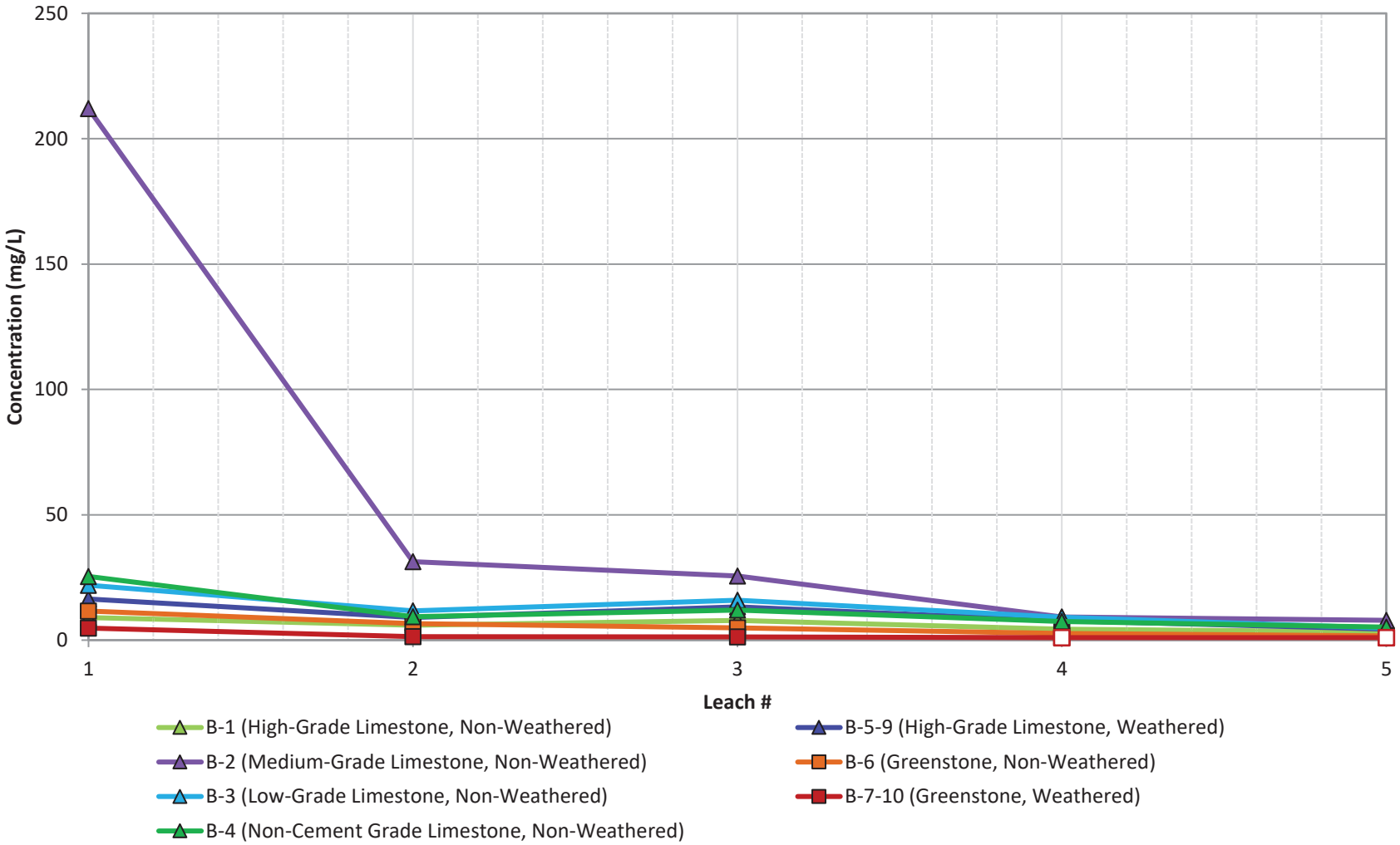



*Open symbols denote values at or below the method detection limit

WSP GOLDER

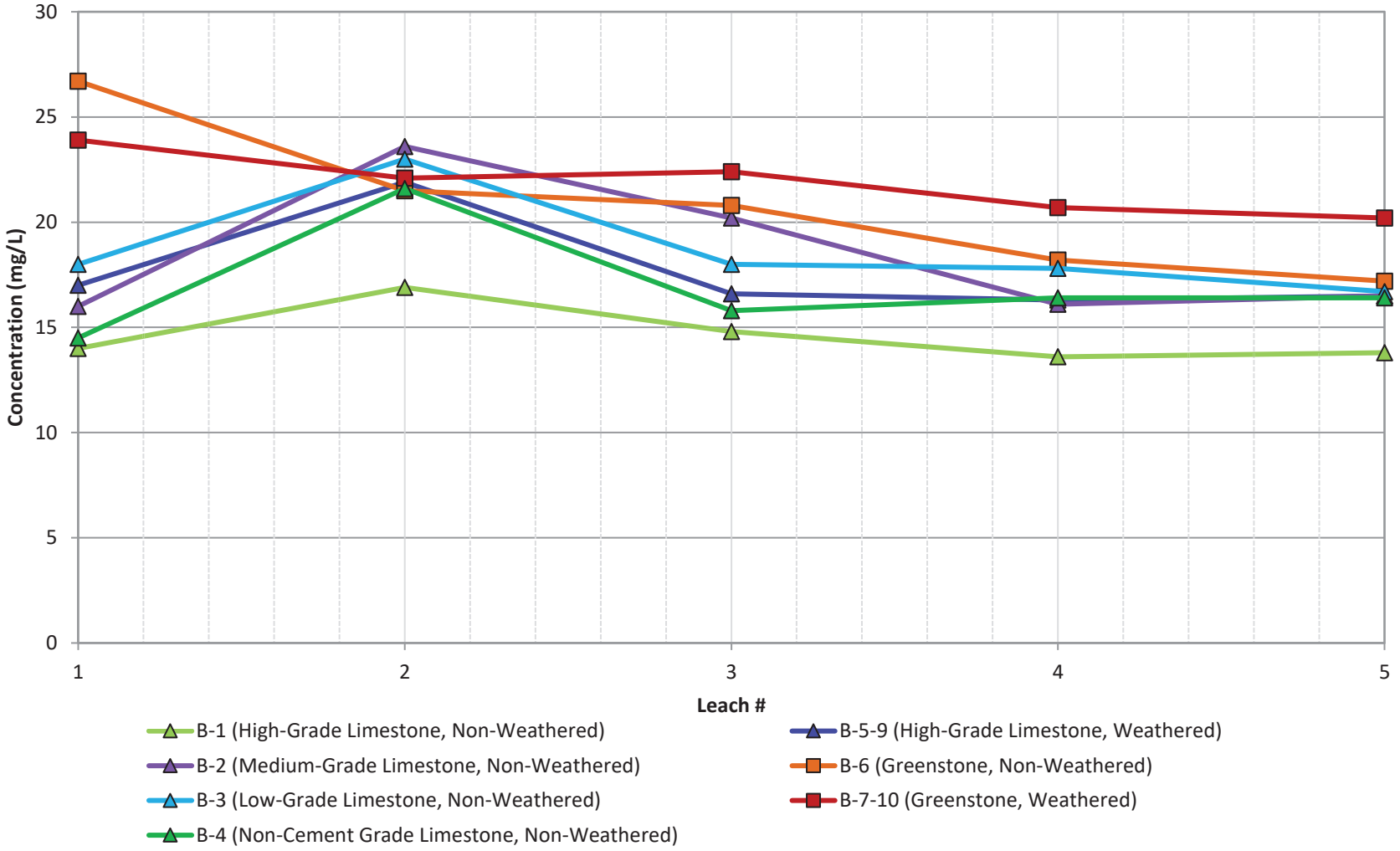
Title: **Sequential Modified WET- Chloride**

| Project Name | Project No. 31405507 | FIGURE C-1 |
|---|---|---|
| Client Name: Lehigh Permanente | Date: 8/4/2022 | |



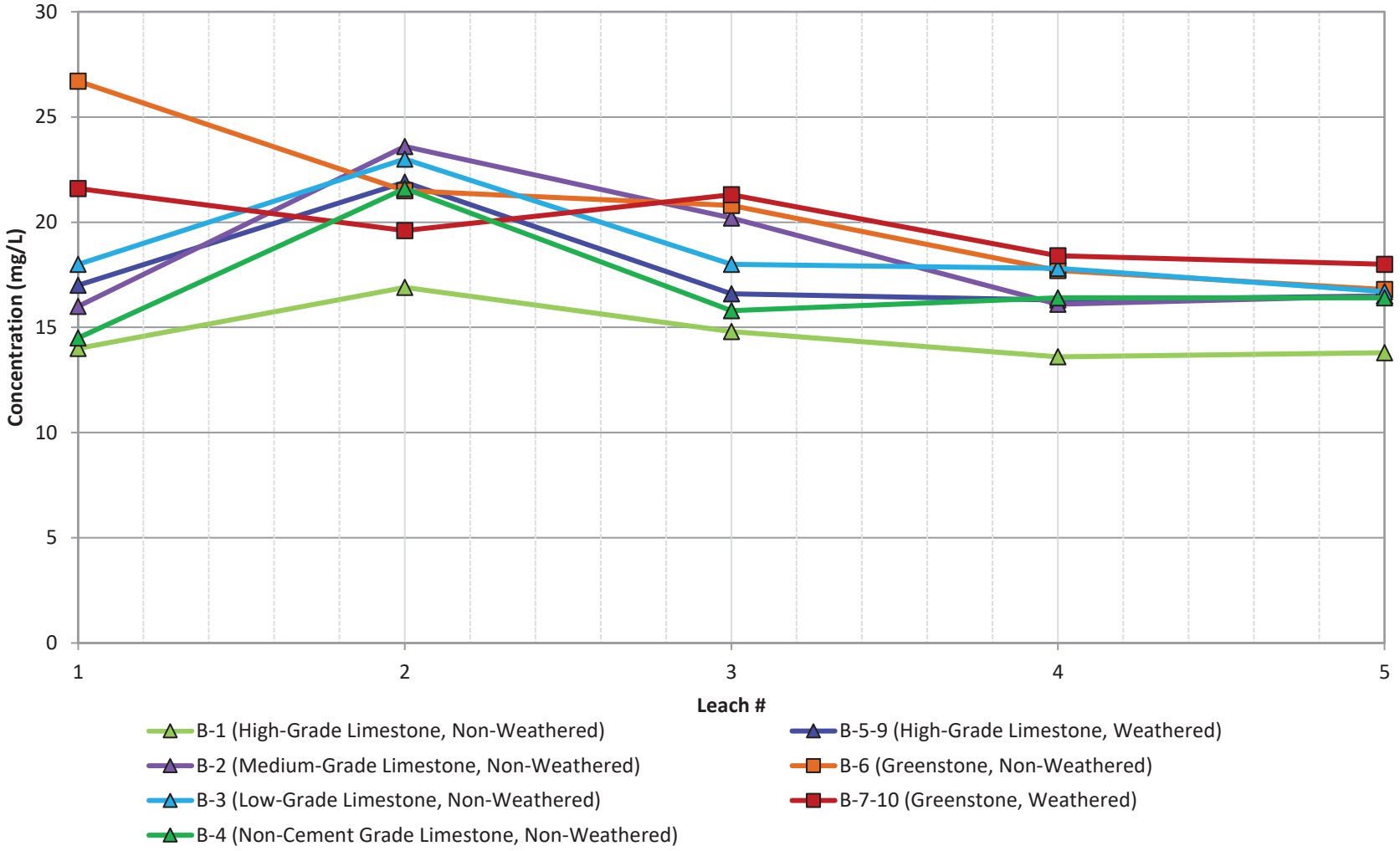

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Sulfate** | | |
| | Project Name | Project No. 31405507 | FIGURE C-2 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



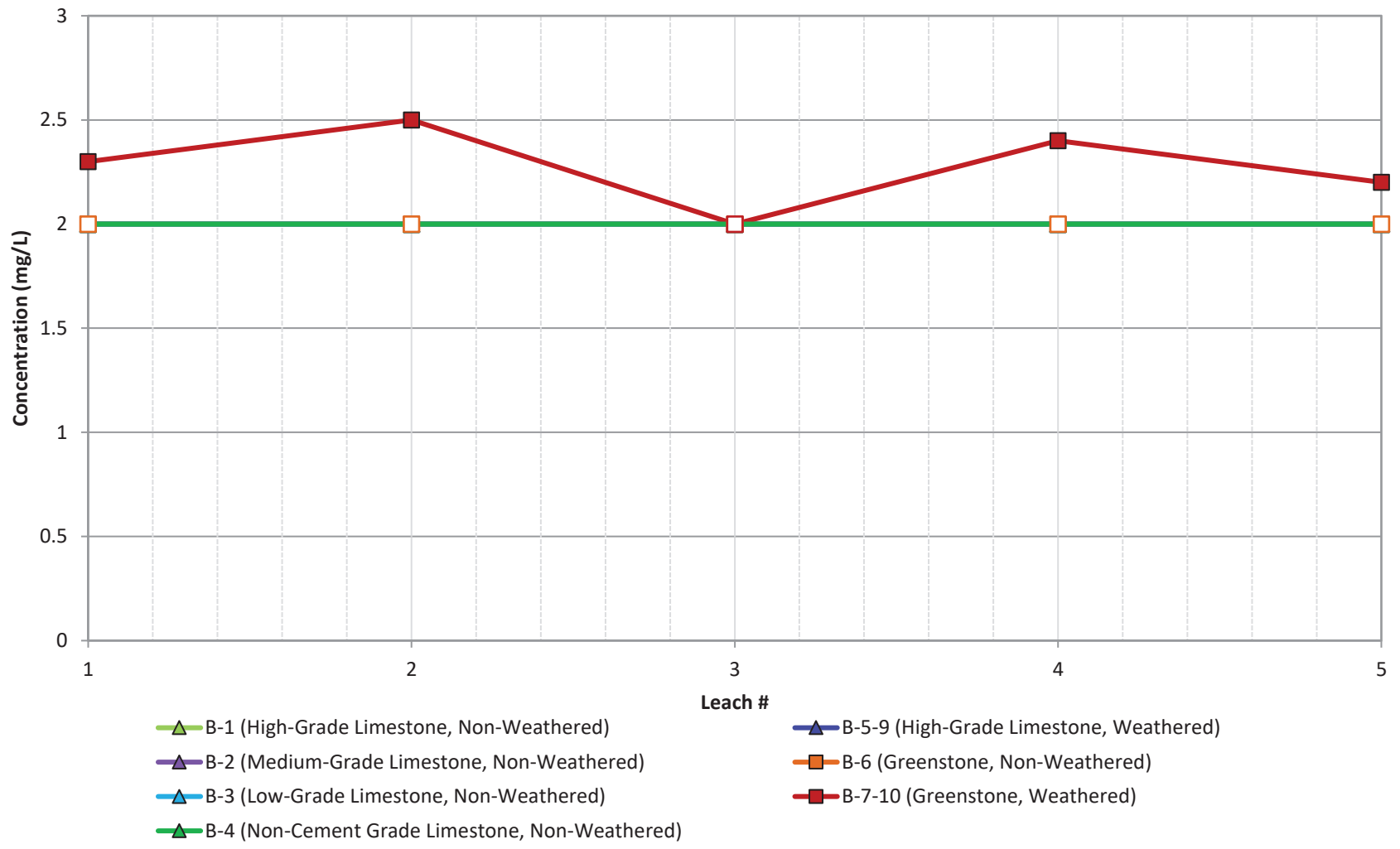

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Total Alkalinity** | | |
| | Project Name | Project No. 31405507 | FIGURE C-3 |
| | Client Name: Lehigh Permanente | Date: 3/4/2022 | |



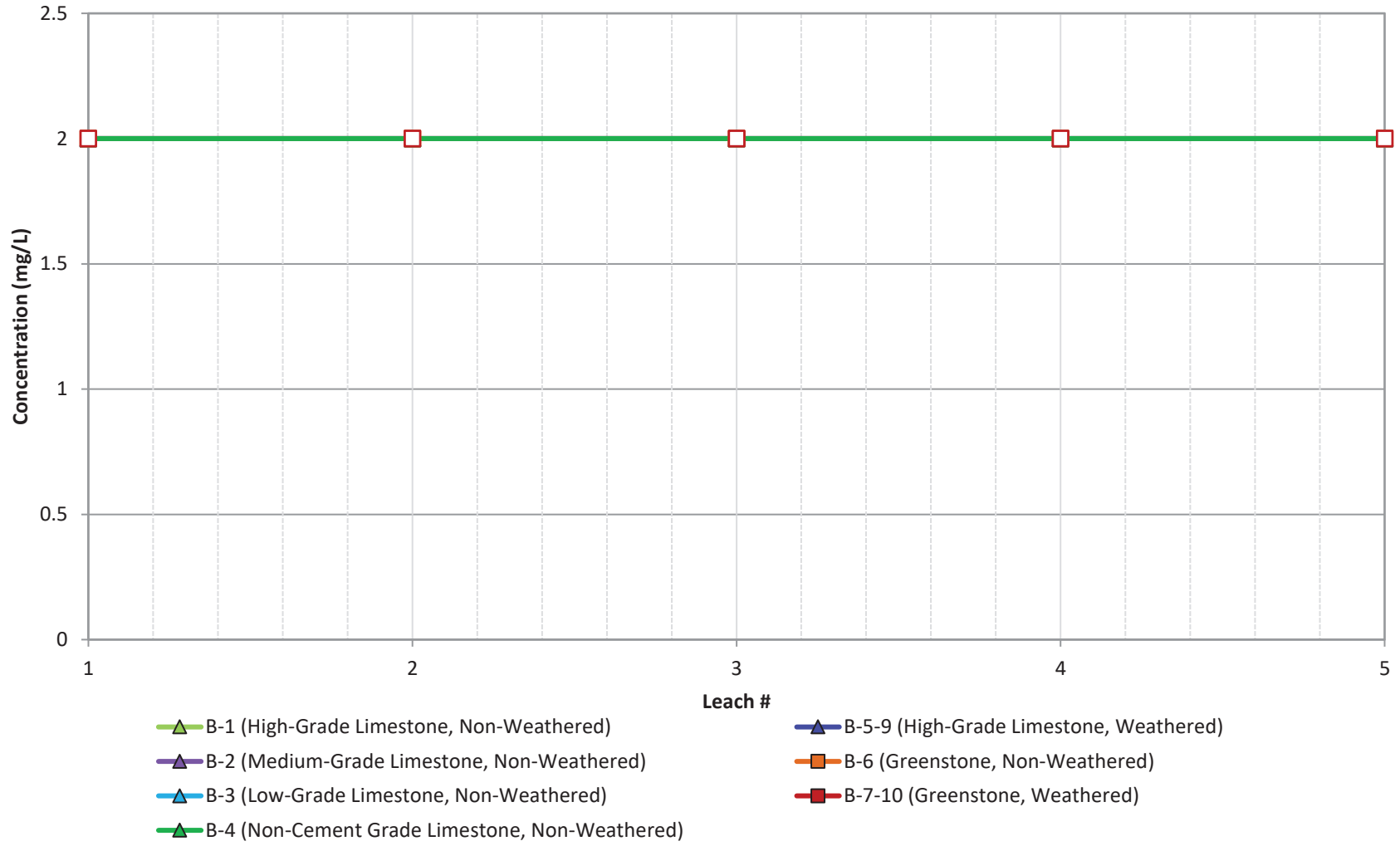

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Bicarbonate as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-4 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



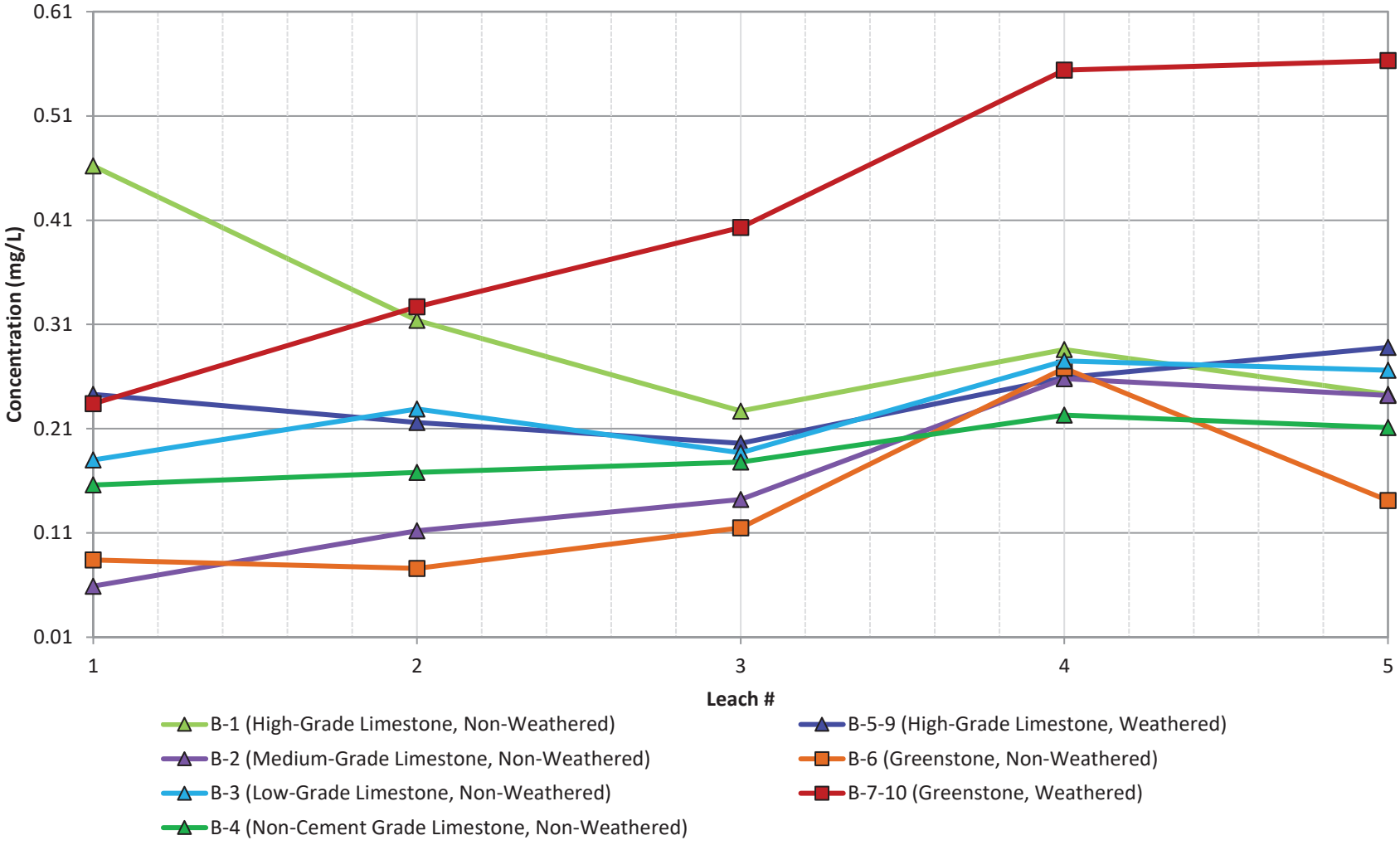

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Carbonate as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-5 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



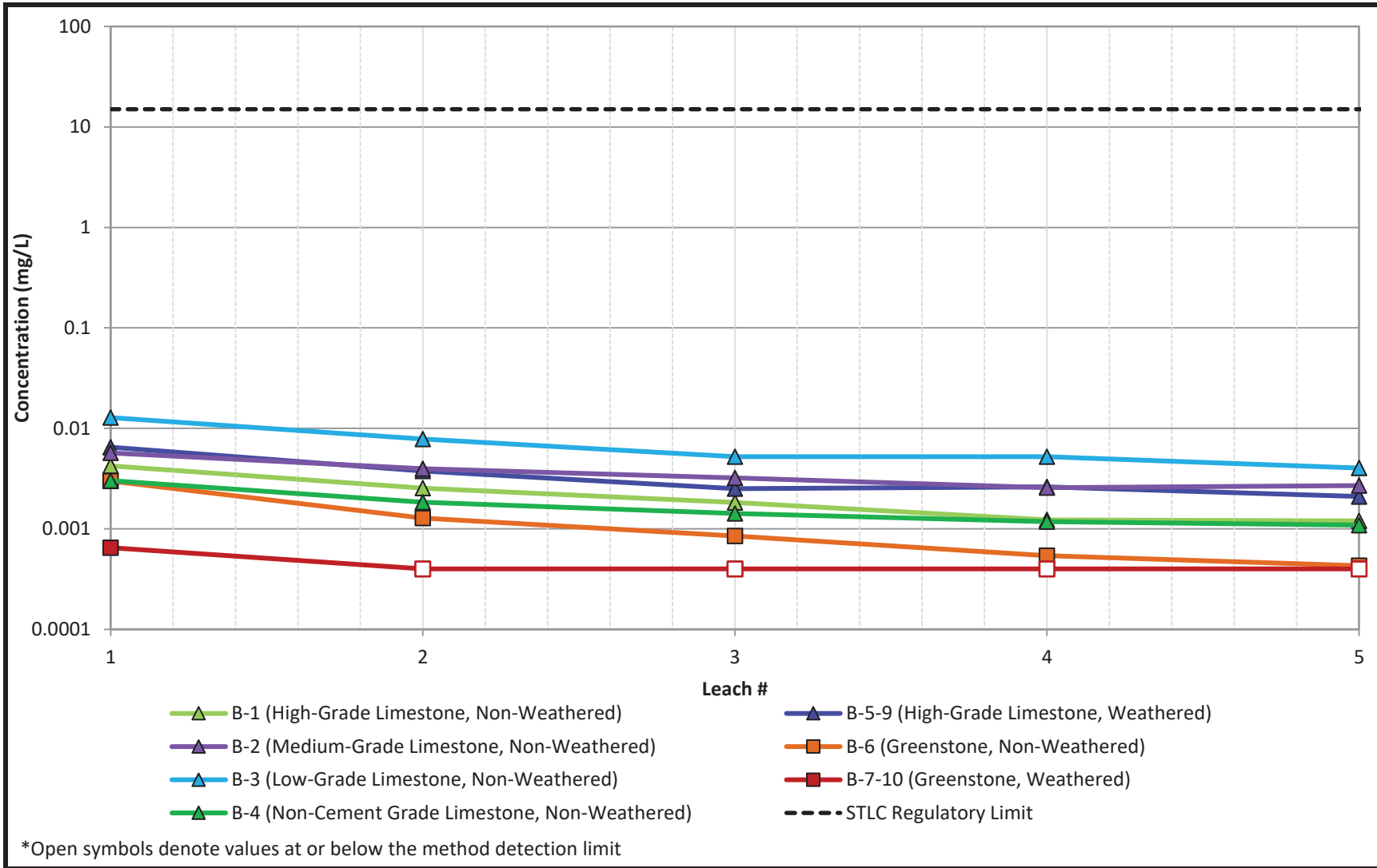

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Hydroxide as CaCO3** | | |
| | Project Name | Project No. 31405507 | FIGURE C-6 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



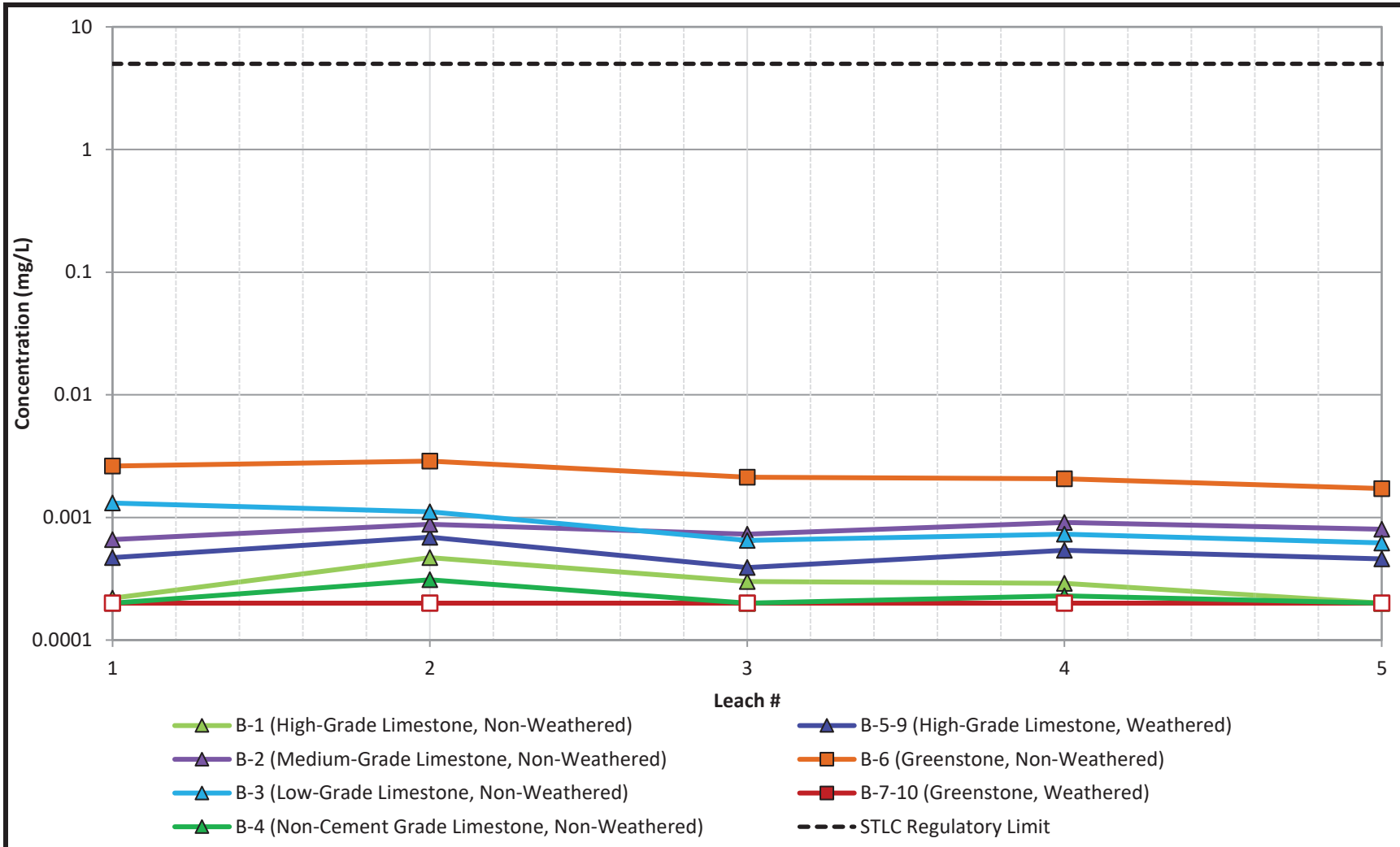

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Aluminum** | | |
| | Project Name | Project No. 31405507 | FIGURE C-7 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



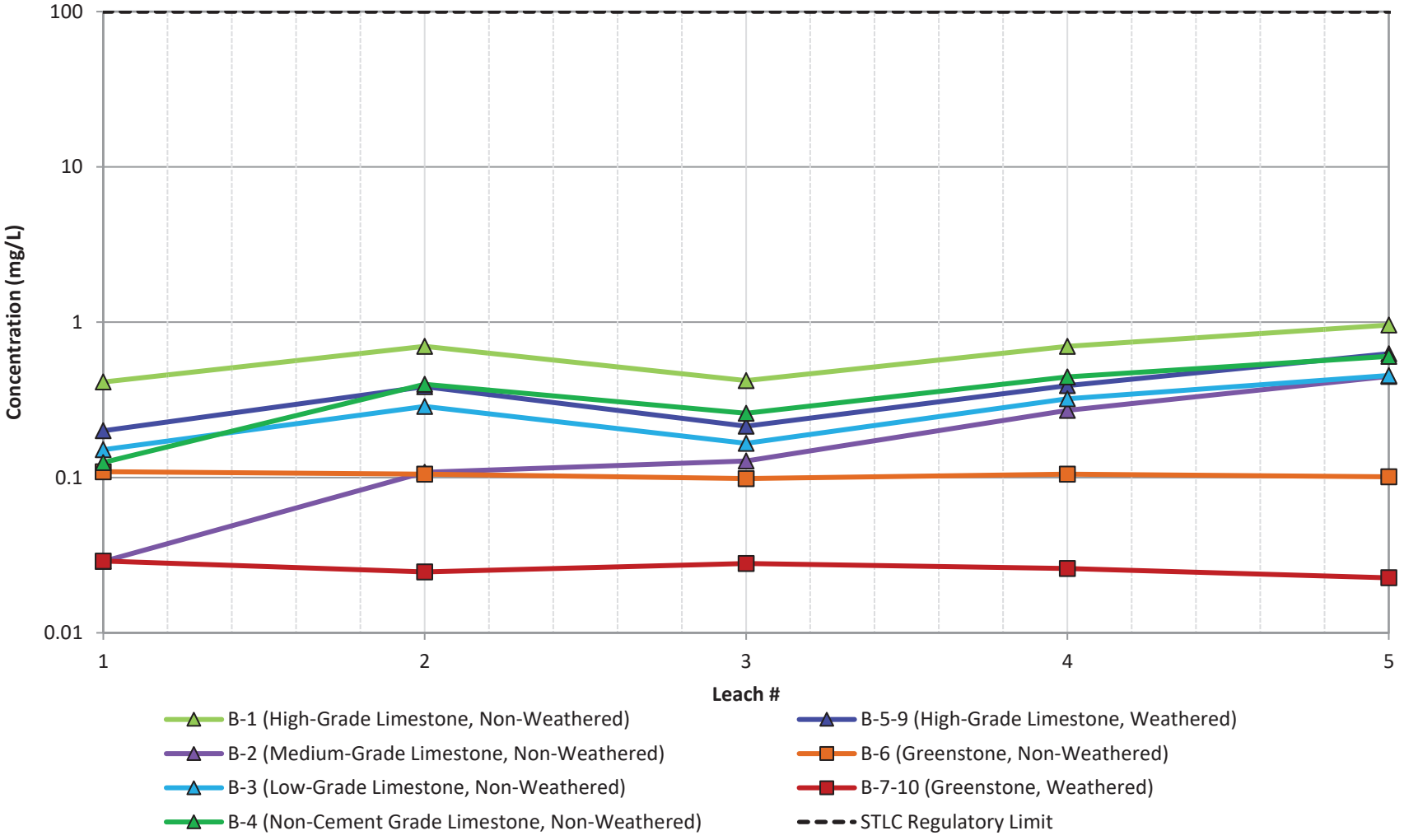

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Antimony** | | |
| | Project Name | Project No. 31405507 | FIGURE C-8 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



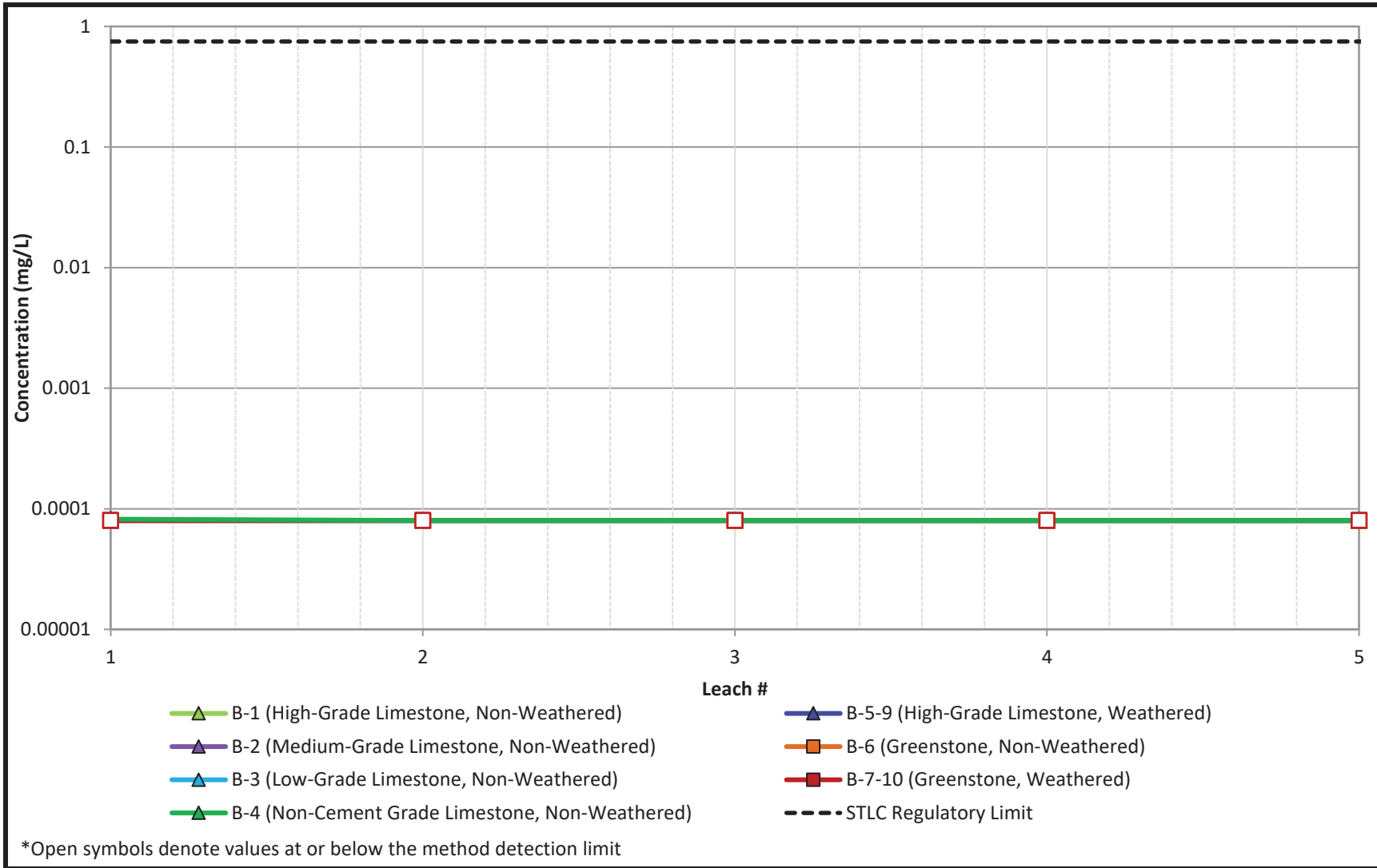

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Arsenic** | | |
| | Project Name | Project No. 31405507 | FIGURE C-9 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



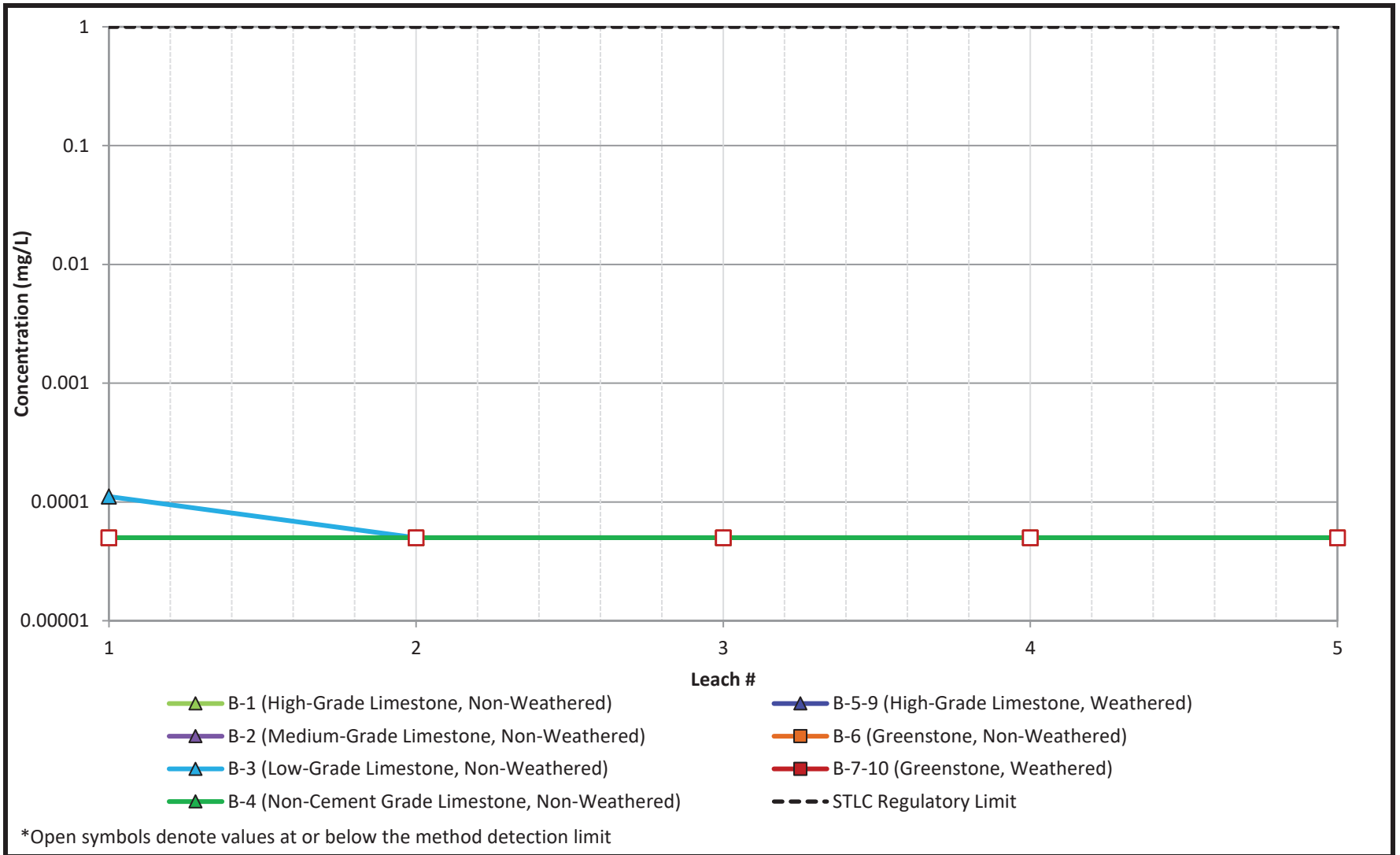

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Barium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-10 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



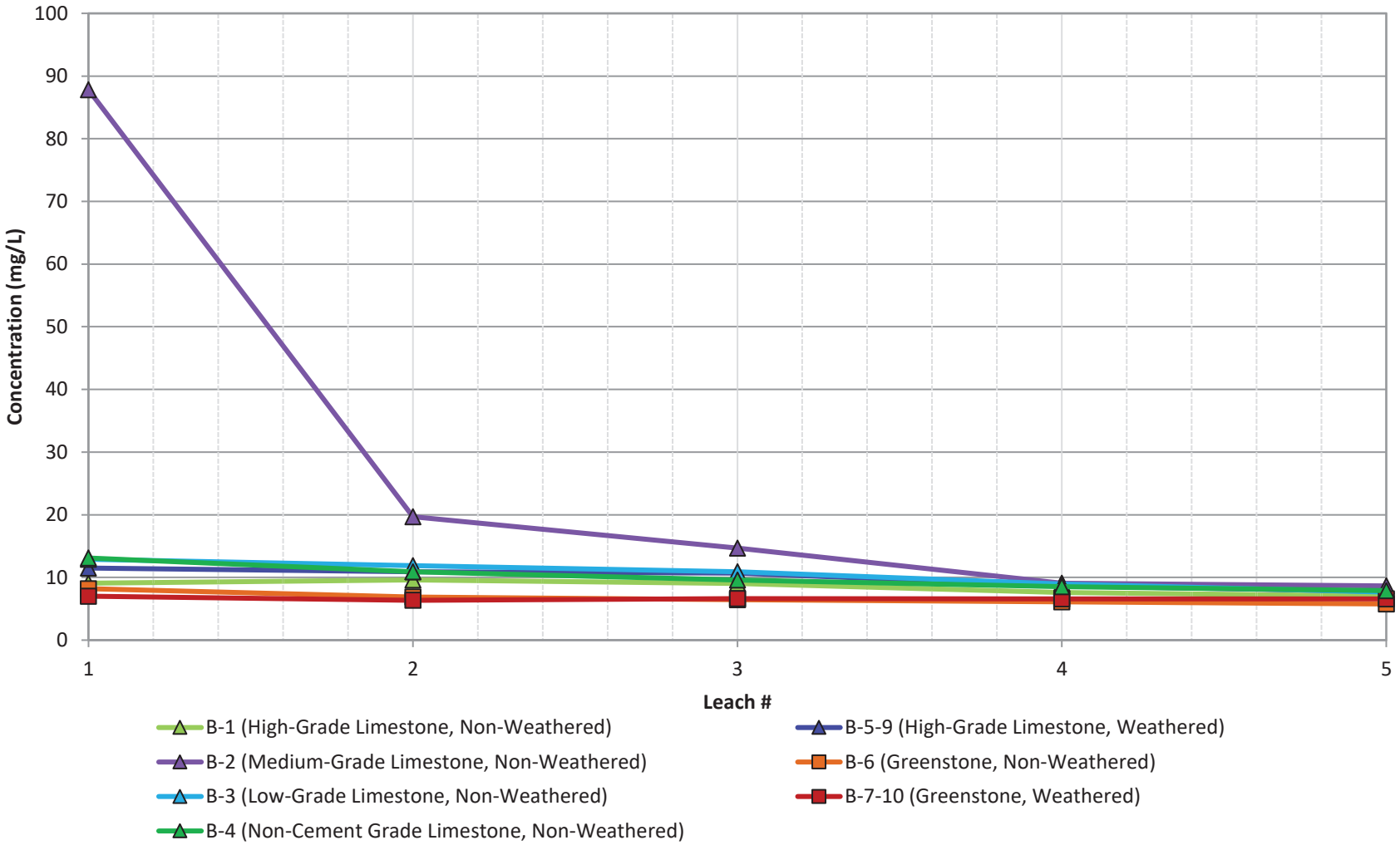

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Beryllium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-11 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



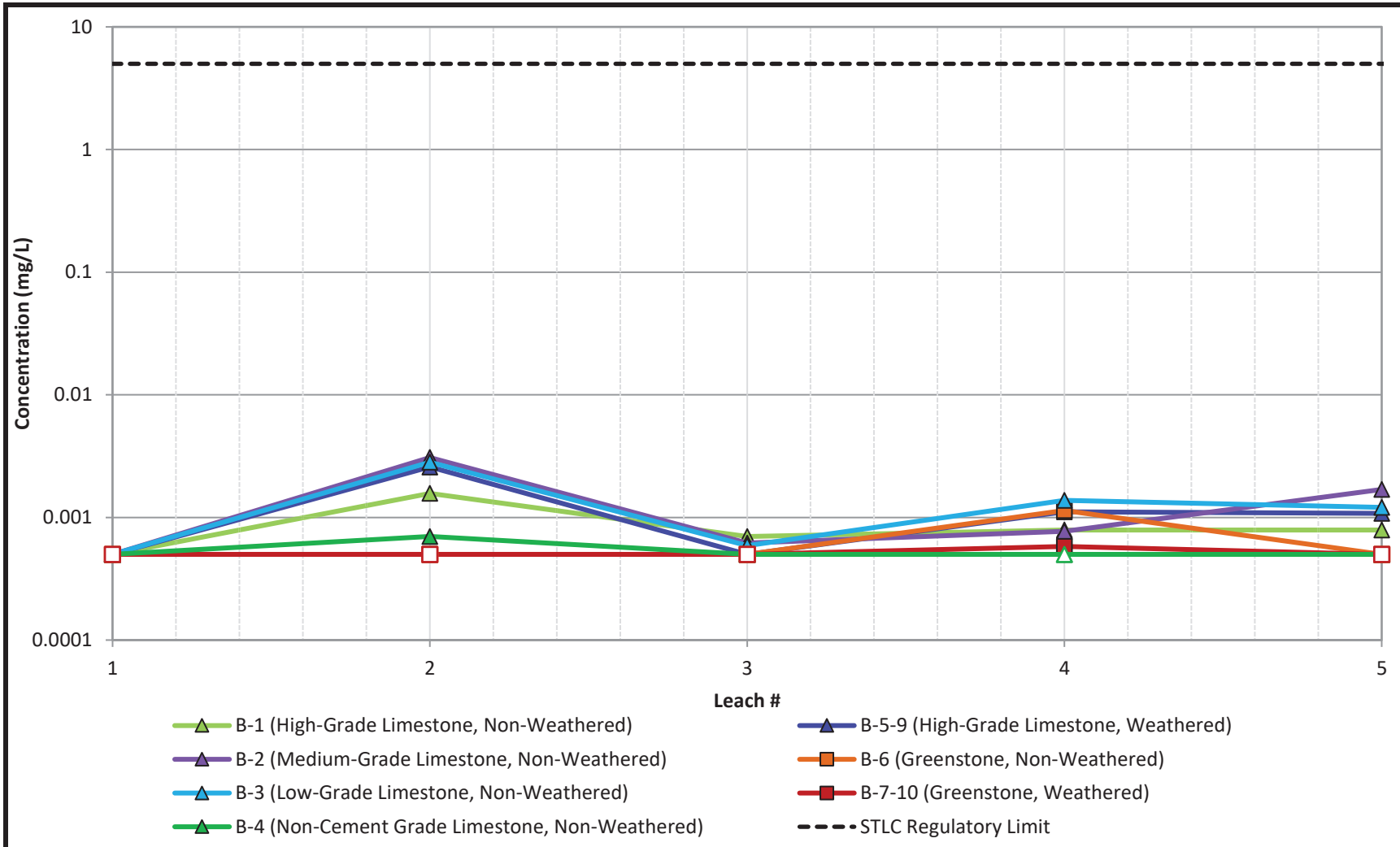

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Cadmium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-12 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



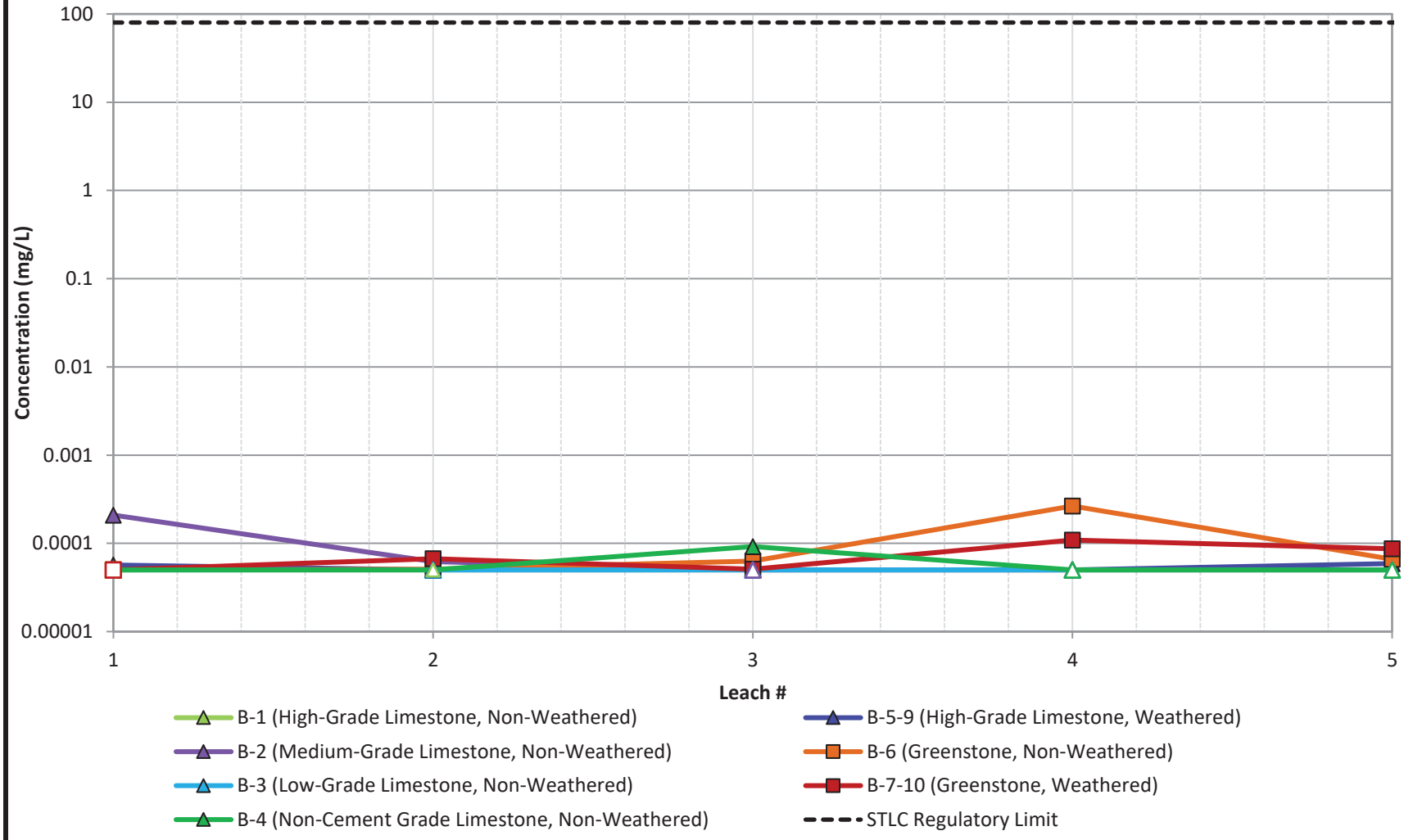

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Calcium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-13 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



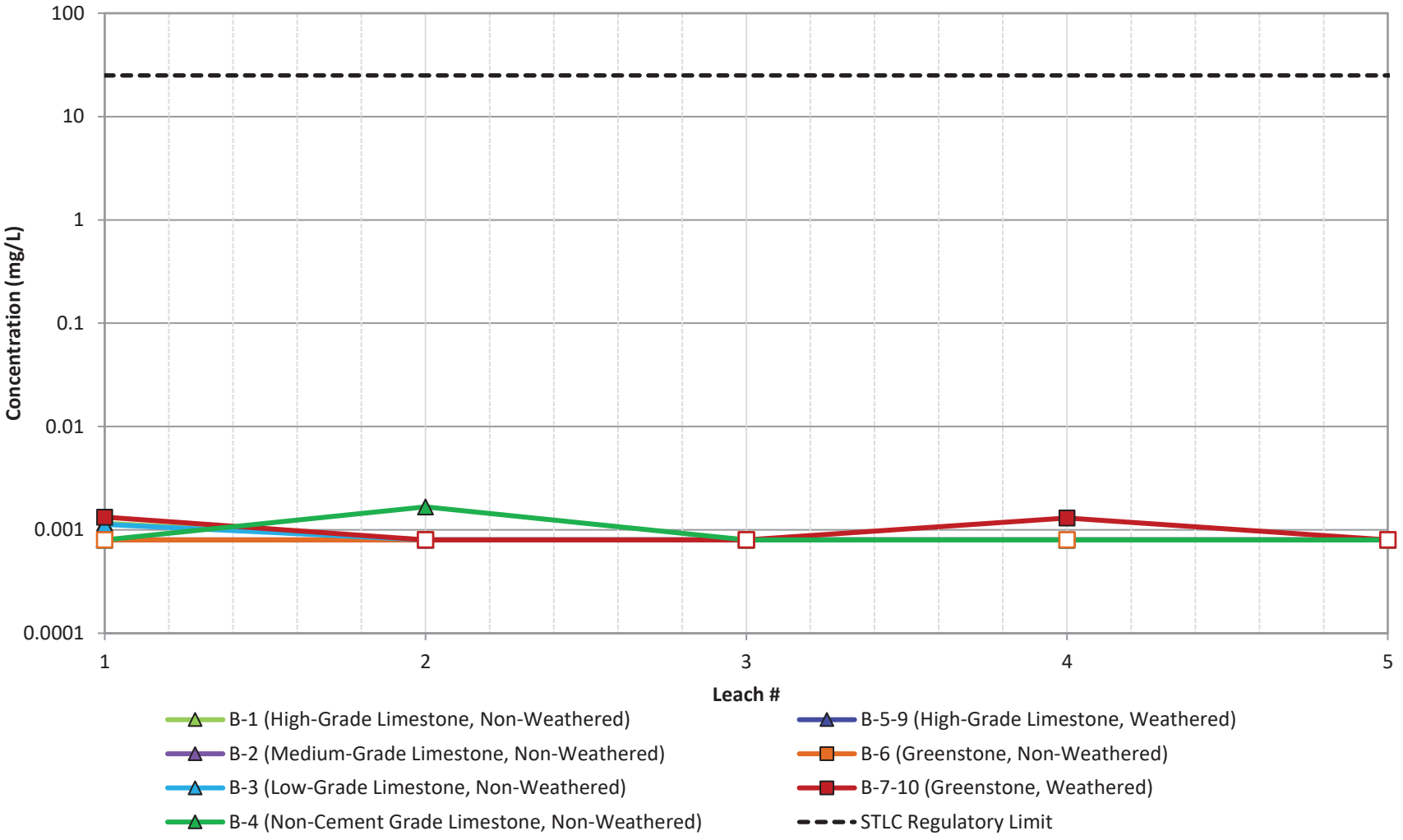

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Chromium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-14 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



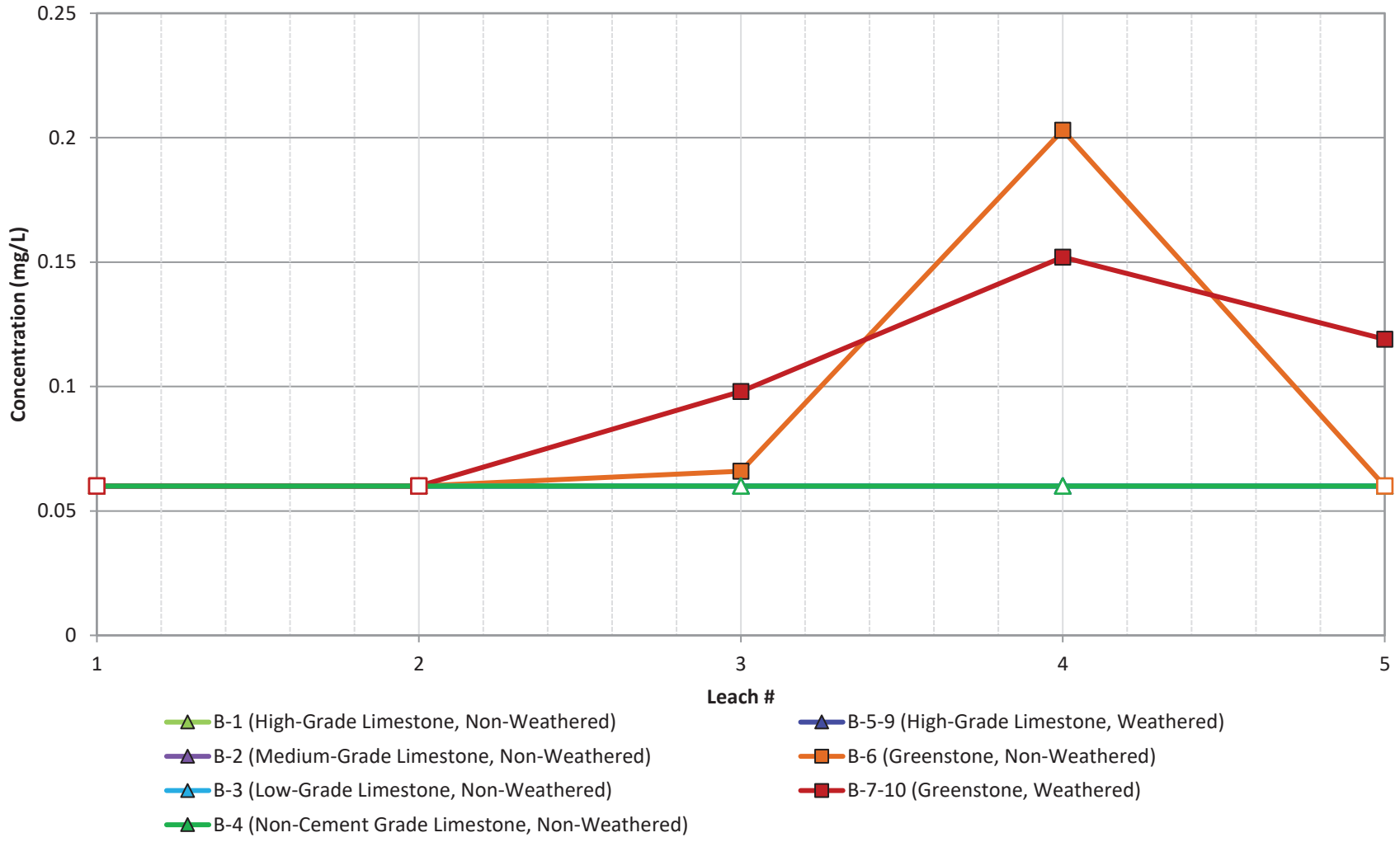

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Cobalt** | | |
| | Project Name | Project No. 31405507 | FIGURE C-15 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



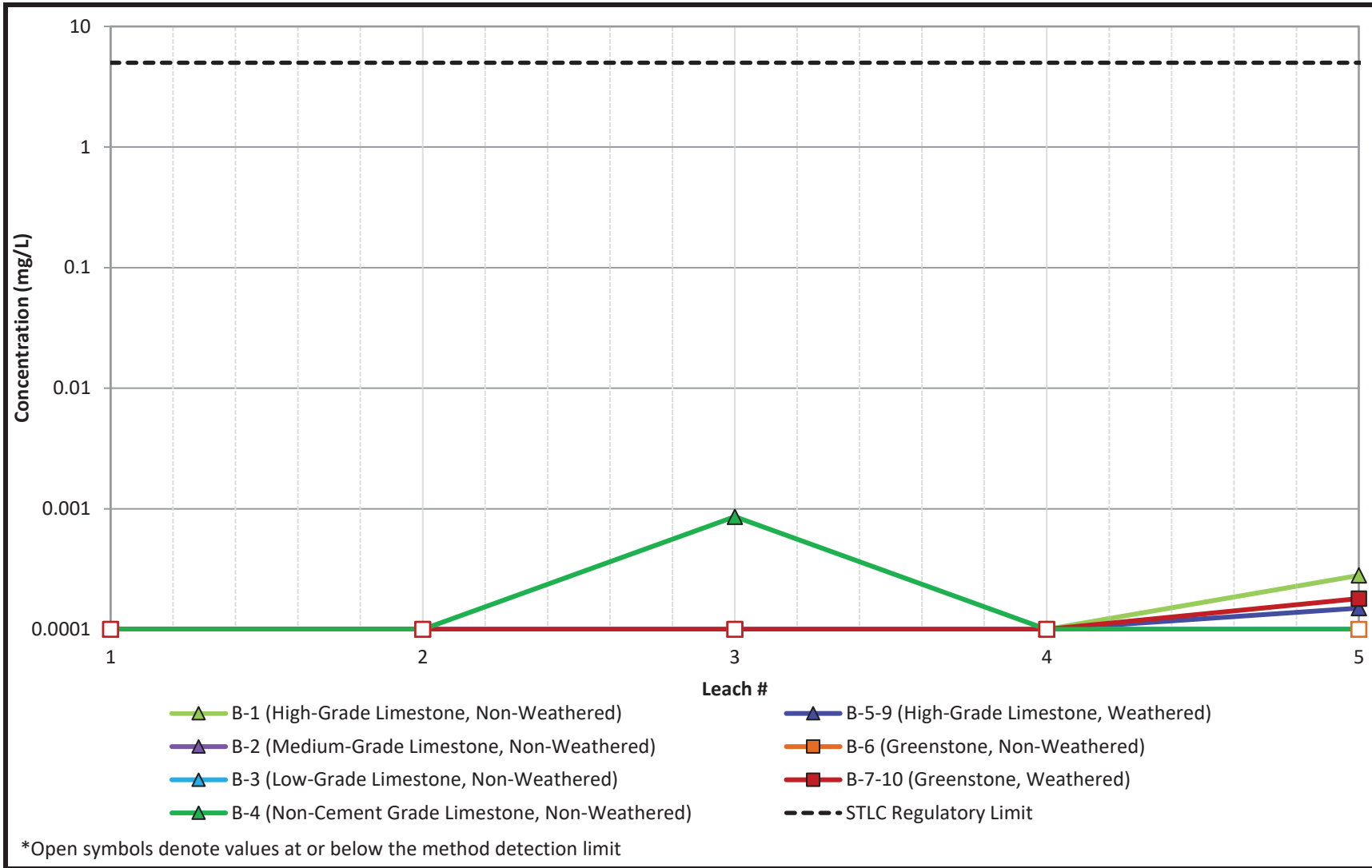

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Copper** | | |
| | Project Name | Project No. 31405507 | FIGURE C-16 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



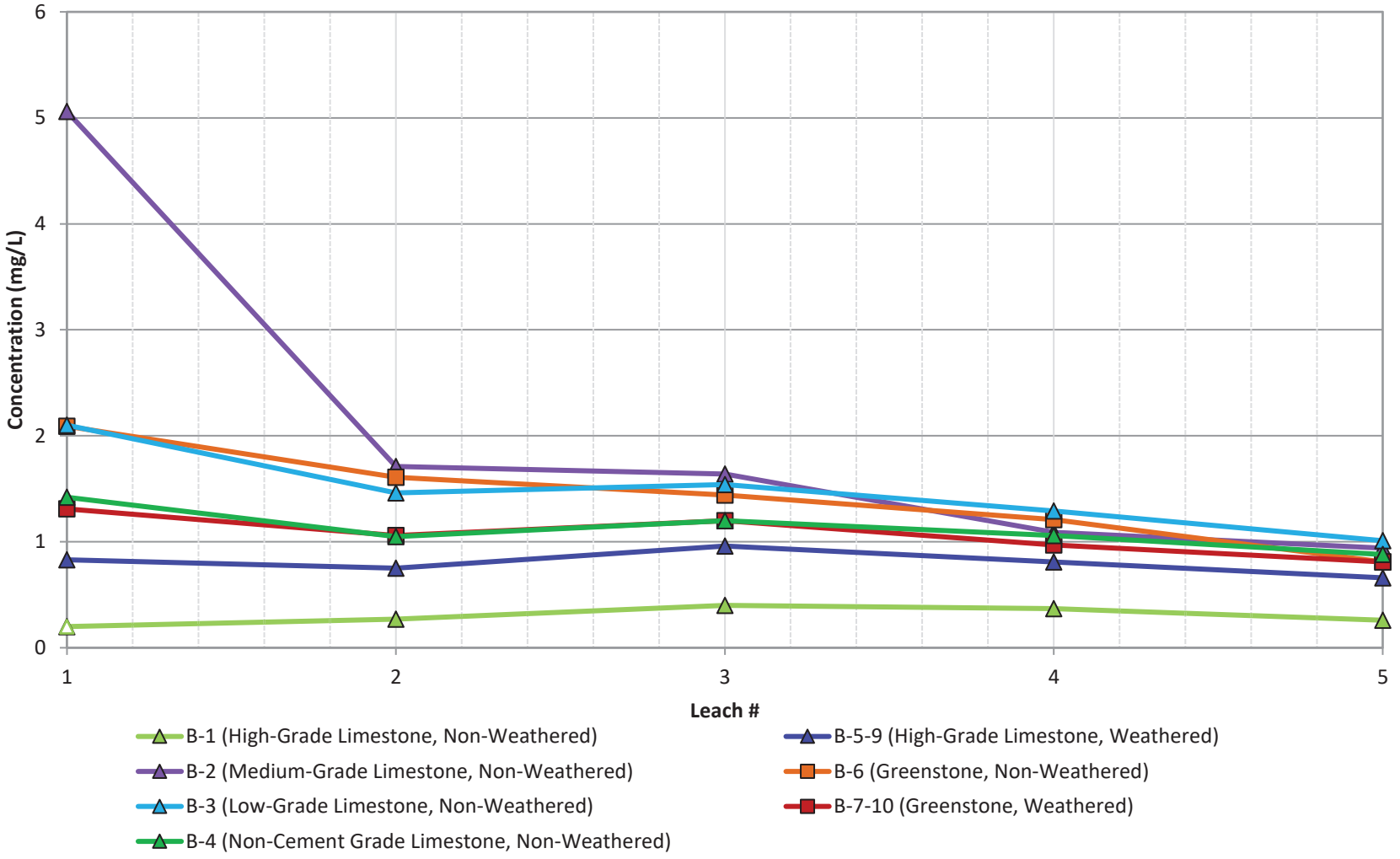

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Iron** | | |
| | Project Name | Project No. 31405507 | FIGURE C-17 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



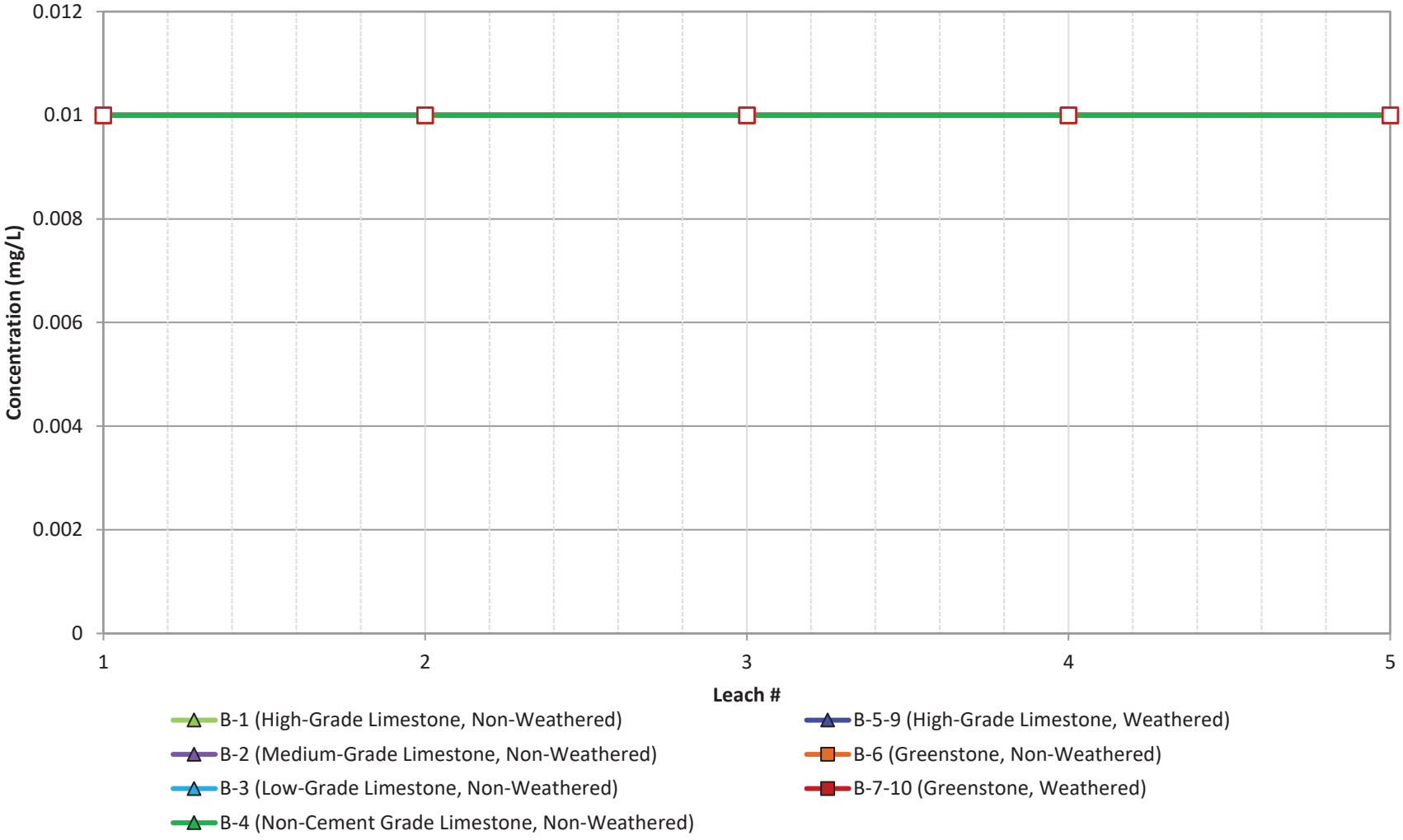

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Lead** | | |
| | Project Name | Project No. 31405507 | FIGURE C-18 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



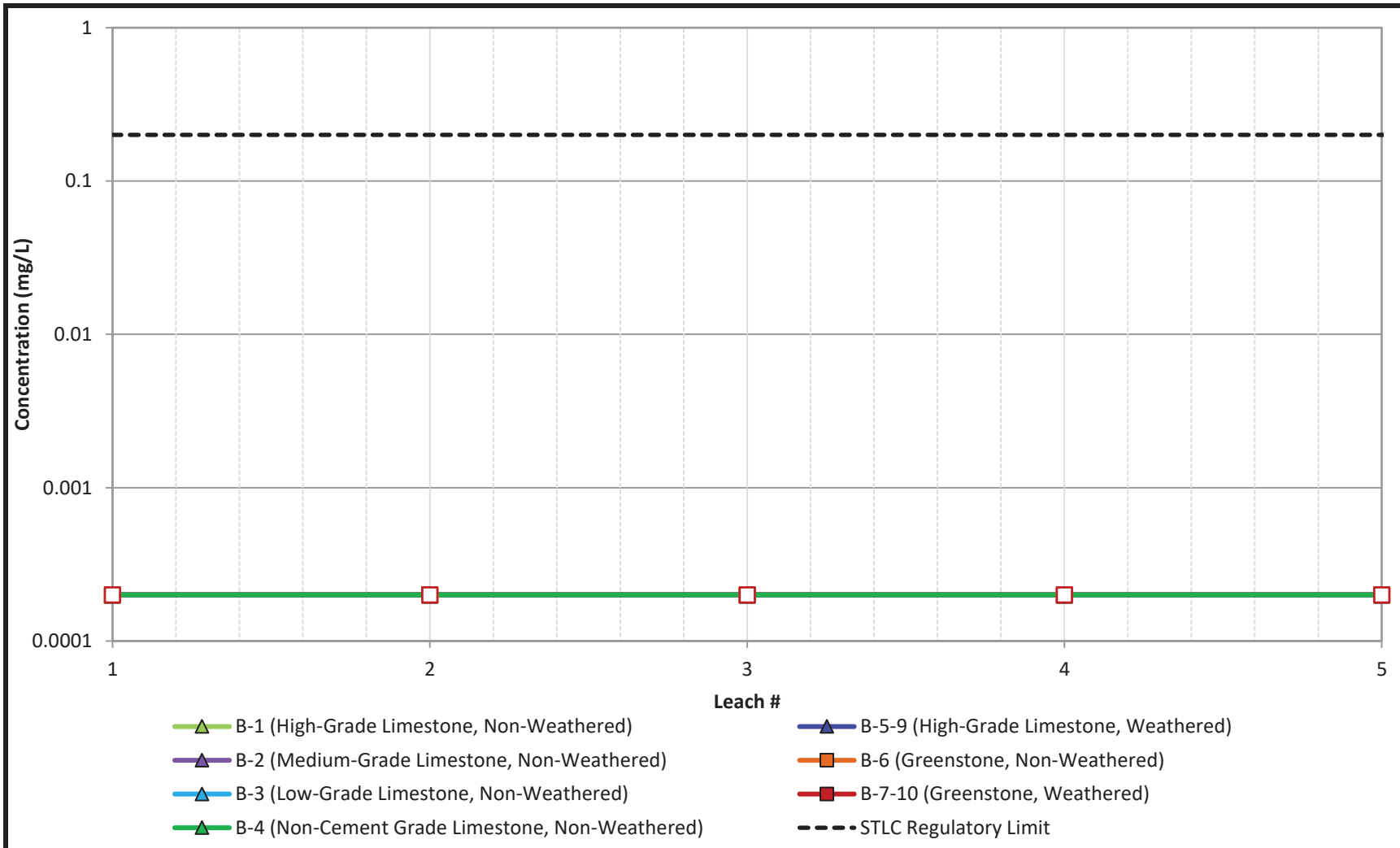

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Magnesium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-19 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



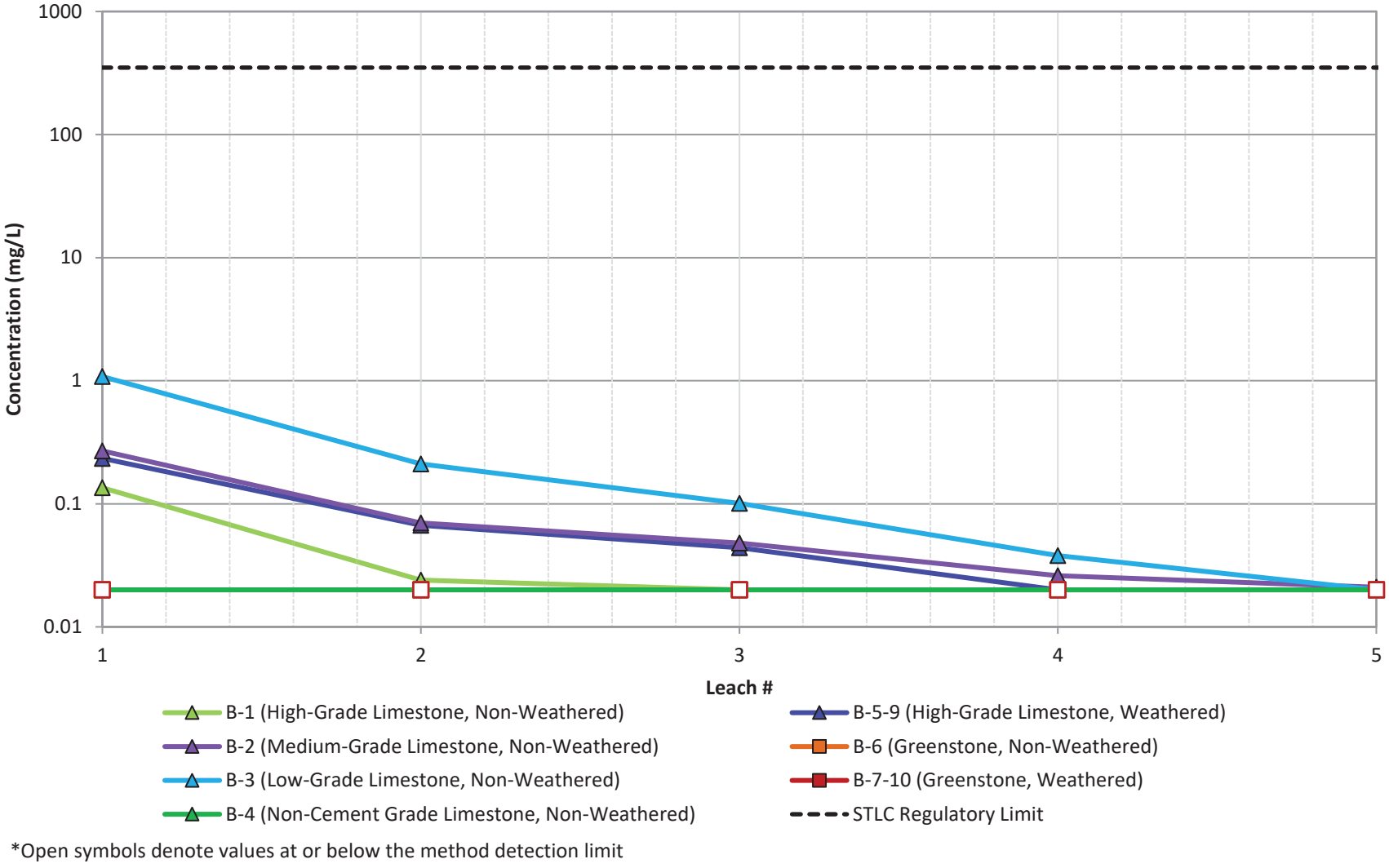

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Manganese** | | |
| | Project Name | Project No. 31405507 | FIGURE C-20 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



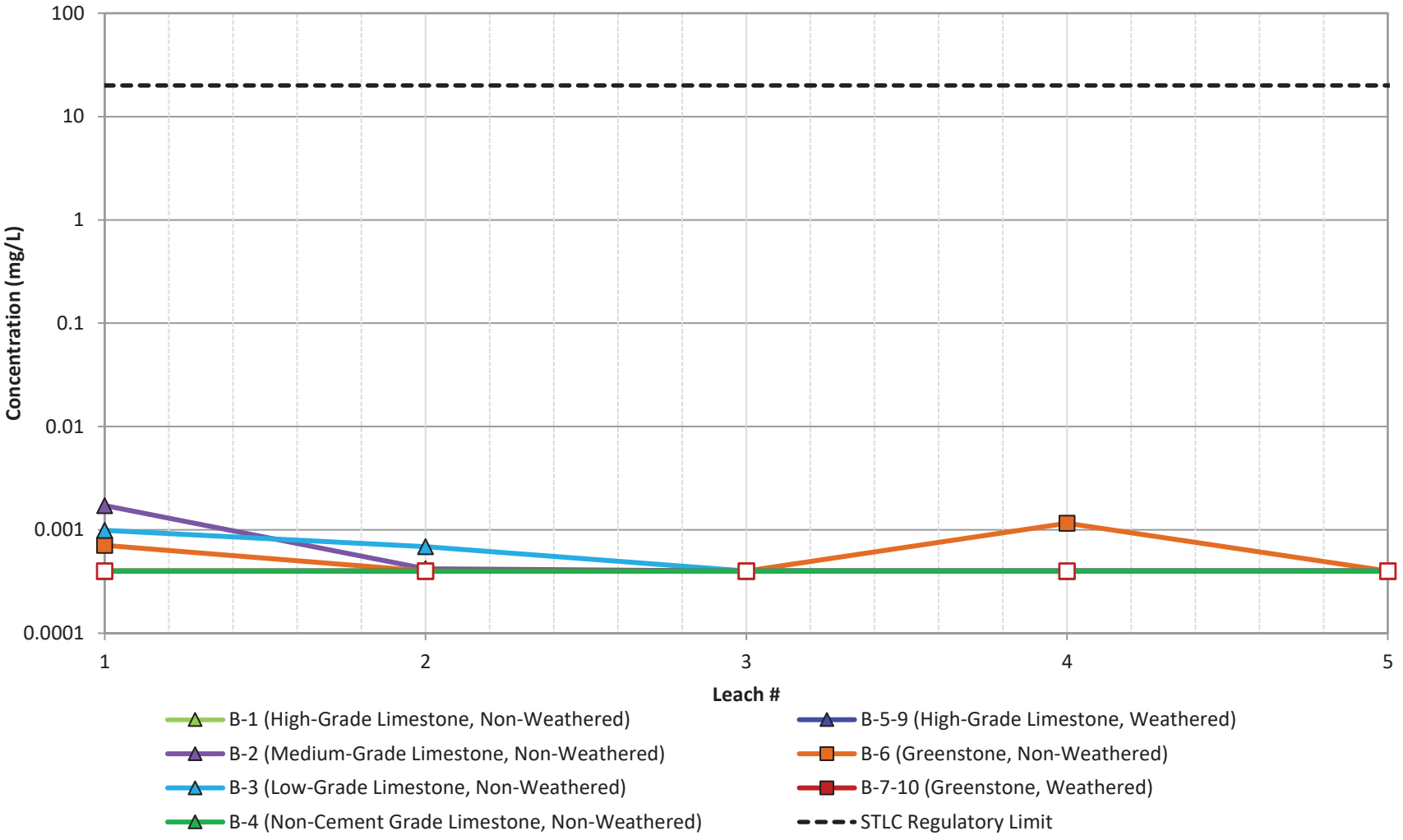

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Mercury** | | |
| | Project Name | Project No. 31405507 | FIGURE C-21 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



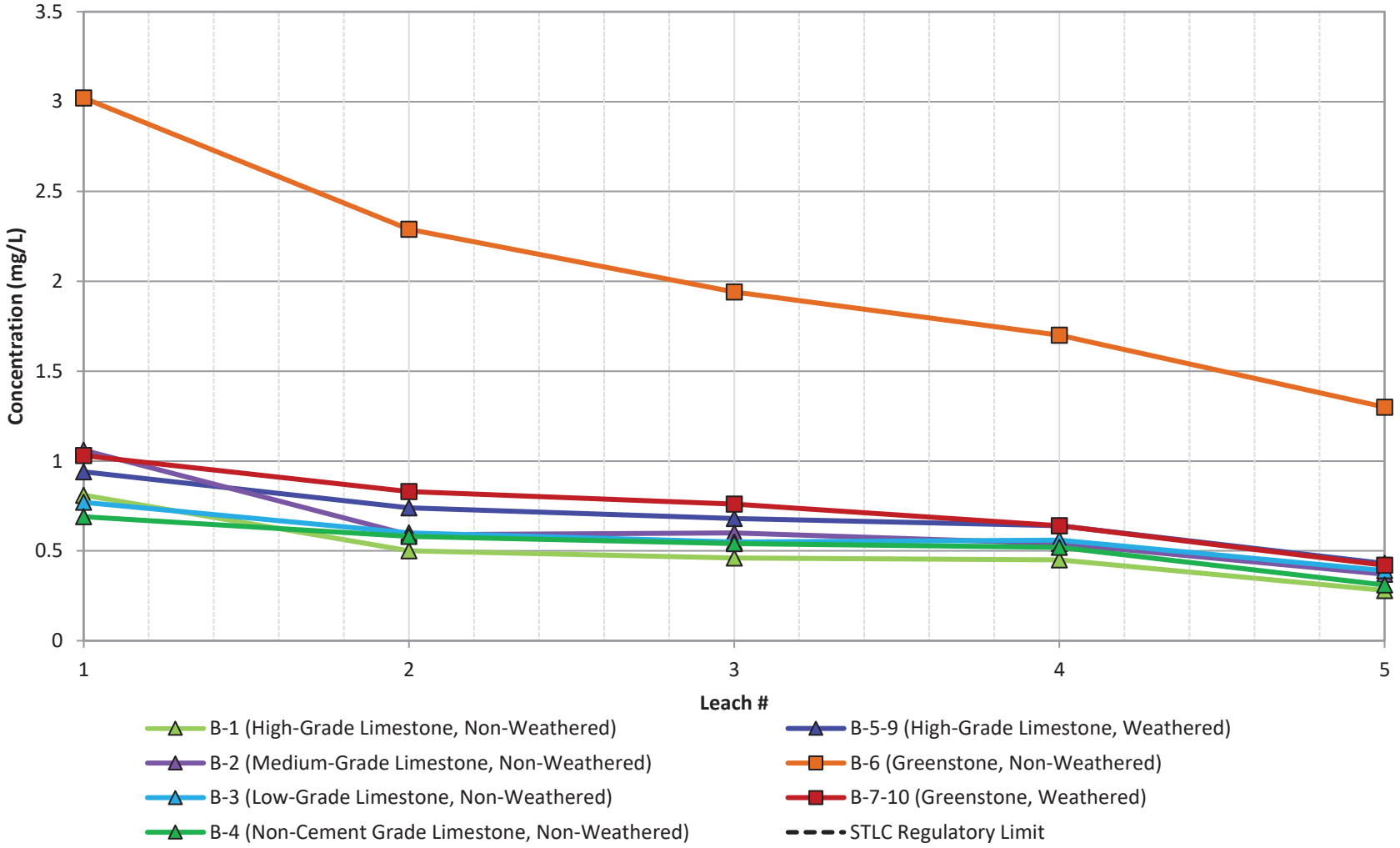

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Molybdenum** | | |
| | Project Name | Project No. 31405507 | FIGURE C-22 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



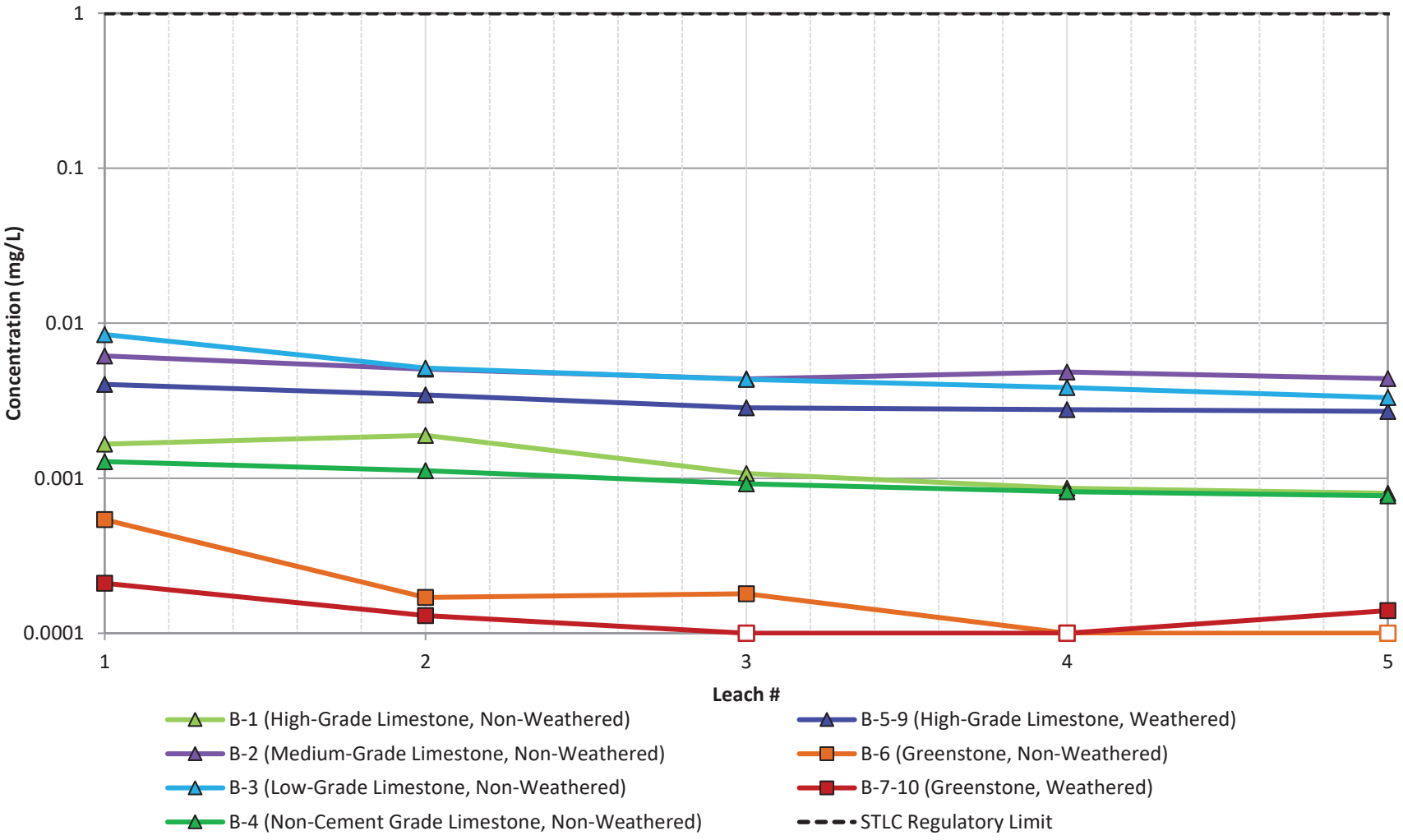

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Nickel** | | |
| | Project Name | Project No. 31405507 | FIGURE C-23 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



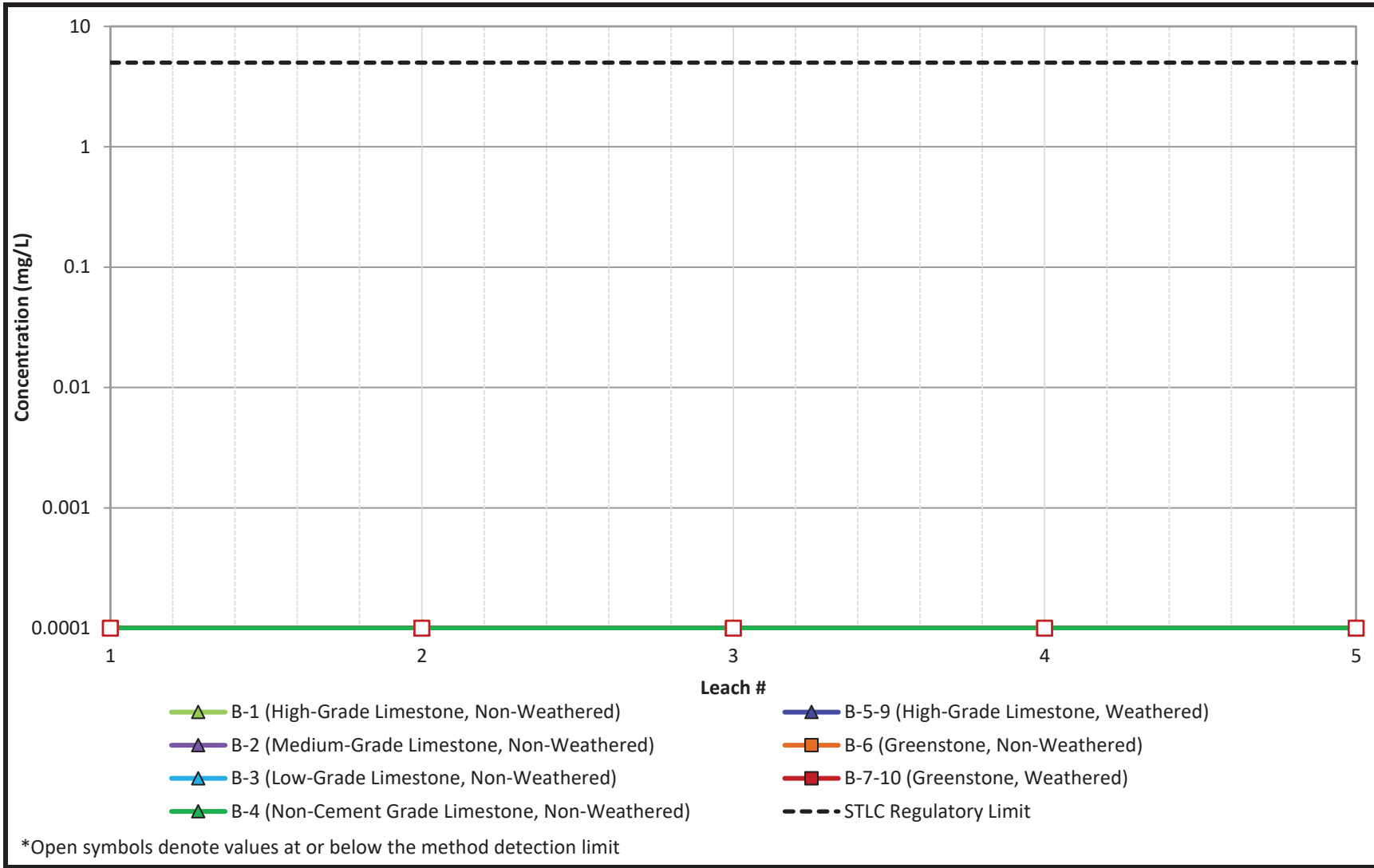

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Potassium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-24 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



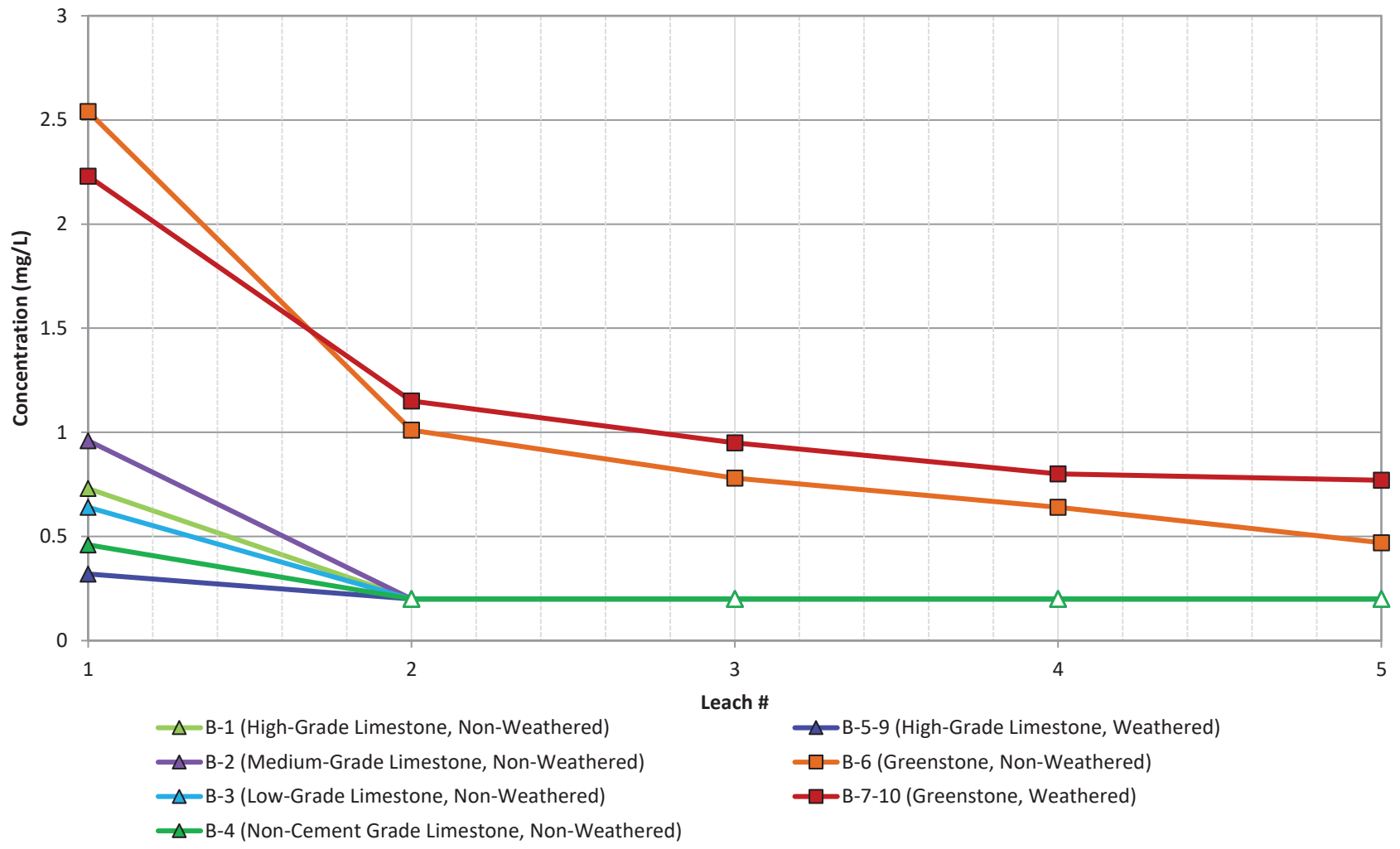

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Selenium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-25 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



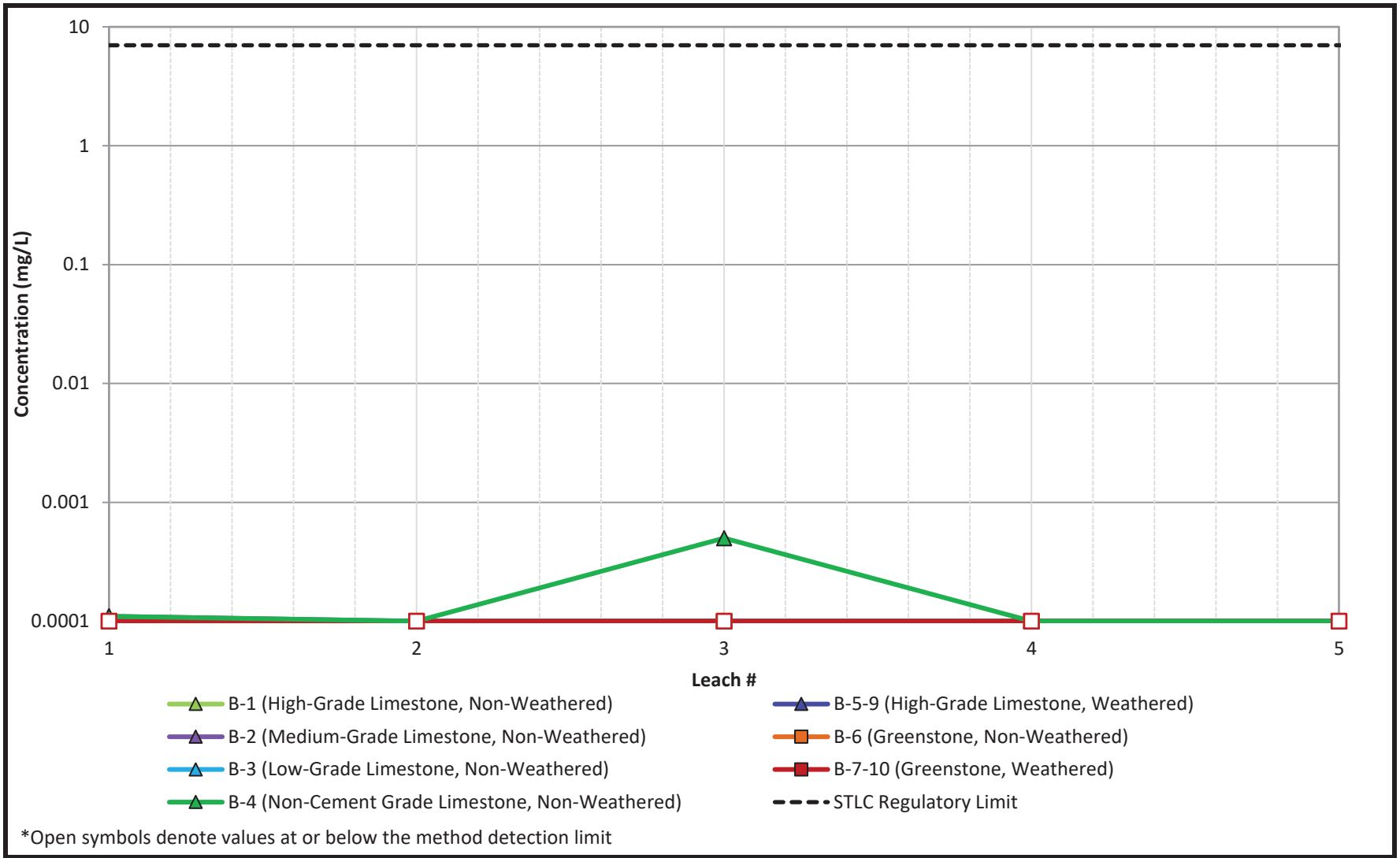

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Silver** | | |
| | Project Name | Project No. 31405507 | FIGURE C-26 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |



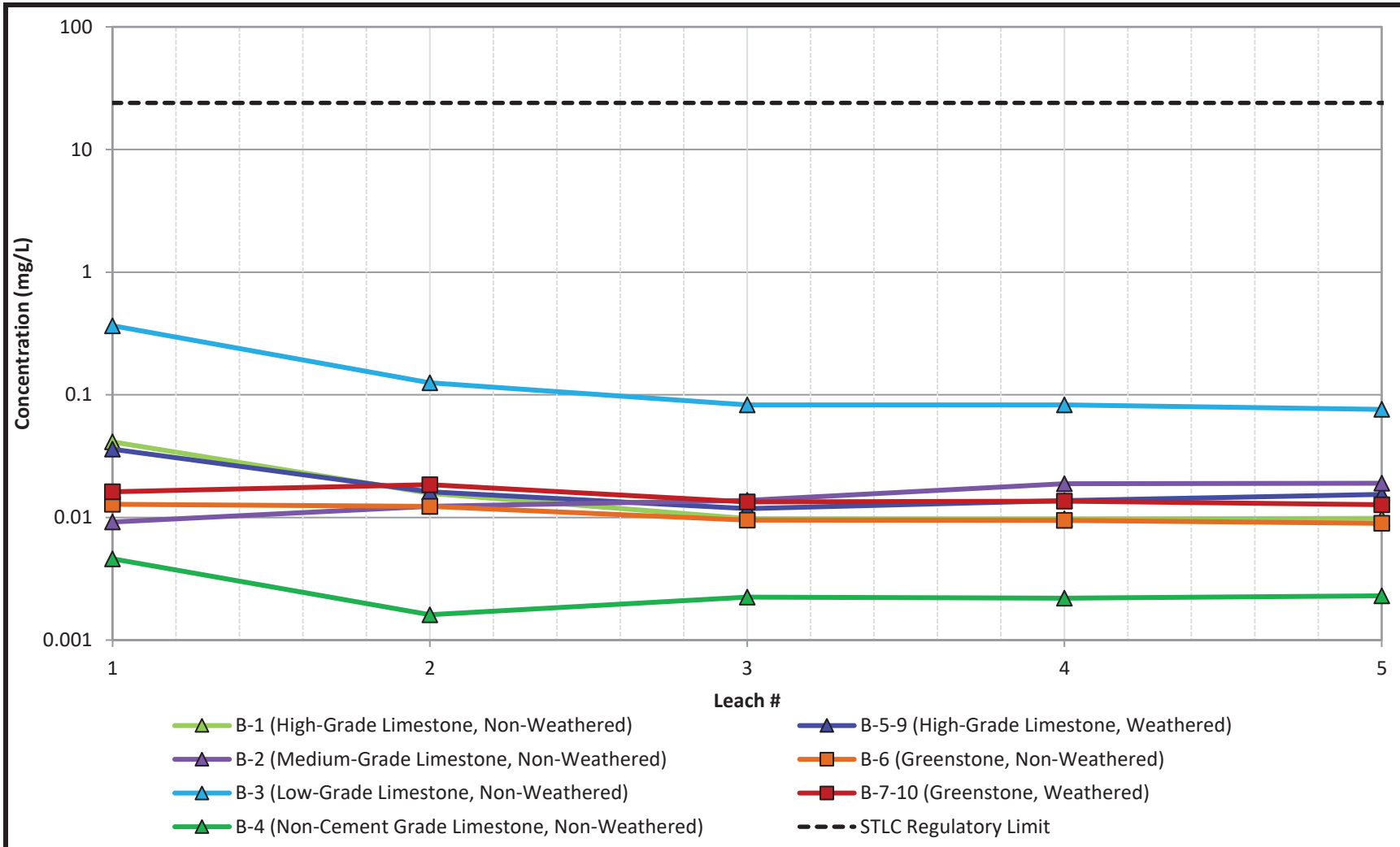

*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Sodium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-27 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |




*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Thallium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-28 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |




*Open symbols denote values at or below the method detection limit

| | | | |
|---|---|---|---|
| WSP GOLDER | Title: **Sequential Modified WET- Vanadium** | | |
| | Project Name | Project No. 31405507 | FIGURE C-29 |
| | Client Name: Lehigh Permanente | Date: 8/4/2022 | |

# G4. Seismic Refraction Survey (NorCal Geophysical Consultants, Inc. May 22, 2014)

NORCAL GEOPHYSICAL CONSULTANTS, INC.

May 22, 2014

Golder Associates, Inc.
425 Lakeside Drive
Sunnyvale, CA 94085

Subject: Seismic Refraction Survey
Sites 4 and 11
Permanente Quarry
Cupertino, California

NORCAL Job #14-245.15B

Attention: George Wegmann,

This report presents the findings of seismic surveys performed by NORCAL Geophysical Consultants, Inc. for Golder Associates, Inc. at Permanente Quarry in Cupertino, California. The surveys were performed during the period March 4 through 11th, 2014 by NORCAL Professional Geophysicist William J. Henrich, PGp 893. Geologist Jeff Linder and Field Technician Dave Walter of Golder Associates, Inc. provided field assistance throughout the duration of the survey.

## 1.0 SITE DESCRIPTION AND PURPOSE

The seismic surveys were conducted at two locations referred to as Area 11 and Area 4, as shown on Plates 1A and 1B, respectively. Both areas encompass sections of Permanente Creek which drains in a general west to east direction. The area north of the creek has been subjected to accumulations of overburden materials related to quarrying operations. Particle sizes of the mine wastes ranged from sand and gravel size up to boulders that, on the surface, were several feet across. The local bedrock consisted of greywacke (sandstone), greenstone and limestone belonging to the Franciscan Complex.

The purpose of the seismic survey was to determine the thickness of alluvium and alluvium-rock fills at accessible select areas within the stream channel, along parallel haul roads and areas north of the stream channel. This data will be used by others to assess volumes of unconsolidated materials needed to be removed for restoration to the original stream channel grade and configuration as part of a reclamation plan for the quarry.

## 2.0 METHODOLOGY

We collected seismic data using two methods known as seismic refraction (SR) and multi-channel analysis of surface waves (MASW). The SR method was used to determine the compressional (P-) wave velocity of subsurface materials. The P-wave velocity (Vp) of fill, sediments, and rock are dependent on physical properties such as compaction, density, hardness, and induration. However, other factors such as bedding, fracturing, and saturation also affect Vp.

Typically, low Vp is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vp usually indicates dense and highly compacted or saturated sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vp typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the SR methodology is provided in Appendix A.

The MASW method was used to determine both the P-wave and the shear (S-) wave velocity of subsurface materials in areas where limited access precluded the use of the SR method. S-waves typically propagate through earth materials at roughly one-half the velocity of P-waves. However, S-wave velocities are more directly related to the strength of fill, sediments, and rock than P-waves. Furthermore, unlike Vp, S-wave velocity (Vs) is not affected by saturation. Typically, low Vs is indicative of loose, dry soils, poorly compacted fill material, poorly to semi-consolidated sediments, or alternatively, deeply weathered and/or highly fractured rock. Moderate Vs usually indicates dense and highly compacted sedimentary deposits or fill, and/or moderately weathered and fractured sedimentary rock. High Vs typically represent un-weathered sedimentary (i.e., sandstone, conglomerate, meta-sandstone or basalt) bedrock. A more detailed description of the MASW method is provided in Appendix B.

## 3.0 DATA ACQUISITION

SR surveys were conducted in two locations referred to as the Rock Pile Area (Area 11) and the Material Removal Area (Area 4). The SR surveys were conducted according to the procedures described in Appendix A. MASW soundings were conducted in Area 11 according to the procedures described in Appendix B. The salient features of the data acquisition procedures used in each area are described in the following sections.

### 3.1 AREA 11

In Area 11 we collected SR data from 8-lines ranging in length from 75- to 250-ft. The locations of these lines, labeled Line 1 through Line 8, are shown on Plate 1A. We also conducted two MASW soundings. The locations of the soundings, labeled MASW-9 and MASW-10 are also shown on Plate 1A. Where possible, the SR lines and MASW soundings were located within the stream channel. However, there were some areas where the lines had to be placed on adjacent compacted gravel roads because of the presence of dense vegetation, concrete linings or steel culverts within the channel.

### 3.2 AREA 4

In Area 4, we acquired SR data from 13-lines ranging in length from 125- to 250-ft. The locations and orientations of the SR lines are shown on Plate 1B. The SR lines were positioned within the stream channel and on the northern portions (hill slopes, access roads and parking area) of the site.

## 4.0 DATA PROCESSING

### 4.1 SEISMIC REFRACTION (SR)

The refraction data were processed as described in Appendix A. Elevation data were provided by Waterways Consultants, Inc. at each shot point location within every seismic line. These elevation data were incorporated into the final processed seismic models. Further information regarding specific data input and sample compilations can be found in Appendix A.

### 4.2 MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

The MASW data were processed according to the procedures described in Appendix B.

## 5.0 RESULTS

The results of the seismic refraction survey are illustrated by the seismic velocity cross-sections (profiles) shown on Plates 2 through 8. On each profile the vertical axis represents elevation above mean sea level (MSL) and the horizontal axis represents draped survey distance (Station) along each line. Color shaded areas represent the lateral and vertical extent of the seismic layers comprising each profile. Modelled layer depths (thicknesses) as described in the Appendix A were determined beneath each geophone. These data were interpolated/extrapolated beneath each shot point. The relationship between color and seismic velocity is indicated by the color scales plotted to the right of each seismic refraction profile. In order to indicate how velocity varies from line to line within each survey area, the same scale was used for every profile. The results obtained in each area are described in the following sections. Specific results are presented for areas where two or more seismic refraction profiles either cross each other or are in a local proximity. It was useful to group seismic lines in this manner because of common characteristics involving of topography, location or surface conditions.

## 5 .1 AREA 11

### 5.1.1 Lines 1 and 2 (Plate 2)

Lines 1 and 2 were located within the stream channel, just west of a retention pond, as shown on Plate 1A. During the survey, water from remote pumping was actively being discharged to the stream channel above the seismic lines. The profile for Line 1 indicates velocities (Vp) ranging from 1200- to 7200-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1as representing unconsolidated stream deposits and V2 as representing bedrock. The depth to rock ranged from 18- to 25-ft. The Profile for Line 2 indicates velocities (Vp) ranging from 1150- to 2550-ft/sec. Our interpretation of the data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. Given the low velocities of these layers, we interpret both as representing unconsolidated stream deposits. The difference in velocity between the two layers is related to their relative degree of compaction. V2 has a higher velocity than V1 because it is more highly compacted, probably because of the overbearing weight of V1. Line 2 did not detect bedrock because it was a relatively short line length which limited the depth of exploration.

### 5.1.2 Line 3 – 6, MASW Soundings 9 and 10 (Plate 3)

Lines 3 through 5 were located on access roads that parallel the stream channel, as shown on Plate 1A. Line 6 was situated in open, gravel packed area that ranged from 40 to 60-ft north of a subsurface diversion channel. The profiles for Lines 3-6 indicate velocities (Vp) ranging from 2300- to 7800-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated materials, e.g. road fill and/or alluvium. Given the high velocity range of V2 (6850- to7800-ft/sec) we interpret it as representing bedrock. The depths to bedrock ranged from 8- to 35-ft bgs.

MASW Soundings 9 and 10 were located north of Seismic Refraction Line 3, as shown on Plate 1A. The MASW soundings were acquired for the purpose of assessing possible near surface high velocity layers and providing depth to bedrock information further north of the stream channel. The 1D MASW Velocity Models (9 and 10) shown at the top of Plate 3 indicate a near surface high velocity layer (Vs=1500- to 2000-ft/sec) that is 8- to 16-ft thick. We interpret this high velocity layer as representing compacted (by very heavy vehicle loads) road fill. The materials underlying the compacted fill have lower velocities (Vs=500- to1000-fps) and thus constitute a velocity inversion. This velocity inversion, which is typically about 8- to 9-ft thick, is characteristic of alluvium. It is underlain, at depths of 17- to 26-ft bgs by velocities (Vs) of about 1800-ft/sec. We interpret these velocities as being indicative of consolidated bedrock. The bedrock depth indicated by the MASW-9 model (about 17-ft) is more shallow than the depth

indicated by the Line 3 profile (23-ft) at its point of closest approach. Conversely, the bedrock depth indicated by the MASW-10 model (26-ft) is significantly greater than the 5- to 10-ft depth indicated by the Line 3 and Line 4 profiles at their points of closest approach to MASW-10. These factors highlight the erratic nature of the bedrock surface and can be, in part, attributed to the fact that MASW-9 and MASW-10 are 25-ft north of Lines 3 and 4.

Additionally, the MASW soundings were undertaken to provide a constraint on the seismic refraction results in the general area (Seismic Refraction Lines 3 and 4) as the MASW techniques can accommodate shallow velocity inversions in processing. The MASW bedrock depths (17- to 26-ft bgs) derived from MASW analysis thus formed an approximate magnitude range of values. Our seismic refraction results indicated that bedrock depths ranged from 5- to 35-ft bgs which is in the same order of magnitude as the MASW estimate of depths to bedrock in the general area.

### 5.1.3 Lines 7, 8 and 11(Plate 4)

Lines 7, 8 and 11 trend northward, away from the stream channel, as shown on Plate 1A. Lines 7 and 8 cross an uphill section of accumulated mine waste and packed surficial gravel. The local topography was highly variable and steep. Line 11 crosses a gently sloping, open, gravel packed area from the edge of a metal culvert up to point 50-ft distant from the rock discharge pile (Rock Pile). The profiles for Lines 7, 8 and 11indicate velocities ranging from 1850- to 5700-ft/sec. Our interpretation of the data resolves this range into two seismic layers designated as V1 and V2, in order of increasing depth and velocity. Because of its relatively low velocity and highly variable thickness, we interpret V1 as representing mine wastes and/or alluvium. We interpret V2 as representing bedrock. Beneath Lines 7 and 8, the depth to rock ranges from less than 10- to over 50-ft. The Time-Distance plot for Line 11 indicated a relatively high velocity V1 layer associated with the road bed. No characteristic higher V2 bedrock velocity layer was detected. Therefore, no modeling results are presented for this line.

## 5.2 AREA 4

### 5.2.1 Lines 12, 13, 14 and 15 (Plate 5)

Lines 12, 13 and 14 were situated within a relative wide section of the stream channel, as shown on Plate 1B. Line 15 was located along a man-made bench that parallels the stream channel, about 20-ft upslope from the channel. The profiles for the four lines indicate velocities (Vp) ranging from about 900- to 3550-ft/sec. Our interpretation of the refraction data resolves this velocity range into three layers labeled V1 through V3 in order of increasing depth and velocity. We interpret the V1 and V2 layers as representing unconsolidated stream deposits and V3 as representing weathered bedrock. The depth to rock (V2/V3 interface) ranges from 7- to 23-ft bgs.

The relatively low velocity of V3 (2800- to 3450-ft/sec) suggests that it comprises a very weak rock like a meta-shale. The profile for Line 15 indicates that bedrock deepens to the east (downstream), reaching a maximum depth of 36-ft-bgs at the east end of the line. This puts it at an elevation of 1190-1192-ft MSL, which corresponds to the bedrock elevations at the west end of Line 12 and the east end of Line 13.

**5.2.2. Lines 16 and 17 (Plate 6)**

Lines 16 and 17 were situated on top of a gravel packed, level parking area, as shown on Plate 1B. The profiles for both lines indicate velocities (Vp) ranging from 1150- to 6200-ft/sec. Our interpretation of the Line 16 and Line 17 data resolves this range into two seismic layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing fill and alluvium and V2 as representing bedrock. The depth to rock ranges from17- to 23-ft bgs.

**5.2.3 Lines 18, 19, 20 and 21 (Plate 7)**

Lines 18 through 20 were located within the active stream channel, as shown on Plate 1B. However, there was no water in the channel at the time the survey was conducted. Line 21 extended north and upslope from the west end of Line 19. The profiles for these lines indicate velocities (Vp) ranging from 1100- to 4150-ft/sec. Our interpretation of the data resolves this range into three layers labeled V1 through V3 in order of increasing depth and velocity. V2 is absent beneath Line 18 and V3 is absent beneath Line 19. We interpret the combined V1 and V2 layers, with velocities ranging from 1050- to 2650-ft/sec, as representing unconsolidated stream and slope deposits. However, below Lines 19 and 20, the V2 layer could represent decomposed bedrock or dense gravel deposits. In addition, our field observations indicate that, beneath Line 21, V2 could represent mining waste that contains a high percentage of boulder size fill. We interpret theV3 layer as representing bedrock with velocities, where defined, ranging from 3400- to 4150-ft/sec. The depth to rock ranges from about 8- to 32-ft.

**5.2.4 Lines 22, 23 and 24 (Plate 8)**

Line 22 and Line 23 were located on an access road, as shown on Plate 1B. This road leads to Pond 4 (not shown). Line 24 extended southeast and down slope, from the access road towards the stream channel. The profiles for the three lines indicate velocities (Vp) ranging from 1200- to 6700-ft/sec. Our interpretation of the data resolves the velocity range into two layers labeled V1 and V2 in order of increasing depth and velocity. We interpret V1 as representing unconsolidated stream deposits. We interpret V2 as representing bedrock. Beneath Lines 22 and 23, the computed depths to bedrock ranged from 18- to 30-ft bgs. Beneath Line 24, the depths to bedrock decrease in the down slope direction; ranging from 18-ft bgs near the access road to only 8-ft bgs at the southeast edge of the profile.

## 6.0 STANDARD CARE

The scope of NORCAL's services for this project consisted of using geophysical methods to characterize the subsurface. The accuracy of our findings is subject to specific site conditions and limitations inherent to the techniques used. We performed our services in a manner consistent with the standard of care ordinarily exercised by members of the profession currently employing similar methods. No warranty, with respect to the performance of services or products delivered under this agreement, expressed or implied, is made by NORCAL.

We appreciate having the opportunity to provide you with this information.

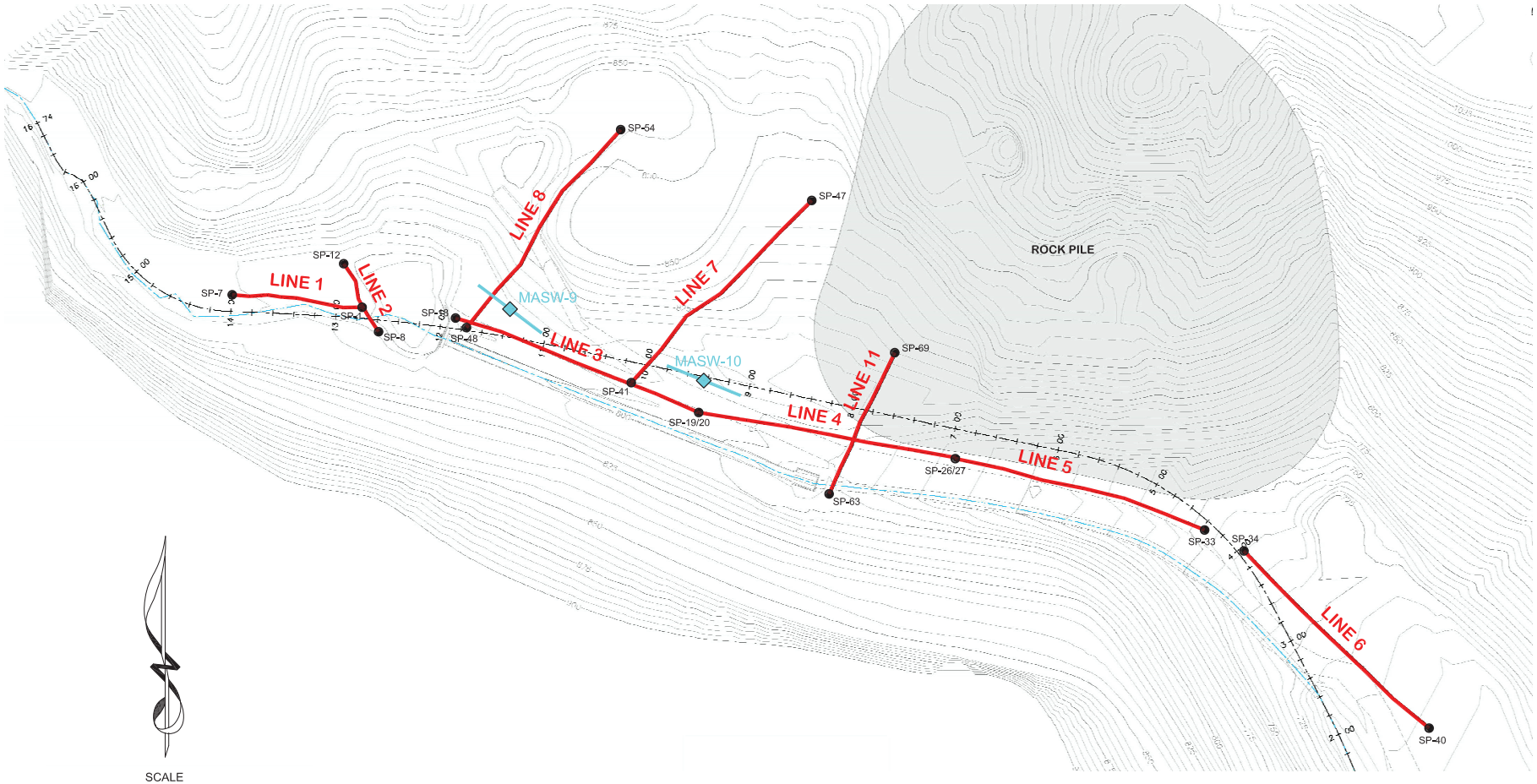
Respectfully,

NORCAL Geophysical Consultants, Inc.

William J Henrich
Professional Geophysicist PGp 893

WEB/tlt

Enclosures: Plates 1A, 1B and 2 through 8
Appendix A - Seismic Refraction (SR)
Appendix B – Multi-channel Analysis of Surface Waves (MASW)




SCALE
0 50 100 200
(1 inch = 100 feet)

## LEGEND

| | |
|---|---|
| | SEISMIC REFRACTION LINE |
| SP-1 | SHOT POINT LOCATION |
| | CENTER POINT OF MASW LINE |

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

# SITE LOCATION MAP
# PERMANENTE QUARRY AREA 11
# SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

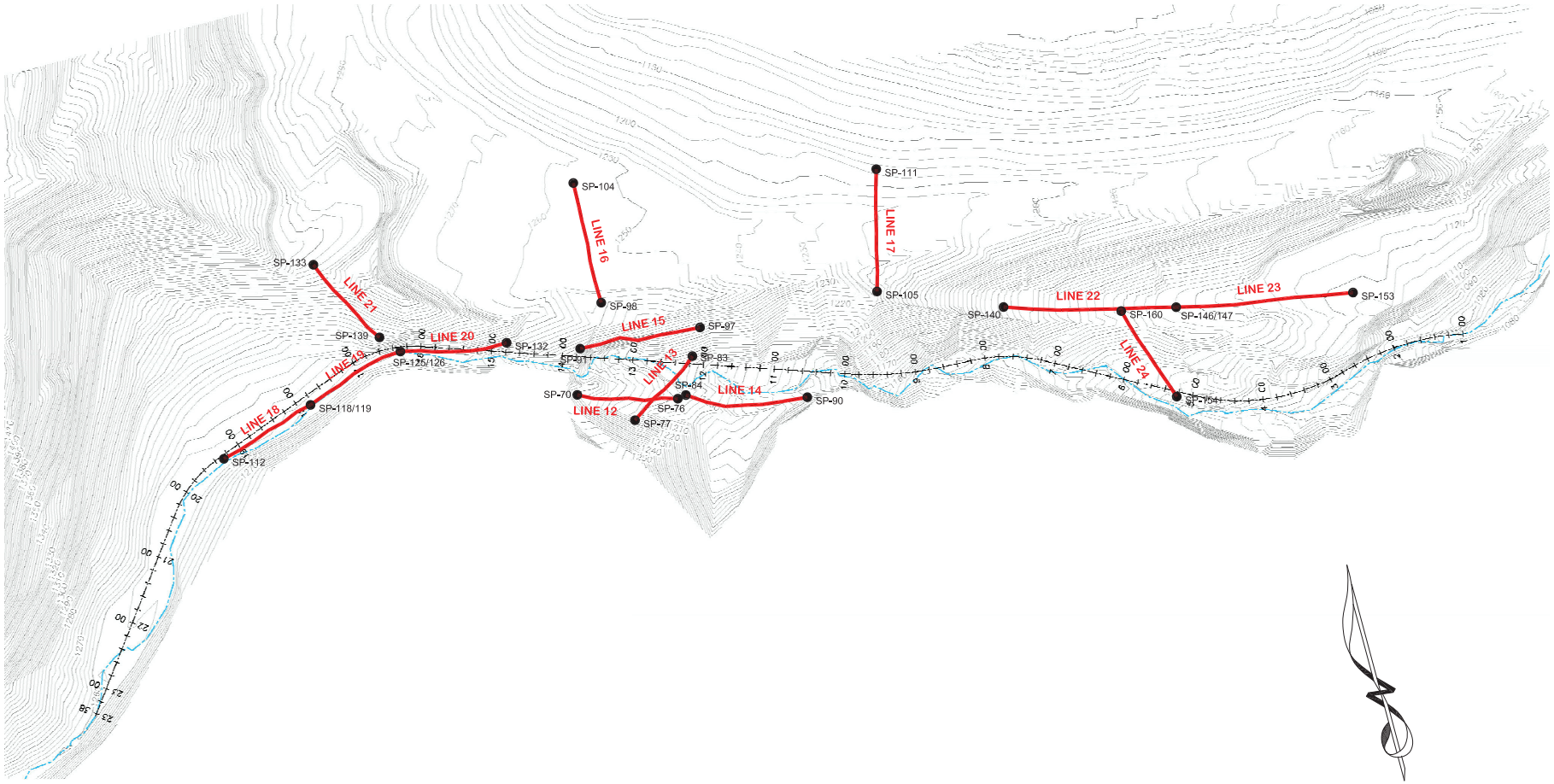
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1A




SCALE

0 150 300

(1 Inch = 150 feet)

## LEGEND

| | |
|---|---|
| ——— | SEISMIC REFRACTION LINE |
| ● SP-1 | SHOT POINT LOCATION |

NOTE: BASE MAP PROVIDED BY WATERWAYS CONSULTING, INC.

NORCAL

# SITE LOCATION MAP
# PERMANENTE QUARRY AREA 4
# SEISMIC REFRACTION SURVEY

LOCATION: CUPERTINO, CALIFORNIA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

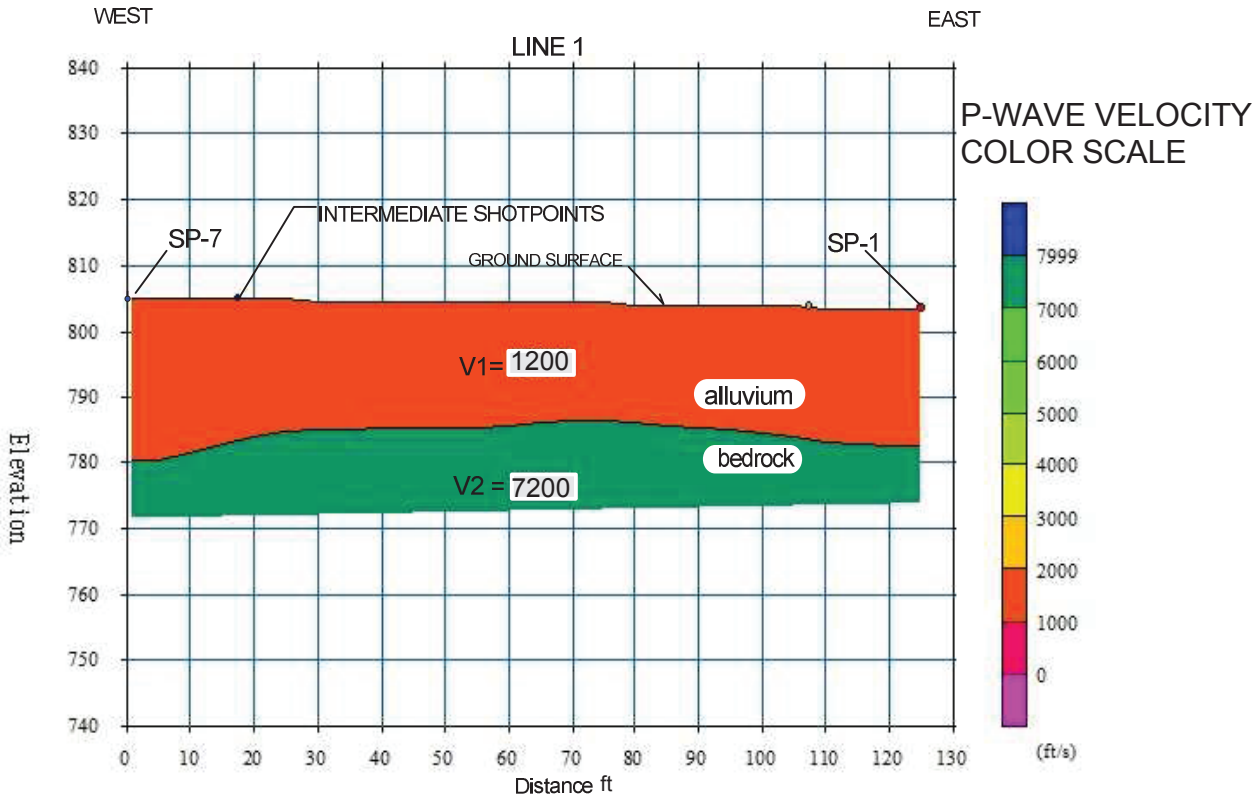
NORCAL GEOPHYSICAL CONSULTANTS INC.

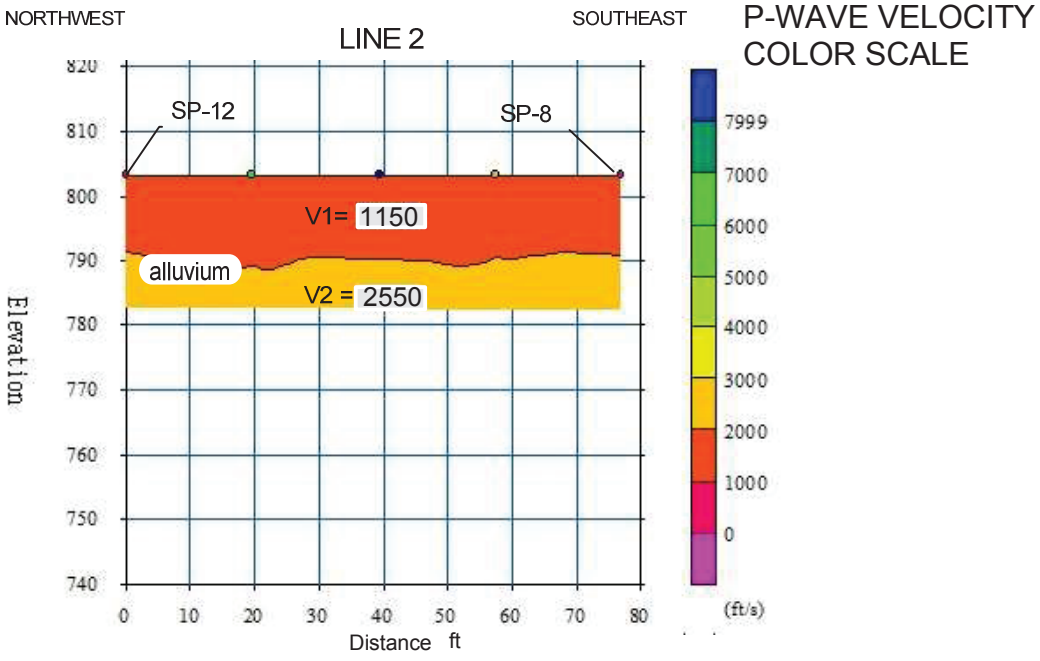
DATE: MAY 2014

DRAWN BY: G.RANDALL

APPROVED BY: WJH

PLATE 1B




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

Horizontal/Vertical Scale 1' = 30 feet

NORCAL

# SEISMIC REFRACTION PROFILES LINES 1 AND 2

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

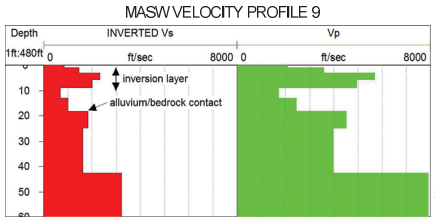
NORCAL GEOPHYSICAL CONSULTANTS INC.

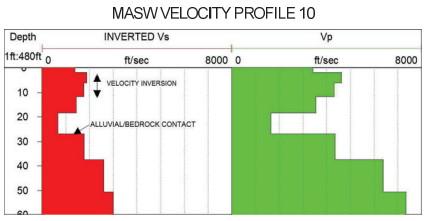
DATE: APRIL, 2014

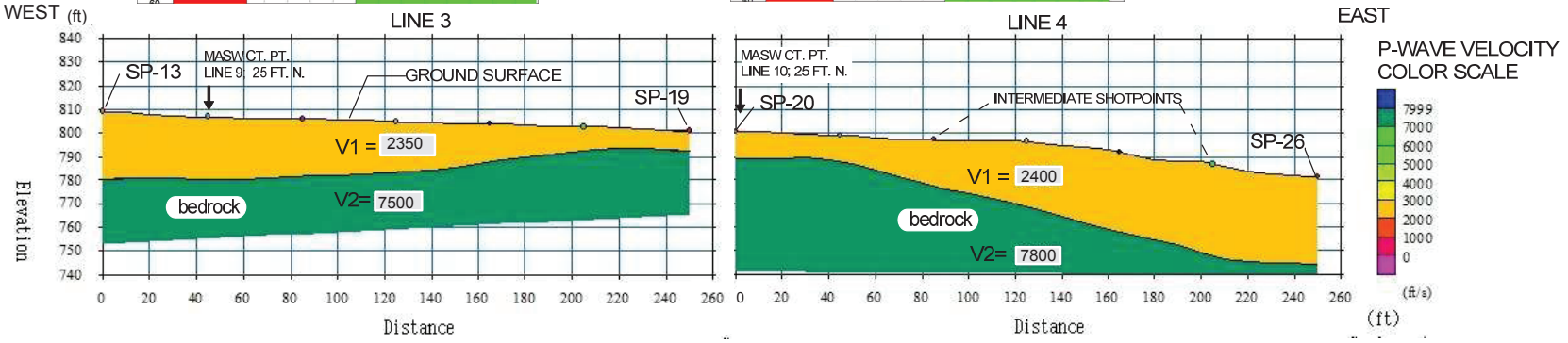
DRAWN BY: W HENRICH

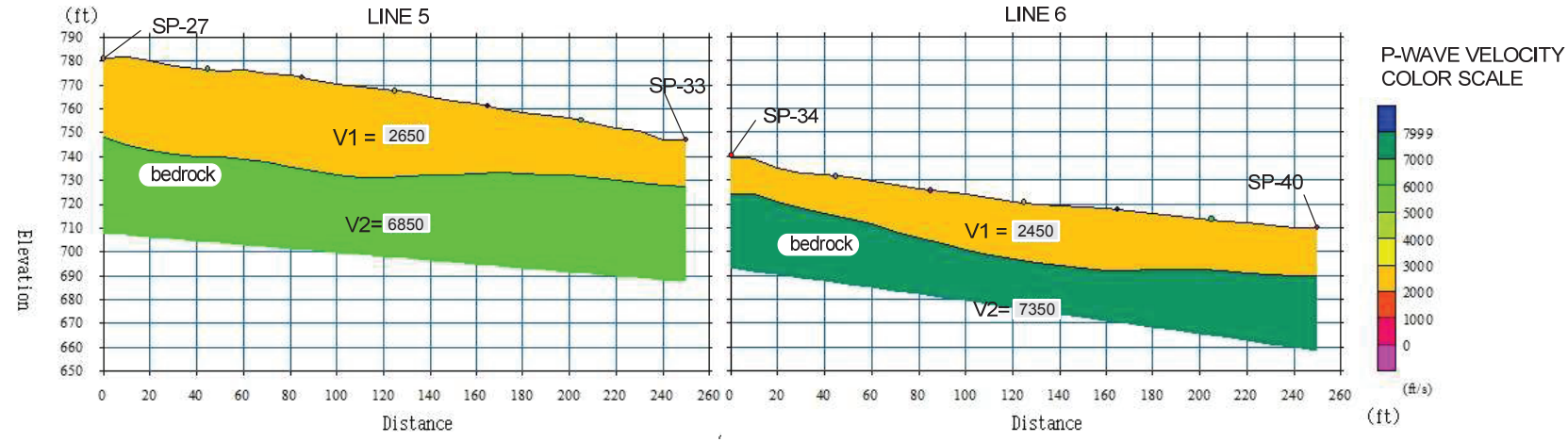
APPROVED BY: WJH

PLATE 2




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: 1" APPROX. EQUALS 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 3, 4, 5 AND 6;
MASW PROFILES 9 AND 10

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

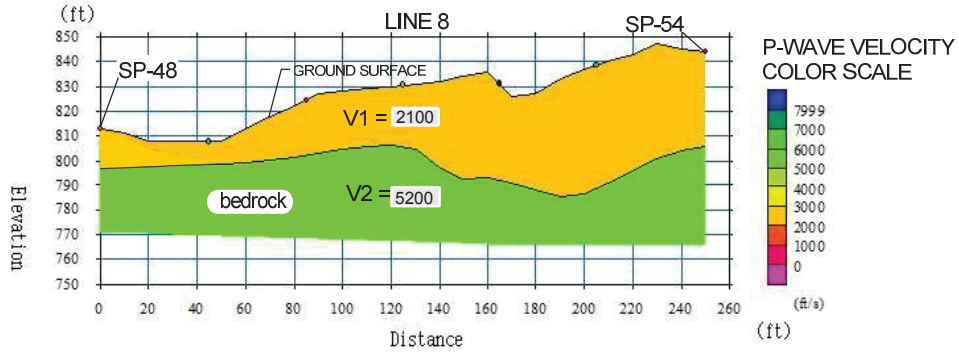
DRAWN BY: W. HENRICH

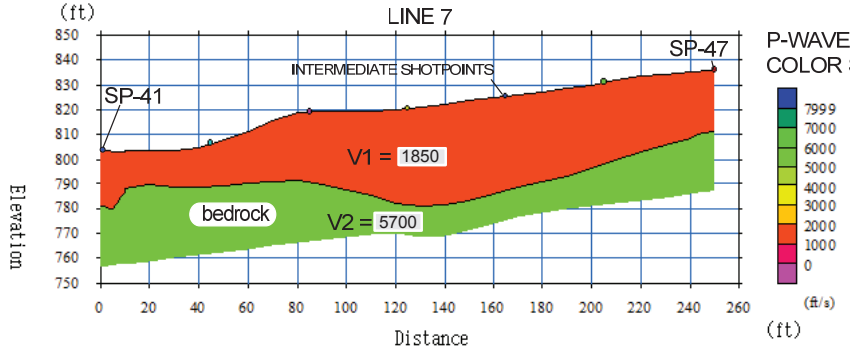
APPROVED BY: WJH

PLATE 3

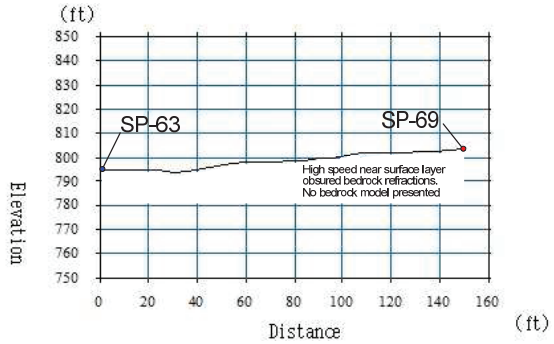
SOUTHWEST

NORTHEAST




LINE 11




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 7, 8, AND 11

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

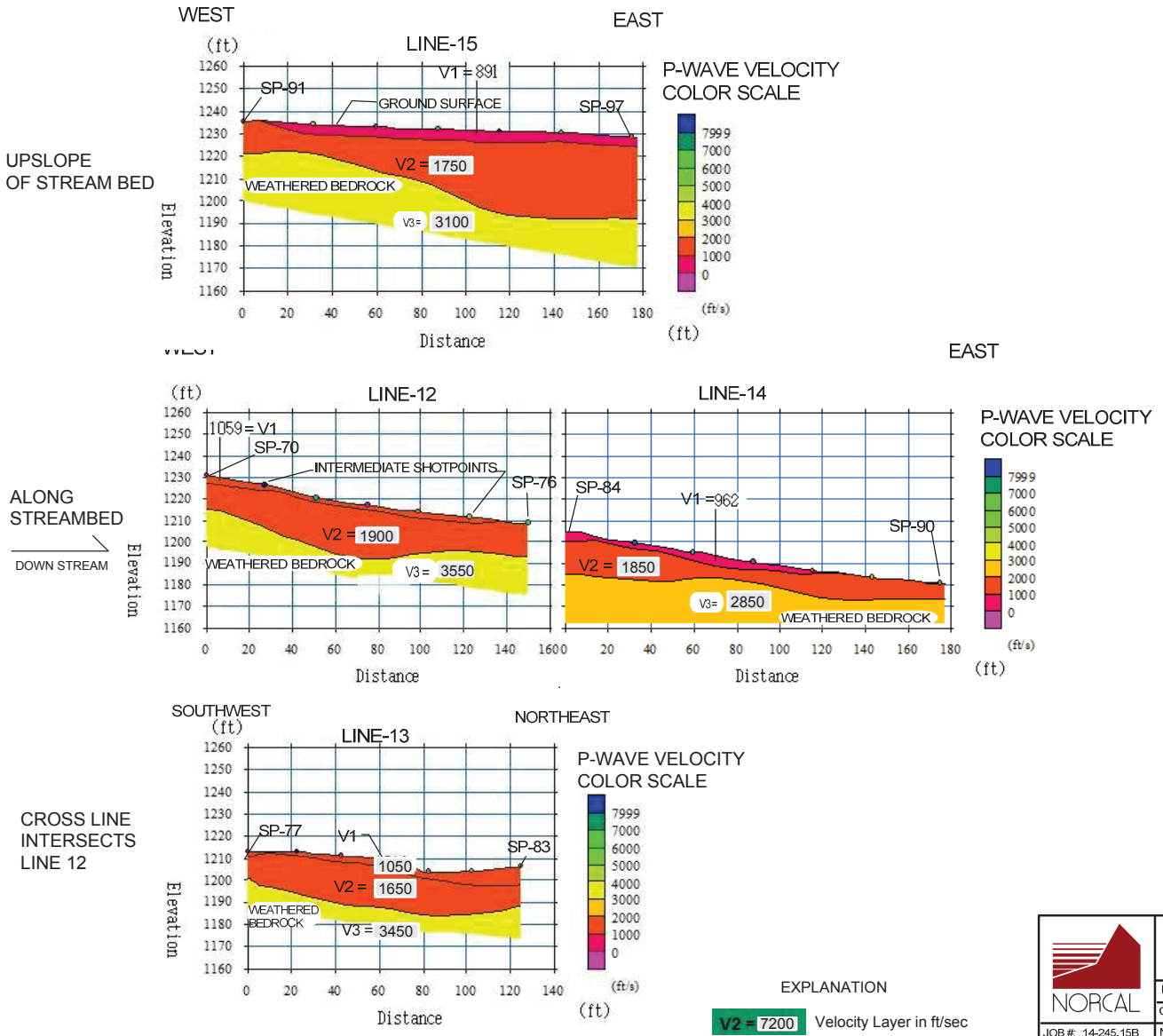
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 4

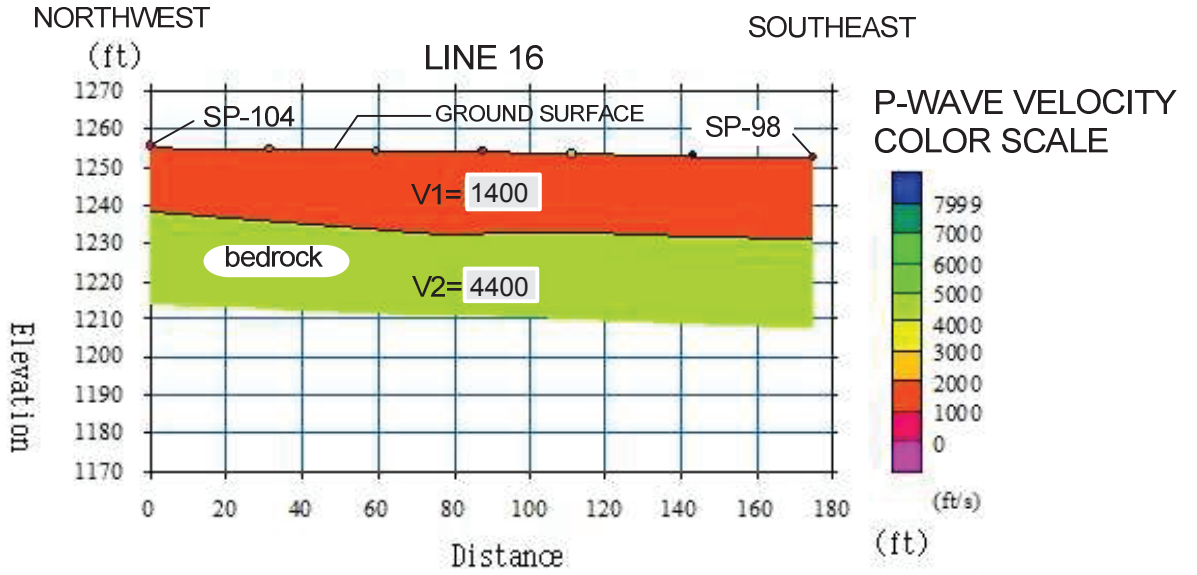


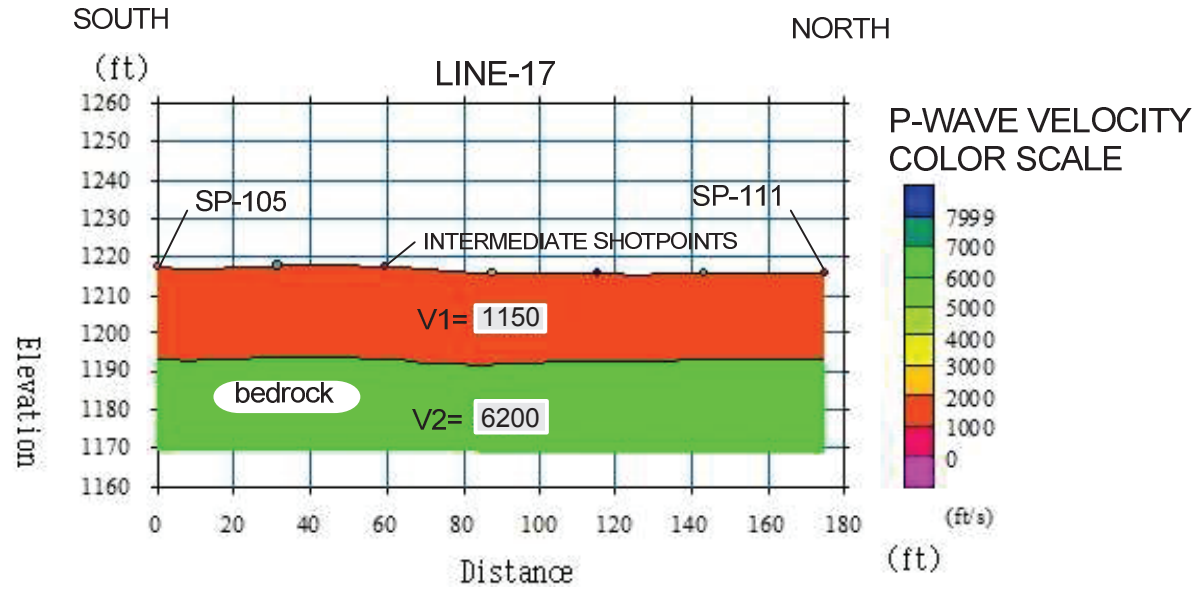

NORCAL

SEISIMC REFRACTION PROFILES
LINES 12, 13, 14, AND 15

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA
CLIENT: GOLDER ASSOCIATES, INC
JOB #: 14-245.15B
NORCAL GEOPHYSICAL CONSULTANTS INC.
DATE: APRIL, 2014
DRAWN BY: W. HENRICH
APPROVED BY: WJH

PLATE
5




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL TO 50 FEET

NORCAL

SEISMIC REFRACTION
PROFILES LINES 16 AND 17

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC.

JOB #: 14-245.15B

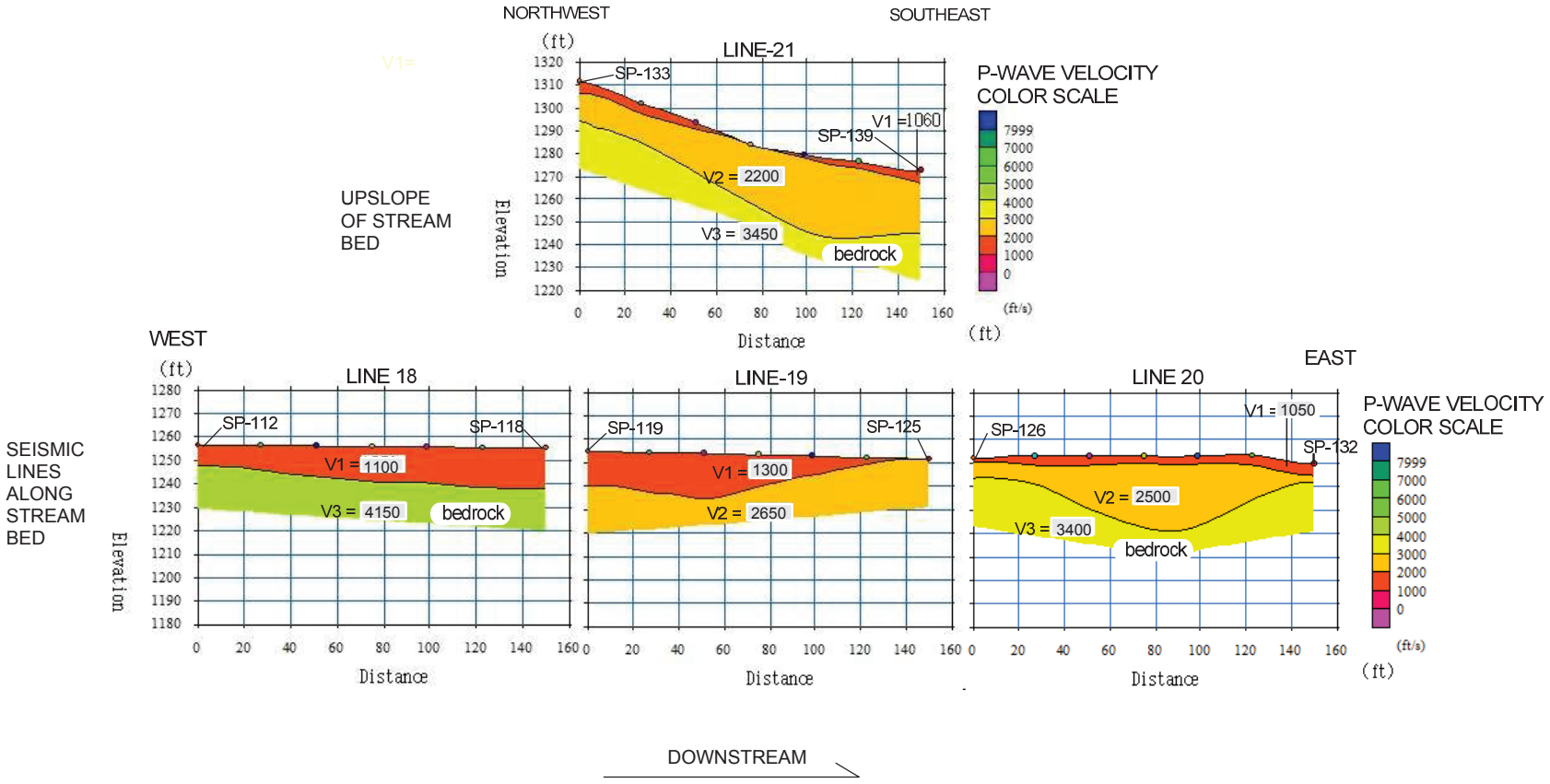
NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W HENRICH

APPROVED BY: WJH

PLATE 6




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

HORIZONTAL/VERTICAL SCALE: ONE INCH APPROX. EQUAL 50 FEET

NORCAL

SEISIMC REFRACTION PROFILES
LINES 18, 19, 20 AND 21

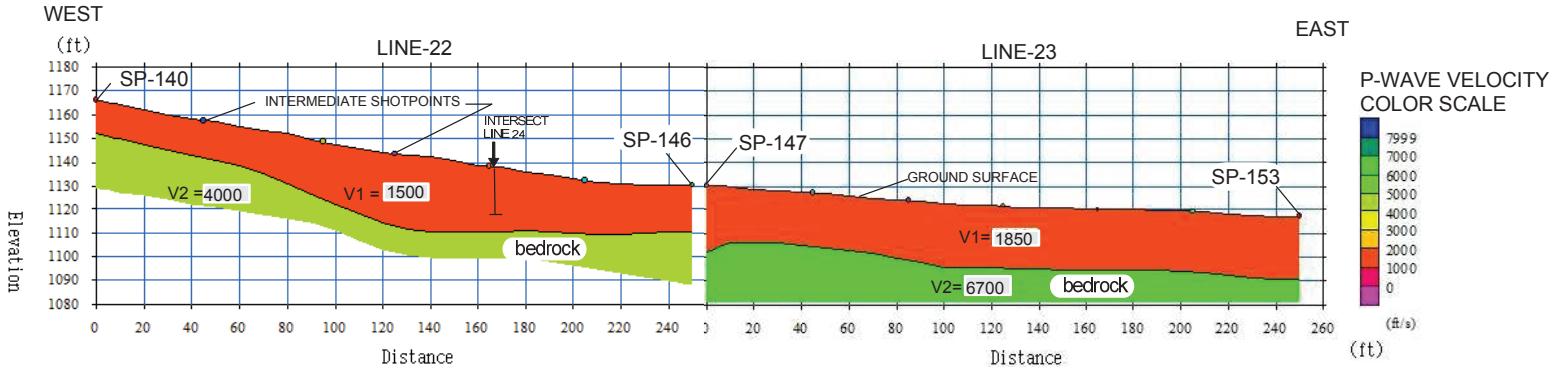
LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

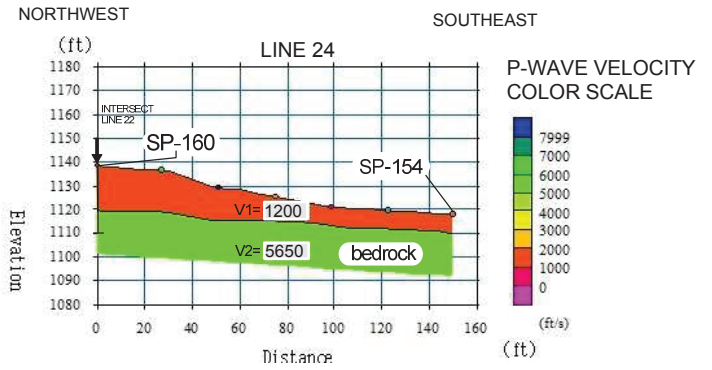
CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B | NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014 | DRAWN BY: W. HENRICH | APPROVED BY: WJH

PLATE 7




EXPLANATION

V2 = 7200 Velocity Layer in ft/sec

NORCAL

SEISIMC REFRACTION PROFILES
LINES-22, -23 and -24

LOCATION: PERMANENTE QUARRY, CUPERTINO, CA

CLIENT: GOLDER ASSOCIATES, INC

JOB #: 14-245.15B

NORCAL GEOPHYSICAL CONSULTANTS INC.

DATE: APRIL, 2014

DRAWN BY: W. HENRICH

APPROVED BY: WJH

PLATE 8

# Appendix A

# SEISMIC REFRACTION (SR)

# SEISMIC REFRACTION (SR)

## 1.0 METHODOLOGY

The seismic refraction method provides information regarding the seismic velocity structure of the subsurface. An impulsive (mechanical or explosive) source is used to produce compressional (P) wave seismic energy. The P-waves propagate into the earth and are refracted along interfaces caused by an increase in velocity. A portion of the P-wave energy is refracted back to the surface where it is detected by sensors (geophones) that are coupled to the ground surface in a collinear array (spread). The detected signals are recorded on a multi-channel seismograph and are analyzed to determine the shot point-to-geophone travel times. These data can be used along with the corresponding shot point-to-geophone distances to determine the depth, thickness, and velocity of subsurface seismic layers.

The seismic refraction technique is based on several assumptions. Paramount among these are that seismic velocity:

1) Increases with depth, and,
2) Is uniform within each layer over the length of the given spread.

In cases where these assumptions do not hold, the accuracy of the technique decreases. For example, if a low velocity layer occurs between two layers of higher velocity, the low velocity layer will not be detected and the depth to the underlying high velocity layer will be erroneously large. Also, if the velocity of a seismic layer varies laterally within a spread, those variations will be interpreted as fluctuations in the elevation of the underlying seismic layer.

## 2.0 DATA ACQUISITION/INSTRUMENTATION

Each SR line consisted of 24-geophones and 7-shot points distributed in a collinear array (spread). In most areas, the geophones were coupled to the ground surface by metal spike affixed to the bottom of each geophone case. In areas where the ground surface was too hard to penetrate (e.g. the road) the geophones were mounted on weighted pedestals that coupled them to the ground by their weight. The geophone intervals ranged from 3- to 10-ft depending on access. For each spread, the two end shot points were located one-geophone spacing beyond the end geophone at both ends of the spread. The remaining five shot points were evenly spaced along the spread. This distribution of shot points and geophones yielded total draped line lengths (end-geophone to end-geophone) ranging from 77- to 250-ft. The SR survey was designed to target the upper 15 to 50 feet of geologic material beneath each line, generally consisting of native soil, fill (mine waste) alluvium/stream deposits, weathered and un-weathered bedrock.

Data acquisition was initiated along each SR line by producing seismic energy using a mechanical source. Seismic energy was produced by impacting a metal strike plate on the ground surface with a 12-16 pound sledge hammer. The resulting seismic waveforms are recorded using a Geometrics ***Geode*** 24-channel engineering distributed array seismograph and Mark Products geophones with a natural frequency of 8-Hz. The seismic waveforms were digitized, processed and amplified by the Geode and transmitted via a ruggedized Ethernet cable to a field computer. There the data were archived for subsequent processing and displayed on the computers LCD screen in the form of seismograms. These were subsequently used to determine the time required for P-waves to travel from each shot point to each geophone in a given array (spread).

## 3.0 DATA ANALYSIS

The recorded seismic data were processed using the software package ***SeisImager*** which was written by Oyo Corporation (Japan) and distributed by Geometrics Inc. The first stage of seismic processing included compilation (7 shot points per line) and identification of first arriving P-wave energy. This process was conducted using ***Pickwin, Version 3.2.0.1*** (2004), which is part of the ***SeisImager*** package. A second interactive program ***Plotrefa, Version 2.8.0.1*** (2006) was used to assign geophone travel times, geophone/shot point surface elevations and velocity layer assignments to compute a 2D seismic velocity model based on these inputs. Example Time-Distance graph from a 7 shot point refraction line and inverted seismic layer model are presented in the following figures.

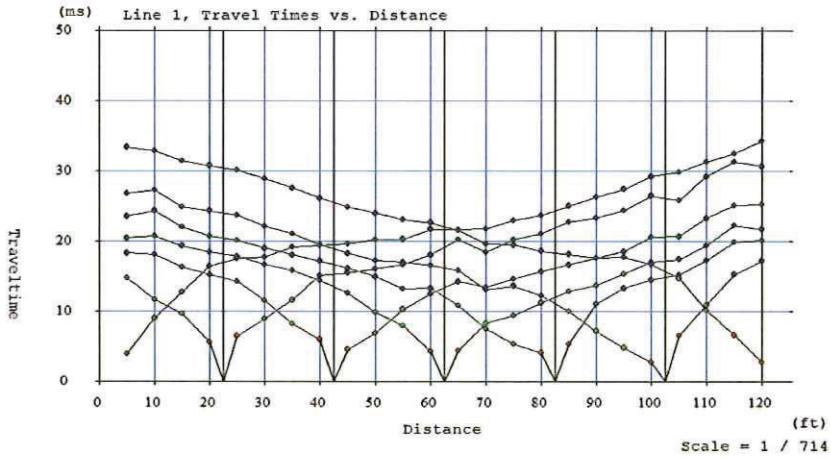



Figure 1 Example SR Time-Distance Graph, 24-geophones; 7 equal spaced shot points

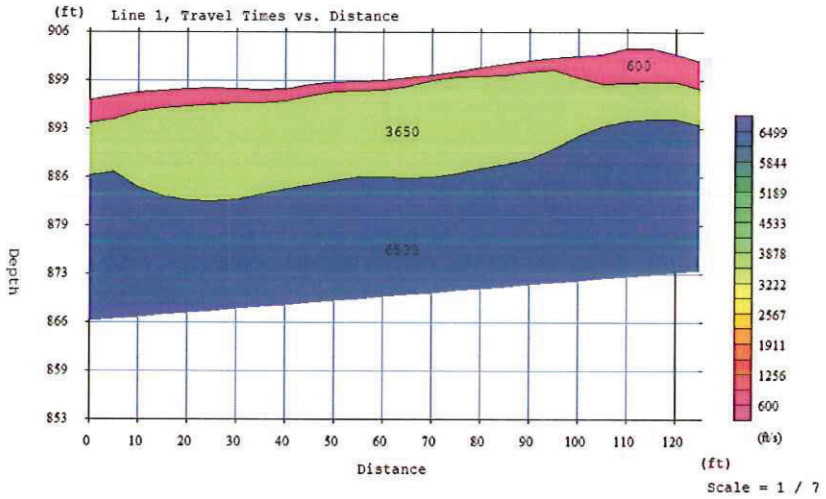



Figure 2 Time-Term Inverted Seismic Velocity Model

For this survey we have chosen an inversion routine that is based on the time-term method. The time-term method employs a combination of linear least squares and delay time analysis to invert the first arrivals into a velocity model. The model can consist of two or three velocity layers depending on the presence of significant line slopes that can be fitted to the first arrival times. Depths to the tops of the velocity layers are calculated below each geophone. For end and interior shot points the depths are extrapolated from the nearest geophone. This inversion as described above produces simplified velocity layers that, though generalized, will provide an adequate, useable characterization of the depth to bedrock.

## 4.0 LIMITATIONS

In general, there are limitations unique to the SR method. These limitations are primarily based on assumptions that are made by the data analysis routine. First, the data analysis routine assumes that the velocities along the length of each spread are uniform. If there are localized zones within each layer where the velocities are higher or lower than indicated, the analysis routine will interpret these zones as changes in the surface topography of the underlying layer. A zone of higher velocity material would be interpreted as a low in the surface of the underlying layer. Zones of lower velocity material would be interpreted as a high in the underlying layer.

Second, the data analysis routine assumes that the velocity of subsurface materials increase with depth. Therefore, if a layer exhibits velocities that are slower than those of the material above it, the slower layer will not be resolved. Also, a velocity layer may simply be too thin to be detected. Due to these and other limitations inherent to the SR method, the results of the SR survey should be considered only as approximations of the subsurface conditions. The actual conditions may vary locally. Other independent data (e.g., surface and borehole geology) should be integrated with SR data to enhance the subsurface interpretation.

# Appendix B

# MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

# MULTI-CHANNEL ANALYSIS OF SURFACE WAVES (MASW)

## 1.0 METHODOLOGY

When seismic energy is generated at or near the ground surface, seismic waves are produced. Those that travel along the ground surface are referred to as ground roll or surface waves. Those that propagate into the earth are referred to as body waves. When a vertical impact seismic energy source is used, the resulting surface waves account for more than two-thirds of the energy that is produced. As a result, surface waves are the most prominent signal on multi-channel seismic records. In addition, surface waves have dispersion properties that body waves lack. That is, different wavelengths have different penetration depths and, therefore, propagate at different velocities. This is referred to as dispersion. Since surface waves travel at 0.9 times the velocity of S-waves, it is possible to determine subsurface Vs by analyzing the dispersion of surface waves. Furthermore, since S-wave velocities are directly proportional to shear modulus, this provides a direct indication in the variation of stiffness (or rigidity) of subsurface materials.

Computer software and processing techniques developed by researchers at the University of Kansas have made it possible to analyze surface waves using a large number of shot points and geophones. This is referred to as multi-channel analysis of surface waves (MASW). Surface wave data are gathered in much the same way as high resolution seismic reflection data. Seismic energy generated by vertical impacts on the ground surface is detected by an array of closely spaced geophones (spread). The energy source and the geophones are sequentially moved along a profile as the survey progresses.

The data gathered from each shot point are analyzed to determine the variation in surface wave velocity versus frequency (dispersion curve). Computer software then inverts the dispersion curve to determine the variation in Vs versus depth. The data gathered from multiple shot points and geophone locations can be collated to produce a two dimensional (2D) cross-section showing the variation in Vs with depth and distance beneath a line.

## 2.0 DATA ACQUISITION/INSTRUMENTATION

Soundings MASW-9 and -10 each comprised an array of 24-geophones distributed at 3-ft intervals in a collinear array (spread). Seismic energy was produced at four shot points on each spread through multiple impacts with a 12-pound sledge hammer against a metal strike plate placed on the ground surface. The shot points were positioned at distances of 3- and 12-ft beyond the end geophones at both ends of each spread. The resulting seismic waveforms were recorded using a Geometrics ***Geode*** 24-channel distributed array seismograph and Oyo ***Geospace*** geophones with a natural frequency of 8-Hz. The seismograph was networked to a field computer where the data were displayed on a LCD screen for QA/QC review and archived for subsequent processing.

## 3.0 DATA ANALYSIS

The MASW data were processed using the software package ***SurfSeis 2.05*** which was developed by the Kansas Geological Survey. Using this software, the data acquired from each shot point were processed to develop an overtone display. This is a color contoured plot that depicts phase velocity as a function of frequency and signal amplitude. The overtone display serves as a guide in nominating the dispersion curve that is used by the inversion routine. However, prior to nominating the dispersion curve, the four overtones were merged into one in order to increase the signal to noise ratio and maximize the continuity of the display. The merged and enhanced overtone was then used as a guide in nominating the dispersion curve used in the inversion process. At the onset of the inversion routine the software created a 1D model comprising 10-layers. Starting values of depth, thickness, Vp, Vs and Poisson's ratio ($\alpha$) were assigned to each layer. The program then proceeded to refine the starting model through an iterative procedure in order to develop a 1D model that provided the best fit to the dispersion curve. In so doing, it was necessary that either Vp or $\alpha$ remain fixed during the inversion process. In this case, we opted to have $\alpha$ remain fixed, at a value of 0.4, so that the final model would provide the best indication of both Vp and Vs as a function of depth. The value of 0.4 was used for $\alpha$ because it is typical of most near surface earth materials.

# G5. Regional Hydraulic Geometry and Analogue Channel Assessment (Waterways Consulting, Inc., October 30, 2018)

# TECHNICAL MEMORANDUM - REVISED for 90% DESIGN

| | |
|---|---|
| *Prepared by:* | Waterways Consulting, Inc. |
| *Date:* | October 30, 2018 |
| *Re:* | Permanente Creek Restoration – Regional Hydraulic Geometry and Analogue Channel Assessment |

## Introduction

Waterways Consulting, Inc. (Waterways) is developing engineering drawings to restore portions of Permanente Creek that flow through the Permanente Quarry (Quarry) property and have been impacted by past mining activities. The proposed approach at two locations (the Rock Pile Area and Material Removal Area[1]) focuses on restoring the channel form to an approximation of the pre-mining channel geometry and providing suitable aquatic habitat for local species, including resident rainbow trout. The Quarry is situated on lands owned by Lehigh Hanson Heidelberg Cement Group on the east side of the Santa Cruz Mountains to the west of Cupertino. Quarry operations over the past century have resulted in significant channelization, the installation of numerous culverts and sedimentation basins, and considerable sediment inputs to Permanente Creek. The altered channel form and high sediment loads resulted in the degradation of the instream aquatic habitat.

The proposed restoration will remove overburden sediment and several culverts, rebuild the affected channel reaches, and restore impacted riparian and aquatic habitats. Restoring Permanente Creek at the Rock Pile and Material Removal Areas requires a complete reconstruction of the streambed. Consequently, there is a need to estimate the appropriate channel morphology to support the restoration design, including active channel widths, depths and pool geometries and spacing.

Regional curves, relating channel dimensions to drainage area, exist for the San Francisco Bay region (Dunne and Leopold 1978) (Figure 1). However, these curves are regional in nature, incorporating data from a range of landscape settings and channel morphologies. For example, channel geometries of the low gradient bottomlands of the Santa Clara Valley will vary from bedrock-controlled streams in the Santa Cruz Mountains that are higher gradient and more influenced by hillslope processes. Given that much of the proposed restoration activities are in higher gradient, confined reaches of Permanente Creek, the appropriateness of the regional curves can be improved by focusing the data on sites with a similar geomorphic setting. Focusing the dataset on sites in the Santa Cruz Mountains could greatly improve the use of the hydraulic geometry curves to constrain expected channel morphologies in the impacted reaches of Permanente Creek. Furthermore, field-based measurements of channel geometry within less impacted reaches of Permanente Creek and in adjacent watersheds that exhibit similar characteristics to Permanente Creek could both provide a test for and improve the quality of the developed relationships.

[1] Although the analogue study was developed to support design efforts for the Rockpile and Material Removal Areas of the Permanente Restoration Project, the results are applicable to other locations within the project area including Culverts #7 and #8 within the Channel Widening Area.

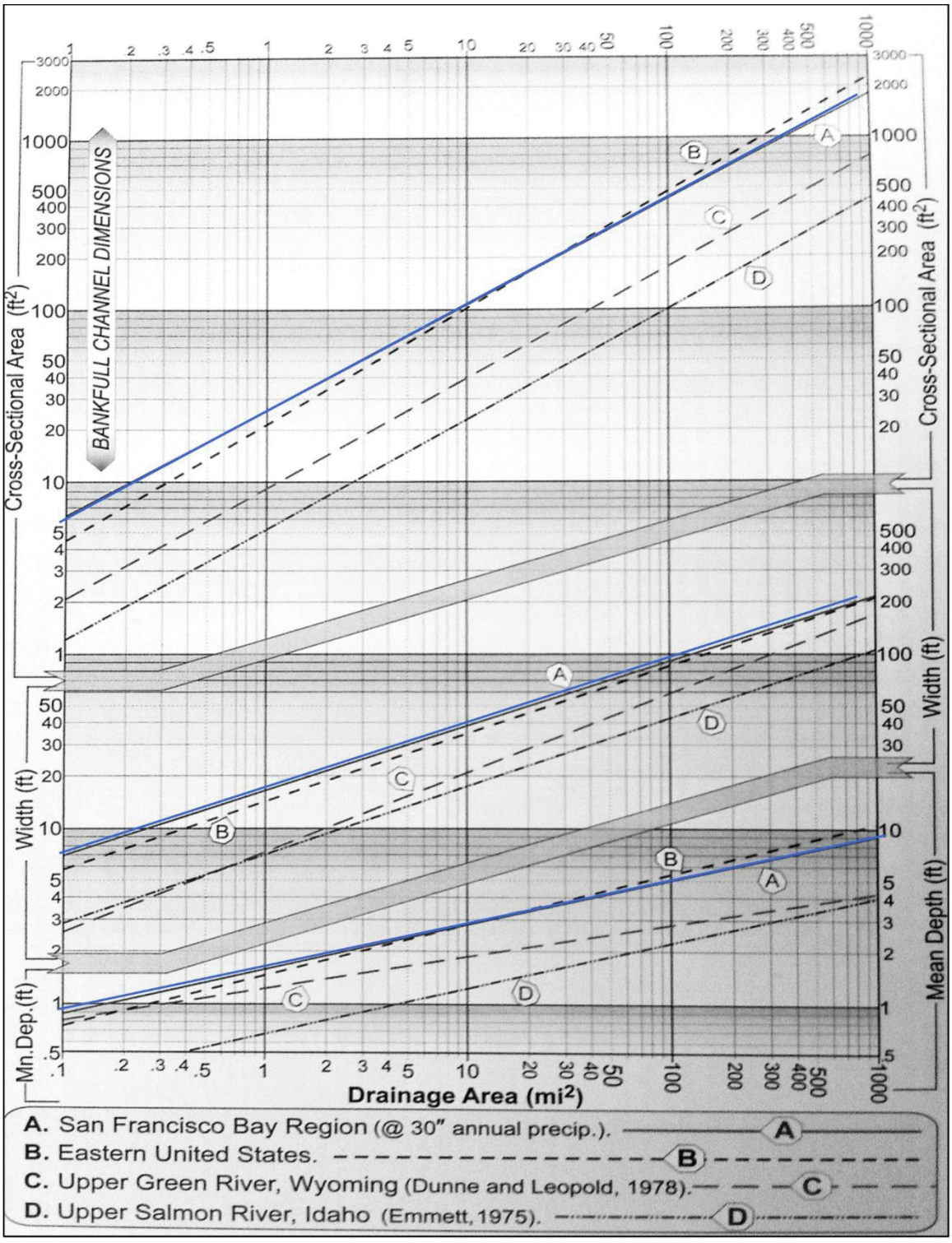



**Figure 1. Regional hydraulic geometry curves produced by Dunne and Leopold (1978) relating drainage area to bankfull depth, width and cross-sectional area. The blue lines highlight the regional curves for the San Francisco Bay Area.**

To create more site-specific curves, Waterways compiled data for the Santa Cruz Mountain sites that were included in the Dunne and Leopold (1978) curves for the San Francisco Bay region, surveyed two analogue stream channels close to the project area that were previously identified as having similar watershed and geomorphic characteristics as Permanente Creek (URS 2011)[2], and surveyed two segments of Reach 20 on Permanente Creek in what was considered a less impacted reach. These data were used to define reach-specific channel dimensions for the restoration effort. In addition, a longitudinal profile surveyed along portions of Permanente Creek where the channel morphology was determined to be more representative of natural conditions, was used to identify an appropriate size and spacing for pools to support the engineering design. This memorandum summarizes the findings of this work.

## Study Area

### *Santa Cruz Mountains*

The Santa Cruz Mountains have a complex geologic history, resulting in areas dominated by sandstone, limestone, igneous rocks (e.g., basalt), or metamorphic rocks (e.g., serpentine). The variable geologies result in different rates of erosion and the presence of different types of channel-forming sediment among streams that can be spatially close to each other. For example, Permanente Creek has abundant limestone that forms calcium carbonate precipitates that can bind rocks along the channel bed and banks. On the other hand, Stevens Creek is approximately one and one-half miles southeast of Permanente Creek and does not have limestone, and thus does not exhibit calcium carbonate precipitates.

Santa Cruz Mountain streams tend to be small headwater channels at the higher elevations and larger, alluvial streams at the lower elevations. The higher and mid-elevation streams generally flow through narrow valleys with steep hillslopes that restrict lateral channel movement. The steep hillslopes are susceptible to landslides and debris flows, especially following wildfire events. Entire reaches can be transformed during a debris flow and associated mudflow event. Debris flows can result in mobilization and deposition of sediment and debris across an entire valley bottom, leaving an aggraded valley consisting of an unsorted mix of materials. Subsequent high flows following a debris flow event reworks the aggraded material, with the active channel incising into the relatively uniform post-debris flow floodplain surface. Large roughness elements, including boulders and logs, become exposed as the channel incises into the debris flow surface, influencing the planform of the channel and providing local grade control for both the channel and floodplain. In higher gradient reaches, pools and riffles form in response to randomly spaced roughness elements. Along Permanente creek, debris flows prior to mining operations likely provided large wood and boulders that were incorporated into steep step-pool reaches and lower gradient riffle-pool reaches.

[2] The URS Plan was prepared to comply with the July 27, 1999 Cleanup and Abatement Order – 99-018 issued by the San Francisco Bay Regional Water Quality Control Board by preparation of a report that documented a field reconnaissance of Permanente Creek throughout the quarry facility identifying areas requiring stabilization, prioritizing stabilization activities at candidate sites, and preparing an implementation schedule.

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SANTA CRUZ, CA 95060
PH:(831)421-9291 // FAX:(888)819-6847
WWW.WATWAYS.COM

Map identifying the location of the surveyed reference reaches for Permanente Creek.

FIGURE

**2**

### *Field Sites*

Waterways reviewed the URS Plan and studied published literature on the Santa Cruz Mountains to determine suitable reference reaches for Permanente Creek. We determined that a reach along Swiss Creek and a reach along Corte Madera Creek were the most appropriate reference reaches for Permanente Creek (Figure 2 and Table 1). The URS Plan described Corte Madera Creek and Swiss Creek as similar in drainage area, slope, and valley shape to Permanente Creek. Both creeks are in the Santa Cruz Mountains, relatively close to Cupertino, with precipitation regimes similar to the Permanente Creek watershed. Corte Madera Creek flows west and Swiss Creek flows east through confined, steep stream valleys, constrained on both sides by steep hillslopes prone to mass wasting and debris flow events. Both reference reaches are bedrock-controlled with a step-pool channel pattern formed by large boulders and other recently delivered colluvial deposits. Swiss Creek exhibited calcium carbonate precipitates within the active channel, similar to the calcium carbonate formations identified in Permanente Creek. In addition to the reference reaches in adjacent watersheds, a less impacted reach (Reach 20) within Permanente Creek was chosen to further support development of regional hydraulic geometries in support of the engineering design effort.

**Table 1. Basin Characteristics for the Field Sites and Permanente Creek.**

| | Swiss Creek | Corte Madera Creek | Permanente Creek |
|---|---|---|---|
| **Average annual precipitation (in)** | 33.8 | 38.6 | 34.2 |
| **Mean basin elevation (ft)** | 1,842 | 1,917 | 1,957 |
| **Dominant geology** | limestone, sandstone | sandstone, shale | limestone, sandstone |
| **Dominant hillslope process** | landslide/debris flow | landslide/debris flow | landslide/debris flow |
| **Average channel slope (%)** | 10.72 | 8.39 | 3.4 - 13.85 |
| **Drainage area (sq. miles)** | 0.8 | 1.4 | 2.7 |

## Analysis Approach

To develop the regional hydraulic geometry relationships, information from the USGS streamflow gage database was compiled for streams in the Santa Cruz Mountains. The focus of this data mining effort was the 1.5-year[3] recurrence discharge because it approximates the channel forming, or bankfull, discharge (Dunne and Leopold, 1978). To evaluate the performance of the curve and provide data for smaller watersheds, which was missing from the USGS dataset, we collected field data from the two adjacent watersheds and within Reach 20 of Permanente Creek with a specific focus on measuring channel geometries at bankfull indicators that were identified in the field.

### *Hydraulic Geometry using existing USGS gage data*

Waterways identified 33 USGS stream gages in the Santa Cruz Mountains, but only 14 of the 33 had sufficient peak flow records to be used in the hydraulic geometry analysis (Table 2). Ideally the gage sites would be limited to the eastern Santa Cruz Mountains near Cupertino and Santa Clara. However, since there are a limited number of gages with sufficient data, the 14 gages Waterways assessed are

[3] Previous iterations of this study focused efforts on the 2-year event. Results of that effort identified disparities between the gage-based analysis and the field-based analysis with the field-based analysis consistently under predicted bankfull widths and depths. This suggested that field-based bankfull indicators occurred at a discharge approximating the 1.5-year event rather than the 2-year event. These results, combined with comments from the reviewers prompted us to redo the analysis with a focus on the 1.5-year event rather than the 2-year event.

**Table 2. USGS gage sites used to develop regional hydraulic geometry curves.**

| Site Name | Location | Period of Record | Drainage Area (sq. miles) | 1.5-Year Flood Discharge (Bankfull) (cfs) | Estimated Bankfull Width (feet) | Estimated Bankfull Cross Sectional Area (sq. feet) | Estimated Bankfull Depth (feet) |
|---|---|---|---|---|---|---|---|
| Llagas Cr above Chesbro Reservoir | 37.1483, -121.7672 | 1971-1982, 2004-2010 | 9.6 | 390 | 25.0 | 132.5 | 5.3 |
| Aptos Creek near Aptos | 37.0020, -121.9050 | 1972-1983 | 10.2 | 185 | 29.3 | 68.7 | 2.3 |
| San Lorenzo River near Boulder Creek | 37.2067, -122.1439 | 1969-1992, 1997 | 6.2 | 105 | 24.7 | 32.9 | 1.3 |
| Bear Creek at Boulder Creek | 37.1278, -122.1158 | 1978-1992, 1997 | 16.0 | 540 | 33.8 | 122.5 | 3.6 |
| Boulder Creek at Boulder Creek | 37.1267, -122.1217 | 1977-1992, 1997 | 11.3 | 680 | 47.4 | 305.2 | 6.4 |
| Zayante Creek at Zayante | 37.0861, -122.0458 | 1958-1992, 1997 | 11.1 | 480 | 28.0 | 103.0 | 3.7 |
| San Lorenzo River at Big Trees | 37.0444, -122.0714 | 1937-2017 | 106.0 | 3700 | 87.5 | 682.0 | 7.8 |
| Carbonera Creek at Scotts Valley | 37.0506, -122.0125 | 1985-2007 | 3.6 | 505 | 26.5 | 117.4 | 4.4 |
| Scott Creek above Little Creek | 37.0642, -122.2283 | 1937-1941, 1959-1973, 1982 | 25.1 | 600 | 43.5 | 145.0 | 3.3 |
| Pescadero Creek near Pescadero | 37.2608, -122.3278 | 1952-2017 | 45.9 | 1350 | 53.0 | 291.5 | 5.5 |
| San Gregorio Creek at San Gregorio | 37.3258, -122.3856 | 1955, 1970-2017 | 50.9 | 1900 | 61.5 | 402.5 | 6.5 |
| Pilarcitos Creek at Half Moon Bay | 37.4666, -122.4331 | 1967-2017 | 27.8 | 450 | 33.0 | 139.0 | 4.2 |
| Redwood Creek at Redwood City | 37.4494, -122.2325 | 1960-1997 | 1.8 | 170 | 13.0 | 41.5 | 3.2 |
| San Franciscquito Creek at Stanford University | 37.4233, -122.1883 | 1931-1941, 1951-2017 | 37.4 | 1000 | 45.5 | 198.5 | 4.4 |
| Saratoga Creek at Saratoga | 37.2544, -122.0383 | 1934-2017 | 9.2 | 255 | 25.6 | 40.2 | 1.6 |

located throughout the eastern and western Santa Cruz Mountains. Despite the slightly wider than ideal geographic range, our gage analysis improves upon the current regional analyses by focusing on a smaller area and limiting gage sites to the Santa Cruz Mountains.

Waterways compiled the existing information available at each of the selected gaging sites, including drainage area, discharge, field measurements of channel width and cross-sectional area, and local channel slope near the gage. We imported the discharge data into HEC-SSP (U.S. Army Corps of Engineers 2010) and developed flood frequency curves (USGS, Bulletin 17b, 1982) for each gage site to estimate the 1.5-year recurrence interval discharge. We then reviewed measurements of channel width and cross-sectional area at each gage site to find measurements that were taken during a high flow event that approximated the 1.5-year recurrence interval discharge. Four of the gaging sites did not have channel width and cross-sectional area data recorded during a 1.5-year event, so we extrapolated based on the available data. We then estimated bankfull depth at each gage site by dividing channel

cross-sectional area by channel width. Banfull width, bankfull depth, and the 1.5-year flood discharge were plotted separately against drainage area. One outlier was identified and removed from the study.

## *Analogue Site Assessment*

Waterways surveyed a 200-foot reach of Corte Madera Creek, located downstream of the Alpine Road Trail culvert, a 171-foot reach of Swiss Creek, located approximately 500 feet upstream from the Peacock Court bridge, and two segments within Reach 20 of Permanente Creek totaling over 300 feet of channel. We chose reach locations that were beyond the influence of instream structures (e.g., culverts, bridges) and were representative of conditions within the reach. We used an auto-level to survey four channel cross section profiles at Corte Madera Creek, three channel cross section profiles at Swiss Creek, two sets of three channel cross-section profiles at Permanente Creek and a longitudinal profile at all four sites. Each channel cross section profile included the expanse of the valley floor and the identification of significant geomorphic features using field indicators, such as bankfull. In most cases, the field indicator used to estimate the bankfull width and depth was the base of mature trees.

Using the survey data, Waterways calculated the bankfull channel width and plotted each cross section to calculate their cross-sectional areas. We then divided each cross-sectional area by the surveyed bankfull width to determine average bankfull depth. We estimated drainage area for each field site using StreamStats (USGS 2012) and calculated channel slopes using the surveyed longitudinal profiles. Channel widths and hydraulic depths were determined for each cross-section and then averaged for each reach, or reach segment, to obtain a single channel width and depth for each creek at the estimated bankfull discharge. Two separate segments were surveyed in Reach 20 of Permanente Creek to identify differences in channel geometry based on differences in local channel slope with one segment having a local channel slope of 4.6% and the other a local channel slope of 8.2%.

## *Hydraulic Geometry Analysis*

Waterway combined the USGS gage site data with the field survey data to determine trends in channel geometry as a function of drainage area. We developed relationships between drainage area and bankfull width, bankfull depth, and the 1.5-year recurrence interval discharge. Trend lines were fit to the data to provide a predictive tool to estimate these parameters at specific restoration sites, most specifically the Rock Pile and Material Removal Areas (Figures 3, 4, and 5). Using the equation for each trend line, we solved for the predicted channel width and depth for specific restoration areas within Permanente Creek based on a drainage area of 2.7 square miles (Culverts 7 and 8), 2.54 square miles (Rock Pile), and 2.02 square miles (Material Removal Area). Table 3 summarizes the results of this analysis.

**Table 3. Channel Dimensions Calculated Using Hydraulic Geometry Relationships**

| Project Site | Drainage Area ($mi^2$) | Predicted Bankfull Width (ft) | Predicted Bankfull Depth (ft) | Cross Sectional Area ($ft^2$) |
|---|---|---|---|---|
| Culvert 7 | 2.70 | 17.9 | 2.3 | 31 |
| Culvert 8 | 2.70 | 17.9 | 2.3 | 31 |
| Rock Pile | 2.54 | 17.5 | 2.3 | 29 |
| Material Removal Area | 2.02 | 16.0 | 2.1 | 25 |

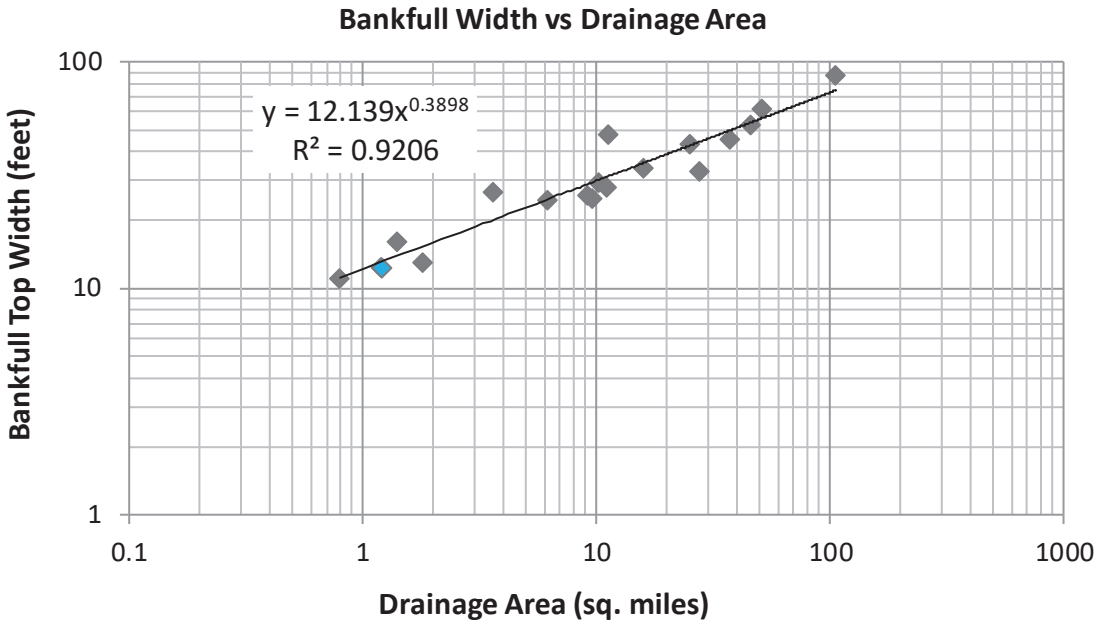


**Figure 3. Bankfull Top Width as a Function of Drainage Area for the Santa Cruz Mountains. The blue marker represents the sites on Permanente Creek in Reach 20.**

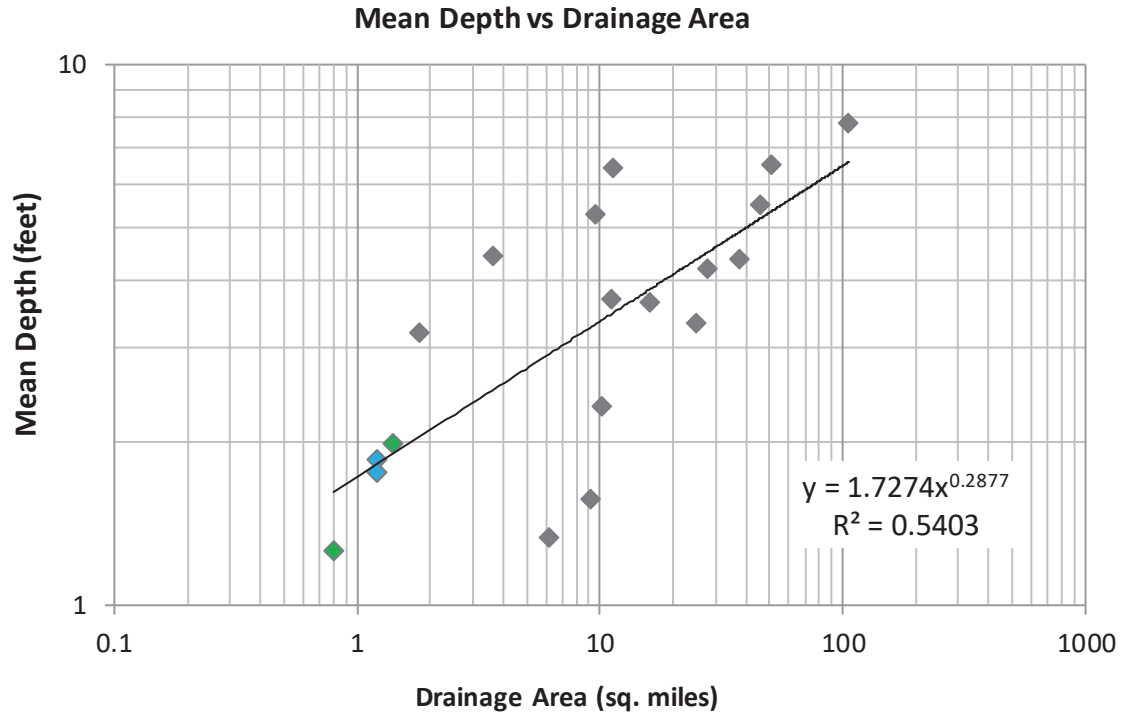


**Figure 4. Bankfull Depth as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.**

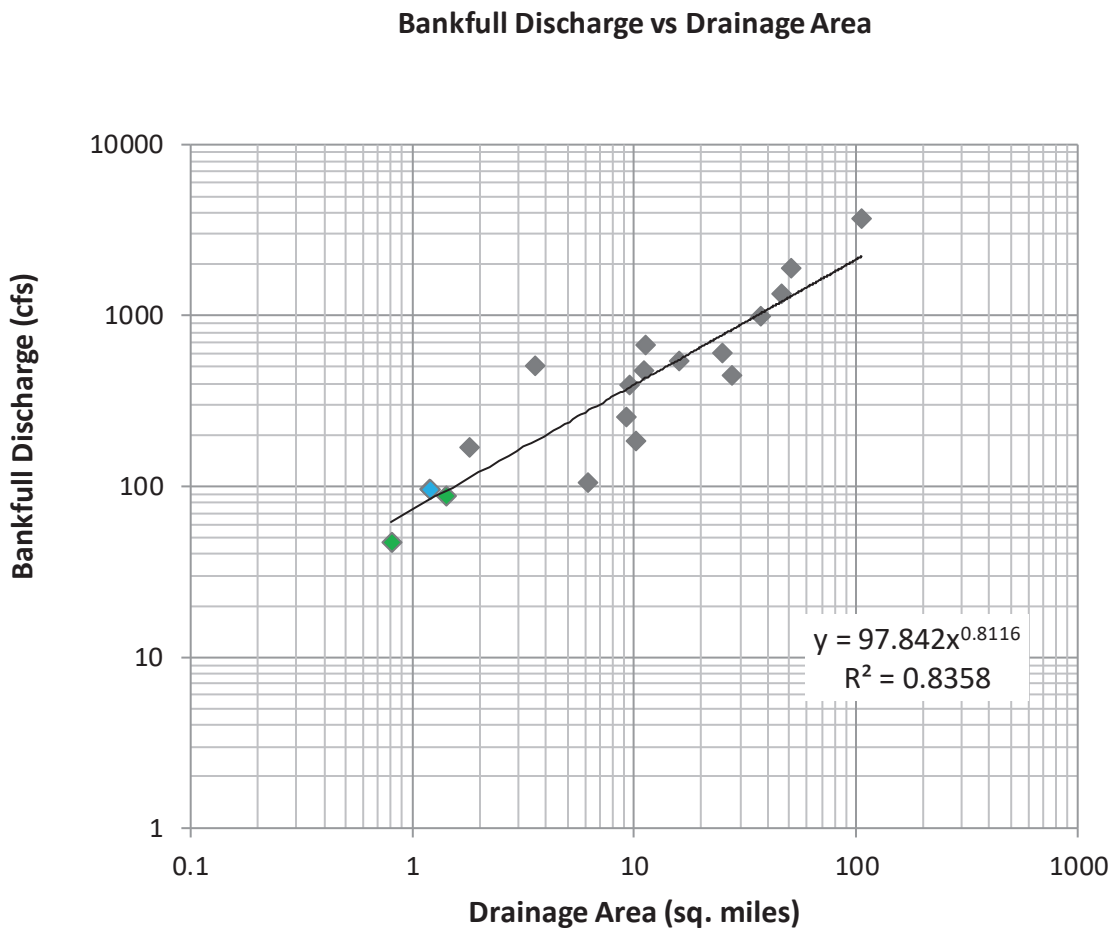


**Figure 5. Bankfull Discharge as a Function of Drainage Area for the Santa Cruz Mountains. The green data points are Swiss and Corte Madera Creeks. The blue data points are the sites on Permanente Creek.**

## *Pool Geometry*

An important design parameter for reach-scale restoration of Permanente Creek is pool length and pool spacing. Despite the legacy of impacts to Permanente Creek, it was determined that several reaches (R14-R16 and R20-R21) continued to exhibit naturally formed pool and riffle geometries that encompass a range of channel slopes. These conditions provided an opportunity to measure pool and riffle geometries, locally, to support the design effort, rather than measuring those parameters in other adjacent watersheds which may lack specific characteristics found in Permanente Creek such as the prevalence of calcium carbonate precipitates. Given the inherent variability in pool geometries associated with the debris flow morphology of the channel, it was important to collect data along entire reaches and summarize the information to convey averages and ranges of natural conditions. To convey the range of natural variability, longitudinal profile data was collected along the entire length of the identified reaches within Permanente Creek to calculate pool length and spacing in relation to reach-

scale channel gradients (Table 4). These data were then used to calculate pool statistics for each site-specific restoration area.

**Table 4. Statistics on Pool Length, Depth and Spacing (in feet) By Reach of Permanente Creek.**

| Reach # | Reach Avg Slope | Avg Pool Length (ft) | Median Pool Length (ft) | St. Dev Pool Length (ft) | Avg Pool Depth (ft) | Median Pool Depth (ft) | St. Dev Pool Depth (ft) | Avg Pool Spacing (ft) | Median Pool Spacing (ft) | St. Dev Pool Spacing (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| **21** | 5.1% | 13.6 | 11.6 | 6.3 | 0.6 | 0.6 | 0.3 | 211 | 150 | 212 |
| **20** | 5.2% | 11.4 | 11.0 | 4.1 | 0.9 | 1.0 | 0.4 | 106 | 92 | 57 |
| **16** | 7.1% | 15.4 | 14.4 | 6.1 | 0.8 | 0.8 | 0.4 | 76 | 65 | 69 |
| **15** | 11.6% | 10.5 | 9.4 | 2.5 | 0.7 | 0.7 | 0.4 | 58 | 39 | 50 |
| **14** | 6.4% | 8.8 | 8.0 | 3.8 | 0.6 | 0.6 | 0.3 | 31 | 19 | 27 |
| | **4-8% Reaches** | **12.0** | **10.3** | **5.7** | **0.7** | **0.7** | **0.4** | **94** | **55** | **124** |
| | **8-12% Reaches** | **10.5** | **9.4** | **2.5** | **0.7** | **0.7** | **0.4** | **58** | **31** | **50** |

## Results/Discussion

Dunne and Leopold's (1978) regional curves provide a predictive tool to estimate bankfull channel dimensions for Permanente Creek. Use of the Dunne and Leopold regional curves for the entire Bay Area estimated a bankfull width for the Permanente project area of approximately 17 to 25 feet and a bankfull depth of approximately 1.5 to 2.0 feet. Because these curves are regional and include a significant number of gage locations that are in a geomorphic setting that are different from the project area, regional curves that are more specific to the Permanente Creek project area were developed. Utilizing the more focused data set, which includes the USGS sites within the Santa Cruz Mountains and the field-based assessments sites on Permanente, Corte Madera and Swiss Creek, the curves predicted a bankfull width of 17.9 feet for Culverts 7 and 8, 17.5 feet for the Rock Pile Area, and 16.0 feet for the Material Removal Area and a bankfull depth of approximately 2.3 feet for Culverts 7 and 8, 2.3 feet for the Rock Pile Area and 2.1 feet for the Material Removal Area prior to mining-related impacts (Table 3). As expected, the Dunne and Leopold (1978) curves describe a wider and flatter channel, most likely due to the inclusion of lower gradient, unconfined, alluvial channels in the analysis. Table 5 includes ranges of bankfull channel dimensions for the areas where the channel will be reconstructed to provide for some variability and flexibility during construction since large non-uniform materials will be used in channel construction.

Measured channel slopes for Corte Madera and Swiss Creek, 8.4% and 10.7% respectively, are in the range of the design slopes at the Rock Pile and Material Removal Areas along Permanente Creek. Field observations of a step-pool channel morphology at these channel gradients suggest that Permanente Creek likely had a step-pool channel pattern in the steeper reaches prior to mining. This is supported by

the observed conditions in the reaches of Permanente Creek that were identified as having pool and riffle geometry that were representative of natural conditions.

The pool analysis, utilizing the surveyed longitudinal profiles along the more intact reaches of Permanente Creek, suggest that there is an inverse relationship between pool length and spacing relative to channel gradient (Table 4). Furthermore, lower gradient reaches exhibit higher overall pool length and spacing variability than higher gradient reaches. This supports the idea that higher gradient reaches (>8% channel slope) are more characterized by a step-pool morphology, whereas lower gradient reaches (4% to 8% channel slope) exhibit more of a pool-riffle morphology. Pool depth was fairly consistent across all of the evaluated reaches with pools ranging between 0.5 and 2 feet, independent of channel slope. This is likely due to the fact that pool depth may be more a function of the presence of localized roughness elements, and the fact that there are limited opportunities to scour deeper pools due to the composition of the bed material and associated natural armoring.

**Table 5. Proposed Channel Dimensions for Constructed Reaches**

| Project Site | Design Slope (%) | Design Slope Range (%) | Proposed Bankfull Width Min (ft) | Proposed Bankfull Width Max (ft) | Proposed Bankfull Depth Min (ft) | Proposed Bankfull Depth Max (ft) | Cross Sectional Area Min ($ft^2$) | Cross Sectional Area Max ($ft^2$) |
|---|---|---|---|---|---|---|---|---|
| **Culvert 7** | 4.3% | 4%-8% | 16.5 | 20.5 | 2.1 | 2.5 | 28.2 | 34.2 |
| **Culvert 8** | 2.7% | <4% | 18.0 | 22.0 | 1.9 | 2.3 | 28.2 | 34.2 |
| **Rock Pile Area** | Varies | <4% | 17.5 | 21.5 | 1.8 | 2.2 | 26.9 | 32.9 |
| | | 4%-8% | 16.0 | 20.0 | 2.0 | 2.4 | | |
| | | >8% | 15.5 | 18.5 | 2.4 | 2.8 | | |
| **Material Removal Area** | Varies | <4% | 16.0 | 20.0 | 1.7 | 2.1 | 22.5 | 28.5 |
| | | 4%-8% | 14.5 | 18.5 | 1.9 | 2.3 | | |
| | | >8% | 14.0 | 17.0 | 2.3 | 2.7 | | |

## References

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# G6. Stability Analysis – Draft (Stantec, August 26, 2022)

Stantec

# Memo

| | | | |
|---|---|---|---|
| To: | Carolina Addison<br>Lehigh Permanente | From: | Paul Kos<br>Denver |
| Project/File: | 233001622 | Date: | August 26, 2022 |

**Reference: PCRP Stability Analysis- DRAFT**

## INTRODUCTION

Lehigh Southwest Cement Company (Lehigh), a subsidiary of Lehigh Hanson, Inc., engaged Stantec Consulting Services Inc. (Stantec) to provide professional engineering services for geotechnical analysis related to proposed grading associated with the Permanente Creek Restoration Project (PCRP) at the Permanente Facility in Cupertino, California. An element of the PCRP involves removing material from the creek corridor and adjacent slopes. The PCRP design and grading plans are presented in the associated report prepared by Waterways (90% Designs, dated August 26, 2022). The grading plans were provided to Stantec by Waterways, and Stantec performed geotechnical analyses of the proposed slopes in support of the environmental review and subsequent permit applications.

This PCRP Stability Analysis has been prepared to assist Lehigh with upcoming environmental review and subsequent permit applications to relevant regulatory agencies. This report documents the results of static and pseudo-static slope stability analyses of the reclamation surface. The report does not contain the creek restoration design details and shall be reviewed in conjunction with Waterways' 90% Designs.

## BACKGROUND

The Permanente Facility is a limestone and aggregate mining operation, active since the late 1930's, in the unincorporated foothills of western Santa Clara County, approximately two miles west of the City of Cupertino, California. The Quarry occupies a portion of a 3,510-acre property (Permanente Property) owned by Hanson Permanente Cement, Inc. and operated by Lehigh.

The Permanente Property is situated in the rugged foothills along the eastern side of the Santa Cruz Mountains segment of the California Coast Ranges. This area of the Coast Ranges is characterized by moderately to steeply sloping hillsides ranging from approximately 500 to 2,000 feet (ft) above mean sea level (AMSL). The eastern side of the range is incised with eastern flowing drainages, including the Permanente Creek Drainage Basin, which flows through the central part of the Permanente Property, and flows through the Cities of Los Altos and Mountain View and into Mountain View Slough or Stevens Creek through the Stevens Creek Diversion Channel operated by the Santa Clara Valley Water District, which ultimately can reach the San Francisco Bay.

## GEOLOGIC SETTING

The geology in the project area is complex due to the faulting and deformation associated with the Franciscan Complex. This geologic unit consists of faulted limestone and metabasalts (greenstone) and also contains basalt, diorite, shale, sandstone, chert, greywacke, and schist. Structure in the area includes numerous low- and high-angle faults. Low-angle faults separate limestone units from greenstone units and

tend to follow the limestone bedding planes and typically dip to the southeast at 10° to 40°. High-angle faults, including the regional Berrocal Fault, are typically oriented in the northwest-southeast direction and dip at greater than 60°. The geology has been mapped several times by different geologists, and numerous drilling programs have been conducted. The results of these previous studies on the geologic units, structure, and interpretation were included in previous submittals (Golder 2011 and Foruria 2004).

## PREVIOUS GEOTECHNICAL EVALUATIONS

The geologic and geotechnical properties of the rocks present at the Permanente Quarry have been evaluated several times by several companies. Each investigation included drilling, laboratory testing, assessment of strength parameters for the various rock types encountered, and slope stability calculations. The rock strength parameters were based on laboratory data, rock mass rating (RMR) calculations, and back-analysis of landslide areas. The strength parameters for soil, greenstone overburden, and limestone have been consistent through multiple geotechnical analyses performed by multiple consultants, and these values are listed in Table 1. The strength parameters for greenstone vary significantly depending on the condition of the bedrock and particularly, the amount of weathering and shearing, and lower-bound values have historically been used for design purposes to be conservative. These lower-bound values are based on back-analysis of the Main Slide in the North Quarry. Laboratory data suggest the in-place greenstone may have significantly higher strength, particularly at depths greater than approximately 50 feet, where the bedrock has not been weathered. Site observations also suggest that greenstone strengths are often under-reported as several areas of the highwall are constructed in weathered greenstone, and these areas have maintained their integrity with 50-foot high benches with face angles of 60° to 70° (Golder 2011).

**Table 1: Historic Rock Strength Summary**

| Material | Unit Weight (pcf) | Cohesion (psf) | Φ' (°) |
|---|---|---|---|
| Limestone | 165 | 12,500 | 30 |
| Greenstone | 155-165 | 1,400-1,880 | 19-23 |
| Fault | 155 | 0 | 20 |
| Slide Debris | 135 | 0-700 | 20-23 |
| Greenstone Overburden | 125 | 0 | 35 |
| Soil | 120 | 200 | 30 |

## GEOTECHNICAL STABILITY EVALUATION

The slope stability analyses were modeled using the software Slide2 Modeler version 9 by rocscience, released in 2020. The software used limit equilibrium on slices of potential failure surface to calculate factor of safety (FoS). The models were evaluated under static and pseudo-static conditions, with horizontal ground acceleration, for the designed ramp configuration provided by the site using the Spencer method. The minimum FoS for each model evaluation is included in this report. The two types of analysis have been summarized in Table 2. The minimum acceptable factors of safety for the analyses are 1.3 for static conditions and 1.0 for pseudo-static conditions based on mining industry standards. For the pseudo-static model conditions, a horizontal seismic coefficient of 0.15 times the force of gravity (g) was applied to the

static condition models to be consistent with previous studies and to follow recommendations for earthquakes with magnitudes up to 8.25 (Golder 2011). To evaluate the slope stabilities, cross-sections were analyzed for the reclamation surface.

**Table 2: Stability Analyses**

| Analysis Type | Description | Minimum Acceptable Factor of Safety |
|---|---|---|
| Static Analysis | A limit equilibrium method of analysis which satisfies moment and force equilibrium to solve a slope stability problem. The output is a single FoS for the potential failure surface with the lowest FoS. | 1.3 |
| Pseudo-static Analysis | A limit equilibrium method of analysis which represents the effects of earthquake shaking by accelerations that create inertial forces. This is the simplest way to analyze the dynamic effects of earthquake loading of a soil or slope. The output is a single FoS for the potential failure surface with the lowest FoS. | 1.0 |

Site specific geotechnical information is available for each rock type on the property, and strength parameters for the material have been established in previous geotechnical analyses (Golder 2011). These strength parameters are based on laboratory testing, back-calculation, and published values for soil properties. These strength parameters are listed in Table 3.

**Table 3: Geotechnical Strength Parameters**

| Material | Unit Weight (pcf) | Cohesion (psf) | Phi' (Degrees) |
|---|---|---|---|
| Greenstone (Weathered) | 165 | 1,800 | 27 |
| Greenstone (Unweathered) | 165 | 12,500 | 30 |
| Limestone | 165 | 12,500 | 30 |

As previously discussed, the greenstone strengths can vary significantly depending on the degree of weathering, and Stantec focused on evaluating the greenstone strengths as part of this geotechnical investigation. The greenstone strengths were re-evaluated based on RMR classifications. The historic greenstone strength ($\phi$'=27° and cohesion=1,800 pounds per square foot [psf]) is suitable for areas that have been weathered and are near the surface. A stronger strength for greenstone is expected for bedrock at depths greater than 50 feet from the surface, which is "beyond" the surficial weathered zone. While this transition to competent bedrock has been demonstrated by drilling, Stantec has used the weathered greenstone strength values for all depths to be conservative. Similarly, there are likely areas with limestone

that would exhibit greater strengths, and these have also not been included in the geotechnical analyses to be conservative.

Stability analyses are focused on areas with greater excavation volumes, particularly the rock pile removal area (Section A) and the 1250 Pond area (Sections C and E); the cross-sections modeled align with Waterway's sections and Waterway's naming conventions have been retained for clarity between the reports. Stantec modelled multiple cross-sections in the Pond 1250 area to evaluate the stability under different slope configurations and excavation depths. The cross-sections extend to the top of the surrounding slopes to evaluate any impacts that the grading may have on the global stability. Stantec adjusted the limits of the analyses to evaluate both the global slope stability and the stability in the area immediately adjacent to the PCRP grading.

The configurations modeled as part of this analysis exceed the minimum acceptable factor of safety, as defined in Table 3. Generally, the elevated geotechnical stability results are from the shallow cut slopes associated with the PCRP grading plan. Results from the stability analyses are shown in Table 4. Printouts of the slope stability sections are attached.

**Table 4: Geotechnical Stability Analyses Results**

| Analysis Area | Analysis method | Section A | Section C | Section E |
|---|---|---|---|---|
| Cut Slope | Static | 1.8 | 3.0 | 2.3 |
| | Pseudo-Static | 1.7 | 2.8 | 2.2 |
| Global Slope | Static | 1.5 | 2.8 | 1.5 |
| | Pseudo-Static | 1.5 | 2.7 | 1.4 |

## CLOSURE

This report provides the analysis and supporting information needed to demonstrate that Lehigh Southwest Cement Company's plan for the PCRP meets design and performance requirements under static and seismic conditions. The PCRP will be excavated so that stable slopes remain. As mutual protection to Lehigh, the public, and Stantec, this report was submitted for exclusive use by Lehigh Southwest Cement Company. Our report and recommendations should not be reproduced in whole or in part without the supporting Waterways 90% Design report and our express written permission, other than as required in relation to agency review and submittals. A draft of this report was reviewed by personnel from Lehigh Southwest Cement Company.

Regards,

**STANTEC CONSULTING SERVICES INC.**

**Reference: PCRP Stability Analysis**

**Paul Kos** P.E.
Senior Geological Engineer
Mobile: 303-570-9163
paul.kos@stantec.com

Attachment: Stability Model Reports

Stantec

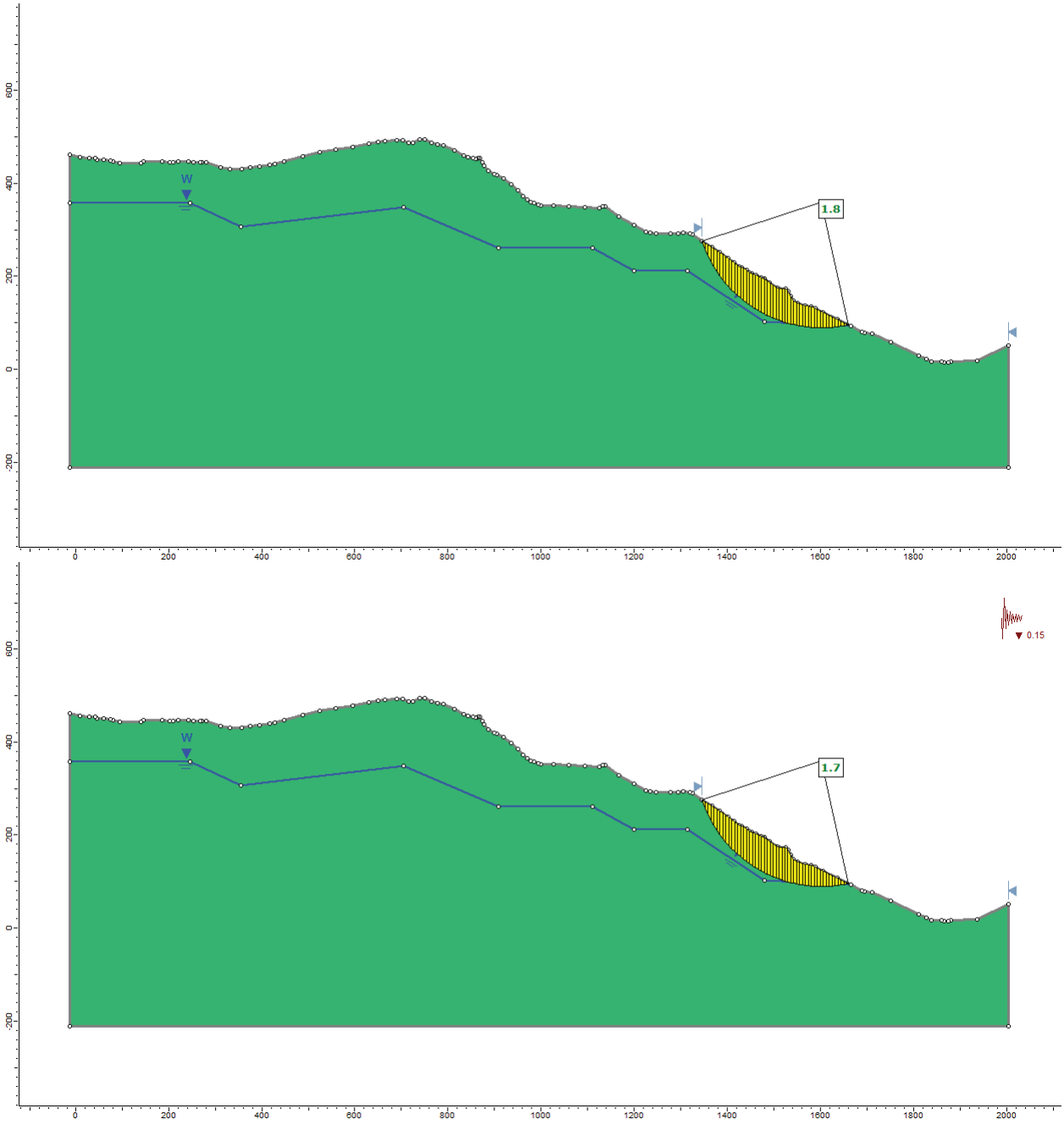
# Memo

## Attachment A

## Stability Model Reports

Design with community in mind

## SECTION A (Rock Pile Removal Area)

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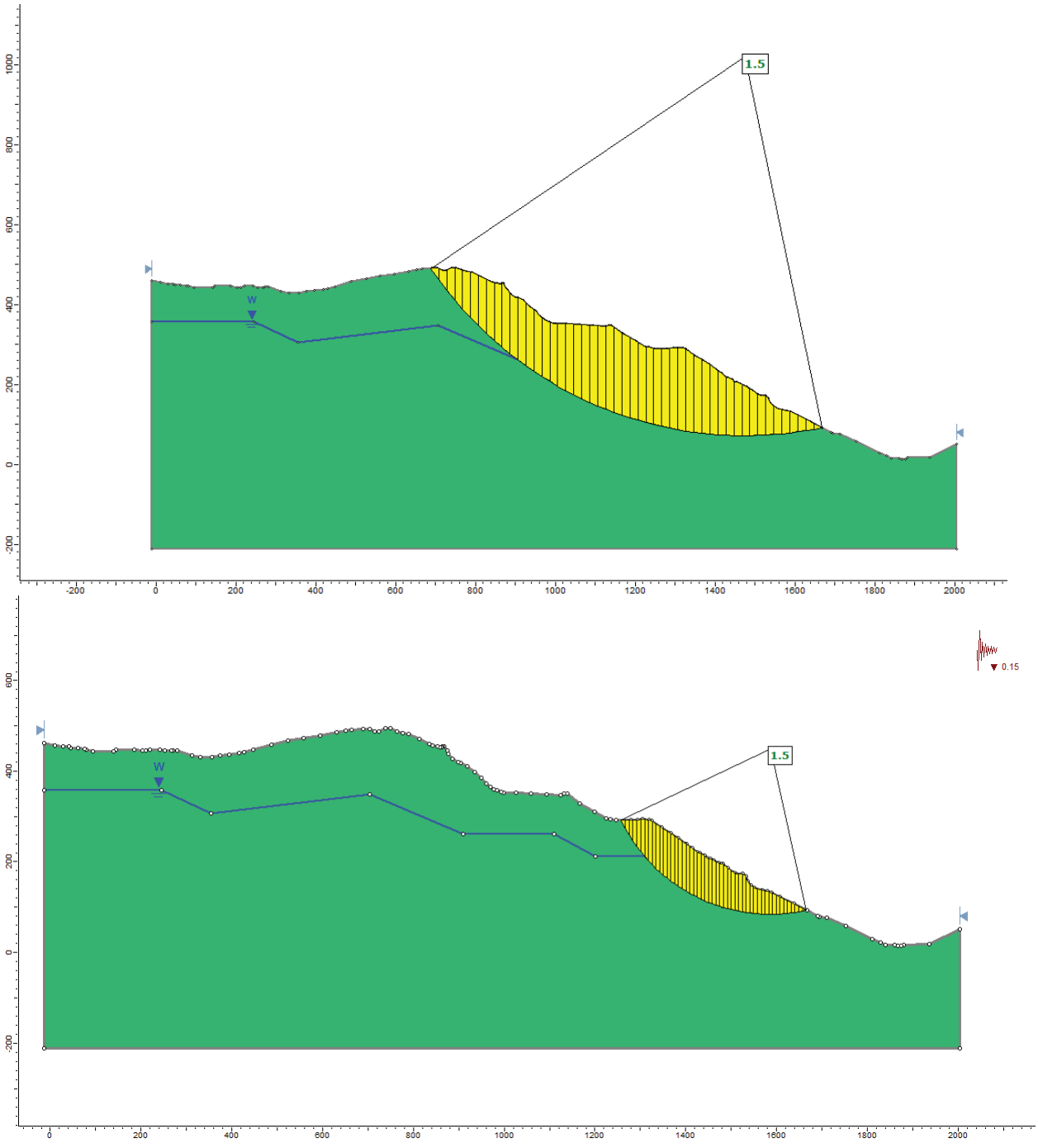


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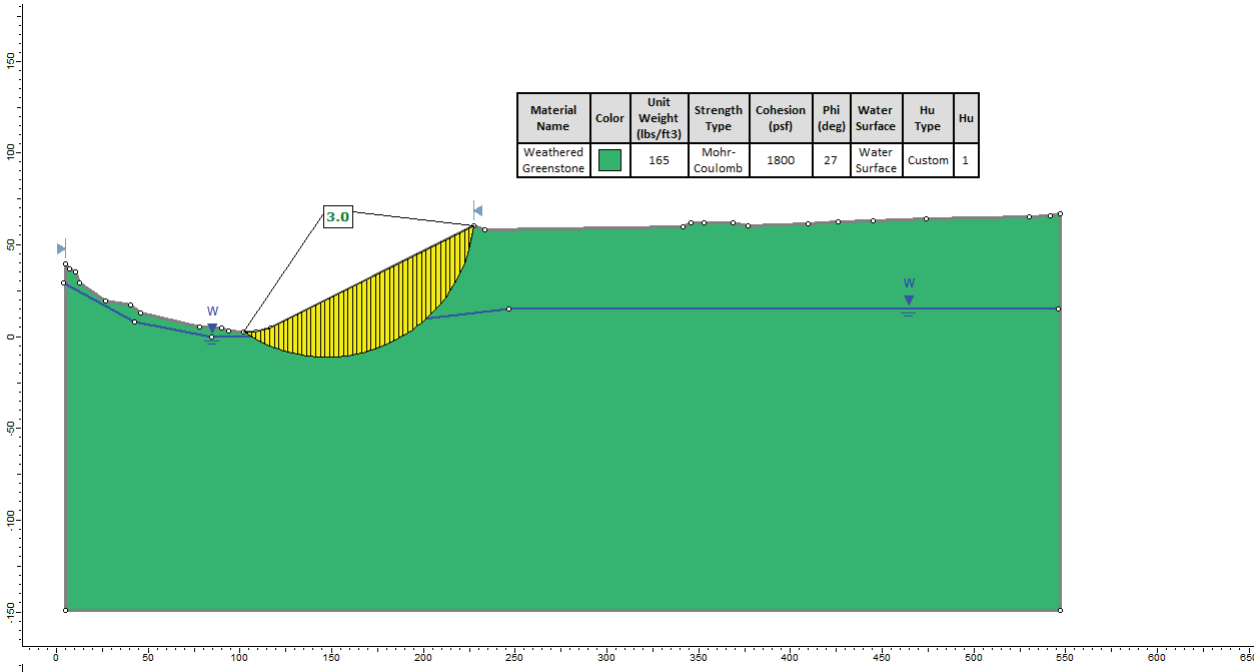
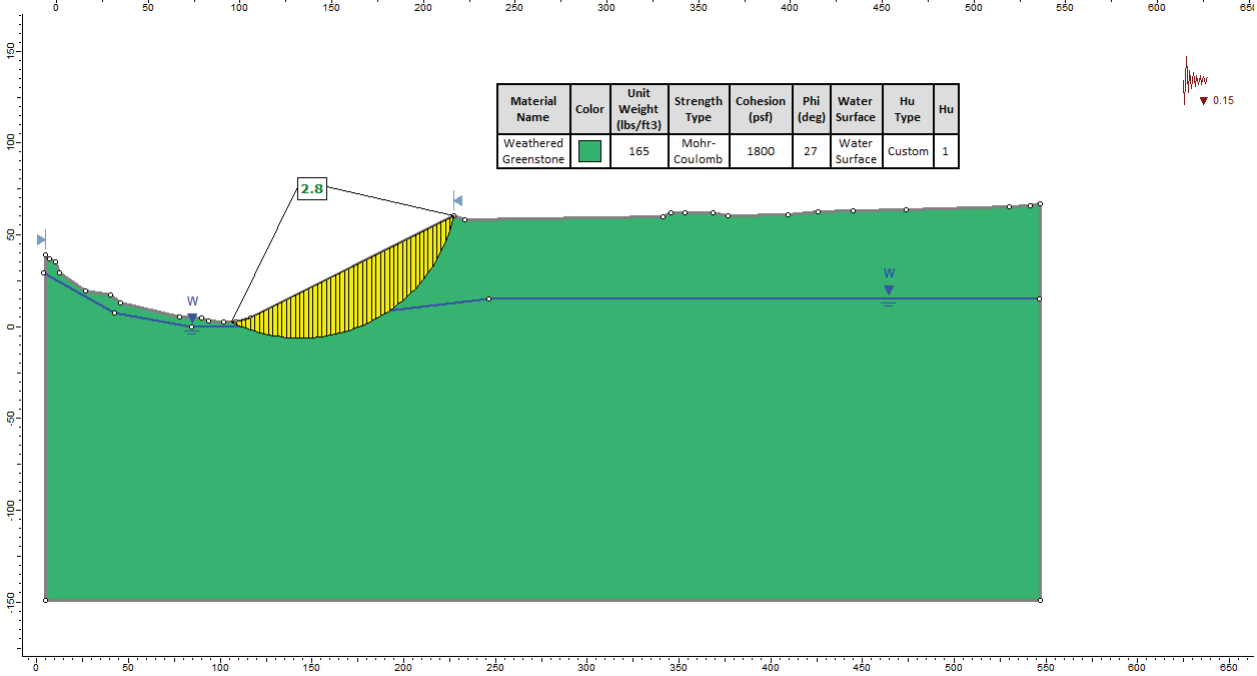
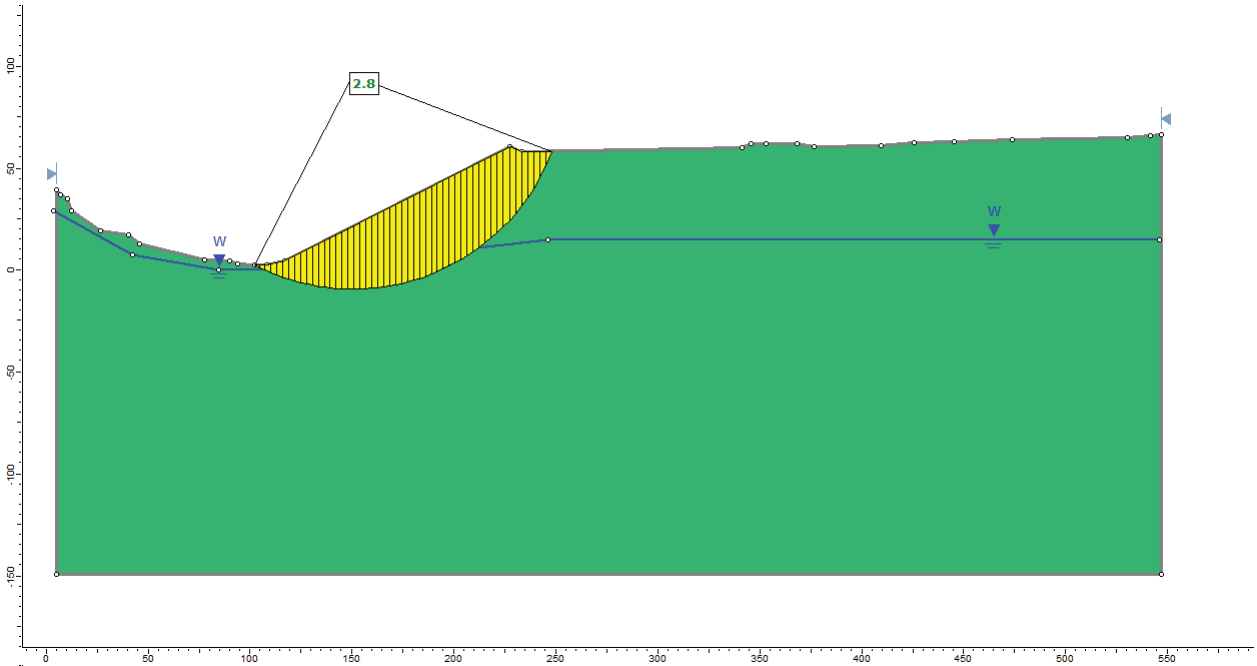
## SECTION C (Pond 1250 Area)

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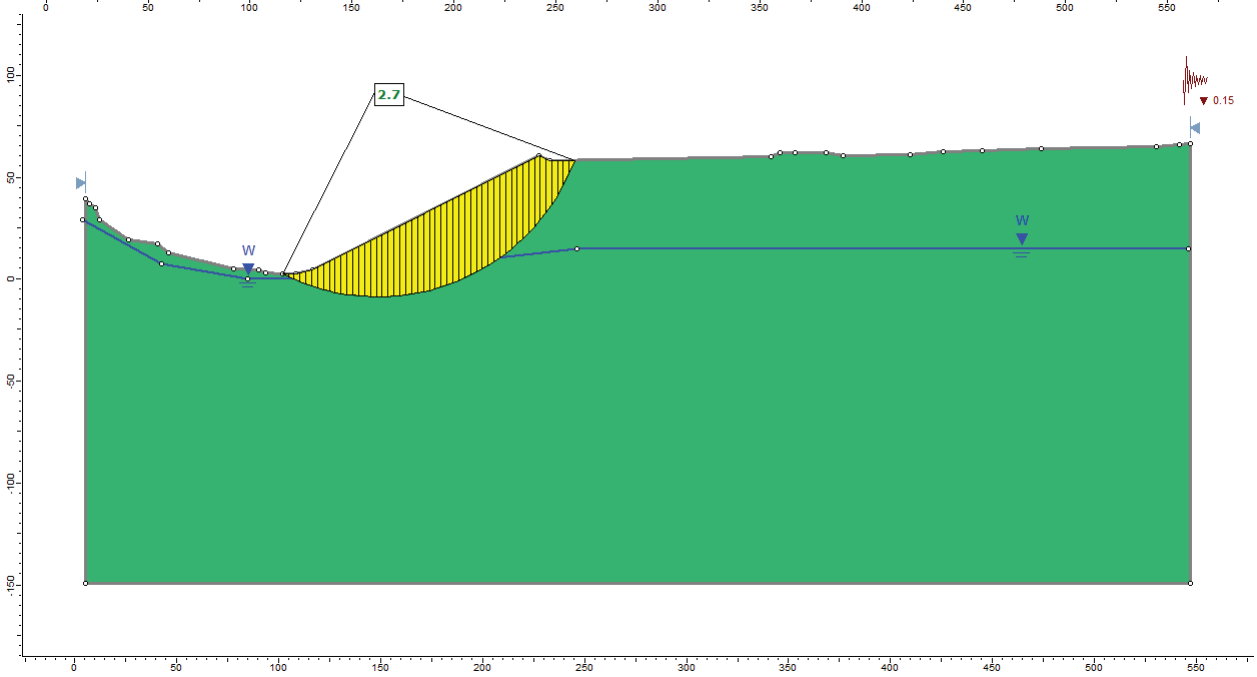
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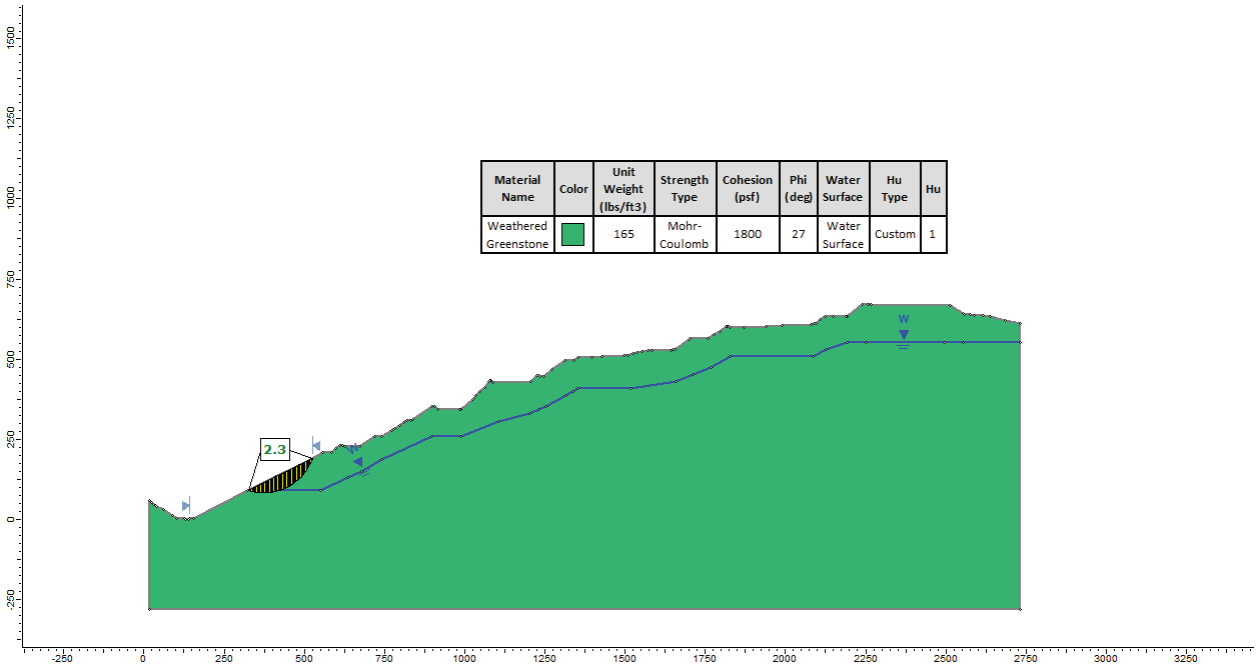
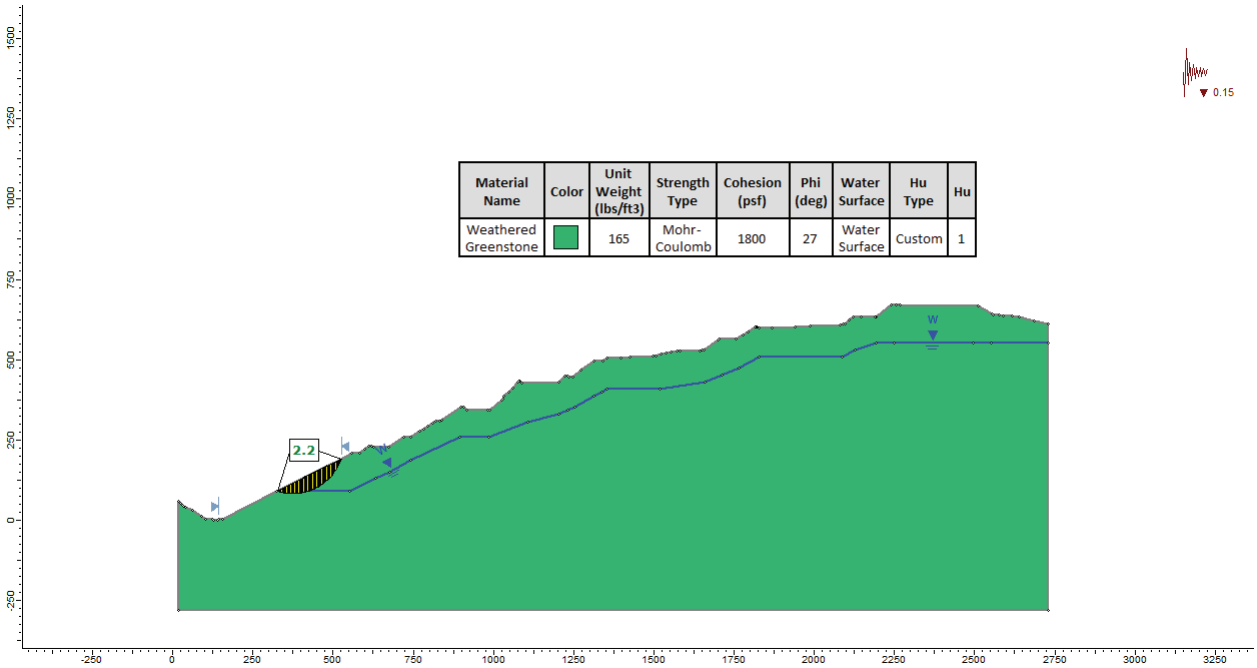
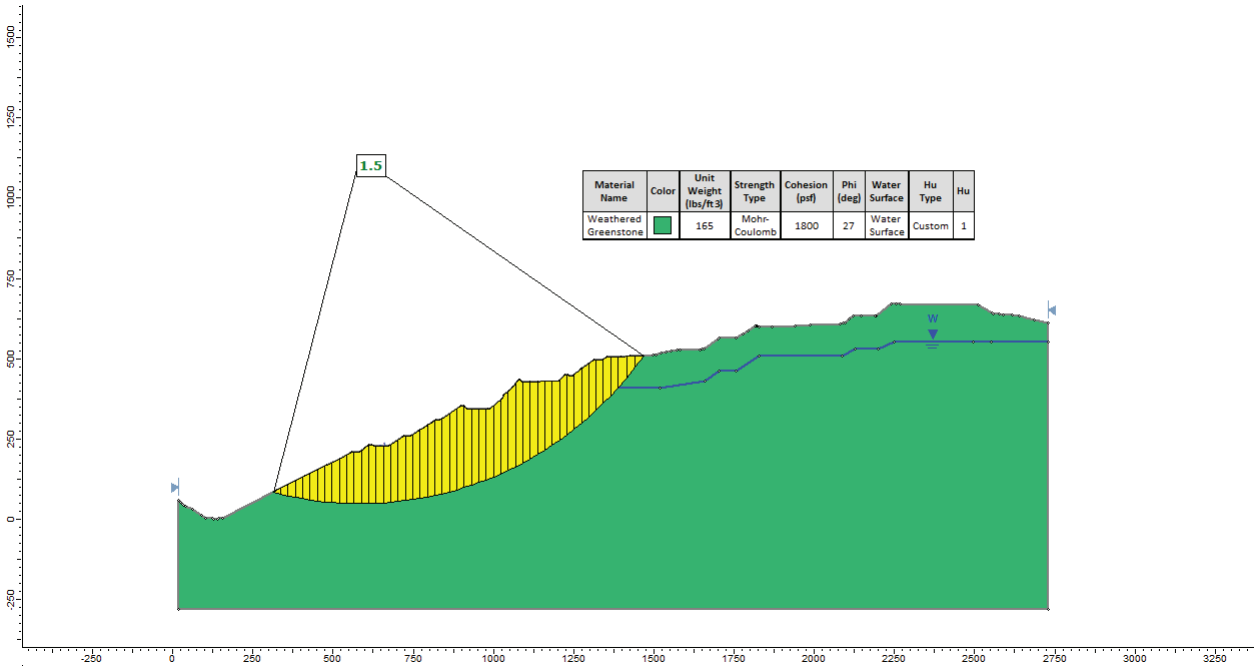
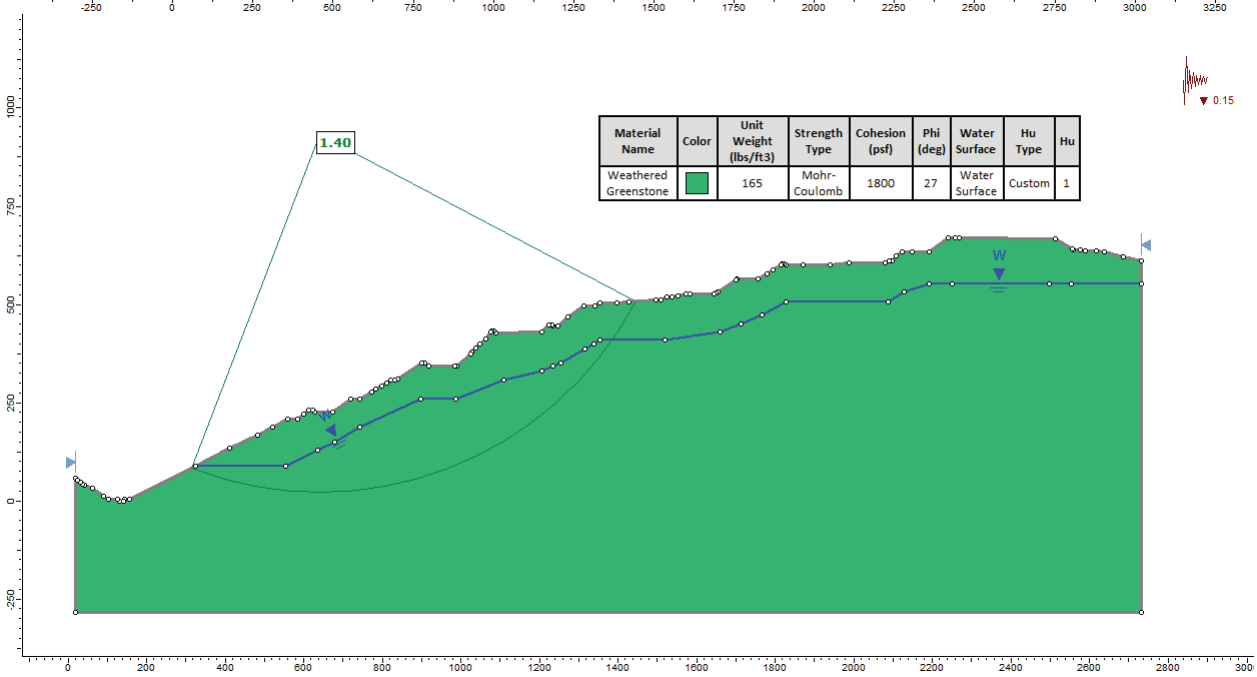
## SECTION E (Pond 1250 Area)






Design with community in mind

# Appendix H

## 2012 Conditions of County Approval

# H1. Impacts and Mitigation Measures for the Final 2012 Permanente Quarry Reclamation Plan Amendment

# APPENDIX H1
## IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

This Appendix H1 is the same as Table ES-3 from the Draft 2012 EIR. Not all of the mitigation measures set forth below apply to the PCRP. Those that do apply are called out specifically in the Draft SEIR and are highlighted in light green below.

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| **Aesthetics, Visual Quality, and Light and Glare** | | | |
| **4.1-1:** Construction of the Project would have a substantially adverse effect on a scenic vista during an interim period. | Significant | None feasible | Significant and unavoidable |
| **4.1-2:** Monitoring and Maintenance of the Project would not have a substantially adverse long term effect on a scenic vista. | Less than significant | None required | Less than significant |
| **4.1-3:** Construction of the Project would substantially damage scenic resources within a state- or County-designated scenic highway or route during the period of time when active reclamation activities are occurring. | Significant | None feasible | Significant and unavoidable |
| **4.1-4:** Neither active reclamation activities nor monitoring and maintenance of the Project would result in long term substantial damage to scenic resources within a state- or County-designated scenic highway or route. | Less than significant | None required | Less than significant |
| **4.1-5:** The Project would alter and substantially degrade the existing visual character or quality of the Project Area during the period of time when active reclamation activities are occurring. | Significant | None feasible | Significant and unavoidable |
| **4.1-6**: The implementation of active reclamation activities would alter, but not permanently substantially degrade, the existing visual character or quality of the Project Area. | Less than significant | None required | Less than significant |
| **4.1-7:** Lighting required for the Project would not adversely affect daytime or nighttime views in the Project Area. | Significant | **Mitigation Measure 4.1-7:** No night lighting shall be allowed permitted on the east-facing slope of the EMSA or any other location within the EMSA that would be visible from public locations on the Santa Clara Valley floor including roadways. | Less than significant |
| **4.1-8:** The Project would not create new permanent sources of light or glare that would affect daytime or nighttime views in the area. | Less than significant | None required | Less than significant |
| **6-1:** Project construction activities could make a cumulatively considerable contribution a substantial adverse effect on a scenic vista and degradation of the existing visual character or quality of the Project Area. | Significant | None feasible | Significant and unavoidable |
| **Agriculture and Forestry Resources** | | | |
| (No impact) | | | |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| **Air Quality** | | | |
| **4.3-1:** The Project would generate emissions of criteria air pollutants which could contribute to existing nonattainment conditions and further degrade air quality. | Less than significant | None required | Less than significant |
| **4.3-2:** Project traffic associated with operational and reclamation activities would generate localized CO emissions on roadways and at intersections in the Project vicinity. | Less than significant | None required | Less than significant |
| **4.3-3:** The Project would expose people to increased levels of toxic air contaminants, which could lead to an increase in the risk of cancer. | Significant | **Mitigation Measure 4.3-3a:** Within 90 days of Project approval, the Applicant shall submit to the County and the BAAQMD a comprehensive inventory of all Project-related off-road construction equipment expected to be used during any portion of the Project. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted annually throughout the duration of the Project.<br><br>**Mitigation Measure 4.3-3b:** Within 90 days of Project approval, the Applicant shall provide a plan for approval by the County and the BAAQMD demonstrating that Project-related off-road equipment would achieve a Project (EMSA-specific) wide fleet-average 35 percent reduction in DPM emissions compared to the proposed fleet in the ALG report (ALG, 2011a) during Phase 1 of the Project. The plan shall be updated and submitted annually throughout the duration of the Project. Options for reducing emissions may include, but are not limited to:<br>• Using newer model engines (e.g., engines that meet U.S. EPA interim/final Tier 4 engine standards);<br>• Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (http://www.arb.ca.gov/diesel/verdev/verdev.htm);<br>• Use of low-emissions diesel products or alternative fuels;<br>• Use of alternative material handling options (e.g., conveyor system); or<br>• Other options as may become commercially available and verifiable.<br>; or<br>**4.3-3c:** The Applicant shall submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project. | Less than significant |

## APPENDIX H1 (CONTINUED)
## IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| **4.3-4:** The Project would expose people to increased levels of toxic air contaminants, which could increase acute and chronic health risks. | Less than significant | None required | Less than significant |
| **4.3-5:** The Project would increase emissions of PM2.5, which could adversely affect human health. | Significant | **Mitigation Measure 4.3-5:** Implement Mitigation Measures 4.3-3a and 4.3-3b (or, alternatively, implement Mitigation Measure 4.3-3c). | Less than Significant |
| **Biological Resources** | | | |
| **4.4-1:** Project activities could result in adverse effects on special-status and migratory birds. | Less than significant | None required | Less than significant |
| **4.4-2:** Project activities could result in adverse effects on special-status bats. | Significant | **Mitigation Measure 4.4-2a: Use of Buffers near Active Roosts.** During the November 1 to March 31 hibernation season, work shall not be conducted within 100 feet of woodland habitat that provides suitable bat roosting habitat. Bat presence is difficult to detect using emergence surveys during this period due to decreased flight and foraging behavior. If a qualified bat biologist determines that woodland areas do not provide suitable hibernating conditions for bats and they are unlikely to be present in the area, work may commence as planned.<br><br>**Mitigation Measure 4.4-2b: Roosting Bats, Maternity Roosting Season.** Nighttime evening emergence surveys and/or internal searches within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts within 100 feet of wooded Project boundaries. All active roosts identified during surveys shall be protected by a buffer to be determined by a qualified bat biologist. The buffer shall be determined by the type of bat observed, topography, slope, aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance, etc. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date, surveys shall be repeated.<br><br>Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season.<br><br>**Mitigation Measure 4.4-2c: Bat Roost Replacement.** All special-status bat roosts destroyed by the Project shall be replaced by the Applicant at a 1:1 ratio onsite with a roost suitable for the displaced species (e.g., bat houses for colonial roosters). The design of such replacement habitat shall be coordinated with CDFG. The new roost shall be in place prior to the time that the bats are expected to use the roost (e.g., prior to April 1 if the roost destroyed by the Project was used by a maternity colony), and shall be monitored periodically for 5 years to ensure proper roosting habitat characteristics (e.g., suitable temperature and no leaks). The roost shall be modified | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | as necessary to provide a suitable roosting environment for the target bat species. | |
| **4.4-3:** Project activities could result in adverse effects on the San Francisco dusky-footed woodrat. | Less than significant | None required | Less than significant |
| **4.4-4:** Project activities could result adverse effects on special status aquatic organisms. | Less than significant | Implement **Mitigation Measure 4.10-2a: Interim Stormwater Control and Sediment Management.** | Less than significant |
| **4.4-5:** Project activities could result in selenium-burdened runoff reaching aquatic habitats and, thereby, in deleterious effects to aquatic organisms and their prey base. | Significant | **Mitigation Measure 4.4-5: Selenium-related Impacts to Aquatic Habitat.** Implement Mitigation Measures 4.10-2a: Interim Stormwater Control and Sediment Management; 4.10-2b: EMSA Interim Stormwater Monitoring Plan; Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA; Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit; and Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit. | Significant and unavoidable |
| **4.4-6:** Project activities could result in the loss or degradation of riparian habitat associated with Permanente Creek. | Less than significant | None required | Less than significant |
| **4.4-7:** Project activities could result in the loss of native oak woodland as defined by Oak Woodlands Conservation Law. | Significant | **Mitigation Measure 4.4-7: Sudden Oak Death Minimization Measures.** To reduce the possibility of spreading Sudden Oak Death to oak woodlands in the Study Area, the Applicant shall implement the following measures:<br>• Prior to any reclamation work within the Project Area, equipment shall be sanitized, including shoes, pruning gear, trucks, and heavy equipment such as earthmoving, tree trimming, chipping, or mowing equipment. Except for trucks, this equipment shall remain onsite for the duration of Project activities and shall not be transferred between this and other worksites, as doing so increases the potential of transferring infected spores to or from another site.<br>• After the completion of work activities, any accumulation of plant debris (especially leaves), soil, and mud shall be washed off of equipment or otherwise removed onsite, and air filters shall be blown out.<br>• All contractors shall have sanitation kits onsite for cleaning equipment. Sanitation kits should contain chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-Up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves.<br>• All organic material imported for mixing with Quarry pit backfill shall have been composted at a facility that meets the standards of Title 14 California Code of Regulations, Division 7, Chapter 3.1; alternative sources of organic material may be used if approved by the County of Santa Clara Agricultural Commissioner as being as effective as the composting process to sanitize | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | SOD-infected materials.<br>• All other imported fill material, soil amendments, gravel, etc. required for construction and/or restoration activities to be placed within the upper 12 inches of the ground surface shall be free of vegetation or plant material. | |
| **4.4-8:** Project activities could result in substantial adverse effects on wetlands and jurisdictional waters associated with Permanente Creek through direct removal, filling, hydrological interruption, or other means. | Significant | **4.4-8a: Wetland Identification and Avoidance.** A qualified wetland biologist shall physically delineate all federal and state waters and wetland features mentioned above and identified in the 2008 wetland delineation (WRA, 2008). This shall occur before any PCRA activities begin, and when feasible, reclamation activities shall completely avoid these areas. Silt fence shall be installed between jurisdictional waters or wetlands and areas sprayed with hydroseed to prevent filling of wetlands with tackifier or other hydroseed material. Use of hand-seeding or working with hand tools may be required to avoid equipment impacting wetlands.<br>**4.4-8b: Wetland Mitigation Plan.** If avoidance of jurisdictional waters or wetlands is not feasible, the following measures shall be implemented:<br>A qualified wetland biologist shall prepare a Mitigation and Monitoring Plan (MMP) for impacts to wetlands and waters under state or federal jurisdiction. The MMP shall outline the anticipated mitigation obligations for temporary and permanent impacts to waters of the state and/or U.S., including wetlands, resulting from PCRA activities. The MMP shall include:<br>• Baseline information;<br>• Anticipated habitat enhancements to be achieved through compensatory actions, including whether mitigation will occur within the Project Area along Permanente Creek or at an offsite location, as well as mitigation site location and hydrology;<br>• When possible, a preference for mitigation within the Permanente Quarry property, for impacts to both jurisdictional waters and wetlands;<br>• Performance and success criteria for habitat enhancement of Permanente Creek or other waterways to compensate for impacts to Other Waters, including:<br>– A replanting plan for appropriate native riparian woody vegetation, including but not limited to arroyo willow, white alder, California wild rose, and snowberry, bigleaf maple, western creek dogwood, and Oregon ash;<br>– An 80% overall revegetation planting success for all mitigation areas over a ten-year period; | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | – A minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;<br>– Plantings that are self-reliant, exhibit average or better health and vigor and have observable growth in stems and leaves at least two years prior to the end of the ten-year monitoring period;<br>– Visual inspection of all revegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;<br>– Observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new non-native species; and<br>– Annual monitoring reports submitted to CDFG and RWQCB documenting revegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.<br>• Performance and success criteria for wetland creation or enhancement including, but not limited to, the following:<br>– At least 70 percent survival of installed plants for each of the first three years following planting.<br>– Performance criteria for vegetation percent cover in Years 1-4 as follows: at least 10 percent cover of installed plants in Year 1; at least 20 percent cover in Year 2; at least 30 percent cover in Year 3; at least 40 percent cover in Year 4.<br>– Performance criteria for hydrology in Years 1-5 as follows: Fourteen or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of three of the five monitoring years; OR establishment of a prevalence of wetland obligate plant species.<br>– Invasive plant species that threaten the success of created or enhanced wetlands shall not be allowed to contribute relative cover greater than 35 percent in year 1, 20 percent in years 2 and 3, 15 percent in year 4, and 10 percent in year 5. | |
| **Cultural and Paleontological Resources** | | | |
| **4.5-1**: Project activities could cause an adverse change in the significance | Significant | **Mitigation Measure 4.5-1a:** The Applicant shall document the physical characteristics | Significant and |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| of an historical resource pursuant to §15064.5 of the CEQA Guidelines and the County's Historic Preservation Ordinance. | | and their historic context of the contributing features of the Kaiser Permanente Quarry Mining District, including archival photo-documentation, mapping, and recording of historical and engineering information including measured drawings about the property according to the standards of the Historic American Building Survey/Historic American Engineer Record/Historic American Landscapes Survey (HABS/HAER/HALS), to be placed in a local public archive such as the Archives of the County of Santa Clara;<br><br>**Mitigation Measure 4.5-1b:** The Applicant shall salvage and/or relocate a representative portion of the Permanente Quarry Conveyor System and the remains of the early 1940s crusher, which constitute character-defining features that otherwise would be lost as a part of implementation of the Project; and<br><br>**Mitigation Measure 4.5-1c:** The Applicant shall prepare public information programs to educate the general public on the historic nature of the potential Kaiser Permanente Quarry Mining District, including but not limited to exhibits at the Quarry office, publications available at the Quarry office, and an online presentation available on the Applicant's website (www.lehighpermanente.com). | unavoidable |
| **4.5-2:** Project activities could cause an adverse change in the significance of an archaeological resource as defined in §15064.5 of the CEQA Guidelines. | Significant | **Mitigation Measure 4.5-2:** If cultural resources are encountered during Project implementation, the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified archaeologist and a Native American representative. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse. If the archaeologist and Native American representative determine that the resources may be significant and cannot be avoided, they shall notify the County and an appropriate treatment plan for the resources shall be developed by the Applicant in consultation with the County and the archaeologist. Measures in the treatment plan could include preservation in place (capping) and/or data recovery. The archaeologist shall consult with Native American representatives in determining appropriate treatment for prehistoric or Native American cultural resources. Ground disturbance shall not resume within 100 feet of the find until an agreement has been reached as to the appropriate treatment of the find. | Less than significant |
| **4.5-3:** Project activities could directly or indirectly destroy a unique paleontological resource or site. | Significant | **Mitigation Measure 4.5-3:** If a paleontological resource is encountered during implementation of the RPA, the Applicant shall notify the County and all activity within 100 feet of the find shall halt until it can be evaluated by a qualified paleontologist as defined by the Society of Vertebrate Paleontology Guidelines (SVP, 1995). The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the County and the Applicant, in consultation with the | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the County and Applicant prior to allowing work in the 100-foot radius to resume. | |
| **4.5-4:** Project activities could disturb human remains, including those interred outside of formal cemeteries. | Significant | **Mitigation Measure 4.5-4:** In the event that human skeletal remains are encountered, the Applicant is required by Health and Safety Code Section 7050.5, Public Resources Code Section 5097.98, Title 14 California Code of Regulations Section 15064.5(e), and County Ordinance No. B6-18 to immediately notify the County Coroner. Upon determination by the County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of §7050.5 of the Health and Safety Code and the County Coordinator of Indian affairs. No further disturbance of the site shall be made except as authorized by the County Coordinator of Indian Affairs in accordance with the provisions of state law and the County Ordinance. If artifacts are found on the site, a qualified archaeologist shall be contacted along with the County Planning Office. No further disturbance of the artifacts shall be made except as authorized by the County Planning Office. | Less than significant |
| **Energy Conservation** | | | |
| **4.6-1:** The Project would include means for avoiding or reducing wasteful and/or unnecessary consumption of energy. | Less than significant | None required | Less than significant |
| **Geology, Soils, and Seismicity** | | | |
| **4.7-1:** Rock and soil slopes constructed as part of the proposed reclamation of the EMSA, Quarry pit, and WMSA could fail under static or seismic forces if not properly engineered and constructed. | Significant | **Mitigation Measure 4.7-1: Avoidance and containment of shallow slumps and/or fall-back of overburden material.** In all areas requiring the use of excavators for grading within the PCRA (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), the Applicant and/or its contractor shall begin excavations from the top of slope and proceed downward. The Applicant and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas of the PCRA where excavations would occur in sloped materials, the Applicant and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles, wooden shoring systems, wire mesh or other containment measures(s), and the Applicant and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | approved by a California State registered geotechnical engineer. | |
| **4.7-2:** In the event of a major earthquake in the region, seismic ground shaking could result in injury to site workers, damage to Quarry equipment and structures, or trigger slope failures. In addition, a large earthquake on the San Andreas Fault could result in minor ground deformation along traces of the Berrocal or Monte Vista Fault Zones. | Less than significant | None required | Less than significant |
| **4.7.3:** Earthmoving and other ground disturbance associated with the phased reclamation of the site could temporarily promote accelerated erosion and soil loss. | Less than significant | None required | Less than significant |
| **Greenhouse Gas Emissions** | | | |
| **4.8-1:** The Project could result in an increase in greenhouse gas emissions and contribute to climate change. | Significant | **Mitigation Measure 4.8-1a: Develop Annual GHG Inventory.** The Applicant shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Applicant shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.<br><br>**Mitigation Measure 4.8-1b: Greenhouse Gas Emissions Reduction Plan.** The Applicant shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT $CO_2e$ per year. The GHG Plan shall include, but not be limited to, the following measures:<br><br>1. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.<br>2. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the West Materials Storage Area (WMSA) to reclaim the Quarry pit.<br><br>If the Applicant is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT $CO_2e$ per year using the above measures, the Applicant shall offset all remaining Project incremental emissions above that threshold. Any offset of Project emissions shall be demonstrated to be real, permanent, verifiable, enforceable, and additional. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):<br><br>1. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Applicant develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.<br>2. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Applicant may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.<br>3. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund. | |
| **4.8-2:** The Project could conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHG. | Less than significant | None required | Less than significant |
| **Hazards and Hazardous Materials** | | | |
| **4.9-1:** The Project could create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials. | Less than significant | None required | Less than significant |
| **4.9-2:** The Project could create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. | Less than significant | None required | Less than significant |
| **4.9-3:** Sedimentation and detention basins planned for erosion and flood control at the Project site could provide breeding grounds for vectors. | Less than significant | None required | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| **Hydrology and Water Quality** | | | |
| **4.10-1:** Post-reclamation conditions in the East Materials Storage Area (EMSA), West Materials Storage Area (WMSA), and Quarry pit would increase selenium concentrations in Permanente Creek to levels exceeding baseline conditions and RWQCB Basin Plan objectives. | Significant | **Mitigation Measure 4.10-1a: Professional Geologist Verification of Non-Limestone-Containing Material Use.** A California-certified Professional Geologist shall be onsite during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the Quarry pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The geologist shall inspect and document whether limestone is present at the source area (Quarry pit and WMSA), whether limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and Quarry pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of suspect rock fragments. If observation, field testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the geologist shall document its presence, temporarily halt fill operations, and notify the County Planning Office and field superintendent. Once notified, the Applicant shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification. | Less than significant |
| **4.10-1 (cont.)** | | Mitigation Measure 4.10-1b: Verification Water Quality Monitoring. The Applicant shall implement the following water monitoring and verification program within 90 days of Project approval and continue the program throughout the backfilling and reclamation phases and for 5 years following completion of reclamation. As part of this program, the Applicant shall:<br>• Collect quarterly Quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium.<br>• Perform quarterly electrical conductivity and pH measurements of the Quarry water.<br>• Measure and record daily volumes of any water that is pumped from the pit area.<br>• Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall | |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | be estimated.<br>• Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered.<br>• Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and revegetation results in runoff water quality that meets Basin Plan Water Quality Objectives and all other applicable water quality standards). Stormwater runoff monitoring and sampling shall be conducted following the placement and final grade of the 1-food-run-od-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding the Basin Plan Water Quality Objectives. Three rounds of representative surface water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer.<br>• The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last five years of active mining. Based on the results of any refined water balance and water quality projections, the Applicant shall also review and refine the water management procedures.<br>• Reclamation of the Quarry Pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate, to the satisfaction of the Director of Planning and Development, that selenium in surface water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Objectives. | |
| **4.10-2:** Interim reclamation activities within the Project Area would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek. | Significant | **Mitigation Measure 4.10-2a: Interim Stormwater Control and Sediment Management.** To minimize the discharge of sedimentation and metal constituents, particularly selenium, to watercourses, the Applicant shall implement the following stormwater and sediment management controls in addition to general BMPs required by the SWPPP in active and inactive reclamation areas throughout Phases 1, 2 and 3 of the Project. The Applicant shall:<br>• Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that non-limestone materials are placed beneath and are covered by non- | Significant and unavoidable |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.<br>• Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.<br>• Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.<br>• In areas such as the WMSA where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the PCRA and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, operator training regarding the prevention of triggering debris slides.<br>• Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.<br>• Divert all runoff generated from disturbed active and inactive reclamation areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways entering Permanent Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.<br>• Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.<br>• Replace the limestone rock and materials that are currently used in the | |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
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| | | existing BMP ditches and cover or otherwise separate runoff from limestone rock in the existing sediment pond embankments.<br>• Cover large limestone surfaces that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.<br>• Inspect and maintain BMPs after each qualifying rain event to ensure their integrity.<br>• Reconstruct or reline all existing stormwater conveyances and check dam structures that are constructed or lined with limestone rock using non-limestone material (greenstone, breccias, greywacke, metabasalt), available at the Quarry.<br>• Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be reported and corrected immediately.<br>• Provide adequate erosion control training to all equipment operators, site superintendants, and managers to ensure that stormwater and erosion controls are maintained and remain effective.<br>• Use only jute netting or other suitable replacement for erosion control in the PCRA; no plastic monofilament shall be used for erosion control or other purposes, as California Red legged Frogs and other wildlife may become entangles in it.<br>• Ensure that all stormwater, erosion, and sediment control BMPs installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist or landscape architect, an American Institute of Hydrology registered professional hydrologist, or a certified erosion control specialist.<br>**Mitigation Measure 4.10-2b: EMSA Interim Stormwater Monitoring Plan.** The Applicant shall develop a stormwater sampling plan that would supplement preexisting surface water monitoring required by General Industrial Storm Water and Sand and Gravel NPDES Permit and be designed specifically to monitor surface water during reclamation activities in active and inactive excavation and backfill areas. The purpose of this plan is to evaluate performance of temporary BMPs and completed reclamation phases at the EMSA and to identify areas that are sources of selenium (measured on total recoverable basis), sediment, or high TDS. At a minimum, the plan shall require the Applicant to inspect BMPs and collect water samples for analysis of TDS and metals, including selenium, within 24 hours after a qualifying rain event and sample non-stormwater discharges when they occur. If elevated selenium, sediment, or TDS is | |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
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| | | identified through sample analysis, the Applicant shall identify the source and apply any new or modified standard BMPs available. BMPs that show sign of failure or inadequate performance shall be repaired or replaced with a more suitable alternative. Following implementation, the Applicant shall re-test surface water to determine the effectiveness of such modifications, and determine whether additional BMPs are necessary.<br><br>**Mitigation Measure 4.10-2c: Monitoring and Determination of BMP Effectiveness for the EMSA.**<br><br>• Within 30 days of Reclamation Plan Amendment approval, sampling and testing shall occur within 24 hours after a qualifying rain event. If no qualifying rain event occurs within 30 days of Reclamation Plan approval, then testing shall begin at the first qualifying event. Testing shall be conducted in accordance with the Stormwater Sampling Plan developed and approved in accordance with Mitigation Measure 4.10- 2b.<br><br>• If test results for two consecutive years show that stormwater discharging from the EMSA into Permanente Creek exceeds total recoverable selenium of 5 µg/L, or other applicable discharge requirement as determined by the RWQCB, then the County shall schedule a public hearing before the Planning Commission to determine whether the Applicant is complying with the stormwater discharge requirements. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.<br><br>• If the Planning Commission determines that the Applicant is not complying with discharge requirements, then the Applicant shall install a treatment system (or alternative) as described under Mitigation Measure 4.10-2e.<br><br>**Mitigation Measure 4.10-2d: Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit.**<br><br>• Within 30 days of the start of reclamation activities for Phase 2, the Applicant shall conduct monthly water sampling and testing results as described in Mitigation Measure 4.10-1b.<br><br>• If test results for two consecutive years show that selenium levels are higher than base levels, then the County shall schedule a public hearing before the Planning Commission to determine whether the reclamation activities are causing an increase in total selenium above the base levels. “Base levels” shall be defined as water testing results for an average for two years immediately prior to start of Phase 2 reclamation for discharge into Permanente Creek from the WMSA and Quarry pit. For purposes of triggering Planning Commission review, the sampling shall occur at locations | |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| | | where water discharges to Permanente Creek.<br>• If the Planning Commission finds that reclamation activities are causing an increase in selenium over base levels, then the Applicant shall install a treatment system ( or alternative) as described under Mitigation Measure 4.10-2e.<br>**Mitigation Measure 4.10-2e: Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or the WMSA and Quarry Pit.**<br>• Within 30 days of Reclamation Plan Amendment approval, the Applicant shall begin designing a treatment facility (or alternative) and pilot system for discharge into Permanente Creek. The treatment shall be designed to achieve the Basin Plan Water Quality Objective for selenium (total recoverable selenium of 5 µg/L) for discharge from the EMSA, and/or to achieve the "base level" standard for the WMSA and Quarry pit as defined under Mitigation Measure 4.10-2d.<br>• The Applicant shall complete design, pilot testing, and feasibility analysis for a treatment facility within 24 months of Reclamation Plan Amendment approval or by such other time as may be prescribed by the RWQCB.<br>• The Planning Commission shall hold a public hearing no later than 30 months after Reclamation Plan Amendment approval to determine feasibility of the treatment facility (or alternative). The Planning Commission may defer the public hearing if the Regional Water Quality Control Board determines that additional time is necessary to complete the design, pilot testing, and feasibility analysis,<br>• If the Planning Commission determines that a treatment facility is feasible, the Planning Commission shall also establish a timeline for implementing the treatment facility.<br>• Construction, installation, and operation of a treatment facility (or alternative) shall be required if discharge requirements are not met as described under Mitigation Measures 4.10-2c and 4.10-2d, based on a determination of the Planning Commission, and if it has been determined feasible by the Planning Commission following a public hearing. | |
| **4.10-3:** The Permanente Creek Reclamation Area (PCRA) reclamation activities would contribute concentrations of selenium, Total Dissolved Solids (TDS), and sediment in Permanente Creek. | Less than significant | None required | Less than significant |
| **4.10-4:** The Project would alter the existing drainage pattern of the site, | Significant | **Mitigation Measure 4.10-4: Construction of Onsite Detention Facility.** The | Less than |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| which could result increased storm water runoff rates and on- or offsite flooding. | | Applicant shall design and construct detention facilities that would 1) manage increased runoff caused by the reclaimed Quarry pit, 2) reduce excessive discharges to Permanente Creek, and 3) develop the capacity to detain and release the 100-year flow using onsite detention basins while optimizing groundwater infiltration. The final drainage design shall ensure that offsite, downstream flows would not cause an increased flooding potential or lead to hydromodification effects. In addition to the detention facilities for the Quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control improvement project. Design considerations for onsite detention basins shall include the following performance standards. The basin shall be designed to:<br>• Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB.<br>• Effectively drain between storm events within the period of time specified by the Santa Clara County 2007 Drainage Manual.<br>• Enhance the settlement of fine sediment while limiting the potential for sediment- laden water to be discharged to Permanente Creek.<br>• Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods.<br>• Control surface water inflows to the detention facility using energy reduction features (i.e., rip-rap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin.<br>• Infiltrate surface water to the extent practicable while accounting for and protecting the local groundwater condition and water quality<br>In addition to the detention facilities for the Quarry pit, the Applicant shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and manage 100-year peak flow to the extent practical. The Applicant shall also consider a broader watershed approach and consult with SCVWD on ways to detain peak flows offsite in relation areas of existing flooding and to the current SCVWD flood control improvement project. | Significant |
| **4.10-5:** Groundwater discharge from the Quarry pit after backfilling and | Less than | None required | Less than |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
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| reclamation is complete would adversely alter surface water flows to Permanente Creek. | significant | | significant |
| **4.10-6:** The Project would alter the existing drainage pattern of the site, which could result in increased stormwater ponding, accumulation of selenium, and flooding. | Significant | **Mitigation Measure 4.10-6: Stormwater Control to Avoid Ponded Water and Selenium Accumulation.** The Applicant shall incorporate drainage features into the final drainage design for the Quarry pit area to eliminate the potential for surface ponding on the floor of the Quarry pit once it has reached its final elevation (990 amsl). The drainage design for the finished Quarry pit fill shall include engineered elements (e.g., conveyance channels, infiltration galleries) that facilitate groundwater recharge and percolation from limestone areas to groundwater in the Quarry backfill with the objective of accommodating high groundwater elevation without creating surface water bodies that may contain elevated levels of selenium. These measures shall be incorporated into the design of the additional basin proposed for the floor of the Quarry pit once the floor is raised to its final elevation. | Less than significant |
| | | | |
| **Land Use and Planning** | | | |
| **4.11-1:** The Project would be incompatible with adjacent land uses. | Less than significant | None required | Less than significant |
| **Mineral Resources** | | | |
| **4.12-1:** The planned backfill of the Quarry pit would hinder further extraction of cement-grade limestone and aggregate resources from the Quarry pit, thereby resulting in the loss of availability of a mineral resource of state, regional, and local significance. | Less than significant | None required | Less than significant |
| **Noise** | | | |
| **4.13-1:** Operations associated with reclamation during Phase 1 would exceed County noise standards and increase ambient noise levels at noise-sensitive uses in the vicinity. | Significant | **Mitigation Measure 4.13-1a:** The Applicant shall prohibit all heavy equipment operations in the northeasterly 11.5 acres of the EMSA (as shown in Figure 4.13-8) during nighttime hours (i.e., between 10:00 p.m. to 7:00 a.m.).<br>**Mitigation Measure 4.13-1b:** The Applicant shall either: (1) limit all operations in the EMSA within 1,600 feet of the caretaker's residence (as shown in Figure 4.13-8) to no more than one 8-hour shift per day, or (2) submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the Project. | Less than significant |
| **4.13-2:** Operations associated with reclamation during Phase 2 would increase ambient noise levels at noise-sensitive uses in the vicinity. | Less than significant | None required | Less than significant |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| **4.13-3:** Operations associated with reclamation Phase 3 may be audible at noise-sensitive uses in the vicinity. | Less than significant | None required | Less than significant |
| **4.13-4:** Operations within the Permanente Creek Reclamation Area may be audible at noise-sensitive uses in the vicinity. | Less than significant | None required | Less than significant |
| **Population and Housing** | | | |
| (No impact) | | | |
| **Public Services** | | | |
| (No impact) | | | |
| **Recreation** | | | |
| **4.16-1:** The Project would be near a public park and trail and could affect existing or future recreational opportunities. | Less than significant | None required | Less than significant |
| **Transportation/Traffic** | | | |
| **4.17-1:** The Project would cause increases in traffic volumes on area roadways, but would not conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system. | Less than significant | None required | Less than significant |
| **4.17-2:** Traffic generated by Project activities could affect traffic safety of pedestrians and bicyclists. | Less than significant | None required | Less than significant |
| **4.17-3:** The Project would provide safe access, and would not obstruct access to nearby uses or fail to provide for future street right-of-way. | Less than significant | None required | Less than significant |
| **Transportation/Traffic (cont.)** | | | |
| **4.17-4:** Traffic generated by the Project would contribute to pavement wear-and-tear on area roadways. | Less than significant | None required | Less than significant |
| **Utilities and Service Systems** | | | |
| **4.18-1:** The Project would require and result in the construction of new storm water drainage facilities, the construction of which could cause environmental effects. | Less than significant | None required | Less than significant |
| **4.18-2:** The Project may not be able to be served by a landfill with | Less than | None required | Less than |

**APPENDIX H1 (CONTINUED)**
**IMPACTS AND MITIGATION MEASURES FOR THE FINAL 2012 PERMANENTE QUARRY RECLAMATION PLAN AMENDMENT**

| Environmental Impact | Significance before Mitigation | Mitigation Measures | Significance after Mitigation |
|---|---|---|---|
| sufficient permitted capacity to accommodate the Project's solid waste disposal needs. | significant | | significant |

# H2. 2012 Conditions of County Approval

# FINAL CONDITIONS OF APPROVAL

**Approved by Planning Commission, June 7, 2012 and modified by the Board of Supervisors on June 26, 2012**

**(ATTACHMENT TO THE RESOLUTION, EXHIBIT 1)**

MEETING DATE: June 7, 2012

FILE NUMBER 2250-13-66-10P-10EIR (M1)

NAME (Mine Operator): Hanson Permanente Cement, Inc. (Lehigh Southwest Cement)

**PROJECT DESCRIPTION**:

Reclamation Plan Amendment (RPA) for Lehigh Permanente Quarry, located at 24001 Stevens Creek Boulevard, in unincorporated Santa Clara County. The RPA amends and supersedes the previously approved 1985 Permanente Quarry Reclamation Plan for a 20-year period to satisfy the reclamation requirements of the Surface Mining and Reclamation Act of 1975. The RPA encompasses 1,238.7 acres within the Mine Operator's 3,510-acre ownership. The reclamation activities will be implemented in three phases over an estimated 20-year period. Phase I is approximately nine years, and involves reclamation activities in the EMSA and continuation of existing mining activities in the WMSA and Quarry Pit. Phase II is approximately five years, and includes reclamation activities within the WMSA and Quarry Pit. During Phase II, the WMSA overburden stockpile will be moved via a conveyor system to use as backfill of the Quarry Pit. The EMSA will be reclaimed during Phase II or sooner. Phase III is approximately 5 years, and involves removing the equipment, buildings and unnecessary roads from the Project area. Reclamation activities in the Permanente Creek Reclamation Area will occur during all three phases described above.

The conditions of approval of the RPA are not intended by the Planning Commission to prevent or interfere with more stringent requirements that have or may be imposed by the RWQCB or any other agency or court. Nothing in these conditions alters or has any limiting effect on the jurisdiction of any other agency, including the Regional Water Quality Control Board and the California Air Resources Board.

**APPLICATION APPROVED SUBJECT TO CONDITIONS STATED BELOW BASED ON PLANS AS SUBMITTED.**

**GENERAL REQUIREMENTS:**

1. The conditions of approval contained herein shall supersede and replace all previous conditions of approval from the 1985 Reclamation Plan approval.

2. All development, operations, and reclamation that occur under this RPA shall be consistent with the approved plans, unless modified per these conditions. The approved plans include maps, drawings, tables, and a narrative description within the RPA prepared by EnviroMINE Incorporated, including Attachments A through J, dated December 13, 2011 and received by the County on December 15, 2011. Plans also include engineered drawings prepared by Chang Consultants, dated December 12, 2011 (appended to the RPA), and Reclamation Water Quality prepared by Strategic Engineering & Science, Inc., dated December 2011 (RPA, Attachment G), and replacement Sheet 7 of 13 for Basin 40A by Chang Consultants, received by the County on March 13, 2012.

3. Within 60 days of approval of the RPA, Mine Operator shall submit six (6) copies plus one electronic copy of a "Final" RPA, incorporating changes required per the conditions of approval for the RPA, Mitigation Monitoring and Reporting Program, and Final Environmental Impact Report.

4. Within 60 days following approval of the RPA, the Mine Operator shall submit to the Planning Manager or the Manager's designee (hereinafter referred to as Planning Manager), legal descriptions for all affected parcels of real property. Pursuant to Section 2772.7 of the Public Resources Code, specifically referred to as SMARA, the County will record a Notice of Reclamation Plan Approval with the County Recorder's Office covering those parcels affected by the approved RPA. The notice shall read: *"Mining Operations conducted on the hereinafter described real property are subject to a RPA approval by the County of Santa Clara Planning Commission. A copy of said approved RPA is on file with the Department of Planning and Development, located the Santa Clara County Government Center, East Wing, 7$^{th}$ Floor, 70 W. Hedding Street, San Jose, CA 95110."* The Mine Operator shall be responsible for all the reasonable costs associated with recording said notice.

5. If reclamation is not complete on or before June 30, 2032, the Mine Operator shall file an application for an amendment to the reclamation plan prior to that date.

6. The proposed end use following reclamation is hillside open space.

7. The Mine Operator shall be responsible for paying all reasonable costs associated with work by the Department of Planning and Development, or with work conducted under the supervision of the Department of Planning and Development, in conjunction with, or in any way related to the conditions of approval identified in this RPA, the mitigations contained in the Mitigation Monitoring and Reporting Program, and the annual SMARA inspections and annual review of financial assurance cost estimates. This includes but is not limited to costs for staff time, attorney's fees, consultant fees, and direct costs associated with report production and distribution.

8. An Annual Report shall be prepared by the County each year that summarizes compliance with the RPA and conditions of approval, Mitigation Monitoring and

Reporting Program, and annual SMARA inspections and review of financial assurance cost estimates.

a. Annual Report shall be presented to the Planning Commission at a public meeting by December of each year, starting in 2013.

b. Mine Operator shall provide a reasonable amount of funding to the Department of Planning and Development for all aspects of report preparation, including but not limited to reimbursement for staff time, consultant fees, attorney's fees, and direct costs associated with report production and distribution.

c. Mine Operator shall provide by October 1 of each year, the information requested by the Planning Manager that is needed for the preparation of the Annual Report.

d. The County will include information provided by the Regional Water Quality Control Board related to the Water Board's determination regarding the Mine Operator's compliance with water quality standards, including waste load allocation and other permitting requirements, and the effectiveness of best management practices (BMPs) on the site.

9. If at any time the Planning Manager determines that the Quarry is not in compliance with the RPA, Mitigation Monitoring and Reporting Program, or any condition of approval, and as such is in violation of the RPA, the Director may take any and all actions necessary to ensure compliance with the Plan in accordance with applicable laws and regulations.

10. Copies of the RPA Mitigation Monitoring and Reporting Program, approved plans, conditions of approval shall be maintained at the premises of the Permanente Quarry, 24001 Stevens Creek Boulevard, at all times: one copy of all the documents shall be stored in the administration building at this location and one copy of all the documents shall be stored in the mine operations office.

11. By October 1 of each year, starting in 2012, the Mine Operator shall provide to the Planning Manager a report summarizing the date of the annual training, topics reviewed, and list of all employees attending the training. The Mine Operator shall annually train all mining staff, including outside vendors, contractors, or consultants who are responsible for implementation of any part of the mine operations or reclamation at Permanente Quarry, on the requirements and provisions of the RPA, the conditions of approval, and the MMRP.

12. Within 60 days following approval of the RPA, the Mine Operator shall submit to the Planning Manager a copy of its Storm Water Pollution Prevention Plan (SWPPP) of the approved RPA, which is hereby appended to the RPA by reference. The Mine Operator is responsible for providing the Department of Planning and Development with any and all updates to the SWPPP.

13. All mitigation measures contained within the Mitigation Monitoring and Reporting Program (MMRP) prepared for the project are adopted as conditions of approval and noted as such. The language contained within the MMRP shall be the guiding language for implementation of the condition or measure unless as modified within these conditions of approval.

14. By August 1st of each year, or as required by the Santa Clara County SMARA Inspection Program, the Mine Operator shall submit annually Financial Assurance Cost Estimates (FACE) to the Planning Manager for review and approval, which shall serve as the basis for the amount of financial assurances required of the Mine Operator, account for disturbed and those lands to be disturbed in the following year by the surface mining operations, inflation, and reclamation of lands accomplished in accordance with the approved RPA. Cost estimates shall utilize the most up to date cost figures for the San Francisco Bay Area and shall include appropriate costs for all materials to be utilized, labor rates, and equipment rates utilized in calculating the FACE. Upon approval of the FACE by the County and review by the State Office of Mine Reclamation (OMR), the Mine Operator shall post an acceptable Financial Assurance mechanism with the Department of Planning and Development prior to commencing any disturbance in areas not previously disturbed by the mining operation.

**OTHER AGENCIES/JURISDICTIONS**

15. Copies of all violations or abatement notices, requests for reports or information related to this RPA and its authorized uses by federal, state, or local jurisdictions/agencies, or subsequent modification of another agency's permit or submission of an application for any permit to another agency shall be provided to the Planning Manager within 10 business days of the County's request.

**SEVERABILITY**

16. If any of the RPA conditions of approval, or RPA approval, are held to be invalid, that holding shall not invalidate any of the remaining conditions or limitations set forth.

17. If any condition(s) of approval is invalidated by a court of law, and said invalidation would change the findings and/or mitigation measures associated with the approval of this RPA, the amendment may be reviewed, at the discretion of the Planning Commission, and substitute feasible condition(s)/mitigation measures may be imposed to adequately address the subject matter of the invalidated condition(s).

**DUTY TO DEFEND AND INDEMNIFY**

18. As a condition of RPA approval, including adjustment, modification or renewal, the Mine Operator agrees to:

    a. Defend, at the Mine Operator's sole expense, any action brought against the County by a third party challenging either its decision to approve the RPA or the manner in which the County is interpreting or enforcing the conditions of the RPA; and

    b. Indemnify the County against any settlements, awards, or judgments, including attorney's fees, arising out of or resulting from any such action.

19. Upon demand from the County, the Mine Operator shall reimburse the County for any court costs and or attorney's fees which the County may be required by a court to pay as a result of any such action the Mine Operator defended or which it had control of the defense. The County may, at its sole discretion, participate in the defense of any such action, but such participation shall not relieve the Mine Operator of its obligations under this condition.

20. The Mine Operator agrees to defend, indemnify and hold harmless the County, its agents, officers and employees, from any claim, action or proceeding against the County, to challenge any portions of the EIR certification, reclamation plan process or approval. In addition to damages, indemnification includes reimbursing the County for staff and consultant cost, and attorney's fees (including claims for private Attorney General fees).

21. Neither the approval of the RPA or compliance with conditions of approval shall relieve the Mine Operator from any responsibility otherwise imposed by law for damage to persons or property, nor shall the issuance of any RPA or related permit serve to impose any liability upon the County of Santa Clara, its officers, employees or agents for injury or damage to persons or property.

**RECLAMATION REQUIREMENTS**

22. Within 60 days of RPA approval, the RPA limit of disturbed area surrounding the northern and eastern edges of the EMSA, the northern and western edges of the WMSA, and the perimeter of the Rock Plant area shall be clearly demarcated in the field and shall remain in place until final reclamation has been completed. On an annual basis, demarcation shall be modified to encompass the RPA boundaries nearest the areas subject to surface mining and reclamation, as shown on aerials submitted per Condition #23. Demarcated areas shall be located and marked in the field by a licensed land surveyor or registered civil engineer authorized to practice land surveying. Demarcation shall use orange construction fencing or other brightly colored material acceptable to the Planning Manager.

23. At the same time as the proposed Annual Report each year, the operator shall submit to the Planning Manager a surveyed coordinate list file obtained by Global Positioning System (GPS), prepared by a licensed land surveyor or registered civil engineer authorized to practice land surveying, to be reviewed and approved by

the County Surveyor, identifying the limits of reclamation, with aerial photographs of the RPA area, annotated to illustrate (a) where surface mining and reclamation activity occurred within the prior 24 months and (b) areas where mining and reclamation activities will occur in the next 24 months. Existing topographic data shall be included with the aerial photographs, and the operator shall provide projected topographic data demonstrate how the topography will look two years later. The aerial photographs must be flown and taken biennually between June 1 and June 30 starting with June 2013. If requested by the Planning Manager or Planning Commission the materials shall be in a readable scale.

24. Reclamation of finished slopes and benches shall commence at the earliest feasible date once the slopes and benches are established, as set forth in the RPA.

25. Rockfills, where used, should be spread in lifts not exceeding five-feet in thickness by tracked equipment, and compacted by track-walking or wheel-rolling using heavy dozers (Caterpillar D-9 or larger) and/or fully loaded rubber-tired hauling equipment, respectively. A minimum of three passes should be performed for each lift.

26. Within 60 days of RPA approval, Mine Operator shall submit a site plan identifying area(s) where topsoil, dirt, soil amendments shall be retained and used in the reclamation and re-vegetation process. Soil stored for reclamation purposes shall be clearly identified and marked in the field.

27. The Mine Operator shall safeguard stockpiles of topsoil or overburden to be used for reclamation from wind and erosion by using controls including, but not limited to, hydroseeding, erosion control mats, and coir wattles (aka "straw wattles").

28. The Mine Operator shall use soil amendments, in accordance with the RPA, to improve the effectiveness of the soils used for re-vegetation of final slopes. Re-vegetation shall satisfy the criteria identified in the RPA. Reporting of the test plots for the re-vegetation criteria identified in the RPA shall be submitted to the County as part of the Mine Operator's annual report. Re-vegetation shall include only plant materials identified in the re-vegetation palette contained in the approved RPA. The Mine Operator shall follow the "test plot" program in the RPA to determine the appropriateness and success rates of the proposed re-vegetation palette identified in the RPA. Reporting on the test plot program shall be part of the Mine Operator's annual report submitted by the County and shall be prepared by a qualified biologist.

29. Re-vegetation of all reclaimed slopes within the RPA Boundary shall meet the minimum success criteria listed in the approved RPA before any completed phase of reclamation may be deemed reclaimed by the County and Office of Mine Reclamation (OMR).

30. The Planning Manager shall have authority to administratively review and approve minor revisions to the re-vegetation palette contained in the approved RPA. Status report shall be given to the Planning Commission after any revisions and presented at the next available Planning Commission meeting.

31. Equipment, structures, nonessential roads, as identified in the RPA, shall be removed from the project area prior to that area being deemed reclaimed by the County and OMR.

32. Construction or demolition waste or any other foreign materials are prohibited from being stored in overburden or used in reclamation. Overburden shall be compacted, tested, and documented to demonstrate it will support post-mining uses. Regarding compaction, testing, and documentation of the overburden, documentation shall be submitted to the Planning Manager within 30 days of completion.

33. Stilling basins shall be maintained in good conditions and cleaned of silt and debris as necessary. A report shall be submitted to the Planning Manager as part of the Annual Report, fully depicting total quantities of silt removed from the basins (reported in cubic yards or tons) and where such silt is placed on the site or off the site.

34. The Mine Operator shall comply with the conditions of permits and plans required by and issued from the Regional Water Quality Control Board (RWQCB), including but not limited to approval of the Permanente Creek Restoration Plan and water discharge permits. The Mine Operator shall provide copies of all permits to the Planning Manager within 10 business days of issuance by RWQCB.

35. Reclamation shall be deemed complete by the County and State Office of Mine Reclamation (OMR) once reclamation has been performed to the terms of the approved RPA, and required monitoring and inspections have demonstrated compliance with the reclamation performance standards and mitigation measures as prescribed in the Mitigation, Monitoring and Reporting Program, including compliance with all pertinent permits or other requirements for reclamation issued by non-Santa Clara County public agencies, including but not limited to the RWQCB and the State Department of Fish and Game.

36. The Mine Operator shall comply with the conditions of permits required by and issued from the Bay Area Air Quality Management District (BAAQMD). Upon request by the County, the Mine Operator shall provide copies of all permits, and amendments to the Planning Manager within 10 business days of the request.

37. The Mine Operator shall obtain and comply with all applicable permits required by the Santa Clara County Hazardous Materials Division of the Department of Environmental Health. The Mine Operator shall provide copies of all permits to the Planning Manager within 10 business days of issuance.

*Permanente Creek Restoration Area (PCRA)*

38. Within 30 days of final RPA approval, submit to the Planning Manager a detailed schedule describing the implementation actions to control sedimentation, remove limestone boulders, and stabilize slopes within the Permanente Creek Restoration Area in the Summer and Fall of 2012, consistent with the RPA.

39. **Limestone Boulder Removal**. By October 15, 2012, per the RPA, identified limestone boulders in the PCRA shall be removed. In addition, any limestone boulders identified in the future shall be removed. Submit to the Planning Manager by August 1, 2012, a report and map summarizing the field inspection and identification of all limestone boulders in the PCRA. Submit to the Planning Manager by December 15, 2012, a report and summarizing the actions to remove all limestone boulders in the PRCA, consistent with the "Best Management Practice for Removal of Limestone Boulders from Permanente Creek" (Attachment J to the RPA).

40. **Permanente Creek Restoration**. Prior to the start of Permanente Creek restoration activities in Phase III for PCRA subareas 3, 4, 5 and 7, as identified in the RPA, the Mine Operator shall submit to the Planning Manager a Permanente Creek Restoration Plan. The Restoration Plan shall include the elements of the Permanente Creek Long Term Restoration Plan (URS, March 11, 2011) to the extent set forth in the RPA. The Restoration Plan shall include, at minimum, engineered drawings for creek restoration, a riparian re-vegetation plan, hydrology / hydro-geomorphology studies supporting concepts to be used in creek restoration, and a long term monitoring and reporting program. The Creek Restoration Plan shall be reviewed and approved by the County prior to implementation. The Mine Operator shall obtain all necessary permits and approvals from all applicable local, state, and federal authorities, including without limitation the Regional Water Quality Control Board, Department of Fish and Game, and U.S. Army Corps of Engineers to implement the work.

41. Prior to the start of any grading or any grading activity that affects jurisdictional resources of the California Department of Fish and Game, Regional Water Quality Control Board, or U.S. Army Corps of Engineers, the Mine Operator must provide to the Planning Manager proof of permits / clearances (or documentation that a permit is not needed).

**ENVIRONMENTAL CONDITIONS AND EIR MITIGATION MEASURES**

*Light and Glare:*

42. No night lighting shall be allowed or permitted on the east-facing slope of the EMSA or any other location within the EMSA that would be visible from public locations on the Santa Clara Valley floor including roadways. *(Implements Mitigation Measure 4.1-7)*

*Air Quality – Health Hazards Risk:*

43. Within 90 days of final RPA approval, the Mine Operator shall submit to the County and BAAQMD a comprehensive inventory of all RPA-related off-road construction equipment expected to be used during any portion of the RPA period. The inventory shall include the horsepower rating, engine production year, and projected hours of use or fuel throughout for each piece of equipment. The inventory shall be updated and submitted annually to the Planning with the Annual Report, throughout the duration of the RPA. *(Implements Mitigation Measure 4.3-3a)*.

44. Within 90 days of final RPA approval, the Mine Operator shall provide a plan for approval by the Planning Manager and BAAQMD demonstrating that off-road equipment to be used for Reclamation of the EMSA would achieve an average 35 percent reduction in Diesel Particulate Matter (DPM) emissions compared to the proposed fleet described in the ALG report (Ashworth Leininger Group, December 13, 2011) during RPA Phase I. The plan shall be updated and submitted annually to the Planning Manager, with the Annual Report each year throughout the duration of the RPA. Options for reducing emissions may include, but are not limited to:

    a. Using newer model engines (e.g. engines that meet US EPA interim/final Tier 4 engine standards).

    b. Use of Retrofit Emission Control Devices that consist of diesel oxidation catalysts, diesel particulate filters, or similar retrofit equipment control technology verified by CARB (www.arb.ca.gov/diesel/verdev/verdev.htm)

    c. Use of low emissions diesel products or alternative fuels;

    d. Use of alternative material handling options (e.g. conveyor system); or other options as may become commercially available and verifiable. *(Implements Mitigation Measure 4.3-3b).*

45. In lieu of Condition No. 43 and No. 44 (Mitigation Measures 4.3-3a and 4.3-3b), the Mine Operator may submit within 90 days of the RPA approval evidence establishing to the Planning Manager's satisfaction that there are legally binding restrictions precluding any occupancy of the caretaker's residence located at 2961 Stevens Creek Boulevard, Cupertino (APN 342-63-003) during the entirety of Phase I of the Project. *(Implements Mitigation Measure 4.3-3c)*

*Biological Resources- Avian Species*

46. **Avian Species - Preconstruction Surveys.** Ground disturbance into undisturbed areas and vegetation (tree and shrub) removal should occur between September 1 and January 30, outside of the breeding season for most bird species. If ground disturbance or tree and shrub removal occurs between February 1 and June 15, preconstruction surveys will be performed within 14 days prior to such activities to determine the presence and location of nesting bird species. If ground disturbance or removal of vegetation occurs between June 16 and August 31, pre-construction surveys will be performed within 30 days prior to such activities.

Thirty (30) days prior to the start of any ground disturbance into undisturbed areas or vegetation removal, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified ornithologist to conduct pre-activity surveys.

The pre-construction surveys shall be submitted to the Planning Manager no later than five (5) business days prior to the start of such activities. If the tree removal or vegetation clearing shall occur during the non-nesting season, submit documentation both before and after tree removal / vegetation clearing confirmation completion of work within this time frame.

47. **Avian Species - Use of Buffers for to Avoid Nests**. If preconstruction surveys determine that active nests are found close enough to the land clearing and tree removal area to be disturbed by these activities, the ornithologist, in consultation with CDFG, will determine the extent of a construction-free buffer zone (typically 250 feet) to be established around the nest to prevent nest abandonment and direct mortality during construction.

*Biological Resources- Bat Species*

48. **Bat Species - Non-Roosting Season**. Removal of potential bat roost habitat (buildings, large trees, snags, vertical rock faces with interstitial crevices) or construction activities within 250 feet of potential bat roost habitat should occur in September and October to avoid impacts to bat maternity or hibernation roosts. *(Implements Mitigation Measure 4.4-2a).*

49. **Bat Species – Maternity Roosting Season.** If removal of potential bat roost habitat cannot occur during September and October, bat roost surveys will be conducted to determine if bats are occupying roosts.

    Nighttime evening emergence surveys and/or internal searches within large tree cavities shall be conducted by a qualified biologist during the maternity season (April 1 to August 31) to determine presence/absence of bat maternity roosts within 100 feet of wooded Project boundaries. All active roosts identified during surveys shall be protected by a minimum buffer determined by a qualified bat biologist, in consultation with California Department of Fish and Game (CDFG). The buffer shall be determined by the type of bat observed, topography, slope aspect, surrounding vegetation, sensitivity of roost, type of potential disturbance. Each exclusion zone shall remain in place until the end of the maternity roosting season. If no active roosts are identified, then work may commence as planned. Survey results are valid for 30 days from the survey date. Should work commence later than 30 days from the survey date surveys shall be repeated. Operations may continue for many years. Surveys do not need to be repeated annually unless additional clearing of potential roosting or hibernation habitat could occur outside of the non-roosting season.

    Thirty days prior to the removal of potential bat roost habitat, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified

biologist to conduct pre-activity surveys. The pre-construction surveys shall be submitted to the Planning Manager no later than five (5) business days prior to the removal of any potential habitat. *(Implements Mitigation Measure 4.4-2b)*.

50. **Special Status Bat Species- Hibernation Season**. During the November 1 to March 31 hibernation season, work shall not be conducted within 100 feet of any woodland habitat (as identified in the Draft EIR Figures 4.4-1 through 4.4-4), unless a qualified bat biologist determines that woodland areas do not provide suitable hibernating conditions for bats and they are unlikely to be present in the area.

    Submit a report by a qualified bat biologist to the Planning Manager verifying the absence of suitable habitat as described above if work is proposed within 100 feet of woodland habitat between November 1 and March 31. *(Implements Mitigation Measure 4.4-2a)*

51. **Special Status Bat Species - Maternity Season Emergence.** Any trees felled during vegetation removal will not be chipped or otherwise disturbed for a period of 48 hours to allow any undetected bats potentially occupying these trees to escape. *(Implements Mitigation Measure 4.4-2b).*

52. **Bat Roost Replacement.** All special-status bat roosts destroyed by the Project shall be replaced by the Mine Operator at a 1:1 ratio onsite with a roost suitable for the displaced species (e.g., bat houses for colonial roosters). The design of such replacement habitat shall be in consultation with CDFG. The new roost shall be in place prior to the time that the bats are expected to use the roost (e.g., prior to April 1 if the roost destroyed by the Project was used by a maternity colony), and shall be monitored periodically for 5 years to ensure proper roosting habitat characteristics (e.g., suitable temperature and no leaks). The roost shall be modified as necessary to provide a suitable roosting environment for the target bat species. *(Implements Mitigation Measure 4.4-2c)*

*Biological Resources- Dusky Footed Woodrat*

53. **San Francisco Dusky Footed Woodrat.** Within 30 days prior to initial ground disturbance in woodland or scrub/chaparral communities, (as identified in the Draft EIR Figures 4.4-1 through 4.4-4), conduct pre-construction surveys for active woodrat stick nests that could be directly impacted. Surveys should take place in all suitable habitat types within the Project Area. Any stick nests within active work areas will be flagged and dismantled under the supervision of a biologist. If young are encountered during the dismantling process, the material shall be placed back on the nest and remain unmolested for three (3) weeks in order to give the young enough time to mature and leave of their own accord. After that period, the nest dismantling process may begin again. Nest material shall be moved to suitable adjacent areas (oak woodland, scrub, or chaparral) that will not be disturbed. If construction does not occur within 30 days of the pre-construction survey, surveys shall be repeated.

Sixty (60) days prior to initial ground disturbance within woodland or scrub / chaparral communities, the Mine Operator shall submit to the Planning Manager a copy of a contract with a qualified biologist to conduct pre-activity surveys. The pre-construction surveys shall be submitted to the Planning Manager no later than five business days prior to the start of initial ground disturbance.

54. To reduce indirect impacts on San Francisco dusky-footed woodrat by attracting urban-adapted predators, trash and food waste shall be disposed of in proper waste receptacles and emptied on a regular basis. Additionally, quarry personnel, contractors, and visitors shall not feed wildlife within the Permanente Property and appropriate site signage and employee education shall facilitate this condition.

*Biological Resources- Invasive Plants, Sudden Oak Death*

55. **Introduction of Invasive Plants or Pathogens**. If regulated or restricted plant materials are to be transported between the Project Area and a location in a non-infested county or state, the spread of the Sudden Oak Death pathogen shall be avoided by obtaining the necessary certificates of transport pursuant to the regulations described in the Biological Resources Assessment prepared for the Lehigh Permanente Quarry by WRA Environmental Consultants, dated December 2011.

56. **Sudden Oak Death.** To reduce the possibility of spreading Sudden Oak Death to oak woodlands in the Study Area, the Mine Operator shall implement the following measures:

    a. Prior to any reclamation work within the Project Area, equipment shall be sanitized, including shoes, pruning equipment, trucks, and heavy equipment such as earthmoving, tree trimming, chipping, or mowing equipment. Except for trucks, this equipment shall remain onsite for the duration of Project activities and shall not be transferred between this and other worksites, as doing so increases the potential of transferring infected spores to or from another site.

    b. After the completion of work activities, any accumulation of plant debris (especially leaves), soil, and mud shall be washed off of equipment or otherwise removed onsite, and air filters shall be blown out.

    c. All contractors shall have sanitation kits onsite for cleaning equipment. Sanitation kits should contain chlorine bleach (10/90 mixture bleach to water) or Clorox Clean-Up or Lysol, scrub brush, metal scraper, boot brush, and plastic gloves.

    d. All organic material imported for mixing with Quarry pit backfill shall have been composted at a facility that meets the standards of Title 14 California Code of Regulations, Division 7, Chapter 3.1; alternative sources of organic material may be used if approved by the County of

Santa Clara Agricultural Commissioner as being as effective as the composting process to sanitize SOD-infected materials.

e. All other imported fill material, soil amendments, gravel, etc. required for construction and/or restoration activities to be placed within the upper 12 inches of the ground surface shall be free of vegetation or plant material. *(Implements Mitigation Measure 4.4-7)*

*Biological Resources- Wetlands*

57. **Wetland Identification and Avoidance.** A qualified wetland biologist shall physically delineate all federal and state waters and wetland features identified in the 2008 wetland delineation (WRA, 2008) before any Permanente Creek Reclamation Area (PCRA) activities begin, and when feasible, reclamation activities shall avoid filling these areas unless authorized by the appropriate permitting agencies. Silt fence or other appropriate barriers and buffer zones shall be installed between jurisdictional waters or wetlands and areas sprayed with hydroseed to prevent filling of wetlands with tackifier or other hydroseed material; alternatively, the use of hand-seeding or working with hand tools may be utilized to avoid filling wetlands. *(Implements Mitigation Measure 4.4-8a)*

    Prior to the start of PCRA activities, the wetland biologist shall submit a report to the Planning Manager showing the wetland areas delineated and the installation of all fencing and barriers (photos and map).

    This condition shall not apply to Phase III Permanente Creek Restoration Activities in subareas 3, 4, 5 and 7, as identified in the RPA. Such Activities are expected to require an independent review and permitting process, as described in the RPA.

58. **Wetland Mitigation Plan.** If filling of jurisdictional waters or wetlands is not feasible, the following measures shall be implemented:

    a. A qualified wetland biologist shall prepare a wetland Mitigation and Monitoring Plan (MMP) for impacts to wetlands and waters under state or federal jurisdiction. The MMP shall be submitted for review and approval by the Planning Manager, and as required by law by the Regional Water Quality Control Board and US Army Corps of Engineers. The MMP shall outline any anticipated mitigation obligations for temporary and permanent impacts to waters of the state and/or U.S., including wetlands, resulting from PCRA activities. The MMP shall include:

        i. Baseline information;

        ii. Anticipated habitat enhancements to be achieved through compensatory actions, including whether mitigation will occur within the Project Area along Permanente Creek or at an offsite location, as well as including mitigation site location and hydrology;

iii. When possible, a preference for mitigation within the Permanente Quarry property, for impacts to both jurisdictional waters and wetlands;

iv. Performance and success criteria for habitat enhancement of Permanente Creek or other waterways to compensate for impacts to Other Waters, including:

1. A replanting plan for appropriate native riparian woody vegetation, including but not limited to arroyo willow, white alder, California wild rose, and snowberry, bigleaf maple, western creek dogwood, and Oregon ash;

2. An 80% overall re-vegetation planting success for all mitigation areas over a ten-year period;

3. A minimum overall mitigation ratio of 1.1:1 acres for permanent impacts and 1:1 acres for temporary impacts;

4. Plantings that are self-reliant, exhibit average or better health and vigor and have observable growth in stems and leaves at least two years prior to the end of the ten-year monitoring period;

5. Visual inspection of all re-vegetation sites during each growing season, with qualitative and quantitative measures of plant cover and performance;

6. Observations of total percent plant cover in the planting area, natural recruitment of native species, and establishment of new non-native species; and

7. Annual monitoring reports submitted to CDFG and RWQCB documenting re-vegetation conditions, including recommendations to adapt maintenance and replacement of failed plantings.

b. Performance and success criteria for wetland creation or enhancement including, but not limited to, the following:

i. At least 70 percent survival of installed plants for each of the first three years following planting.

ii. Performance criteria for vegetation percent cover in Years 1-4 as follows:

1. at least 10 percent cover of installed plants in Year 1;

2. at least 20 percent cover in Year 2;

3. at least 30 percent cover in Year 3;

4. at least 40 percent cover in Year 4.

c. A performance criteria for hydrology in Years 1-5 as follows:

i. Fourteen or more consecutive days of flooding, ponding, or a water table 12 inches or less below the soil surface during the growing season at a minimum frequency of three of the five monitoring years; OR establishment of a prevalence of wetland obligate plant species.

ii. Invasive plant species that threaten the success of created or enhanced wetlands should shall not be allowed to contribute relative cover greater than 35 percent in year 1, 20 percent in years 2 and 3, 15 percent in year 4, and 10 percent in year 5.

d. MMP monitoring reports shall be submitted to the Planning Manager and responsible permitting agencies. *(Implements Mitigation Measure 4.4-8b)*

*Biological Resources- California Red Legged Frog (CRLF)*

59. To minimize disturbance to dispersing or foraging CRLF, all grading activity within PCRA subareas 4 through 7 shall be conducted during the dry season, generally between May 1 and October 15, or before the onset of the rainy season, whichever occurs first, unless exclusion fencing is utilized. Construction that commences in the dry season may continue into the rainy season if exclusion fencing is placed around the construction zone to keep the frog from entering the construction area.

60. Pre-construction surveys for CRLF shall be conducted prior to construction activities within PCRA subareas 4 through 7. If CRLF are observed in the construction area or access areas, they shall be removed from the area by a USFWS permitted biologist and temporarily relocated to nearby suitable aquatic habitat.

61. Because dusk and dawn are often the times when CRLF are most actively foraging, all restoration activities within PCRA subareas 4 through 7 shall cease one half hour before sunset and shall not begin prior to one half hour after sunrise. Additionally, restoration activities shall not occur during rain events, as CRLF are most likely to disperse during periods of precipitation.

*Cultural Resources*

62. The Mine Operator shall document the physical characteristics and their historic context of the contributing features of the Kaiser Permanente Quarry Mining District, including archival photo-documentation, mapping, and recording of historical and engineering information including measured drawings about the property according to the standards of the Historic American Building Survey/Historic American Engineer Record/Historic American Landscapes Survey (HABS/HAER/HALS), to be placed in a local public archive such as the Archives of the County of Santa Clara.

Verification of documentation as described above shall be submitted to the Planning Manager within sixty (60) days prior to removal of the Permanente Quarry Conveyor System as described under Condition #63. *(Implements Mitigation Measure 4.5-1a)*

63. Prior to any of the following: modification, relocation, removal, or demolition of the Permanente Quarry Conveyor System, the Mine Operator shall salvage and/or relocate a representative portion of the Permanente Quarry Conveyor System and the remains of the early 1940s crusher, which constitute character-defining features that otherwise would be lost as a part of implementation of the Project.

    Verification of salvage / relocation as described above shall be submitted to the Planning Manager within thirty (30) days prior to start of mining / reclamation activities in the existing Conveyor System and 1940's crusher area. Conveyor is located west of the EMSA and southeast of the Quarry Pit, the crusher is located south of the Quarry Pit adjacent to Permanente Creek (reference Historic Resource Evaluation, Permanente Quarry Facility Comprehensive Reclamation Plan Project – Lehigh Southwest Cement Company, prepared by Archives and Architecture, LLC, October 2011). *(Implements Mitigation Measure 4.5-1b)*

64. At least sixty (60) days prior to commencement of any work as described above Condition #63, the Mine Operator shall prepare public information programs to educate the general public on the historic nature of the potential Kaiser Permanente Quarry Mining District, including but not limited to exhibits at the Quarry office, publications available at the Quarry office, and an online presentation available on the their website (currently, www.lehighpermanente.com). Verification of documentation as described shall be submitted to the Planning Manager. *(Implements Mitigation Measure 4.5-1c)*

65. If cultural resources are encountered during Project implementation the Mine Operator shall notify the Planning Manager and all activity within 100 feet of the find shall stop until the cultural resource is evaluated by a qualified archaeologist and a Native American representative. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include stone, concrete, or adobe footings and walls; filled wells or privies; and deposits of metal, glass, and/or ceramic refuse.

    If the archaeologist and Native American representative determine that the resources may be significant and cannot be avoided, they shall notify the Planning Manager and an appropriate treatment plan for the resources shall be developed by the Mine Operator in consultation with the Planning Manager, and the archaeologist. Measures in the treatment plan could include preservation in place (capping) and/or data recovery. The archaeologist shall consult with Native

American representatives in determining appropriate treatment for prehistoric or Native American cultural resources. Ground disturbance shall not resume within 100 feet of the find until an agreement has been reached as to the appropriate treatment of the find. *(Implements Mitigation Measure 4.5-2)*

66. If a paleontological resource is encountered during implementation of the RPA the Mine Operator shall notify the Planning Manager, and all activity within 100 feet of the find shall stop until it can be evaluated by a qualified paleontologist as defined by the Society of Vertebrate Paleontology Guidelines (SVP, 1995). The paleontologist shall evaluate the resource and determine its significance. If significant, the paleontologist shall notify the Planning Manager. The Mine Operator, in consultation with the County and the paleontologist, shall prepare a treatment plan such that the fossil would be recovered and scientific information preserved. The paleontologist shall implement the treatment plan in consultation with the Planning Manager and Mine Operator, prior to allowing work in the 100-foot radius to resume. *(Implements Mitigation Measure 4.5-3)*

67. In the event that human skeletal remains are encountered, the Mine Operator is required by Health and Safety Code Section 7050.5, Public Resources Code Section 5097.98, Title 14 California Code of Regulations Section 15064.5(e), and County Ordinance No. B6-18 to immediately notify the County Coroner. Upon determination by the County Coroner that the remains are Native American, the coroner shall contact the California Native American Heritage Commission, pursuant to subdivision (c) of §7050.5 of the Health and Safety Code and the County Coordinator of Indian affairs. No further disturbance of the site shall be made except as authorized by the County Coordinator of Indian Affairs in accordance with the provisions of state law and the County Ordinance. If artifacts are found on the site, a qualified archaeologist shall be contacted along with the Planning Manager. No further disturbance of the artifacts shall be made except as authorized by the Planning Manager. *(Implements Mitigation Measure 4.5-4)*

*Geological and Soils*

68. **Avoidance and containment of shallow slumps and/or fall-back of overburden material.** In all areas requiring the use of excavators for grading within the Permanente Creek Reclamation Area (PCRA) (e.g., access road in-sloping, installation/repair of sedimentation basins, and removal of slide debris), the Mine Operator and/or its contractor shall begin excavations from the top of slope and proceed downward. The Mine Operator and/or its contractor shall not undercut sloped materials unless no other option is feasible as determined by a registered geotechnical engineer (e.g., excessively sloped or otherwise inaccessible terrain). In all areas of the PCRA where excavations would occur in sloped materials, the Mine Operator and/or its contractor shall install barriers immediately downslope of the activity. Downslope barriers shall be designed and installed in a manner that would be adequate to prevent overburden and/or native materials from falling, sloughing or sliding further downslope, or into Permanente Creek. Such measures may consist of temporary interlocking soldier piles,

wooden shoring systems, wire mesh or other containment measures(s). The Mine Operator and/or its contractor shall not be permitted to conduct excavation or grading activities downgradient of the barrier, or prior to its installation. The ultimate location, design and installation method of such measures shall be prepared and certified, or reviewed and approved by a California State registered civil geotechnical engineer.

Thirty days (30) prior to the start of all excavation / grading activities as described above, submit to Planning Manager a plan showing the installation of all downslope barriers as described above. *(Implements Mitigation Measure 4.7-1)*

69. Within thirty (30) days following approval of the RPA, submit a Geotechnical Engineer's Plan Review letter that confirms the RPA, as modified by other conditions of approval, conforms with the recommendations presented in Golder's Report (RPA Appendix C, dated November 2011). In regards to the EMSA, specifically, the letter must verify that the plans indicate where the native slope is steeper than 2.5H:1V, the topsoil and colluvium will be over-excavated within the area extending inward 100 feet from the toe of the outer slope.

70. The geotechnical design recommendations provided by Golder Associates (RPA Appendix C, November 2011) are being implemented as part of the ongoing stockpiling activities within the EMSA and as a condition of approval Project. The measures are identified below:

    a. Foundation preparation should be completed prior to fill placement of the outer 50 feet beneath the EMSA fill. Foundation preparation should consist of over-excavation of outer 50 feet of topsoil, organic materials (trees, brush, grasses), fine-grained colluvium with a Plastic Index greater than 25, or other unsuitable soils until firm bedrock, granular soils, or clay soils with a Plastic Index less than 25 are exposed. If the exposed foundation surface is inclined at 5H:1V or steeper, the over-excavation distance from the outer slope should be extended from 50 feet to 100 feet. Furthermore, the fill placed on slopes of 5H:1V or steeper should be benched into the slope with individual bench heights of at least 2 feet and up to approximately 5 feet.

    b. A qualified California Registered Professional Geologist, Certified Engineering Geologist, or a California Registered Civil Engineer with geotechnical experience should inspect the foundation preparation to ensure all unsuitable materials are removed prior to placement of the outer 50 to 100 feet of EMSA fill.

    c. If seepage or wet zones are observed in the foundation, suitable drainage provisions should be incorporated into the foundation prior to fill placement. Suitable drainage provisions include the placement of a blanket of free-draining sand or gravel over the seepage/wet zone in conjunction with a perforated, polyvinyl (PVC) or high-density polyethylene (HDPE) drain pipe that drains positively toward and daylights at the slope face.

The sand or gravel drainage material should be fully covered with a minimum 8-oz/square yard, non-woven, geotextile filter to provide separation from the EMSA materials.

d. The fine waste materials shall be placed in lifts not to exceed 8-feet, and offset a minimum of 30 feet from the final slope face. Each lift of fine waste should be allowed to dry before being covered by overburden material. Each lift shall be overlain by a minimum 25-foot thick lift of overburden.

e. Any modification to the EMSA fill geometry including increases to the maximum overall slope inclination, maximum inter-bench slope inclination, slope height, or footprint shall require an additional or revised slope stability analysis.

*Greenhouse Gas Emissions (GHG)*

71. **Develop Annual GHG Inventory.** The Mine Operator shall become a reporting member of The Climate Registry. Beginning with the first year of the Project and continuing for the duration of the Project, the Mine Operator shall conduct an annual inventory of GHG emissions and shall report those emissions to The Climate Registry. The annual inventory shall be conducted according to The Climate Registry protocols and third-party verified by a verification body accredited through The Climate Registry.

    Within 90 days of approval of the RPA, the Mine Operator shall submit documentation verifying registration with The Climate Registry to the Planning Manager. Copies of annual reporting to Climate Registry shall be submitted to the Planning Manager by October 1 of each year. *(Implements Mitigation Measure 4.8-1a)*

72. **Greenhouse Gas Emissions Reduction Plan.** The Mine Operator shall prepare, submit for County and BAAQMD approval, make available to the public, and implement a Greenhouse Gas Emissions Reduction Plan (GHG Plan) containing quantifiable strategies to ensure that the Project-related incremental increase of GHG emissions does not exceed 1,100 MT Co2e per year. The GHG Plan shall include, but not be limited to, the following measures:

    a. Replacement of on-road and off-road vehicles and construction equipment with lower GHG-emitting engines, such as electric or hybrid.

    b. Use of the Overland Conveyor System, powered by electric motors, to move more than 75 percent of the waste rock from the WMSA to reclaim the Quarry pit.

    The Greenhouse Gas Emissions Reduction Plan shall be submitted to the Planning Manager within 90 days of final RPA Approval. *(Implements Mitigation Measure 4.8-1b)*

73. **Greenhouse Gas Offsets.** If the Mine Operator is unable to reduce the Project-related incremental increase of GHG emissions to below 1,100 MT Co2e per year per Condition #72, the Mine Operator shall offset all remaining Project incremental emissions above that threshold. Any offset of emissions related to the RPA shall be demonstrated to be real, permanent, verifiable, and enforceable. To the maximum extent feasible, as determined by the County in coordination with the BAAQMD, offsets shall be implemented locally. Offsets may include but are not limited to, the following (in order of preference):

    a. Onsite offset of Project emissions, for example through development of a renewable energy generation facility or a carbon sequestration project (such as a forestry or wetlands project for which inventory and reporting protocols have been adopted). If the Mine Operator develops an offset project, it must be registered with the Climate Action Reserve or otherwise approved by the BAAQMD in order to be used to offset Project emissions. The number of offset credits produced would then be included in the annual inventory, and the net (emissions minus offsets) calculated.

    b. Funding of local projects, subject to review and approval by the BAAQMD, that would result in real, permanent, verifiable, enforceable, and additional reduction in GHG emissions. If the BAAQMD or County of Santa Clara develops a GHG mitigation fund, the Mine Operator may instead pay into this fund to offset Project incremental GHG emissions in excess of the significance threshold.

    c. Purchase of carbon credits to offset Project incremental emissions to below the significance threshold. Carbon offset credits must be verified and registered with The Climate Registry, the Climate Action Reserve, or other source that is approved by the California Air Resources Board as being consistent with the policies and guidelines of the California Global Warming Solution Act of 2006 (AB 32), or available through a County- or BAAQMD-approved local GHG mitigation bank or fund.

    Documentation verifying that offsets have been accomplished, if required, must be submitted for review and approval to the Planning Manager and BAAQMD within 90 days of final RPA Approval. *(Implements Mitigation Measure 4.8-1b)*

*Hydrology and Water Quality:*

74. **Certified Geologist Verification of Non-Limestone-Containing Material Use.** A California Certified Engineering Geologist shall be onsite during reclamation to verify that non-limestone run-of-mine rock is used as cover on the EMSA and WMSA. In addition, the Geologist shall observe and document activities associated with placing the final overburden on the Quarry Pit (i.e., ensuring that organic material is mixed to specifications). Using visual and field testing methods, with occasional bulk sampling and laboratory analysis, the geologist shall observe and document the type of rock placed over the limestone-containing material during reclamation activities. The geologist shall inspect and document whether limestone is present at the source area (Quarry Pit and WMSA), whether

limestone rock is transported from the source area to segregation stockpiles, and whether limestone is present within the lifts of the proposed 1-foot layer of run-of-mine cover rock (in the EMSA, WMSA, and Quarry Pit). Inspection involves observing the excavation, hauling, stockpiling, and placement of the non-limestone cover material, performing a visual assessment of the rock, and conducting random spot sampling and field testing of suspect rock fragments. If observation, field-testing, or laboratory analysis indicates that significant amounts of limestone are intermixed with the supposed non-limestone cover material, the geologist shall document its presence, temporarily halt fill operations, and notify the Planning Manager and field superintendent. Once notified, the Mine Operator shall remove the limestone-containing materials and then perform verification field sampling in addition to laboratory verification. *(Implements Mitigation Measure 4.10-1a)*

Within ninety (90) days of final RPA Approval, the Mine Operator shall submit to the Planning Manager a copy of a contract or an employee resume employed by the Mine Operation that is a California-certified Engineering Geologist responsible to conduct monitoring as described above. Quarterly reports shall be submitted from the Geologist to the Planning Manager describing effectiveness of mitigation and monitoring during final reclamation as described above.

75. The County reserves the right to retain, if it deems necessary, at the expense of the Mine Operator, a third-party California-certified Engineering Geologist, to provide independent oversight or monitoring to implement Condition #74.

76. **Verification and Water Quality Monitoring**. Within ninety (90) days of RPA approval, the Mine Operator shall begin and continue throughout the backfilling and reclamation phases and for 5 years following completion of reclamation and for 5 years following the start of groundwater discharge from the Quarry Pit into Permanente Creek as described on page 4.10-39 of the Final Environmental Impact Report, a Verification and Water Quality Monitoring Program. The Mine Operator shall implement the following:

    a. Collect quarterly Quarry pit water samples and analyze for general water chemistry and dissolved and total metals, including selenium.

    b. Perform quarterly electrical conductivity and pH measurements of the Quarry water.

    c. Measure and record daily volume of any water that is pumped from the pit area.

    d. Conduct annual seep surveys in March or April of each year within the Quarry pit. Any seeps identified shall be sampled for general water chemistry and minerals and dissolved metals, and the seep flow rate shall be estimated.

    e. Perform routine testing of each of the various rock types that comprise the overburden to further characterize bulk and leachable concentrations of key metal constituents (selenium in particular). Such testing shall be

performed until the average concentrations and the variability within a rock type is no longer changing significantly as new data are gathered.

f. Sample and test runoff from the EMSA and WMSA throughout and following reclamation to confirm the concepts and closure plans (i.e., that cover with non-limestone material and re-vegetation results in runoff water quality that meets Basin Plan Benchmarks and all other applicable water quality standards, including, but not limited to, a site specific NPDES permit for the Quarry and a TMDL for selenium in Permanente Creek. Stormwater runoff monitoring and sampling shall be conducted following the placement and final grading of the 1-foot run-of-mine non-limestone cover material to ensure that surface water discharging from this cover does not contain selenium at concentrations exceeding Basin Plan Benchmark values. Three rounds of representative surface water samples shall be collected and analyzed to verify rock cover performance prior to the placement of the vegetative growth layer.

g. Sample and test groundwater discharge from the Quarry Pit into Permanente Creek following reclamation as described on page 4.10-39 of the Final Environmental Impact Report to confirm that water quality in discharge meets Basin Plan Benchmarks and all other applicable water quality standards.

h. The data obtained through this mitigation measure shall be used to reevaluate the water balance components such as runoff and groundwater inflow and the water quality associated with these within the last five years of active mining. Based on the results of any refined water balance and water quality projections, the Mine Operator shall also review and refine the water management procedures. *(Implements Mitigation Measures 4.4-5 and 4.10-1b.)*

All testing data shall be submitted to the Planning Office with the Annual Report by October 1 of each year.

77. Reclamation of the Quarry Pit, EMSA, and WMSA areas shall not be considered complete until 5 years of water quality testing as described above demonstrate to the satisfaction of the Planning Manager that selenium in surface water runoff and any point source discharges has been reduced below all applicable water quality standards, including Basin Plan Benchmarks.

78. Within 90 days of RPA approval, the Mine Operator shall implement the following stormwater and sediment management controls in addition to general BMPs required by the SWPPP in active and inactive reclamation areas throughout Phase I, II, and III of the RPA. The Mine Operator shall:

    a. Segregate limestone materials from the non-limestone materials (breccia, graywacke, chert, and greenstone) by way of operational phasing to ensure that non-limestone materials are placed beneath and are covered by non-

limestone materials. A California Professional Geologist shall oversee stockpiling, segregation, and placement of non-limestone materials.

b. Stabilize inactive areas, such as temporary stockpiles or dormant excavations that drain directly or indirectly to Permanente Creek using an appropriate combination of BMPs to cover the exposed rock material, intercept runoff, reduce its flow velocity, release runoff as sheet flow, and provide a sediment control mechanism (such as silt fencing, fiber rolls, or hydroseeded vegetation). Standard soil stabilization BMPs include geotextiles, mats, erosion control blankets, vegetation, silt fence surrounding the stockpile perimeter, and fiber rolls at the base and on side slopes.

c. Temporarily stabilize active, disturbed reclamation areas undergoing fill placement before and during qualifying rain events expected to produce site runoff. Stabilization methods include combined BMPs that protect materials from rain, manage runoff, and reduce erosion. Reclamation activities involving grading, hauling, and placement of backfill materials cannot take place during periods of rain.

d. In areas such as the WMSA where fill slopes are steep and composed of loose material, controls shall be in place to prevent material from sloughing off into the PCRA and Permanente Creek. These controls shall include debris/silt fencing placed on outer edge of grading and excavation operations back-sloping excavations to prevent grade slope towards the creek, operations buffer areas that require the use of smaller grading equipment, temporary berms along the outer extent of operations closest to the creek, Mine Operator training regarding the prevention of triggering debris slides.

e. Cover active haul roads with non-limestone materials where exposed limestone surfaces are present. Roads that undergo dust control by watering must have fiber rolls or equivalent runoff protection installed along the road side to reduce runoff and avoid drainage to Permanente Creek.

f. Divert all runoff generated from disturbed active and inactive reclamation areas to temporary basins, the Quarry pit, or temporary vegetated infiltration basins and kept away from drainage pathways entering Permanent Creek. To the extent possible, drainage of the non-limestone materials shall be diverted directly to sediment control facilities and natural surface drainages.

g. Install up-gradient berms where limestone fines or stockpiles are placed, to protect against stormwater run-on, and install ditches and down-gradient berms to promote infiltration rather than run-off.

h. Replace the limestone rock and materials that are currently used in the existing BMP ditches and cover or otherwise separate runoff from limestone rock in the existing sediment pond embankments.

i. Cover large limestone surfaces that would remain exposed during the rainy season with interim covers composed of non-limestone rock types.

j. Inspect and maintain BMPs after each qualifying rain event to ensure their integrity.

k. Reconstruct or reline all existing stormwater conveyances and check dam structures that are constructed or lined with limestone rock using non-limestone material (greenstone, breccias, greywacke, metabasalt), available at the Quarry.

l. Regularly inspect all stormwater and erosion controls, especially before and following qualifying rain events. Inspections shall be documented and periodically reported. Any violations shall be corrected immediately.

m. Provide adequate erosion control training to all equipment and mine operators, site superintendants, and managers to ensure that stormwater and erosion controls are maintained and remain effective.

n. Use only jute netting or other suitable replacement for erosion control in the PCRA; no plastic monofilament shall be used for erosion control or other purposes, as California Red Legged Frogs and other wildlife may become entangled in it.

o. Ensure that all stormwater, erosion, and sediment control BMPs are installed, inspected, maintained, and repaired under the direction of either a California certified engineer, geologist, or landscape architect, a registered professional hydrologist, or a certified erosion control specialist.

Implementation of the Best Management Practices described above shall begin within 30 days of final RPA Approval. Prior to October 1, 2012, the Operator shall provide a report, with photos, documenting and demonstrating that the aforementioned BMP's are being implemented in all areas as described above. Prior to October 15 of each year, a County Inspector shall verify installation of the aforementioned BMP's. Inspection of BMP's by a County Inspector shall occur monthly between October 15 and April 15 for each year when interim reclamation activities occur. *(Implements Mitigation Measures 4.4-5 and 4.10-2a)*

79. **Interim Stormwater Monitoring Plan.** Prior to the start of reclamation activities, the Mine Operator shall develop a Stormwater Monitoring Plan for sampling and testing stormwater, that would supplement preexisting surface water monitoring required by General Industrial Storm Water and Sand and Gravel NPDES Permit and any other applicable permits designed to specifically monitor surface water during reclamation activities in active and inactive excavation and backfill areas, and locations where water discharges to Permanente Creek. The purpose of this plan is to evaluate performance of temporary BMPs and completed reclamation phases and to identify areas that are sources of selenium (measured on recoverable basis), sediment, or high TDS. At a minimum, the plan shall require the Mine Operator to inspect BMPs and collect water samples for analysis of TDS and metals, including selenium, within 24 hours after a

qualifying rain event and sample non-stormwater discharges when they occur. If elevated selenium, sediment, or TDS is identified through sample analysis, the Mine Operator shall identify the source and apply any new or modified standard BMPs available. BMPs that show sign of failure or inadequate performance shall be repaired or replaced with a more suitable alternative. Following implementation, the Mine Operator shall retest surface water to determine the effectiveness of such modifications, and determine whether additional BMPs are necessary. *(Implements Mitigation Measures 4.4-5 and 4.10-2b)*

For Phase I, submit the Stormwater Monitoring Plan for Phase I to the Planning Manager for review and approval prior to October 1, 2012.

For Phase II and III, submit a Monitoring Plan to the Planning Manager for review and approval sixty (60) days prior to the start of Phase II.

Stormwater testing results shall be submitted to Planning Manager on a monthly basis between October 15 and April 15 of each year. If a qualifying rain event did not occur during any month during this period (and stormwater testing was not conducted), notification shall be submitted to the Planning Manager in lieu of testing results.

80. **Monitoring and Determination of BMP Effectiveness for the EMSA**:

    a. Within 30 days of RPA approval, sampling and testing shall occur within 24 hours after a qualifying rain event. If no qualifying rain event occurs within 30 days of RPA approval, then testing shall begin at the first qualifying rain event. Testing shall be conducted in accordance with the Interim Stormwater Monitoring Plan developed and approved in accordance with Condition #79.

    b. If test results for two consecutive years show that stormwater discharging from the EMSA into Permanente Creek exceeds total recoverable selenium of Basin Plan Water Quality Objective, currently 5 μg/L (micrograms per liter), or other applicable discharge requirement as determined by the RWQCB, then the County shall schedule a public hearing before the Planning Commission to determine whether the Mine Operator is complying with stormwater discharge requirements. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

    c. If the Planning Commission determines that the Mine Operator is not complying with discharge requirements, then the operator shall install a treatment system (or alternative) as described in Condition #82. *(Implements Mitigation Measures 4.4-5 and 4.10-2c)*

81. **Monitoring and Determination of BMP Effectiveness for the WMSA and Quarry Pit**

a. Within 30 days of the start of reclamation activities for Phase II, the Mine Operator shall conduct monthly water sampling and testing results in compliance with the Interim Stormwater Monitoring Plan, as described under Condition #79.

b. If test results for two consecutive years show that selenium levels are higher than base levels, then the County shall schedule a public hearing before the Planning Commission to determine whether the reclamation activities are causing an increase in total selenium above the base levels. "Base levels" shall be defined as water testing results for an average for two years immediately prior to start of Phase II reclamation for discharge into Permanente Creek from the WMSA and Quarry Pit. For purposes of triggering Planning Commission review, the sampling shall occur at locations where water discharges to Permanente Creek.

c. If the Planning Commission finds that reclamation activities are causing an increase in selenium over base levels, then the Mine Operator shall install a treatment system (or alternative) as described under Condition #82. *(Implements Mitigation Measures 4.4-5 and 4.10-2d.)*

82. **Design, Pilot Testing, and Implementation of Selenium Treatment Facility or Alternative for the EMSA and/or WMSA and Quarry Pit.**

a. Within 30 days of RPA approval, the Mine Operator shall begin designing a treatment facility (or alternative) and pilot system for discharge into Permanente Creek. The treatment shall be designed to achieve the Basin Plan Water Quality Objective for selenium (total recoverable selenium of 5 μg/L) for discharge from the EMSA as defined in Condition #80, and/or to achieve the "base level" standard for the WMSA and Quarry Pit as defined in Condition #81 *(reference to Mitigation Measures 4.10-2d)*.

b. The Mine Operator shall complete design, pilot testing, and feasibility analysis for a treatment facility within 24 months of RPA approval or by such other time as may be prescribed by the RWQCB.

c. The Planning Commission shall hold a public hearing no later than 30 months after RPA approval to determine feasibility of the treatment facility (or alternative). The Planning Commission may defer the public hearing if the RWQCB determines that additional time is necessary to complete the design, pilot testing, and feasibility analysis. If the Planning Commission determines that a treatment facility is feasible, the Planning Commission shall also establish a timeline for implementing the treatment facility.

d. Construction, installation, and operation of a treatment facility (or alternative) shall be required if discharge requirements are not met as described under Conditions # 80 and # 81 based on a determination of the Planning Commission, and if it has been determined feasible by the Planning Commission following a public hearing. *(Implements Mitigation Measures 4.4-5 and 4.10-2e.)*

*Downstream Flood Protection*

83. **Construction of Onsite Detention Facility.** The Mine Operator shall design and construct detention facilities that would 1) manage increased runoff caused by the reclaimed Quarry pit, 2) reduce excessive discharges to Permanente Creek, and 3) develop the capacity to detain and release the 100-year flow using onsite detention pond basins while optimizing groundwater infiltration. The final drainage design shall ensure that offsite, downstream flows would not cause an increased flooding potential or lead to hydro-modification effects. Design considerations for onsite detention basins shall include the following performance standards:

    a. Maintain turbidity of receiving water outflows within discharge limitations for Permanente Creek, as set forth by the San Francisco Bay Regional Water Quality Control Board Basin Plan or other more stringent, site-specific limitations set forth by the RWQCB.

    b. Effectively drain between storm events within the period of time specified by the Santa Clara County 2007 Drainage Manual.

    c. Enhance the settlement of fine sediment while limiting the potential for sediment-laden water to be discharged to Permanente Creek.

    d. Incorporate appropriate sediment traps (i.e., low areas that promote sediment settlement) in areas away from outflow structures to limit discharge of sediment at high flow periods.

    e. Control surface water inflows to the detention facility using energy reduction features (i.e., rip-rap aprons, vegetated swales) to reduce inflow velocity and agitation of sediment within the basin.

    f. Infiltrate surface water, to the extent practicable and consistent with the water-quality recommendations for the backfill material as described in the RPA, while accounting for and protecting the local groundwater condition and water quality.

    g. In addition to the detention facilities for the Quarry pit, the Mine Operator shall ensure that the desiltation ponds proposed in other smaller project areas such as the EMSA, are engineered to function as detention basins and attenuate stormwater flows to the extent practical. The Mine Operator shall also consider a broader watershed approach and consult with Santa Clara Valley Water District (SCVWD) on ways to detain peak flows offsite in relation to areas of existing flooding and to the current SCVWD flood control improvement project. *(Implements Mitigation Measure 4.10-4)*

84. **Stormwater Control to Avoid Ponded Water and Selenium Accumulation**. The Mine Operator shall incorporate drainage features into the final drainage design for the Quarry pit area to eliminate the potential for surface ponding on the floor of the Quarry pit once it has reached its final elevation (990 amsl). The drainage design for the finished Quarry pit fill shall include engineered elements (e.g., conveyance channels, infiltration galleries) that facilitate groundwater

recharge and percolation from limestone area to groundwater in the Quarry backfill with the objective of accommodating high groundwater elevation without creating surface water bodies that may contain elevated levels of selenium. These measures shall be incorporated into the design of the proposed basin for the floor of the Quarry pit once the floor is raised to its final elevation. (*Implements Mitigation Measure 4.10-6*)

Prior to the start of Phase III, submit final drainage design demonstrating compliance with the standards described above.

85. Any body of water created during the operation of the quarry, both during excavation and processing the material, shall be maintained to provide for mosquito control and to prevent creation of any health hazards or public nuisance.

86. Sixty (60) days following RPA approval, the Mine Operator shall provide to the Planning Manager revised plans that show redesigned rip-rap energy dissipaters per the Association of Bay Area Governments (ABAG) standard for the 25 year storm for all discharge points on the reclamation plans.

*Noise*

87. The Mine Operator shall prohibit all heavy equipment operations in the northeasterly 11.5 acres of the EMSA (as shown in Draft EIR, Figure 4.13-8) during nighttime hours (i.e., between 10:00 p.m. to 7:00 a.m.). *(Implements Mitigation Measure 4.13-1a)*

88. The Mine Operator shall either: (1) limit all operations in the EMSA within 1,600 feet of the caretaker's residence (as shown in Figure 4.13-8) to no more than one 8-hour shift per day, or (2) submit evidence establishing to the County's satisfaction that there are legally-binding restrictions precluding any occupancy of the caretaker's residence during the entirety of Phase 1 of the RPA. *(Implements Mitigation Measure 4.13-1b)*

*EMSA Equipment*

89. Within thirty (30) days of the RPA Approval, the Mine Operator shall post a sign inside all mine equipment operating in the EMSA area with the text from Condition #42 (Light and Glare) and Conditions # 87 and # 88 (Noise). The sign shall be posted prominently within view of the vehicle operator. Within 30 days of the RPA approval, the Mine Operator shall submit to the Planning Manager photo documentation demonstrating compliance of this.

90.