SOIL MANAGEMENT PLAN

407 Spreckels Avenue
Manteca, California

Farallon PN: 1071-133

April 16, 2024

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APPENDICES

Appendix A Excerpts from Previous Environmental Investigations

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Appendix C California Department of Toxic Substances Control Clean Imported Fill Material Information Advisory

ACRONYMS AND ABBREVIATIONS

AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, total xylenes
CCR	California Code of Regulations
COCs	constituents of concern
Contractor	the party appointed by Prologis, L.P. or by another party(ies) to conduct Site improvements or redevelopment
DRO	total petroleum hydrocarbons as diesel-range organics
Environmental Professional	the engineer or environmental consultant appointed by Prologis, L.P. and/or the Contractor (the party appointed by Prologis, L.P. or by another party(ies) to conduct Site improvements or redevelopment) to assist in monitoring environmental conditions or activities
Environmental Restriction	Covenant and agreement to restrict the use of property, 407 Spreckels Avenue, Manteca, San Joaquin County, between the Owner and Central Valley Regional Board, dated July 9, 2018.
EPA	U.S. Environmental Protection Agency
Farallon	Farallon Consulting, L.L.C.
HASP	Health and Safety Plan
GRO	total petroleum hydrocarbons as gasoline-range organics
NFA	No Further Action Letter issued by the Central Valley Regional Board to the Owner of 407 Spreckels Avenue, dated July 26, 2018.
Prologis	Prologis, L.P.
Regional Board	Central Valley Regional Water Quality Control Board
SMP	Soil Management Plan
Site	the property at 407 Spreckels Avenue in Manteca, California
UST	underground storage tank
VOCs	volatile organic compounds

1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Soil Management Plan (SMP) on behalf of Prologis, L.P. (Prologis) for the property at 407 Spreckels Avenue in Manteca, California (herein referred to as the Site) (Figure 1). The purpose of this SMP is to provide protocols for managing confirmed and potentially impacted soil that may be encountered during future improvement activities involving subsurface work at the Site.

This document has been organized into the following sections:

- **Section 2, Site Description and Background,** provides a description of the Site and its historical use, the general Site setting, regional geology and hydrogeology, and the Site regulatory status.
- **Section 3, Known Environmental Conditions,** summarizes environmental investigations previously conducted at the Site, the defining regulations applicable to the Site, the constituents of concern (COCs), and the areas where COCs have been detected or are suspected to be detected at concentrations exceeding the defining regulations.
- **Section 4, Soil Management Plan,** presents the details of this SMP, including the requirements for communication, health and safety, and reporting; and management of soil, groundwater, stormwater, and unanticipated subsurface conditions.
- **Section 5, Modifications to the Soil Management Plan,** presents the conditions under which modifications to this SMP may be required.
- **Section 6, Scope, Representations, and Limitations,** provides the details of the scope of this SMP and representations and limitations under this SMP.
- **Section 7**, **References**, lists the documents cited in this SMP.

2.0 SITE DESCRIPTION AND BACKGROUND

This section provides a description of the Site and its historical use, the general Site setting, regional geology and hydrogeology, and the Site regulatory status.

2.1 SITE DESCRIPTION AND HISTORICAL USE

The Site consists of San Joaquin County parcel number 22125035, which totals approximately 14.83 acres of land. The Site is currently vacant undeveloped land, consisting of a disked soil.

As early as 1921, the Site and the adjoining properties to the north, south, and east were developed as the Spreckels Sugar Facility, which consisted of a beet sugar processing plant with warehouses, machine shops, and several fuel tanks used to service the equipment. Beginning in 1996, the facility closed and began decommissioning equipment.

The locations of former Site features are shown on Figure 2.

2.2 GENERAL SITE SETTING

The Site is at an elevation of approximately 42 feet above mean sea level. The topography in the general vicinity of the Site is relatively flat. Regional topography is relatively flat, with a slight slope down to the west/southwest. The water body nearest the Site was identified as the San Joaquin River, approximately 5.6 miles east.

Surrounding properties include medical offices and commercial developments to the north, Spreckels Avenue followed by commercial warehouses to the east, commercial and industrial developments to the south, and single family residential dwellings to the west.

2.3 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Site is in the City of Manteca, approximately 76 miles east of San Francisco in the Central Valley of California, specifically the San Joaquin Valley. The San Joaquin River is the closest waterbody, located approximately 5.6 miles east of the Site. The Site is characterized by Quaternary alluvium and lacustrine sediments. These are composed of sequences of interbedded silts, sands, and clays in shallow soils which may be encountered at the Site.

Prior assessments of the Site identified first-encountered groundwater at depths between 25 to 30 feet below ground surface (bgs). The Site-specific groundwater flow direction was estimated to be toward the west-northwest.

2.4 REDEVELOPMENT PLAN

The Site is planned for commercial-industrial redevelopment. The grading plan includes compaction in place. Underground water retention is planned on the southeastern corner of the Site to a depth of 13 feet bgs. As groundwater has been documented to occur at depths of at least 25 feet bgs, groundwater will not be encountered during redevelopment.

3.0 KNOWN ENVIRONMENTAL CONDITIONS

This section summarizes environmental investigations previously conducted at the Site and identifies the defining regulations applicable to the Site. The constituents of concern (COCs) and the areas where they have been detected at concentrations exceeding the defining regulations are also discussed.

3.1 PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Beginning in 1997 and until 2018, various environmental investigations have been performed at the Site beginning with the decommissioning of the sugar processing facility. Initially, San Joaquin County Environmental Health Department was responsible for environmental oversight at the Site. However, the Site was transferred to the Central Valley Regional Water Quality Control Board (Regional Board) to resolve environmental data gaps. Excerpts from the environmental documents and reports discussed below are presented in Appendix A.

Kleinfelder summarized past investigations in a letter to the Regional Board dated July 3, 2017 (Kleinfelder 2017, Appendix A). According to Kleinfelder, four former areas of potential environmental concern were identified for the Site. The former areas included the former diesel aboveground storage tank (AST) area, the former rail spur area, the former underground storage tank (UST) area, and the former slab drain area. The locations of these potential areas of concern are shown on Figure 2, and investigation findings from each area are summarized below.

- **Former Diesel AST Area:** Total petroleum hydrocarbons as diesel-range organics (DRO) were detected at concentrations exceeding applicable regulatory screening guidelines in one soil sample and one groundwater sample in the area. Subsequent groundwater sampling in 2005 demonstrated that the concentrations of DRO in groundwater had attenuated to less than the laboratory reporting limit of 500 micrograms per liter (µg/L) in groundwater.
- **Former Rail Spur Area:** Arsenic was detected at concentrations exceeding applicable regulatory screening guidelines in shallow soil. However, arsenic occurs naturally in soil at concentrations exceeding the guidelines. Polychlorinated biphenyls (PCBs), thallium, and pesticides did not exceed applicable regulatory screening guidelines; however, some laboratory reporting limits exceeded the guidelines. Lead was detected in one shallow soil sample at concentrations exceeding the California Waste Extraction Test (WET) limits for soluble lead, which would require disposal at a

hazardous waste landfill. According to Kleinfelder (2017), the lead-affected soil was excavated and disposed of off the Site.

- **Former UST Area:** The primary COCs associated with USTs were not detected above laboratory reporting limits. The COCs tested included lead; DRO; total petroleum hydrocarbons as gasoline-range organics (GRO); benzene, toluene, ethylbenzene, and total xylenes (BTEX); and methyl tertiary-butyl ether (MTBE).
- **Former Slab Drain Area:** Total extractable petroleum hydrocarbons exceeded risk based screening levels in three of seven soil samples at depths of 10, 12, and 20 feet bgs. Subsequent groundwater sampling in the area between 1997 and 2005 identified decreasing concentrations of total extractable petroleum hydrocarbons over time, reaching negligible concentrations by 2005.

At the request of the Regional Board, Kleinfelder performed additional investigation of the Site in late 2017 and early 2018 (Kleinfelder 2018) (Appendix A). During the investigation, 12 borings were drilled to 29 feet bgs with soil and groundwater samples analyzed, 53 passive soil vapor samples were analyzed across the Site, and 10 active soil vapor samples were analyzed. One ambient air soil vapor sample was analyzed for background levels. The passive soil vapor samples were used to identify areas for active soil vapor sampling. Vapor intrusion levels were calculated using active soil gas concentrations to determine whether the concentrations exceeded indoor air risk-based screening levels for commercial buildings. Kleinfelder concluded the following by media from the cumulative analytical results obtained from the Site.

- **Soil Gas:** Concentrations were compared to various state and federal screening levels for future industrial use applying an attenuation factor of 0.001. Modeling was also performed to evaluate migration of volatile organic compounds (VOCs) in soil gas phase to groundwater. Kleinfelder did not identify conditions that would adversely affect future industrial occupants or groundwater resources.
- **Soil:** Petroleum hydrocarbons and herbicides were not detected at concentrations exceeding industrial screening levels in soil. Select metals were detected at concentrations exceeding regulatory screening levels, but within established background concentrations. Three VOCs were detected in soil samples analyzed at concentrations less than regulatory screening levels or at depths of 25 feet bgs that were not corroborated by soil gas and groundwater data. Pesticides were detected in shallow soil beneath the Site at concentrations exceeding some regulatory screening guidelines, but not at concentrations that adversely affect future industrial use.

Kleinfelder recommended preparing a soil management plan to mitigate potential future off-Site disposal of shallow soil at the Site.

- **Groundwater:** Petroleum hydrocarbons and VOCs were not detected at concentrations exceeding regulatory screening levels where established. Metals detected in groundwater samples were primarily below regulatory screening levels, with minor exceedances that do not correlate with metals in soil analytical results. Based on these results, Kleinfelder concluded adverse conditions warranting further actions for groundwater were not identified.

On July 26, 2018, the Regional Board issued a No Further Action (NFA) determination for the Site based on data obtained from historical investigations. The NFA letter (Appendix A) states a deed restriction will be recorded requiring a soil management plan for any soil taken off the Site to prevent potential water quality impacts from Site soils containing 4,4-DDE and naturally occurring metals above regulatory screening levels for protection of groundwater. The deed restriction was recorded on July 13, 2018 (Appendix A).

3.2 DEFINING REGULATIONS

For the purposes of this SMP, the defining regulations for determining known environmental conditions at the Site are the presence of COCs in subsurface soil at concentrations exceeding published regulatory guidelines for commercial and industrial use. The published regulatory guidelines considered applicable to the Site for evaluating COCs in soil are the Regional Board Environmental Screening levels for Direct Exposure Human Health Risk Levels (Commercial/Industrial Shallow Soil Exposure and Construction Worker), and Leaching to Groundwater Levels (non-drinking water) (Appendix B), or COCs at concentrations similar to historical results summarized in prior assessment documents and approved to remain in place by the Regional Board (Appendix A), collectively referred herein as the Defining Regulations.

The disposition of soil removed from the Site will be determined in accordance with the regulations discussed in Section 4.3, Soil Management.

3.3 CONSTITUENTS OF CONCERN AND AREAS EXCEEDING DEFINING REGULATIONS

Based on findings from previous environmental investigations at the Site, known COCs applicable to the Site primarily include pesticides and metals, and to a lesser extent DRO and VOCs. Previous environmental investigations identified the known and potential presence of pesticides and metals in shallow soil exceeding the Defining Regulations. Other

COCs were less than the Defining Regulations or were detected at depths of at least 15 feet bgs and are not anticipated to be encountered during redevelopment activities at the Site.

4.0 SOIL MANAGEMENT PLAN

This SMP was developed to provide protocols for managing soil that are known to be or potentially are chemically impacted that may be encountered during future improvements or redevelopment activities conducted at the Site. This SMP is applicable to all earthwork activities performed at the Site. Elements of this SMP include:

- Communication requirements;
- Health and safety requirements;
- Soil management;
- Unanticipated subsurface conditions; and
- SMP reporting requirements.

The objective of this SMP is to minimize risk to human health, and to ensure protection of the environment during activities associated with improvements or redevelopment of the Site. Before any earthwork activities commence at the Site, this SMP should be made available to workers to address possible environmental risks associated with chemically impacted soil or unanticipated subsurface conditions.

The terms below as used throughout this SMP are defined as follows:

- Contractor: the party appointed by Prologis or by another party(ies) to conduct Site improvements or redevelopment; and
- Environmental Professional: the engineer or environmental consultant appointed by Prologis and/or the Contractor to assist in monitoring environmental conditions or activities.

4.1 COMMUNICATION REQUIREMENTS

Chemically impacted soil encountered under anticipated conditions during subsurface activities conducted at the Site will be managed in accordance with the procedures described in this SMP. In the event that unanticipated conditions are encountered, earthwork should be stopped, and Prologis should be notified within 24 hours of discovery of such conditions. Any reuse of suspect impacted soil to backfill excavations on the Site requires prior laboratory analysis, as outlined in Section 4.3.5, On-Site Reuse of Soil and Off-Site Disposal of Soil, and subsequent written approval by Prologis. Reporting requirements

related to earthwork activities are described in Section 4.7, Media Management Plan Reporting Requirements.

4.2 HEALTH AND SAFETY REQUIREMENTS

The Contractor or the Environmental Professional is responsible for preparing a Health and Safety Plan (HASP) for all tasks performed that require subsurface work at the Site, with the exclusion of general maintenance activities (e.g., landscaping). The HASP will provide the following information:

- The health and safety considerations for the specific COCs detected or potentially present at the Site;
- Personal protective equipment and monitoring requirements; and
- The physical hazards associated with the planned tasks.

The HASP will detail all planned construction activities and will describe standard safety precautions (e.g., protective gear for workers, proper soil-handling techniques). The HASP also will describe the minimum safety measures to be implemented at the Site during all activities. The Contractor or the Environmental Professional is responsible for ensuring that the safety precautions detailed in the HASP are implemented and monitored during all activities at the Site.

The Contractor or the Environmental Professional will abide by all applicable federal, state, and local regulations and codes relating to health and safety, and will adhere to all California Occupational Safety and Health Administration regulations contained in Title 8 of the California Code of Regulations (8 CCR), as they apply to the Site activities. Applicable regulations may include but are not limited to the following:

- Injury and Illness Prevention Program (8 CCR 1509 and 3202);
- Hazardous Waste Operations and Emergency Response (8 CCR 5192);
- Hazard Communication (8 CCR 5194);
- Personal Protective Equipment (8 CCR 10);
- Respiratory Protective Equipment (8 CCR 5144);
- Control of Noise Exposure (8 CCR 5095 through 5100);
- Excavations (8 CCR 1503 and 1539 through 1547);
- Fire Prevention and Suppression Procedures (8 CCR 4848);

- Portable Fire Extinguishers (8 CCR 6151);
- Cleaning, Repairing, Servicing, and Adjusting Prime Movers, Machinery, and Equipment Lockout/Tagout (8 CCR 3314); and
- Medical Services and First Aid (8 CCR 3400).

Detected and potential chemicals in soil at the Site have been identified under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) and are known to cause cancer and reproductive toxicity. Proposition 65 warnings are required if the estimated exposure to a person exceeds the California Office of Environmental Health Hazard Assessment "safe harbor level." The safe harbor level terms for carcinogens and chemicals with reproductive end points are "no significant risk levels" and "maximum allowable dose levels," respectively. The Contractor or Environmental Professional is responsible for conducting an independent evaluation to determine the need for Proposition 65 notifications for their workers.

If deemed appropriate, the Contractor or Environmental Professional involved in earthwork activities will conduct air monitoring due to the potential presence of VOCs in soil gas at the Site. Details of the air monitoring program should be outlined in the HASP and should include sampling frequency and required documentation. A photoionization detector should be used to monitor for VOCs in the area where work is performed. Action levels should be established in the HASP by the Contractor or Environmental Professional.

Any equipment that has been in contact with known contaminated soil during work conducted at the Site requires decontamination before being used at another location at the Site or before being removed from the Site. The exterior of any vehicles that have been exposed to contaminated soil requires decontamination using brooms or brushes to remove loose soil. If soil remains after brushing, the contaminated surfaces should be washed.

4.3 SOIL MANAGEMENT

This section describes the procedures for handling soil during earthwork activities conducted at the Site. These procedures do not apply to routine maintenance activities such as landscaping.

4.3.1 Site Access

A fence, k-rail, or other appropriate means will be used to surround and limit access to construction areas or soil stockpiles where potentially contaminated soil is exposed.

4.3.2 Soil Excavation

A HASP prepared by the Contractor or the Environmental Professional is required for all earthwork activities conducted at the Site, as specified in Section 4.2, Health and Safety Requirements. In the event that contaminated soil is brought to the surface by grading, excavation, or trenching, provisions stipulated in California State and/or federal law will be followed. Any stockpiling or on-Site reuse of excavated soil will be performed in accordance with the procedures described in this section.

4.3.3 Soil Confirmation Sampling

Soil confirmation sampling is defined as collecting soil samples at the limits of an excavation for laboratory analysis. Soil confirmation sampling typically is performed to document removal of chemically impacted soil to a specific cleanup level. Because soil removal actions anticipated by this SMP are limited to improvements such as utility trenching and do not include soil remediation activities, soil confirmation sampling is not required by this SMP, unless unanticipated contaminated soil is encountered. In the event that unanticipated contaminated soil is encountered and documented through laboratory analysis, Prologis and the Environmental Professional will be notified within 24 hours. The Environmental Professional will direct contaminated soil removal and will collect confirmation soil samples for analysis of COCs from the base and four sidewalls of the excavation, at a minimum, to document removal of soil in accordance with the Defining Regulations.

4.3.4 Soil Stockpiling

Stockpiled soil originating at the Site is required to be covered at the end of each workday. Practical considerations (e.g., the size of the stockpile, weather conditions, the length of time the stockpile will remain) will be used in determining the appropriate covering method. If soil in the stockpile is known or suspected to be chemically impacted, the stockpile will be placed on an impermeable layer (e.g., Visqueen plastic sheeting), fenced, and otherwise protected. Stormwater management with regard to sediment runoff will be consistent with local, state, and federal rules and regulations, including those set forth by Alameda County (under its Clean Water Program), and by the Regional Board. Additional measures must be taken to prevent runoff from entering storm drains leading to San Francisco Bay, as outlined in Section 4.5, Stormwater Management.

4.3.5 On-Site Reuse of Soil and Off-Site Disposal of Soil

It is anticipated that soil excavated from the Site can be reused as backfill material. Excavated soil that does not show evidence of chemical impact based on visual, olfactory inspection, or photoionization detector screening can be reused on the Site without laboratory analysis. Soil that shows evidence of chemical impact requires laboratory analysis prior to reuse at the Site. The frequency of laboratory analysis and specific laboratory analyses to be conducted will be established by the Environmental Professional on a case-by-case basis and approved by Prologis.

The Site-specific COCs will be analyzed using the following methods:

- VOCs by U.S. Environmental Protection Agency (EPA) Method 8260B;
- DRO by EPA Method 8015M;
- Pesticides by EPA Method 8081A; and
- Metals by EPA Method 6010/7000 Series.

Following analysis, if COCs are detected at concentrations less than the Defining Regulations in the soil sampled, or established regional background levels in the case of metals, the soil may be reused on the Site. Soil containing COCs at concentrations exceeding the Defining Regulations will be disposed of at a facility permitted to receive the soil for disposal. Any exceptions will require approval from Prologis.

4.3.6 Off-Site Reuse of Soil

Written approval from Prologis is required for any off-Site reuse of soil generated from earthwork activities or excavated at the Site. Soil intended for off-Site reuse must be sampled and meet the characterization requirements outlined in Section 4.3.5, On-Site Reuse of Soil and Off-Site Disposal of Soil. The sampling frequency for soil being removed from the Site will be determined by the Environmental Professional on a case-by-case basis and by the receiving facility.

4.3.7 Imported Fill Material

Written approval from Prologis is required for any importation of fill material to the Site. All imported fill is required to meet the minimum profile requirements outlined in the California Department of Toxic Substances Control *Information Advisory, Clean Imported Fill Material* (California Department of Toxic Substances Control 2001), provided in Appendix C. The origin of and any analytical data for imported fill material must be provided for Prologis review and

approval prior to importation of fill material. Imported fill material does not include recycled aggregate related to construction activities.

4.3.8 Dust Control

Implementation of dust-control measures to minimize dust generation is required during earthwork activities conducted at the Site. Basic dust-control measures described in the *California Environmental Quality Act Air Quality Guidelines* dated May 2017, prepared by the Bay Area Air Quality Management District (Bay Area Air Quality Management District 2017), must be followed. It is the responsibility of the Contractor to ensure that the presence of dust is minimized during construction activities and that all applicable local and state dust-control requirements are met. Should construction activities result in observable dust at the boundary of the Site, enhanced control measures will be performed by the Contractor.

4.4 STORMWATER MANAGEMENT

Runoff of sediment in stormwater to nearby storm drains will be minimized by implementing applicable stormwater pollution controls. The Contractor is required to obtain all necessary stormwater permits and to implement best management practices during construction activities conducted at the Site.

4.5 UNANTICIPATED SUBSURFACE CONDITIONS

It is unknown whether the locations of all utilities at the Site have been identified and marked. Unknown historical features or other structures also may be present at the Site and may be encountered during construction activities. Unanticipated subsurface features or conditions that may be present at the Site include:

- USTs;
- Concrete vaults;
- Former oil-water separators;
- Underground piping containing chemicals; and
- Chemically impacted soil.

In the event that the Contractor encounters an unanticipated condition, the Contractor will stop work, secure the work area, and notify Prologis within 24 hours of discovery of the condition. Prologis will identify and contact the appropriate entity to respond to the

unanticipated condition. The procedures that will be followed in the event of an unanticipated subsurface structure is discovered are summarized below:

- A licensed Contractor or an Environmental Professional will remove and containerize residual liquid, sludge, or sediment in the subsurface structure and will characterize the residual material(s) as required by the waste-receiving facility(ies);
- The Contractor will remove the subsurface structure in compliance with applicable laws and regulations, and under permit from and oversight by the applicable regulatory agency, if required;
- Soil-removal actions will be performed in accordance with the procedures outlined in this SMP; and
- The area will be cleared after any required regulatory authorization has been obtained from the permitting agency to allow work to proceed.

The Contractor will ensure that the health and safety requirements detailed in Section 4.2, Health and Safety Requirements, are met at all times, which will prepare Site workers for encountering unanticipated conditions during construction activities.

4.6 SOIL MANAGEMENT PLAN REPORTING REQUIREMENTS

With the exception of known conditions at the Site (Appendix A), any earthwork that involves chemically impacted soil or any unanticipated condition will be documented and reported to Prologis and the Regional Board. Minimum reporting requirements will consist of tabulated analytical results compared with industrial land use objectives, scaled Site plans depicting sampling locations, disposal manifests, and descriptions of methods used. All activities involving removal of chemically impacted soil will be performed under the oversight of a California State Professional Geologist or Professional Engineer.

5.0 MODIFICATIONS TO THE SOIL MANAGEMENT PLAN

This SMP has been developed based on currently known environmental conditions at the Site and current applicable regulations. This SMP may require modification for reasons including, but not limited to, the following:

- A change in Site use;
- Receipt of additional information pertaining to Site environmental conditions;
- Intrusive activity not addressed by this SMP;
- Updated chemical toxicity information for contaminants detected at the Site; and
- New legal or regulatory requirements applicable to the Site.

6.0 SCOPE, REPRESENTATIONS, AND LIMITATIONS

This SMP was developed exclusively to address the chemical constituents identified or potentially present during environmental investigations of the Site, as summarized in Section 3.0, Known Environmental Conditions. Other chemicals or media that may be encountered or generated during construction projects (e.g., demolition and construction debris, asphalt, concrete, asbestos-containing materials, lead-based paint) are not addressed in this SMP. In the event that hazardous construction materials are encountered or generated, it is the responsibility of the Contractor to ensure the proper handling and disposal of such materials.

Current Site conditions, laws, policies, and regulations were used to develop this SMP. No representation is made to any present or future developer or owner of the Site or portions of the Site with respect to future Site conditions other than those specifically identified in this document.

This SMP was prepared for the sole use of Prologis, L.P. Unless specifically agreed to in writing, all other such use is unauthorized. Any use or interpretation of or reliance on this SMP is at the sole risk of the unauthorized user, for which Farallon will bear no liability to any party, including any present or future developer, owner, Contractor, agent, occupant, consultant, Environmental Professional, or any other party owning or visiting the Site or portions of the Site based on or arising out of implementation of this SMP. It is expressly understood that although this SMP is intended to provide guidance and establish a framework for management of residual chemicals at the Site to protect human health and the environment, it in no way creates any warranties or obligations by Farallon as to the implementation, adequacy, or success of protective measures under this SMP.

7.0 REFERENCES

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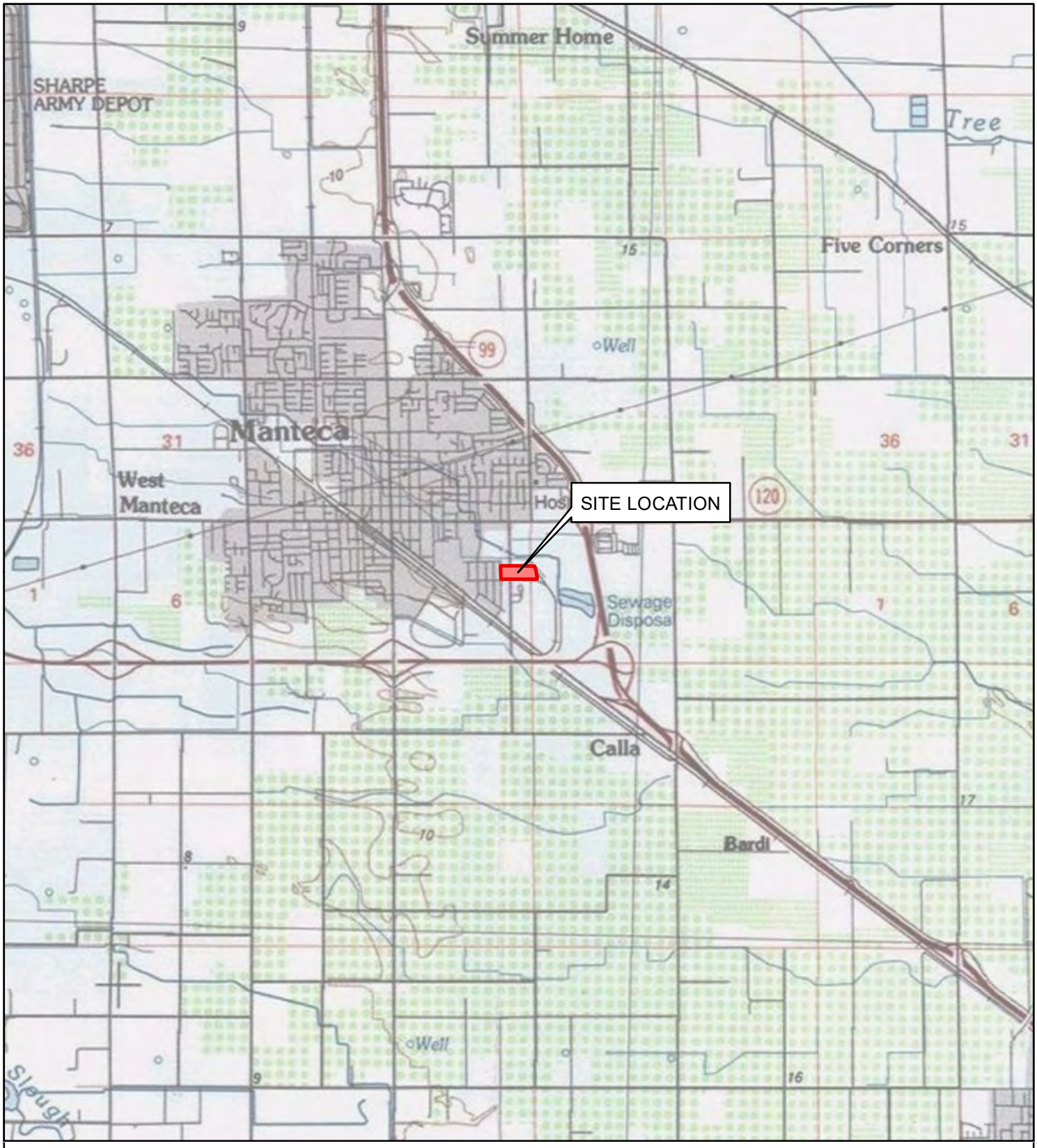
FIGURES

SOIL MANAGEMENT PLAN
407 Spreckels Avenue
Manteca, California

Farallon PN: 1071-133



REFERENCE: 7.5 MINUTE USGS QUADRANGLE MANTECA, CALIFORNIA, DATED 2013

N

0 5,000

SCALE IN FEET

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Washington
Issaquah | Bellingham | Seattle

Oregon
Portland | Baker City

California
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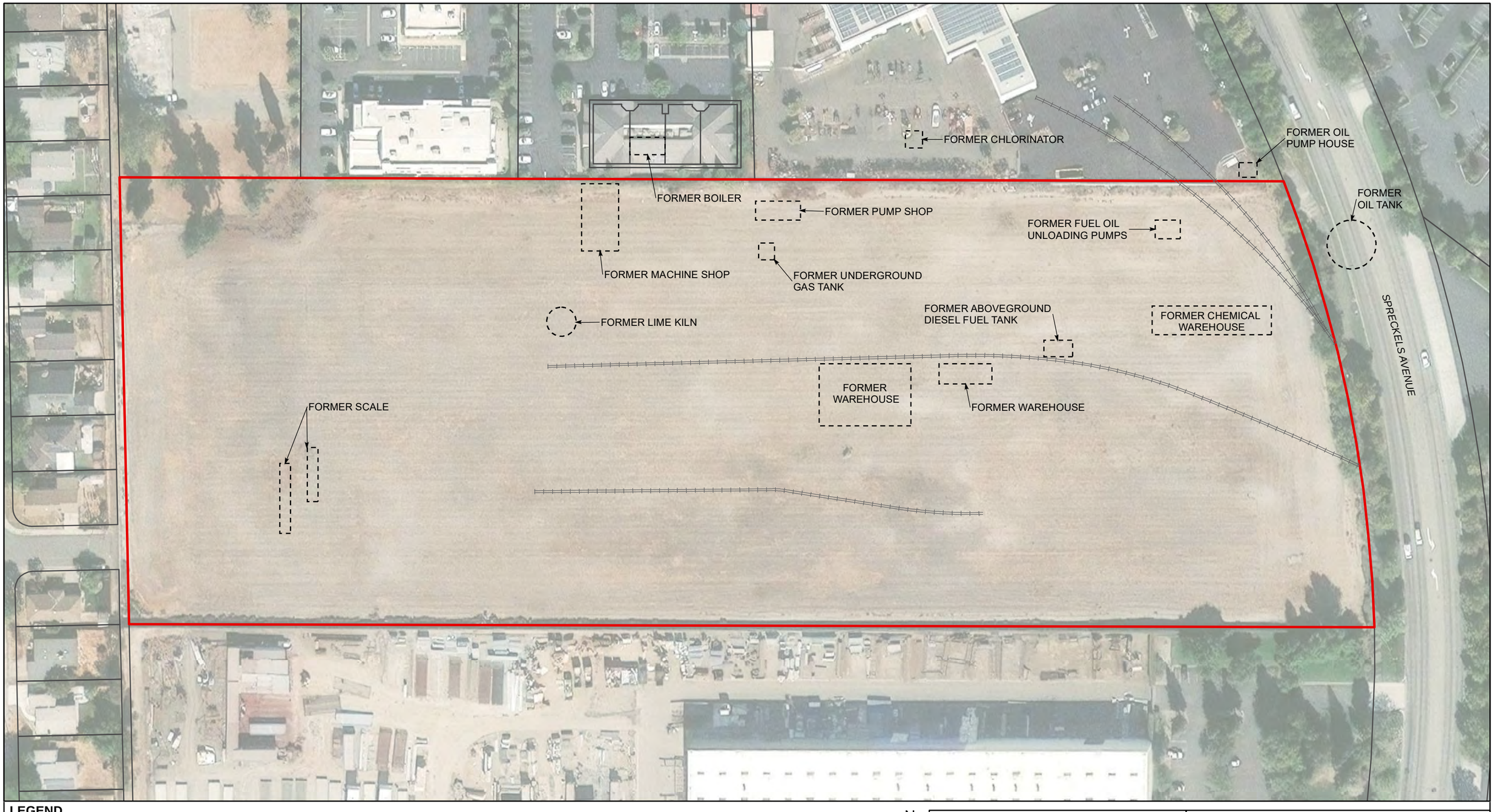
FIGURE 1

SITE VICINITY MAP
407 SPRECKELS AVENUE
MANTECA, CALIFORNIA

FARALLON PN: 1071-133

Drawn By: lmurock | Checked By: JDP | Date: 3/18/2024 | Disc Reference: Q:\Projects\1071 Prologis\133 407 Spreckels Avenue\Mapfiles\001\Figure-01_VicinityMap.mxd



LEGEND

- FORMER RAILROAD SPUR
- FORMER SITE FEATURE
- SITE BOUNDARY
- SAN JOAQUIN COUNTY PARCEL BOUNDARY

0 100
SCALE IN FEET

N

NOTES:
1. ALL LOCATIONS ARE APPROXIMATE.
2. FIGURES WERE PRODUCED IN COLOR. GRAYSCALE COPIES MAY NOT REPRODUCE ALL ORIGINAL INFORMATION.

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FIGURE 2

SITE PLAN
407 SPRECKELS AVENUE
MANTECA, CALIFORNIA

FARALLON PN: 1071-133

Drawn By: lmurock
Checked By: JDP
Date: 3/28/2024
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APPENDIX A
EXCERPTS FROM PREVIOUS ENVIRONMENTAL INVESTIGATIONS

SOIL MANAGEMENT PLAN
407 Spreckels Avenue
Manteca, California

Farallon PN: 1071-133

EXCERPTS FROM PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Soil Management Plan
407 Spreckels Avenue
Manteca, California
Farallon PN: 1071-133

Excerpt 1: Kleinfelder. 2018. *Phase II Environmental Site Assessment Report, Former Spreckels Sugar-Processing Factory, 407 Spreckels Avenue, Manteca, California.* April 6.

Excerpt 2: Kleinfelder. 2017. *Summary of Past Phase II Findings, 407 Spreckels Avenue, Manteca, California.* Letter to the Central Valley Regional Water Quality Control Board. July 3.

Excerpt 3: No Further Action Letter issued by the Central Valley Regional Board to the Owner of 407 Spreckels Avenue, dated July 26, 2018.

Excerpt 4: Covenant and agreement to restrict the use of property, 407 Spreckels Avenue, Manteca, San Joaquin County, between the Owner and Central Valley Regional Board, dated July 9, 2018.

PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT FORMER SPRECKELS SUGAR-PROCESSING FACTORY 407 SPRECKELS AVE MANTECA, CALIFORNIA

April 6, 2018

A Report Prepared for:

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PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT
SPRECKELS
407 SPRECKELS AVE
MANTECA, CALIFORNIA

Kleinfelder Job No. 20173951.001A

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April 6, 2018

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EXECUTIVE SUMMARY

This Phase II Environmental Site Assessment Report describes activities performed on November 21, 22, 30, December 19, 20, 22, 27, and 28, 2017, and March 6, 2018, at the former Spreckels sugar-processing factory property, located at 407 Spreckels Avenue in Manteca, California (Site).

In anticipation of site redevelopment, soil and groundwater quality and soil gas conditions were investigated at operable units 1 through 11 (OU-1 through OU-11) where chemical releases may have occurred during the normal course of factory operations. The scope of work was based on Kleinfelder's approved *Closure Work Plan (Work Plan)*, dated November 2, 2017 (Kleinfelder file control number 20173951.001A/SAC17R68420).

The investigation was performed in general accordance with United States Environmental Protection Agency (USEPA) and Department of Toxic Substances Control (DTSC) guidelines and recognized industry standards.

Investigation activities included passive soil gas, active soil gas, soil, and groundwater sampling and analysis. Passive soil gas sampling provided a qualitative evaluation of soil gas conditions throughout the site. Sample results from the passive soil gas sampling helped to refine the soil gas investigation approach and supported the identification of appropriate locations for active soil gas sampling, which provided a quantitative result. Analytical results were compared to risk-based screening levels as follows:

Medium	Risk-based Screening Levels	Screening Level Sources
Soil gas	DTSC-SLs[a] U.S. EPA RSLs[a]	DTSC (2018) EPA (2017)
Soil	DTSC-SLs U.S. EPA RSLs and SSLs SFRWQCB ESLs	DTSC (2018) EPA (2017) SFRWQCB (2016)
Groundwater	DTSC-SLs U.S. EPA RSLs SFRWQCB ESLs California MCLs[b] California PHGs[b]	DTSC (2018) EPA (2017) SFRWQCB (2016)

Table Notes:
[a] DTSC-SLs and U.S. EPA RSLs for indoor air at commercial/industrial sites were adjusted by an attenuation factor of 0.001 to account for the reduction in soil gas concentrations as vapors migrate through the soil column and building foundations and are diluted in indoor air.
[b] The California Office of Environmental Health Hazard Assessment (OEHHA) establishes MCLs and PHGs pursuant to Health and Safety Code §116365(a) and (c), respectively. MCLs and PHGs are available on-line at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/MCLsandPHGs.html

Abbreviations:

DTSC, Department of Toxic Substances Control
EPA, United States Environmental Protection Agency
SL, screening level
RSL, Regional Screening Level
SSL, Soil Screening Level for the Protection of Groundwater
ESL, Environmental Screening Level
SFRWQCB, San Francisco Bay Regional Water Quality Control Board
MCL, Maximum Contaminant Level
PHG, Public Health Goal

References:

DTSC. 2018. Human Health Risk Assessment (HHRA) Note 3 (January 2018 update, February 2018, Table 2 update) – DTSC-modified Screening Levels (DTSC-SLs). Department of Toxic Substances Control, California Environmental Protection Agency, Sacramento, California.

EPA. 2018. Regional Screening Levels (RSLs) – Generic Tables (November 2017). Available at https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-november-2017. Accessed April 2018.

San Francisco Bay Regional Water Quality Control Board (SFRWQCB). 2016. Environmental Screening Level Workbook. Available on-line at http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml. Accessed September 19, 2017.

The DTSC-recommended attenuation factor of 0.001 for future commercial structures was applied to industrial air RSLs to estimate potential indoor air concentrations, of the chemicals of concern, based on soil gas concentrations. The attenuation factor accounts for the reduction in soil gas concentrations as vapors migrate through the soil column and building foundations and are diluted in indoor air.

Analytical data developed in previous investigations of each operable unit underwent a spot check comparison to current screening levels. The spot check was performed for each historical report associated with the operable units at rates identified within the approved Work Plan. A review of the spot check is provided in Section 5.

Passive Soil Gas Samples

Passive soil gas sampling was conducted at 53 locations on site. Reported qualitative results from the sampling event identified areas for active soil gas sampling.

Active Soil Gas Samples

In ten of ten active soil gas samples, no petroleum-related analytes or other volatile organic compound (VOC) were present at a concentration greater than a soil gas screening level derived using applicable attenuation factor. Similarly, no constituent analyzed was reported at a concentration greater than an industrial air screening level in the single ambient air sample analyzed.

Soil Samples

Methylene chloride was detected in four of 37 samples analyzed. Concentrations are reported above the protection of groundwater soil screening level (SSL) of 2.9 microgram per kilogram (µg/kg) in two of four samples. Reported concentrations ranged from 1.7J (trace) to 6.6J µg/kg (OU-5-SV-01-5 and OU-11-6-7-25, respectively). Soil concentrations of methylene chloride did not exceed the industrial soil RSL of 1,000 milligrams per kilogram (mg/kg).

4,4'-DDE was detected in 14 of 25 samples analyzed. Concentrations are reported above the SSL of 11 µg/kg in eight samples. Reported concentrations ranged from 6.1J to 200 µg/kg (OU-11-SC-01-2 and OU-5-MW-15-2, respectively). Detected concentrations of 4,4'-DDE did not exceed the industrial soil RSL of 9,300 µg/kg.

Arsenic was detected in six of six samples analyzed for metals in soil. Concentrations are reported above the SSL of 0.0015 mg/kg in the six samples. Reported concentrations range from 1.1J to 3 mg/kg (OU-11-6-8-5 and OU-11-6-7-5, respectively). Detected concentrations of arsenic exceeded the DTSC Note 3 screening level of 0.36 mg/kg but did not exceed the industrial soil RSL of 3 mg/kg.

Cobalt was detected in six of six soil samples analyzed for metals. Concentrations are reported above the SSL of 0.27 mg/kg in the six samples. Reported concentrations range from 3.0 to 10 mg/kg (OU-11-6-8-15 and OU-11-6-8-25, respectively). Detected concentrations of cobalt did not exceed the industrial soil RSL of 350 mg/kg.

Mercury was detected in four of six samples analyzed for metals. Concentrations are reported above the SSL of 0.033 mg/kg in two of four samples. Concentrations were reported at trace values ranging from 0.014J to 0.035J mg/kg (OU-11-6-8-5 and OU-11-6-7-5, respectively). Detected concentrations of mercury did not exceed the DTSC Note 3 screening level of 4.5 mg/kg or industrial soil RSL of 46 mg/kg.

Thallium was detected in six of six soil samples analyzed for metals. Concentrations are reported above the SSL of 0.14 mg/kg in the six samples. Concentrations were reported at trace values ranging from 0.070J to 0.21J mg/kg (OU-11-6-7-5 and OU-11-6-7-25, respectively). Detected concentrations of thallium did not exceed the industrial soil RSL of 12 mg/kg.

All other soil detections are reported below their respective SSLs, DTSC Note 3 screening levels, and select ESLs, where established. Additionally, all detected soil exceedances of the SSLs are noted to be below their respective RSLs for industrial soil use.

Groundwater Samples

Benzene was detected in three of six samples analyzed. Concentrations are reported above the California PHG of 0.15 µg/L in all three samples at concentrations ranging from 0.22J µg/L at OU-5-MW-15 to 0.93 µg/L at OU-5-MW-24. Detected concentrations of benzene in groundwater did not exceed the established California MCL of 1 µg/L or the federal MCL of 5 µg/L.

Nitrate as N was detected in two of two samples analyzed. Concentrations are reported above the federal MCL, California MCL, and California PHG of 10 mg/L in one sample, 74 mg/L at OU-1-5-2. Detected concentrations of Nitrate as N are reported as 0.18J mg/L at OU-1-5-1 to 74 mg/L at OU-1-5-2.

Antimony was detected in two of four samples analyzed. Concentrations are reported above the California PHG of 1 µg/L and the MCL of 6.0 µg/L in both samples at concentrations of 26J µg/L at OU-11-6-7 and 110 µg/L at OU-1-5-1.

Arsenic was detected in four of four samples analyzed. Concentrations are reported above the California PHG of 0.004 µg/L and the DTSC Note 3 screening level of 0.0082 µg/L in all four

samples at concentrations ranging from 2.6J µg/L OU-11-6-7 to 7.7 µg/L at OU-1-5-1. Detected concentrations of arsenic in groundwater did not exceed the federal MCL or California MCL of 10 µg/L.

Nickel was detected in four of four samples analyzed. Concentrations are reported above the California PHGs of 12 µg/L in three samples. Reported concentrations ranged from 5.9J µg/L at OU-11-6-8 to 190 µg/L at OU-1-5-2. Additionally, three samples (OU-1-5-1, OU-1-5-2, and OU-11-6-7) are reported above the California MCL of 100 µg/L.

Hexavalent chromium was detected in one of four samples analyzed at 2.2 µg/L at OU-11-6-7. The detected concentration is reported above the California PHG of 0.02 µg/L.

Lead was detected in three of four samples analyzed. Concentrations are reported above the California PHG of 0.2 µg/L in three samples. Reported concentrations ranged from non-detect <0.23 µg/L at OU-11-6-8 to 0.68J µg/L at OU-1-5-2. Detected concentrations of lead in groundwater did not exceed the established federal MCL or California MCL of 15 µg/L.

Thallium was detected in four of four samples analyzed. Concentrations are reported above the California PHG of 0.1 µg/L in all four samples at concentrations ranging from 0.31J µg/L at OU-11-6-7 to 1.2J µg/L at OU-11-6-8. Detected concentrations of thallium in groundwater did not exceed the established federal MCL or California MCL of 2 µg/L.

All other groundwater detections are reported below their respective MCLs and PHGs, where established.

Recommendations

Analyte concentrations in soil gas did not exceed screening levels derived by applying an attenuation factor to commercial/industrial indoor air screening levels. Detected exceedances of SSLs for soil located at the Site are noted to be below all industrial soil RSLs, with the exception of one sample reported at the RSL, and are reported as non-detected below their respective method detection limit or below established MCLs for groundwater. Detected exceedances of screening levels for groundwater are noted to be within background levels for groundwater in the area and vary from detected exceedances in soil. These results indicate that groundwater at the site is not impacted by detected analytes in soil. Based upon the concentrations of the detected analytes at the Site in soil gas, soil, and groundwater, Kleinfelder recommends no

further action to address soil, soil gas, or groundwater quality at the Site and that the Central Valley Regional Water Quality Control Board (CVRWQCB) issue a closure letter for the Site with a Soil Management Plan (SMP) regarding the use of onsite soil or for off hauling purposes only at the earliest possible convenience. Details outlining the recommendation for no further action are discussed below.

1 BACKGROUND

1.1 SITE INTRODUCTION AND DESCRIPTION

The Spreckels Site is an approximately 14.83-acre property located at 407 Spreckels Ave in Manteca, California (Figures 1 and 2). The Site is bounded by industrial and medical offices to the North, industrial businesses to the East, and South, and residential property to the west. Prior to AKF Development Holdings LLC purchase of the property, the property was operated as a sugar-processing factory by Spreckels Sugar Co. until its closure on January 9th, 1996.

Past activities that may have chemically-impacted soil gas, soil, and groundwater, when the plant was in operation have been identified and assessed in previous investigations for environmental concerns. This Phase II investigation report was implemented to address areas where data gaps have been identified by Kleinfelder and the CVRWQCB and to review historical reports and laboratory data for accuracy and completeness so the Site can be petitioned for closure in preparation for Site redevelopment.

1.2 REGIONAL AND LOCAL GEOLOGY

The site lies within the Great Valley Geomorphic Province of California. The valley is approximately 400 miles long and averages about 50 miles wide, and comprises about 20,000 square miles. The valley has been filled with a thick sequence of marine and non-marine sediments from the late Jurassic to Holocene. The uppermost strata of the Great Valley represent, for the most part, the alluvial, flood, and delta plains of two major rivers (Sacramento and San Joaquin Rivers) and their tributaries.

The valley deposits are derived from the Coast Ranges to the west and the Sierra Nevada to the east. Granitic and metamorphic rocks outcrop along the eastern and southeastern flanks of the valley. Marine sedimentary rocks outcrop along most of the western, southwestern, southern, and southeastern flanks; and volcanic rocks and deposits outcrop along the northeastern flanks of the valley. The valley geomorphology includes dissected uplands, low alluvial plains and fans, river flood plains and channels, and overflow lands and lake bottoms. The majority of the native sediments near the site consist of Miocene to Holocene continental

rocks and deposits of a heterogeneous mixture of generally poorly sorted clay, silt, sand and gravel. Some beds of claystone, siltstone, sandstone, and conglomerate are also present.

Data from the investigation and public records at neighboring sites indicate that first encountered groundwater typically occurs at depths between 20 and 27 feet below ground surface (bgs). Groundwater flow direction is to the northwest.

1.3 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) comprises the various exposure pathways by which humans, other animals, or biota could be exposed to hazardous chemicals released to the environment. An exposure pathway describes the course a chemical could take from a source to a location where a receptor (i.e., a human, plant, or animal) could come into contact with that chemical. An exposure pathway comprises five elements:

- Source(s),
- Release mechanism,
- Transport mechanism,
- Exposure point, and
- Receptor.

An exposure pathway is complete (i.e., exposure of a receptor to a chemical could occur) if a receptor ingests or inhales a chemical, or if the chemical contacts or is absorbed through the skin. Exposure cannot occur (and, therefore, there is no risk) if an exposure pathway is not complete. The potential exposure pathways that may be associated with the former Spreckels factory site are presented in Figure 3 and discussed in Report Table 1 below.

Report Table 1: Summary of Receptors and Potential Exposure Pathways

Affected Medium	Receptor	Exposure Pathway	Potentially Complete Pathway?	Comment
Soil	Onsite Commercial Workers and Customers	Direct contact (ingestion, dust inhalation, dermal contact)	NO	After development for commercial/industrial purposes, affected soil will be covered by hardscape (pavement, sidewalks, etc.), or under the footprint of buildings.
	Intrusive Maintenance or Construction Workers	Direct contact (ingestion, dust inhalation, dermal contact)	YES	During or after redevelopment, intrusive and construction works may result in exposure of this receptor group to affected soil during the period of construction or maintenance.

Affected Medium	Receptor	Exposure Pathway	Potentially Complete Pathway?	Comment
Soil Gas	Onsite Commercial Workers and Customers	Inhalation of indoor air	YES	Soil gas migrating from subsurface sources may enter the occupied spaces of a commercial/industrial building constructed in the future.
	Intrusive Maintenance or Construction Workers	Inhalation of outdoor air	YES	Soil gas migrating from subsurface sources may be released to outdoor air during intrusive maintenance or construction works.
Groundwater	Onsite Commercial Workers	Direct contact (ingestion, dermal contact)	NO	Water for personal or commercial/industrial needs will be supplied by a private or municipal system unaffected by chemical releases on the Site.
	Intrusive Maintenance or Construction Workers	Direct contact (ingestion, dermal contact)	YES	Groundwater may enter excavations completed during intrusive maintenance or construction works and result in direct contact exposures of workers.

Potential health hazards for intrusive maintenance or construction workers are best managed under a project- and site-specific health and safety plan because exposure to chemicals in the environment, if exposure occurs at all, would be infrequent and of short-duration. Personal protective equipment (PPE) would also be supplied to intrusive maintenance or construction workers to reduce or eliminate potential hazards. By contrast, a worker employed at a business onsite would likely be present five days per week for several years.

1.3.1 Selection of Appropriate Risk-based Screening Levels

Risk-based screening levels (RBSLs) are concentrations of chemicals in the environment that may warrant further investigation, mitigation, or remediation based on the likelihood of adverse health effects in an exposed individual. Chemicals present at concentrations less than a RBSL generally do not warrant further investigation, mitigation, or remediation.

There are several sources of RBSLs, including the U.S. Environmental Protection Agency (EPA), the California Environmental Protection Agency (Cal/EPA) – Department of Toxic Substances Control (DTSC), and the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Each of these agencies develops RBSLs that are medium-specific and address specific exposure pathways. Thus, for example, Regional Screening Levels (RSLs) developed by EPA for residential soil account for exposure by soil ingestion, dermal contact, and inhalation of volatile chemicals or particulates to which chemicals have adsorbed. Residential soil RSLs do not account for other exposure pathways such as ingestion of homegrown produce.

RBSLs are useful tools for evaluating environmental site assessment data and have been applied to the site assessment data developed for the Spreckels site. The following hierarchy of RBSL sources was considered when selecting RBSLs for use on the subject site:

- DTSC-screening levels – DTSC[1] recommends the use of U.S. EPA RSLs except for specific chemicals that DTSC has determined to be at least three-fold more toxic than EPA and DTSC has developed modified screening levels (DTSC-SLs) to address those chemicals;
- U.S. EPA Regional Screening Levels (RSLs);
- California Maximum Contaminant Level (MCLs) and Public Health Goals (PHGs); and
- San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels (ESLs).

Each of these sources provides SLs applicable to soil, water, and air (indoor or outdoor). For the migration of soil gas from subsurface sources to indoor air, indoor air SLs were adjusted by means of an attenuation factor that accounts for the barrier effect of the soil column and building foundation, and the dilution of soil gas as it enters a building and is mixed with indoor air. DTSC[2] provides attenuation factors for specific building types and land uses. For future commercial buildings, the recommended attenuation factor is 0.001. Soil gas SLs can then be derived from indoor air SLs as follows:

$$SL_{soil\ gas} = RBSL_{indoor\ air} \div AF$$

Where:

$SL_{soilgas}$ = the soil gas screening level
$RBSL_{indoor\ air}$ = the risk-based screening level for indoor air
AF = the unitless attenuation factor published by DTSC

[1] *Human Health Risk Assessment (HHRA) Note 3 – DTSC Modified Screening Levels (DTSC-SLs). Available online at http://dtsc.ca.gov/AssessingRisk/upload/HHRA-Note-3-January-2018.pdf. Accessed February 1, 2018.*

[2] *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (Vapor Intrusion Guidance). Department of Toxic Substances Control, California Environmental Protection Agency, Sacramento, California. October.*

Because chemicals released to soil may migrate through the soil column to groundwater, the U.S. EPA has published SSLs for soil that are intended to protect groundwater (Protection of Groundwater Soil Screening Levels). In the absence of information about groundwater conditions, the Protection of Groundwater SSLs are useful for health effects screening. On the Spreckels site, however, groundwater samples have been collected and analyzed for chemicals of concern, including petroleum-related constituents, VOCs, SVOCs, and metals. Therefore, the Protection of Groundwater SSLs are not necessary for addressing soil.

2 PRE-FIELD ACTIVITIES

2.1 HEALTH AND SAFETY PLAN

Prior to conducting field work for the Phase II investigation, Kleinfelder developed a site-specific health and safety plan (HASP) for on-Site activities. The HASP identified key project personnel, potential health and safety concerns, and appropriate personalized protective equipment (PPE) levels. The HASP was reviewed and signed by Kleinfelder personnel, observers, and subcontractor personnel each day prior to beginning activities.

2.2 UNDERGROUND UTILITY CLEARANCE

Sample locations were marked with white paint and/or wooden stakes and Underground Service Alert (USA) was notified by both Kleinfelder and Vannucci Technologies of the proposed sampling locations at least 72 hours before the start of sampling. The USA Ticket (No. X734001329) was kept active throughout the investigation. Kleinfelder reviewed historical drawings of the Site from previous Phase I and II investigations to assess areas of concern. Prior to the start of intrusive activities, Kleinfelder personal conducted a field walk through to perform final assessment and review of sampling locations.

2.3 PERMITTING AND SUBCONTRACTOR COORDINATION

Prior to advancing the borings for the Phase II Environmental Site Assessment (ESA) sampling activities, Kleinfelder obtained an environmental assessment drilling permit from the San Joaquin County Environmental Health Department (SJCEHD). A copy of the approved permit is included in Appendix A.

3 FIELD ACTIVITIES

Field activities were conducted on November 21, 22, 30, and December 19, 20, 22, 27, and 28, 2017, and March 6, 2018. Field activities included the following:

- Fifty-three (53) passive soil gas (PSG) locations
- Twelve (12) shallow soil and groundwater borings
- Ten (10) active soil gas (ASG) locations and one ambient air location

Rationale for sampling locations (Figure 4) is presented in Table 1.

3.1 PASSIVE SOIL GAS SURVEY

Kleinfelder used passive soil gas (PSG) modules which collect soil gas in absorbent material to obtain preliminary data to identify potential areas for further investigation. PSG sample locations were advanced in an approximate gird pattern to provide coverage over the Site with the understanding that the radius of detection can vary considerably depending on shallow sub-surface soils lithology and permeability. PSG analysis provides qualitative results. The results are typically then used to select locations for the collection of active soil gas (ASG) in canisters. ASG analysis provides quantitative data.

To perform the initial screening, 53 PSG samplers were installed at locations identified on Figure 4. On November 21 and 22, the modules were installed in a narrow ¾-inch pilot hole excavated with a slide hammer and dynamic cone penetrometer to depths between two and three feet bgs in native soil. Removal and backfilling of the pilot holes were completed on November 30, 2017.

3.2 ACTIVE SOIL GAS SAMPLING

Following receipt and review of PSG survey results and preliminary indications of contamination, five duel-nested locations were selected for ASG sampling. Locations are presented in Figure 4. Soil gas probe installation, purging, and sampling was conducted in general accordance with state DTSC Advisory on Active Soil Gas Investigations, April 2012, and is described below.

3.2.1 Probe Installation

On December 19, 2017, five soil borings were advanced to 15 feet bgs using direct push drilling technology and converted to temporary soil gas sampling locations. Soil gas probes consisted of a new polyethylene screened tip attached to new ¼-inch diameter nylaflow tubing. Probes were installed within the five soil borings as a duel-nested configuration with soil gas probes being placed at 5-feet and 15-feet bgs. Prior to installing each probe, approximately three inches of #3 sand was added to the borehole. The probe was then lowered inside the borehole and then another three inches of sand was placed in the annulus between the probe and the borehole sidewalls. Six inches of dry bentonite was then placed above the sand to create a buffer for the hydrated bentonite grout. The remaining annulus was filled with hydrated bentonite grout to approximately six inches below the next probe interval. Dry bentonite was then used to bring the borehole up to the next probe interval to create a buffer between the hydrated bentonite and the shallow probe interval. The probe installation procedure then repeated itself with hydrated bentonite grout being brought up to ground surface. The above-ground end of the tubing was capped and the location was marked with a wooden stake while the bentonite was allowed to hydrate.

3.2.2 Pre-sampling Purging and Leak Checking

On December 22, 2017, Kleinfelder mobilized to the Site to collect samples from the soil gas probes. Soil gas samples were collected using certified “clean” sampling equipment provided by Eurofins / Air Toxics. The equipment included 1 liter (L) stainless steel SUMMA™ canisters, flow meters and sample manifolds, and sorbent tubes. The equipment was inspected by Kleinfelder prior to sampling. On the same day that soil gas samples were collected, ambient air samples were also collected using 6L SUMMA™ canisters and sorbent tubes.

Prior to the collection of soil gas samples, a shut-in test was performed to identify leaks that could result in dilution of soil gas samples by ambient air. A vacuum was applied to each sampling train and monitored for approximately five minutes. All sampling trains passed the shut-in test.

Following the shut-in test, the void space inside of the tubing and pore/void space of the sand pack around the probe was purged of a minimum of three volumes of air to remove ambient air that may have been introduced during probe construction.

Purging was performed using laboratory-provided 60 milliliter (ml) plastic syringes at a flow of 100 to 200 milliliters per minute (ml/min). The ground surface seals for each soil gas sampling probe were also checked for leaks by placing a plastic bag containing a paper towel and 2-propanol near the seal on the ground surface. The laboratory was notified of the use of 2-propanol as a leak tracer for testing and reporting.

3.2.3 Sample Collection

Following purging, a sample of soil gas was collected in a certified clean 1L stainless steel SUMMA™ canister. The canister and flow controller were attached to the sample tubing and placed near the ground seal. After placing the connected SUMMA™ canister the bag containing the leak tracer was opened near the ground seal and the valve on the canister was opened, and the sample was collected. Following sampling, each canister was labeled and returned to its original packaging. Initial and final canister vacuum readings were recorded on each label. During soil gas sample collection, an ambient air sample was also collected in a 6L SUMMA™ canister.

During the December 22, 2017 sampling event, after collection of each soil gas sample, an additional soil gas sample was collected from each probe using laboratory-provided steel sorbent tubes. Approximately 200 ml of soil gas was pulled through the sorbent tube using a 60 ml syringe. Following sample collection, the sorbent tubes were capped, labeled and placed in a cooler with ice pending transport to the analytical lab.

The soil gas samples were transported using chain-of-custody protocols and documentation to Eurofins / Air Toxics for analysis.

After soil gas sample collection was completed, the temporary soil gas probes were decommissioned pursuant to the San Joaquin County Environmental Health Department (SJCEHD) drilling permit guidelines.

3.3 HYDROPUNCH SOIL BORINGS AND SOIL AND GROUNDWATER SAMPLING

To assess soil and groundwater quality, Kleinfelder advanced 11 borings to approximately 29 feet bgs and one (1) boring to approximately 35 feet bgs and collected soil from each boring at 2, 5, 10, 15, 20, 25, and 29 feet. Groundwater was encountered at approximately 27 feet bgs at

each location and was sampled for previously identified constituents of concern. Groundwater collection and sampling is outlined below in section 4.3.1. Hydropunch soil boring locations are shown on Figure 4.

3.3.1 Hydropunch Soil Borings

On December 20, 27, and 28, 2017, 11 borings were advanced to a maximum depth of 29 feet bgs using direct push drilling technology. One boring was advanced to a maximum depth of 35 feet bgs using direct push technology to assess the static groundwater level on Site. Soil borings were advanced at the Site to assess for potential chemical impacts in the Site soil. The borings were advanced at previously identified locations throughout the Site (Figure 4). Samples from two feet bgs were collected from the end of the hand auger bucket while samples between five feet bgs and the total depth were collected at intervals of five feet from direct push acetate liners. During drilling activities, a photoionization detector (PID) was used to provide a qualitative screening of the soil samples for VOCs. The soil retrieved from each boring was logged by a Kleinfelder field geologist for descriptions of lithology and lithologic changes. PID readings were recording during drilling activities and are noted on borings logs. Boring logs are included as Appendix B.

Upon completion of each boring, temporary well casings were installed in before collection of groundwater grab samples. Each temporary well casing consisted of new, 2-inch diameter PVC casing with 2 feet of 0.020-inch slotted screen at the bottom of the casing. Groundwater samples were collected from each temporary well using a steel check valve, cleaned between the collection of each sample, and clean, single-use, plastic tubing. Following completion of sampling, the temporary casings were removed and the borings were backfilled to ground surface with neat cement grout through a tremie pipe, in accordance with SJCEHD permit requirements. A SJCEHD representative was onsite to observe grout placement.

Soil and groundwater samples were labeled with a unique identifier and placed in a cooler with ice pending transfer under chain-of-custody protocol and documentation to California Laboratory Services, Rancho Cordova, California.

3.4 DECONTAMINATION PROCEDURES

All re-usable sample collection equipment was decontaminated after collection of each sample to reduce or eliminate cross contamination. Disposable equipment intended for a single use

(i.e. disposable bailers used for groundwater sampling) were not decontaminated, but were packaged for appropriate disposal. Decontamination in the form of steam-cleaning occurred prior to and after each use of equipment associated with auger drilling. Sampling devices used for hand auguring, including trowels and augers were decontaminated with deionized water and non-phosphate soap.

3.5 FIELD VARIANCES FROM WORKPLAN

A field variance is an action or activity performed differently from what planned activity was established before mobilization. Several field variances from the CVRWQCB letter dated November 21, 2017, were implemented in the field based upon site history, field conditions, and limitations, and the analysis of data from the passive soil gas survey.

CVRWQCB requested five soil and two groundwater samples analyzed for California Administrative Manual (CAM) 17 Metals. Kleinfelder, however, did not analyze soil for CAM 17 metals in this area based upon historical review of OU 1 Phase II reports and the collection of groundwater samples during this investigation for CAM 17 analysis. The site operated as a sugar processing facility with no history of metals. Metals soil data was collected from the former rail spurs in OU-11, where historically higher metals concentrations would be expected. A review of findings from Multivariate Analysis of Lead in Urban Soil in Sacramento California, Michael J. Solt, dated Spring 2010, supports the findings that previous detections of metals in soil are background levels. Groundwater metals data from OU-1 confirmed this variance. Two soil samples were collected for additional VOCs and pesticides analysis of soils.

Operable unit 5 had one additional sample collected at five feet bgs from OU5-MW-15 to vertically delineate pesticides that were reported in the two foot bgs sample. The boring location was advanced directly adjacent to the original boring using a hand auger.

Operable unit 8 was to have two active soil gas locations, six soil sample locations, and seven groundwater locations for TPH and VOCs-chlorinated solvents. Kleinfelder collected one soil gas for VOC and TPH analysis, three soil samples for TPH, six soil samples for VOCs, and four soil samples for pesticides analysis. Three groundwater samples were collected for TPH and VOC-chlorinated solvents analysis. Based upon analysis of the passive soil gas investigation, one active soil gas location was moved to OU-11. Additional soil and groundwater sampling was not conducted in the area based upon field observations of boring proximity to one another within the operable unit as well as supporting data from the passive soil gas survey.

Operable unit 9 was to have four soil and two groundwater samples for pesticides and herbicides. Kleinfelder collected two soil samples for pesticide analysis and one soil sample for herbicide analysis and added three soil samples for TPH and four soil samples for VOC analysis. One groundwater sample was collected for pesticide and herbicide analysis. Additional soil and groundwater sampling was not conducted in the area based upon field observations of boring proximity to one another within the operable unit as well as supporting data from the passive soil gas survey.

Operable unit 11 was to have six soil samples for TPH, VOCs, solvents, and pesticides analysis. Kleinfelder collected eight to 12 soil samples for TPH analysis, 14 samples for VOC and solvent analysis, and 10 samples for pesticides analysis. Additionally, two active soil gas locations were advanced and collected in this area for VOCs and TPH. Additional soil sampling was conducted in the area based upon supporting data from the passive soil gas survey.

3.5.1 Exceeded hold times

A small number of soil samples exceeded hold times. Kleinfelder analyzed results to identify evidence that exceeded hold times may have impacted results. These analyses indicate that hold times did not impact sample results. Concentration detections and ranges are not correlated with hold time exceedances. Further details are outlined below.

3.5.2 TPH

Scope: 13 of 24 samples analyzed for TPH gasoline and diesel exceeded hold times. None of the remaining TPH samples included exceeded hold times. Hold time exceedances ranged from approximately two to four days.

Evidence indicates that hold-time exceedances did not impact TPH results. Of 24 TPH diesel results, 13 hold times were exceeded. However, no TPH diesel concentrations were detected in any soil sample analyzed. The same is true for TPH gasoline, of 24 results, 13 hold times were exceeded, no concentrations were detected.

Only seven detections of TPH motor oil were detected. Two of these seven detections were associated with samples for which TPH diesel and TPH gasoline hold times were not exceeded. TPH diesel and TPH gasoline were not detected in these samples. Moreover, these two

detections include the highest TPH motor oil concentration (44 mg/kg) detected in this investigation.

3.5.3 VOCs

Scope: 13 of 37 samples exceeded hold times. Hold time exceedances ranged from approximately two to three days.

Evidence indicates that hold-time exceedances did not impact VOC results. In all of the samples analyzed for VOCs, only three of 71 potential analytes were detected. Detected concentrations were similar in samples with and without exceeded hold times, and detections were even more likely in samples with exceeded hold times. This indicates that exceeded hold times neither reduced likelihood of detection nor decreased detected concentration. Details are listed below in Report Table 2.

Report Table 2: VOC Exceedances Summary

Analyte	Hold Time Exceeded					Hold Time Exceeded				
	Total Samples	Detections	Percent Detected	Concentration Range	Average Concentration	Total Samples	Detections	Percent Detected	Concentration Range	Average Concentration
Acetone	13	6	46%	29 J to 38 J	32	24	3	13%	28 J to 30 J	29
2-Butanone	13	6	46%	12 J to 13 J	12	24	2	8%	12 J to 12 J	12
Methylene chloride	13	2	15%	1.7 J to 3.2 J	2.5	24	2	8%	2.2 J to 6.6 J	4.5
Other VOCs	13	0	0%	NA	NA	24	0	0%	NA	NA

3.5.4 Pesticides

Scope: Three of 24 samples exceeded pesticide hold times. Hold time exceedances were approximately three days.

Evidence indicates that hold-time exceedances did not impact pesticide results. The three samples with exceeded hold times were limited to a single exploration and collected from depths of five, 15, and 25 feet. In all other Site explorations, pesticides were often detected in the first two feet (13 of 16 samples) but never below (zero of four samples). For the exploration with exceeded hold times, pesticides were not detected at two feet, where hold times were not exceeded, and were not detected below two feet, where hold times were exceeded.

3.5.5 Herbicides

Scope: Three of seven samples exceeded herbicide hold times. Hold time exceedances for these sample were approximately 14 days.

Evidence indicates that hold-time exceedances did not impact herbicide results. Of the seven samples analyzed for herbicides, three samples had exceeded hold times. No herbicide concentrations were detected, however, in any soil sample.

3.5.6 General Chemistry

Scope: Six of six samples exceeded hold times for general chemistry constituents. Hold time exceedances ranged from approximately one to 13 days.

Evidence indicates that hold time exceedances did not impact general chemistry results. Of the six samples analyzed for general chemistry, six samples had exceeded hold times for analytes Ammonia as N and Orthophosphate as PO4. Detected concentrations of these general chemistry analytes are reported in low levels and there is no established RSL for the analytes.

3.5.7 Conclusions

Kleinfelder analyzed results to identify evidence that exceeded hold times may have impacted results. These analyses indicate that hold times did not impact sample results and therefore did not impact Kleinfelder's conclusions. Generally, Kleinfelder collected soil samples not because historical data indicated that soil concentrations exceeded industrial soil RSLs, but because some soil samples exceeded SSLs. Kleinfelder therefore primarily sampled groundwater to demonstrate its protection. Associated soil samples were collected in each operable unit not to assess industrial exposure, but to delineate potential soil contamination that may be associated with potential groundwater contamination.

4 LABORATORY ANALYSIS

Soil gas, soil, and groundwater samples were analyzed for hydrocarbons, metals, VOCs, pesticides and herbicides as described below.

4.1 PASSIVE SOIL GAS

Fifty-three (53) shallow passive soil gas samples plus five trip blanks were submitted under chain-of-custody protocol and documentation to Amplified Geochemical Imaging, LLC. (AGI) of Elkton, Maryland, an ELAP-accredited laboratory. All samples were analyzed for total petroleum hydrocarbons (TPH) and VOCs. A subset of 25 samples was also analyzed for pesticides. Samples were analyzed using thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS) instrumentation following USEPA Method 8260. The passive soil gas survey report and associated maps are included in Appendix C.

4.2 ACTIVE SOIL GAS

Ten soil gas samples and one ambient air sample, were submitted under chain-of-custody protocol and documentation to Eurofins/Air Toxics, of Folsom, California, a California-certified laboratory. The soil gas and ambient air samples were tested using the following methods:

- Full Scan VOCs by gas chromatography (GC) and mass selective detection (MS), (gas samples) by USEPA Test Method TO-15 SIM.
- Total Petroleum Hydrocarbons as gasoline (TPH-g), diesel (TPH-d), kerosene, and JP4 by USEPA Test Method TO-17.
- 2-propanol (leak-check compound) by USEPA Test Method TO-15 SIM.

4.3 SOIL AND GROUNDWATER

California Laboratory Services (CLS) was directed to analyze select soil and groundwater samples for one or more of the following constituents using the indicated USEPA Test Methods:

- TPH-g, TPH-d, TPH-mo, hydraulic and mineral oil, and kerosene by USEPA Test Method 8015
- VOCs including chlorinated solvents and oxygenates by USEPA Test Method 8260
- General chemistry constituents: nitrate as N, total alkalinity, bicarbonate as $CaCO_3^-$, carbonate as $CaCO_3$, chloride, sulfate as SO_4^{2-}, potassium, sodium, ammonia as N, total Kjeldahl nitrogen, orthophosphate as PO_4^{3-}
- CAM 17 Metals by USEPA Test Method 6000/7000 Series;
- Organochlorine Pesticides (OCPs) by USEPA Test Method 8081; and
- Herbicides by USEPA Method 8151A.

Standard turnaround time was requested for all analyses. Copies of analytical laboratory reports and chain-of-custody forms are included in Appendix D. The rationale for each sample location and analytical method is summarized in Table 1.

5 REVIEW OF OPERABLE UNITS

Previous environmental site assessment activities were performed at the site between 1996 and 2005. Investigation activities included soil and groundwater sampling and analysis. A summary of historical site assessment conclusions is outlined below for constituents of concern for each operable unit. Conclusions and data have been taken from the following historical reports:

- *20-3978-01.W11 207RE054 – Limited Phase II Soil and Groundwater Assessment – Three Former Underground Storage Tank Locations*
- *20.3978-01.W12 207RE072 – Limited Phase II Soil and Groundwater Assessment – Existing and Former Above Ground Storage Tank Locations*
- *20-3978-01.W13 207RE073 – Limited Phase II Soil Assessment – Underground Structures and Beet Seed Warehouse*
- *20-3978-01.W14 207RE075 – Limited Phase II Soil Assessment – Vehicle Solvent Washdown Areas, Tote Storage Area, and the Former Auto Shed*
- *20-3978-01WR5 207RE077 – Limited Phase II Soil and Groundwater Assessment – Septic Systems*

A spot check review of previous laboratory data was conducted to compare analytical results in historical laboratory reports to current screening levels for chemicals of concern. The spot check identifies historical reporting limits for operable units 1, 2, 3, 4, 6, 10, and compares those limits to current applicable screening levels for identified chemicals of concern. Spot check tables are attached as part of Appendix E and results from the spot check are discussed below in the applicable Operable Units.

The current Phase II environmental site assessment results from onsite activities performed on November 21, 22, 30, December 19, 20, 22, 27, and 28, 2017, and March 6, 2018, at the Site are discussed for each targeted operable unit (operable units 1, 5, 8, 9, and 11) to address identified potential data gaps. The scope of work was based on Kleinfelder's approved *Closure Work Plan (Work Plan)*, dated November 2, 2017. The investigation was performed in general

accordance with United States Environmental Protection Agency (USEPA) and Department of Toxic Substances Control (DTSC) guidelines and recognized industry standards.

Historical reports, containing original tables, laboratory data, and updated Site operable unit figures are attached as Appendix E. Tables and figures from the recent phase II investigation are attached as Tables 1 through 7, and Figures 1 through 4, OU1, 5, 8, 9, 11.P, OU1.M, OU5.TPH, OU8.TPH, and OU11.M. Associated permits, boring logs, passive gas survey report and maps, and laboratory reports and chain of custody forms are attached as Appendix A through D.

5.1 OPERABLE UNIT 1

OU 1 Description

OU 1 corresponds to sub-recommendation 7-2 of the Closure Work Plan, which concerns septic tanks and leach lines associated with former Spreckels operations. A historical Phase I identified the potential for soil contamination via improper disposal of compounds. Historical Phase II (Historical)[3] samples were collected and analyzed for metals and petroleum/solvent-related compounds. Further details are in the Closure Work Plan (Appendix E). A recent Phase II investigation was conducted for OU 1 and is outlined below under the section titled, 2017 Investigation.

Historical Petroleum Data

Four soil samples were analyzed for Total Extractable Petroleum Hydrocarbons (TEPH), Fuel Fingerprint (EPA 8015M). These analyses yielded 18 results, of which all were below laboratory reporting limits (ND). Reporting limits were also below Industrial Thresholds, but six exceed Protection of Groundwater SSLs) (Appendix E, Table OU1-P, soil samples 5-1 and 5-7).

Two hydropunch samples were analyzed for TEPH Fuel Fingerprint (EPA 8015M). These analyses yielded 10 results. All results were ND, except for one TPHueh detection of 84 ug/L, which is below the lowest TPH-related Tier 1 Groundwater ESL (Tier 1 ESL)[4] (Appendix E

[3] *The Historical Phase II sampling performed in 1998 is referred to as "Historical" to reduce confusion between historical and current Phase II sampling.*

[4] *Tier 1 Environmental Screening Levels (ESLs) are from the San Francisco Regional Water Quality Control Board.*

Table OU1-P, hydropunch samples 5-1-HP and 5-7-HP). Reporting limits were also below the Tier 1 ESL, except for one TPHlo reporting limit of 250 ug/L (Appendix E, Table OU10-L).

Based on the TPHueh detection, the County requested additional sampling and analyses. Two additional borings were drilled and Hydropunch samples collected about 20 feet downgradient of Boring 5-1, where TPHueh was detected. Soil samples were analyzed for TEPH Fuel Fingerprint (EPA 8015M). All results were ND. Reporting limits were below applicable the Industrial Threshold and Protection of Groundwater SSLs (Appendix E, Table OU1-P, soil sample 5-1A). Groundwater Hydropunch samples were analyzed for TEPH Fuel Fingerprint (EPA 8015M). All results were ND. Reporting limits were below Tier 1 ESLs (Appendix E, Table OU1-P, hydropunch sample 5-1A-HP).

Petroleum Conclusions

Historical petroleum-related soil and groundwater data do not indicate petroleum-related issues at OU 1.

- All Historical petroleum-related results were ND, except for one TPHueh detection of 84 ug/L.
- No petroleum-related soil or groundwater results exceeded applicable screening levels.
- While some reporting limits exceeded applicable screening levels, potential soil and water concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in one detection above reporting limits of 33 results would thus be expected to fall well below reporting limits.
- OU 1 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where Historical data indicates petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 1 petroleum concentration theoretically possible given Historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

Historical VOC-Related Data

Two soil samples were collected and analyzed for industrial solvents, ethylene glycol, Volatile Organic Compounds (VOCs) by GCMS (EPA 8240), and semi-VOCs (EPA 8270). These analyses yielded 336 results, of which all were ND. Most laboratory reporting limits are not digitally tabulated and are only available in paper-copy reports (Appendix E, Table OU1-P, soil sample 5-1).

In addition, two hydropunch samples were collected and analyzed for industrial solvents, ethylene glycol, VOCs by GCMS with Tentatively Identified Compounds (TICs) (EPA 8240), and semi-VOCs with TICs (EPA 8270). These analyses yielded 336 results, of which all are ND, except for one detection of bis(2-ethylhexyl)phthalate (310 ug/L). This Bis(2-ethylhexyl)phthalate concentration exceeds the Tier 1 ESL of 4.0 ug/L. Most laboratory reporting limits are not digitally tabulated and are only available in paper-copy reports (Appendix E, Table OU1-P, hydropunch samples 5-1-HP and 5-7-HP).

Based on the bis(2-ethylhexyl)phthalate detection, the County requested additional sampling and analyses. Two additional borings were drilled and one hydropunch and one soil sample collected about 20 feet downgradient of boring 5-1, where this compound was detected. The soil sample was analyzed for Semi-VOCs (EPA 8270) and ethylene glycol. All results were reported below laboratory detection limits. Laboratory reporting limits are not tabulated, and original paper-copy reports have not been located (Appendix E, Table OU1-P, soil sample 5-1A). The groundwater hydropunch sample was analyzed for Semi-VOCs (EPA 8270) (Table OU1-P, hydropunch sample 5-1A-HP). All results are reported below laboratory detection limits. Most laboratory reporting limits were not digitally tabulated and are only available in paper-copy reports (Appendix E, Table OU1-P, hydropunch sample 5-1A-HP). Laboratory reporting limits were not tabulated, and original paper-copy reports have not been located.

Solvent Conclusions

Solvent-related data does not indicate solvent-related issues at OU 1.

- All Historical solvent-related groundwater results were ND, except for one detection of Bis(2-ethylhexyl)phthalate in groundwater. This analyte was not detected in subsequent analyses.

- While most reporting limits are not tabulated, and of those that are, some exceed applicable screening levels, potential soil and water concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in one detection above reporting limits of 33 results would thus be expected to fall well below reporting limits.

- OU 1 was not targeted by Phase II solvent-related exploration; however, the Phase II passive soil gas survey covers OU 1 to assess potential migration of OU 8 contaminates. Potential solvent-related concentrations below Historical reporting limits will therefore be assessed.

Historical Metal Data

Four soil samples were analyzed for CAM 17 metals. These analyses yielded 68 results, of which all were below industrial thresholds. Four cobalt and two mercury concentrations, however, exceed Protection of Groundwater SSLs (Appendix E, Table OU1-M, soil samples 5-1 and 5-7). Kleinfelder has analyzed these metal concentrations against those from OU 7 (Appendix E, Table OU7-M, soil samples 12-8 through 12-16) and OU 11 (Appendix E, Table OU11-M, soil samples 6-6 through 6-13). CAM 17 metal concentration distributions from OU 1 and OU 7 were similar, despite samples being collected from two separate areas to assess potential for two separate means of potential contamination. This observation suggests OU 1 metal concentrations represent natural background concentrations.

In addition, two hydropunch samples were collected during Phase II sampling. Both were analyzed for CAM 17 metals. Most results are ND, and all detections were below Tier 1 ESLs, except for one detection of Nickel at 20 ug/L, which exceeds the Tier 1 ESL of 8.2 ug/L (Appendix E, Table OU1-M, 5-1-HP and 5-7-HP).

Metals Conclusions

Historical soil and groundwater metal data indicate metal issues at OU 1 are unlikely.

- Data indicate metal concentrations likely reflect background conditions.

- All soil concentrations except for arsenic are below the Industrial Threshold, and all concentrations except arsenic, cobalt and mercury are below Protection of Groundwater SSLs.

- Groundwater data indicate that only nickel exceeds applicable water screening levels; however, nickel concentrations in soil samples do not exceed Protection of Groundwater SSLs. These results indicate that metal concentrations in groundwater at the Site are unrelated to reported results of metals in soil at the Site.

- Phase II metal-related explorations will target OU 1. Additional groundwater samples will be collected to confirm Historical results.

2017 Investigation

In December 2017 an additional site investigation was conducted to address historical investigation areas where data gaps were identified. Soil and groundwater data from the December 2017 investigation can be found on tables 4, 6, and 7. Site figures for OU 1 are attached as OU1,5,8,9,11.P for pesticides and OU1.M for metals.

VOC-Related Data

Two soil samples were analyzed for VOCs in OU 1. Both samples were reported as ND, below the laboratory method detection limit for applicable analytes. As discussed in the historical VOC-related data for OU 1, VOCs in groundwater were not analyzed during this field investigation due to the historically low concentrations reported previously (Table 4).

VOC-Related Conclusions

Investigation data for VOCs at OU 1 are reported as non-detect below the laboratory method detection limit for both samples analyzed. Based upon these results, Kleinfelder concludes that VOC concentrations in soil do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides Data

Two soil samples were analyzed for pesticides in OU 1 at two feet bgs. Laboratory results reported detections of 4,4'-DDE in both samples at concentrations of 30J µg/kg (trace) at OU-1-5-1 and 16J µg/kg (trace) at OU-1-5-2. Concentrations were reported above the risk based SSL of 11 µg/kg for 4,4'-DDE. Remaining concentrations of pesticides in OU 1 were reported below risk based SSLs or were reported as non-detect below the laboratory method detection limit for analytes. While 4,4'-DDE is reported as exceeding the SSL in two samples collected in OU 1, all detections were reported below the industrial soil RSL of 9,300 µg/kg (Table 4).

Pesticides Conclusions

Pesticides at OU 1 are reported at trace concentrations for detected analytes. Detected concentrations were also noted to be from the depth interval of ground surface to two feet at each location indicating that pesticides are limited to surface soils. Future site use is planned as industrial with the site being capped or covered with concrete building pads and an asphalt parking lot. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern in soil do not pose a hazard that requires further investigation, mitigation, or remediation.

General Chemistry Related Data

Six soil samples were analyzed for general chemistry constituents of nitrate as N, total alkalinity, bicarbonate as CaCO3, carbonate as CaCO3, hydroxide as CaCO3, chloride, sulfate, potassium, sodium, ammonia as N, total kjeldahl nitrogen, and orthophosphate as PO_4^{3-}. Nitrate as N does not have an established screening level so the screening level for nitrate for industrial soils was used. Reported concentrations for nitrate as N ranged from 1.4J mg/kg (trace) to 81 mg/kg at OU-1-5-1 and 9.6 mg/kg to 24 mg/kg at OU-1-5-2. All detected concentrations of nitrate as N are reported below the industrial soil RSL of 1,900,000 mg/kg for nitrate (Table 4).

In addition, two hydropunch samples were collected during the recent Phase II sampling. Both samples were analyzed for general chemistry constituents of nitrate as N, total alkalinity, bicarbonate as CaCO3, carbonate as CaCO3, hydroxide as CaCO3, chloride, sulfate, potassium, sodium, ammonia as N, total kjeldahl nitrogen, and orthophosphate as PO_4^{3-}. Currently, nitrate as N is the only general chemistry analyte with an established screening level

(10 mg/L federal MCL, CA MCL, and CA PHG). Nitrate as N was detected in two out of two groundwater samples analyzed. Concentrations are reported as 0.18J mg/L (trace) at OU-1-5-1 and 74 mg/L at OU-1-5-2, above the established screening levels (Table 6).

General Chemistry Conclusions

Investigation data for general chemistry in OU 1 indicates that the historical septic tank and leech lines associated with the Spreckels are not a concern. Elevated concentrations of nitrate as N in soil are located in boring OU-1-5-1, while the exceedance of nitrate as N in groundwater is located in boring OU-1-5-2. Detected concentrations of nitrate as N in soil above the exceeded groundwater sample are noted to be low level detections, below established screening levels. These results indicate that the detected exceedance of nitrate as N in groundwater is not related to the historical use of the septic tank and leech lines associated with the Spreckels facility. All other analyzed general chemistry constituents do not currently have established screening levels. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Metals Data

Two hydropunch samples were collected from OU 1 for metals analysis. Laboratory results reported antimony, arsenic, nickel, lead, and thallium to be above applicable screening levels. Antimony was detected in one hydropunch sample, OU-1-5-1 at 110 µg/L, above the established federal MCL and CA MCL of 6 µg/L, and the CA PHG of 1 µg/L. Arsenic was detected in both hydropunch samples in OU 1 at concentrations of 3.3J µg/L (trace) at OU-1-5-2 and 7.7 µg/L at OU-1-5-1, above the applicable established CA PHG and DTSC Note 3 screening levels of 0.004 and 0.0082 µg/L, respectively. Reported concentrations of arsenic in groundwater are below the federal MCL and CA MCL of 10 µg/L. Nickel was detected in both hydropunch samples in OU 1 at concentrations of 150 µg/L at OU-1-5-1 and 190 µg/L at OU-1-5-2, above the CA PHG of 12 µg/L and the CA MCL of 100 µg/L. Lead was detected in both hydropunch samples in OU 1 at concentrations of 0.46J µg/L (trace) at OU-1-5-1 and 0.68J µg/L (trace) at OU-1-5-2, above the CA PHG of 0.2 µg/L. Reported concentrations of lead in groundwater are below the federal MCL and CA MCL of 15 µg/L. Thallium was detected in both hydropunch samples in OU 1 at concentrations of 0.32J µg/L (trace) at OU-1-5-2 and 0.33J µg/L (trace) at OU-1-5-1, above the CA PHG of 0.1 µg/L. Reported concentrations of thallium in

groundwater are below the federal MCL and CA MCL of 2 µg/L. Remaining detections of metals in groundwater are not reported above applicable screening levels where established (Table 7).

Historical metal results in soil were compared to the background concentrations of metals in soil for OU 1. A review of the thesis, *Multivariate Analysis of Lead in Urban Soil in Sacramento, California*, Michael J. Solt, Spring 2010 (SOLT Thesis), which collected soil results from the Sacramento area to establish background concentration of metals in soil indicate that historical detections of metals in soil are below background concentrations for the Site. Historical detections of metals in OU 1 included, cobalt, mercury, and nickel, with reported maximum concentrations for each constituent at 4.4 mg/kg, 0.13 mg/kg, and 4.7 mg/kg. Reported concentrations of cobalt in the SOLT Thesis indicate that cobalt was detected at concentrations ranging from 10.9 mg/kg to 25.5 mg/kg, with a mean concentration of 17.16 mg/kg for all samples analyzed. Reported concentrations of nickel in the SOLT Thesis indicate that nickel was detected at concentrations ranging from 23.5 mg/kg to 112.5 mg/kg, with a mean concentration of 64.91 mg/kg for all samples analyzed. Mercury was not analyzed as part of the SOLT Thesis.

Metals Conclusions

Detected concentrations of lead and thallium that were reported as exceedances in groundwater were noted to exceed only the CA PHG. Detected concentrations of antimony and nickel are reported as exceeding the CA MCLs in groundwater at the site at locations OU-1-5-1 (antimony and nickel) and OU-1-5-2 (nickel). These groundwater concentrations are noted to be above historical groundwater concentrations from the same locations for both antimony and nickel. Current detected concentrations of metals in soil at the site have reported antimony as non-detect below the laboratory method detection limit and low-level concentrations of nickel. Nickel is not reported above any established screening levels for soil in any samples collected during the 2017 investigation. Of detected metals in groundwater in OU 1 only cobalt, mercury, and nickel were detected in historical samples at the Site. Detected historical maximum concentrations of metals in soil at the site are reported below detected minimum concentrations of the same metals in the SOLT Thesis. Differing results of metals in soil and groundwater support the conclusion that concentrations of metals in soil at the Site do not have an impact on metals concentrations in groundwater. This indicates that current concentrations of metals in groundwater at the Site are not a direct result of historical use or activities from the Spreckels facility. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

5.2 OPERABLE UNIT 2

OU 2 Description

OU 2 corresponds to Sub-Recommendations 9.1 and 10.1 of the Closure Work Plan, which pertain to former petroleum-related underground storage tanks (USTs) and petroleum-related USTs that appeared on fire insurance maps. The Phase I identified potential soil contamination via leaks/spills of petroleum-related compounds. Phase II samples were collected and analyzed for petroleum-related compounds.

Historical Petroleum Data

Seven soil samples were analyzed for TPH as referenced by gasoline (TPHg) (EPA 8015M/5030), benzene, toluene, ethylbenzene, xylenes (BTEX) (EPA 8020), methyl tertiary butyl ether (MtBE) (EPA 8020), ethylene dibromide (EDB) (EPA 8010), and organic lead (by LUFT Manual Methods). These analyses yielded 112 results, of which all were ND except for two xylenes concentrations of 0.0056 and 0.0065 mg/kg. These concentrations were reported below industrial thresholds and Protection of Groundwater SSLs. Twenty eight of the 112 laboratory reporting limits were reported above industrial thresholds. Exceedances are limited to organic lead (industrial threshold of 0.003 mg/kg; reporting limit of 0.15 mg/kg) and EDB (industrial threshold of 0.16 mg/kg; reporting limit of 5.0 mg/kg). Fifty six of the 112 reporting limits were reported above Protection of Groundwater SSLs. Exceedances concern organic lead (SSL of 0.0032; reporting limit of 0.15), EDB (SL of 0.0000047; reporting limit of 0.15), benzene (SSL of 0.00023; reporting limit of 0.0050), and ethylbenzene (SSL of 0.0017; reporting limit of 0.0050) (Appendix E, Table OU2-P, soil samples 11-1 through 11-7).

In addition, two hydropunch samples were collected and analyzed for TPHg (EPA 8015M/5030), BTEX (EPA 8020), MTBE (EPA 8020), and ethylene dibromide (EDB) (EPA 8010). These analyses yielded 16 results, all of which are ND. Two of the 16 reporting limits exceed EPA Tier 1 ESLs. Analytes with reporting limits that exceed ESLs were organic lead and EDB (Tier 1 of 0.05; reporting limit of 0.5 ug/L) (Appendix E, Table OU2-P, soil samples 11-1 through 11-7).

Petroleum Conclusions

Historical petroleum-related soil and water data does not indicate petroleum-related issues at OU 2.

- All historical petroleum-related soil and groundwater results are ND, except for two xylenes detections, which are below applicable screening levels.
- While some reporting limits exceed applicable screening levels, potential soil and water concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in only two detections above reporting limits of 128 results would thus be expected to fall well below reporting limits.
- OU 2 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where historical data indicate petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 2 petroleum concentration theoretically possible given historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

Historical Solvent Data

One historical groundwater sample was analyzed for halogenated VOCs (EPA 8010). This analysis yielded 29 results. All were reported as ND (Appendix E, Table OU2-P, hydropunch samples 11-2-HP and 11-7-HP). No reporting limits exceed MCLs and two reporting limits exceed Tier 1 ESL. MCLs are established for both analytes for which reporting limits exceed Tier 1 ESLs (Appendix E, Table OU2-L).

Solvent Conclusions

Solvent-related water data do not indicate solvent-related issues at OU 2.

- All Historical solvent-related groundwater results are ND.
- No reporting limits exceed applicable MCLs.

- Two reporting limits exceed Tier 1 ESLs; however, MCLs are established for both analytes.
- OU 2 is not targeted by solvent-related Phase II exploration.

5.3 OPERABLE UNIT 3

OU 3 Description

OU 3 Corresponds to Sub-Recommendation 12.1 of the Closure Work Plan, which concerns a then-former drum and waste oil storage location. The Phase I identified potential for soil contamination via leaks/spills of petroleum-related compounds. Phase II samples were collected and analyzed for petroleum-related compounds.

Historical Petroleum Data

Six soil samples were analyzed for TPH as referenced by TPHd, TPHlo, and TPHueh (EPA 3550, DHS Luft). These analyses yielded 18 results, of which all are ND except for one TPHueh concentration of 2.1 mg/kg. This concentration was reported below the industrial threshold of 440 mg/kg but above the Protection of Groundwater SSL of 1.5 mg/kg (Appendix E, Table OU3-P, soil samples 12-1 through 12-6). Laboratory reporting limits associated with TPHd and TPHlo were below the industrial threshold and Protection of Groundwater SSLs. Reporting limits associated with TPHueh were below the industrial threshold but exceed the Protection of Groundwater SSL (Table OU 2-L).

Petroleum Conclusions

Historical petroleum-related soil data do not indicate petroleum-related issues at OU 3.

- All Historical petroleum-related soil results were ND, except for one TPHueh detection, which is well below the industrial threshold but marginally exceeds the Protection of Groundwater SSL.
- While some reporting limits exceed Protection of Groundwater SSLs, potential soil concentrations below reporting limits would be expected to be normally distributed. Such

a distribution resulting in only 1 detection above reporting limits of 18 results would thus be expected to fall well below reporting limits.

- OU 3 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where historical data indicate petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 3 petroleum concentration theoretically possible given historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

5.4 OPERABLE UNIT 4

OU 4 Description

OU 4 Corresponds to Sub-Recommendation 12.2 of the Closure Work Plan, which concerns then-former and existing fuel oil and product lines. The Phase I identified potential for soil contamination via leaks/spills of petroleum-related compounds. Phase II samples were collected and analyzed petroleum-related compounds.

Historical Petroleum Data

Nine soil samples were analyzed for TPHd, TPHlo, and TPHueh (EPA 3550, DHS Luft). These analyses yielded 27 results, of which all were ND (Appendix E, Table OU4-P, soil samples 12-25 through 12-28, 12-32 through 12-34). Laboratory reporting limits associated with TPHd and TPHlo were below the industrial threshold and Protection of Groundwater SSLs. Reporting limits associated with TPHueh were below the industrial threshold but exceed the Protection of Groundwater SSL (Appendix E, Table OU 3-L).

Petroleum Conclusions

Historical petroleum-related soil data do not indicate petroleum-related issues at OU 4.

- All Historical petroleum-related soil and groundwater results are ND.
- While some reporting limits exceed Protection of Groundwater SSLs, potential soil concentrations below reporting limits would be expected to be normally distributed. Such

a distribution resulting in no detections above reporting limits of 27 results would thus be expected to fall well below reporting limits.

- OU 4 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where Historical data indicate petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 4 petroleum concentration theoretically possible given Historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

5.5 OPERABLE UNIT 5

OU 5 Description

OU 5 Corresponds to Sub-Recommendation 12.3 of the Closure Work Plan, which concerns a diesel fuel above-ground storage tank (AST). The Phase I identified potential for soil contamination via leaks/spills of petroleum-related compounds. Phase II samples were collected and analyzed for petroleum-related compounds.

Historical Petroleum Data

Eight soil samples were analyzed for TPHd, TPHlo, and TPHueh (EPA 3550, DHS Luft), BTEX (EPA 5030/8020), MTBE (EPA 5030/8020M), and TPHg (EPA 5030/8020). These analyses yielded 72 results, of which all were ND except for those associated with one sample collected at a 15-foot depth, from which concentrations of 2,800 mg/kg of TPHd, 40 mg/kg of TPHg, and 0.009 mg/kg of xylenes were reported. The TPHd concentration exceeds both the Industrial Threshold of 440 mg/kg and the Protection of Groundwater SSL of 1.5 mg/kg. Laboratory reporting limits were not tabulated (Appendix E, Table OU5-P, soil samples 12-39 through 12-42).

One hydropunch sample was collected due to petroleum odor noted during exploration. The sample was analyzed for TPHd, TPHueh, and TPHlo. TPHd was detected at a concentration of 4,900 ug/L. This concentration exceeds Tier 1 ESLs of 100 ug/L (Appendix E, Table OU5-P, hydropunch sample 12-42-HP).

Monitoring Wells MW-15, MW-22, MW-23, and MW-24 were installed in 1997 to monitor OU 5 conditions. MW-15 was located about 20 feet northwest of the AST, where soil staining was noted during ongoing field investigations. MW-22 through MW-24 were installed about 150 feet cross- and downgradient of the AST to define lateral extent of potential groundwater impacts.

Twenty soil samples were collected during monitoring well installation at depths of 5, 10, and 15 feet bgs. Each sample was analyzed for TPHd and one sample was also analyzed for MTBE and BTEX. Results were all ND. TPHd laboratory reporting limits are below the industrial threshold and Protection of Groundwater SSLs (Appendix E, Table OU5-P, soil samples 34-1 through 34-6 and 34-16 through 34-18).

Ten hydropunch groundwater samples were also collected during monitoring well installation. Each sample was analyzed for TPHd and one was also analyzed for MtBE and BTEX. Hydrocarbons with chains greater than approximately 10 were noted as TPHueh in all but one sample at concentrations ranging from 110 to 580 ug/L. These concentrations exceed Tier 1 ESLS; however, MTBE and BTEX were reported as ND (Appendix E, Table OU5-P, hydropunch samples 34-1-HP through 34-6-HP and 34-16-HP through 34-18-HP).

These wells were sampled and analyzed for petroleum-related compounds during four events over an 8-year period: 1997, 2001, 2003, and 2005. Hydrocarbons with chains greater than approximately 10 were noted as TPHueh and TPHd at concentrations ranging from 360 to 3,200 ug/L in 1997; as TPHueh and TPHd at concentrations ranging from 529 to 868 ug/L in 2001; and as TPHd at concentrations ranging from 760 to 840 ug/L in 2003. No hydrocarbons were detected in 2005; however, laboratory reporting limits were 500 ug/L. Moreover, MW-24 was only sampled in 1997 and 2001, as it could not be located 2003 or 2005, and hydrocarbons were not detected in any MW-23 samples analyzed during the monitoring periods (Appendix E, Table OU5-P, MW-15 through MW-24). When MW-23, MW-24, and 2005 data are removed to correct for these inconsistencies, average concentrations decrease from 1,830 ug/L in 1997 to 816 ug/L in 2001 and 725 ug/L in 2003[5]. Because laboratory reporting limits were 500 ug/L in 2005 when no hydrocarbons were detected, concentrations further declined to at least just under 500 ug/L. Regression analysis indicates a logarithmic trend (R^2 = 0.92), which, if projected beyond the monitoring period, indicates concentrations would have reached 0 ug/L sometime around 2008 (Appendix E, Chart OU5-P). This average declining concentration is

[5] *If MW-24 data are included, average concentrations decrease from 1,340 ug/L in 1997 to 720 ug/L in 2001, marginally increase to about 725 ug/L in 2003, and then decline to at least 500 ug/L by 2005.*

consistent with expected natural attenuation; however, the last ND of less than 500 ug/L may have still represented concentrations exceeding the TPHueh Tier 1 ESLs of 100 ug/L, and while the R^2 indicates that time alone can explain about 92% of the variance in average concentrations, the regression is based on limited data.

Petroleum Conclusions

Historical petroleum-related soil and groundwater data indicate that petroleum-related contamination was naturally attenuating over the Historical monitoring period. Phase II explorations have been conducted to confirm this attenuation.

- Petroleum-related groundwater concentrations decreased substantially over an approximate 10-year monitoring period.
- Regression analysis indicates petroleum-related groundwater concentrations would have attenuated to ND sometime around 2008.
- Phase II explorations have been conducted to confirm historical trends.

Historical Solvent Data

Groundwater samples from MW-22 and MW-23 were analyzed for VOCs with TICs and Semi-VOCs with TICs in 2001 and 2005, and groundwater samples from MW-24 were analyzed for VOCs with TICs and Semi-VOCs with TICs in 2001. These analyses yielded over 700 results. All results were reported as ND, except for Semi-VOC TIC diacetone alcohol, which was detected in MW-22 (4.6 ug/L) and MW-23 (15.26 ug/L) in 2005. There are no established Tier 1 ESLs for this compound (Appendix E, Table OU5-P, MW-15 through MW-24). The analytical laboratory indicated that this compound was likely an extraction artifact of sample preparation (STO5R1333, Plant Complex Groundwater Sampling and Analysis, July 2005). Reporting limits are not tabulated, and historical paper-copy reports have not yet been identified.

Solvent Conclusions

Historical solvent-related groundwater data do not indicate solvent-related issues at OU 5.

- Solvents were not detected in approximately 700 results analyzed from multiple wells during multiple monitoring events over an approximate 5-year period.
- While some reporting limits may exceed Tier 1 ESLs, potential concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in only two detections above reporting limits of over 700 results would thus be expected to fall well below reporting limits.
- Phase II explorations target OU 5 to confirm expected petroleum-related natural attenuation. Solvent-related analyses are therefore also being performed to confirm historical solvent results.

2017 Investigation

In December 2017 an additional site investigation was conducted to address historical investigation areas where data gaps were identified. Soil gas, soil, and groundwater data from the December 2017 investigation can be found on tables 2 through 4, and 6. Site figures for OU 5 are attached as OU1, 5, 8, 9, 11.P for pesticides and OU5.TPH for TPH.

TPH Data

During the December 2017 field investigation four soil gas samples were collected from OU 5 and analyzed for TPH. Two co-located locations with soil gas probes at five and fifteen feet bgs were analyzed for TPH gasoline range, diesel range, reference to kerosene, and JP4. Reported concentrations of TPH in soil gas are reported at 6,000 µg/m3 at OU-5-SV-02-15 to 10,000 µg/m3 at OU-5-SV-01-5 for TPH diesel range, 7,800 µg/m3 at OU-5-SV-01-5 for TPH reference to kerosene, and 6,600 µg/m3 at OU-5-SV-02-15 and 11,000 µg/m3 at OU-5-SV-01-5 for JP4. All detections of TPH in soil gas are reported below established screening levels for constituents of concern, where applicable (Table 3).

Various soil locations were analyzed for various TPH constituents during the December 2017 field investigation. Six samples were analyzed for TPH gasoline and diesel in OU 5 with depths ranging from two feet bgs to 15 feet bgs. TPH as gasoline and diesel are reported as non-detect below the laboratory method detection limit for six samples analyzed. Two soil samples were analyzed for TPH motor oil, hydraulic oil, mineral oil, and kerosene at the two foot interval at the Site. Reported results show TPH as motor oil as the only detections in OU 5.

Concentrations for both samples are 7.7 mg/kg at SV-01 and 25 mg/kg at OU-5-SV-02-2. Detected concentrations of TPH as motor oil were reported below the risk based SSL of 89 mg/kg and the Region 9 industrial soil RSL of 440 mg/kg (Table 4).

Four hydropunch locations were advanced in OU 5 for analysis of TPH gasoline, diesel, motor oil, hydraulic oil, mineral oil, and kerosene (Table 6). TPH as gasoline was detected in four out of four samples analyzed with concentrations ranging from 13J µg/L (trace) at OU-5-MW-15 and OU-5-12-42 to 30J µg/L (trace) at OU-5-MW-22. Detected concentrations of TPH as gasoline are reported below the establish Tier 1 ESL of 100 µg/L (Table 6).

TPH Conclusions

Detected concentrations of TPH in soil gas, soil, and groundwater indicate that TPH concentrations have attenuated over time from historical concentrations. All detections were reported below their respective screening levels for soil gas, soil, and groundwater. Reported concentrations of groundwater were noted to estimated concentrations between the laboratory method detection limit and the laboratory reporting limit. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

VOC-Related Data

During the December 2017 field investigation four soil gas samples were collected from OU 5 and analyzed for VOCs. Two co-located locations with soil gas probes at five and fifteen feet bgs were analyzed for full scan VOCs. Laboratory analysis of the soil gas detected concentrations of ethanol, acetone, 2-propanol (leak tracer), 2-butanone, tetrahydrofuran, 4-methyl-2-pentanone, toluene, tetrachloroethene (PCE), ethylbenzene, m,p-xylene, o-xylene, 4-ethyltoluene, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene. Reported concentrations of detected VOCs in soil gas are reported below DTSC Note 3 screening levels and Region 9 industrial air screening levels, with an applied attenuation factor of 0.001, for all detected VOC concentrations (Table 2).

During the December 2017 field investigation 11 soil samples were collected from OU 5 and analyzed for VOCs. Depths of the samples collected ranged from two feet bgs to 15 feet bgs from six boring locations. Laboratory analysis of the soil detected concentrations of acetone, 2-

butanone, and methylene chloride. Reported concentrations of VOCs in soil are reported below risk based SSLs and industrial soil RSLs for all detected VOC concentrations (Table 4).

During the December 2017 field investigation four hydropunch samples were collected from OU 5 and analyzed for VOCs. Laboratory analysis of the groundwater detected concentrations of chloromethane, benzene, toluene, ethylbenzene, and total xylenes. Benzene was detected in three out of four groundwater samples at concentrations ranging from 0.22J µg/L (trace) at OU-5-MW-15 to 0.93 µg/L at OU-5-MW-24. Detected concentrations of benzene are reported above the CA PHG of 0.15 µg/L and below the CA MCL of 1 µg/L and the federal MCL of 5 µg/L. Reported detections of chloromethane, toluene, ethylbenzene, and total xylenes were below their respective federal MCLs, CA MCLs, and CA PHGs, where applicable (Table 6).

VOC-Related Conclusions

Detected concentrations of VOCs in soil gas, soil, and groundwater indicated that VOCs are not a concern in OU 5. Detected concentrations are reported below applicable screening levels for soil gas, soil and groundwater, with the exception of three samples being reported above the CA PHG for benzene in groundwater. However, the three detections of benzene in groundwater were reported below the CA MCL and federal MCL. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides Data

During the December 2017 field investigation six soil samples were collected from OU 5 at two feet bgs and analyzed for pesticides. Laboratory analysis of the soil samples detected concentrations of 4,4'-DDE and 4,4'-DDT. 4,4'-DDE was detected in five out of the six samples with concentrations ranging from 1.8J µg/kg (trace) at OU-5-12-42 to 200 µg/kg at OU-5-MW-15. Three of the five detected concentrations of 4,4'-DDE were reported above the risk based SSL of 11 µg/kg. Detected concentration of 4,4'-DDT were reported below the risk based SSL of 77 µg/kg (Table 4).

In March 2018, one five-foot sample was collected from OU-5-12-42 to delineate the vertical depth of 4,4'-DDE from the 200 µg/kg two foot sample. The location was advanced directly adjacent to the original boring location and hand augered to five feet bgs. The reported laboratory result of 4,4'-DDE for the five-foot sample is 8 µg/kg, below the risk based SSL of 11

µg/kg. Additionally, 4,4'-DDD and 4,4'-DDT were detected in the five-foot interval. Detected concentrations are reported below their respective risk based SSLs 7.5 µg/kg (4,4'-DDD) and 77 µg/kg (4,4'-DDT) (Table 4).

Pesticides Conclusions

Detected concentrations of pesticides in soil indicate that pesticides are a concern within the top two feet of soil at the site. Of the six soil samples collected in the top two feet three samples are reported above the risk based SSL for pesticide constituents. Soil collected from the five-foot interval at the Site below the highest detected pesticide concentration indicates that pesticides have been delineated vertically at the site and that pesticides are a concern in the top two feet of soil only. All other pesticides were reported as non-detect below the laboratory method detection limit for each respective analyte in OU 5. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation or remediation. A soil management plan should be developed to mitigate and control the top two foot of soil at the Site for off-site use only.

5.6 OPERABLE UNIT 6

OU 6 Description

OU 6 Corresponds to Sub-Recommendation 12.4, which concerns an above-ground gasoline convault. The Phase I identified potential for soil contamination via leaks/spills of petroleum-related compounds. Phase II samples were collected and analyzed for petroleum-related compounds.

Historical Petroleum Data

Two soil samples were analyzed for BTEX (EPA 5030/8020), MTBE (EPA 5030/8020M), and TPHg (EPA 5030/8020). These analyses yielded 12 results, of which all were ND (Appendix E, Table OU6-P, soil samples 12-17 and 12-18). Reporting limits are below Industrial Thresholds, but eight reporting limits exceed Protection of Groundwater SSLs.

Petroleum Conclusions

Historical petroleum-related soil data do not indicate petroleum-related issues at OU 6.

- All Historical petroleum-related soil and groundwater results were ND.
- While some reporting limits exceed Protection of Groundwater SSLs, potential soil concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in no detections above reporting limits of 12 results would thus be expected to fall below reporting limits.
- OU 6 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where Historical data indicate petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 6 petroleum concentration theoretically possible given Historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

5.7 OPERABLE UNIT 7

Description

OU 7 Corresponds to Sub-Recommendation 12.5, which concerns an acid/caustic storage area. The Phase I identified potential for soil contamination via leaks/spills of acid and corroded metal compounds. Phase II samples were collected and analyzed for acid- and metal-related compounds.

Historical Acidity Data

Fourteen soil samples were analyzed for pH and alkalinity. Alkalinity ranges from ND to 152, with an average of 48.6, and pH ranges from 7.27 to 9.67, with an average of 8.03 (Appendix E, Table OU7-A, soil samples 12-8 through 12-16). These values do not indicate leaks of acidic or basic solutions. We therefore recommend no further action

Historical Metal Data

Fourteen soil samples were analyzed for CAM 17 metals. Concentrations are below Industrial Thresholds except for arsenic, which is noted at concentrations of 1 mg/kg, exceeding the Industrial Threshold of 0.36 mg/kg. Moreover, arsenic, cobalt and mercury results and arsenic

and thallium laboratory reporting limits exceed Protection of Groundwater SSLs (Appendix E, Table OU7-M, soil samples 12-8 through 12-16). Kleinfelder has analyzed these metal concentrations against those from OU 1 (Appendix E, Table OU1-M, soil samples 5-1 and 5-7) and OU 11 (Appendix E, Table OU11-M, soil samples 6-6 through 6-13). Metal concentration distributions from OU 1 and OU 7 were very similar, despite samples being collected from two separate areas to assess two separate potential contamination causes. This indicates OU 1 metal concentrations represent natural background concentrations.

Metals Conclusions

Historical soil and groundwater metal data indicate metal issues at OU 7 are unlikely.

- Data indicate metal concentrations likely reflect background conditions.
- All concentrations except for arsenic are below the Industrial Threshold, and all concentrations except arsenic, cobalt, and one copper result are below Protection of Groundwater SSLs.
- OU 7 is not targeted for Phase II metal-related investigation; however, metals in soil and groundwater will be analyzed in OU 1 and OU 11. It is expected that these analyses will confirm that metal concentrations in groundwater are unrelated to metal concentrations in Site soil.

5.8 OPERABLE UNIT 8

Description

OU 8 Corresponds to Sub-Recommendation 13.1 of the Closure Work Plan, which concerns slab/factory drains. The Phase I identified potential for soil contamination via improper disposal of petroleum- or solvent-related compounds. Phase II samples were collected and analyzed for petroleum- and solvent-related compounds.

Historical Petroleum Data

Ten soil samples were collected and analyzed for TEPH with Fuel Fingerprint (EPA 8015M). These analyses yielded 60 results. These results were ND, except for TPHueh, which was

detected at concentrations of up to 4,800 mg/kg at 10 feet and 1,600 mg/kg at 20 feet, exceeding the Protection of Groundwater SSL of 1.5 mg/kg and industrial threshold of 440 mg/kg. Most laboratory reporting limits are not tabulated. Those that were tabulated were below industrial thresholds and Protection of Groundwater SSLs, except for TPH-JP4, which exceeds Protections of Groundwater SSLs. (Appendix E, Table OU8-P, soil samples 13-16 through 13-19).

Monitoring wells MW-16, MW-17, MW-18, MW-19, MW-20, and MW-21 were installed to monitor potential groundwater issues associated with OU 8. MW-18 was located within about 10 feet down gradient of soil samples noted above. MW-17 was located within about 50 down/cross gradient. MW-19 was located about 200 feet cross gradient and MW-20 was located about 200 feet up/cross gradient. MW-21 appears to have been located offsite.

Thirty two soil samples were collected during monitoring well installation and sampled for TEPH with Fuel Fingerprint. These analyses yielded 156 results, of which all were ND except for two detections of “weathered” TPHk, which was detected in two samples collected at depths of 10 feet (3,900 mg/kg) and 15 feet (1,400 mg/kg). These concentrations exceed industrial thresholds and Protection of Groundwater SSLs. Reporting limits were all below industrial thresholds and Protection of Groundwater SSLs (Appendix E, Table OU8-P, soil samples 23-4 through 23-6, 34-7 through 15).

Six hydropunch samples were also collected during monitoring well installation. Samples were analyzed for TEPH with Fuel Fingerprint. Results were reported as ND, except for hydrocarbons with chains greater than about 10, which were detected as TPHueh in each sample at concentrations ranging from 120 to 620 ug/L. These concentrations exceed Tier 1 ESLs. Reporting limits were all below Tier 1 ESLs (Appendix E, Table OU8-1, hydropunch samples 34-7-HP through 34-12-HP).

These wells were sampled and analyzed for petroleum-related compounds during four events over an 8-year period: 1997, 2001, 2003, and 2005. Hydrocarbons with chains greater than approximately 10 were noted as TPHueh at concentrations ranging from 250 to 2,900 ug/L in 1997; as TPHueh at concentrations ranging from 160 to 580 ug/L in 2001; and as TPHd at concentrations ranging from 74 to 700 ug/L in 2003. No hydrocarbons were detected in 2005; however, laboratory reporting limits were generally 500 ug/L, which exceeds previous average detections (Appendix E, Tables OU8-P and OU8-PTIC, groundwater samples MW-16 through MW-21). Moreover, the maximum concentration of 2,900 ug/L noted in 1997 was associated

with MW-18, which was not sampled in subsequent years because it could not be located. When MW-18 and 2005 data are removed to correct for these inconsistencies, average TPH concentrations decrease from 284 ug/L in 1997 to 227 ug/L in 2001 and then 203 ug/L in 2003. Regression analysis indicates a linear trend (R^2 = 0.93), which, if projected beyond the monitoring period, indicates concentrations would have reached 100 ug/L sometime around 2013 and will reach 0 ug/L around 2021 (Appendix E, Chart OU8-P). This average declining concentration is consistent with expected natural attenuation; however, the last ND of less than 500 ug/L may have represented concentrations exceeding the TPHd Tier 1 ESL of 100 ug/L, and while the R^2 indicates that time alone can explain about 93% of the variance in average concentrations, the regression is based on limited data. These wells were also sampled for TPHjp4, TPHjp5, and TPHk in 1997. Results are all ND. It does not appear these wells were sampled for TPHjp4, TPHjp5, or TPHk in subsequent events.

Petroleum Conclusions

Historical petroleum-related soil and groundwater data indicate that petroleum-related contamination was naturally attenuating over the Historical monitoring period. Phase II explorations have been conducted to confirm this attenuation.

- Petroleum-related groundwater concentrations decreased substantially over an approximate 10-year monitoring period.
- Regression analysis indicates petroleum-related groundwater concentrations would have attenuated to below Tier 1 ESLs around 2013.
- Phase II explorations have been conducted to confirm Historical trends.

Historical Solvent Data

Ten soil samples were collected and analyzed for VOCs by GCMS (EPA 8240) and semi-VOCs (EPA 8270). These analyses yielded 399 results, of which all were reported as ND. Most laboratory reporting limits are not tabulated. Those that are tabulated are generally below industrial thresholds and above Protection of Groundwater SSLs (Appendix E, Table OU8-P, soil samples 13-16 through 13-19).

Monitoring wells MW-16, MW-17, MW-18, MW-19, MW-20, and MW-21 were installed to monitor potential groundwater issues associated with OU 8. MW-18 was located within about 10 feet down gradient of soil samples noted above. MW-17 was located within about 50 down/cross gradient. MW-19 was located about 200 feet cross gradient and MW-20 was located about 200 feet up/cross gradient. MW-21 appears to have been located somewhere offsite.

Thirty two soil samples were collected during monitoring well installation and sampled for VOCs with TICs, Semi-VOCs with TICs, and industrial solvents. These analyses yielded over 3,500 results. Results were reported as ND, except for a few detections associated with samples collected at 10 and 15 feet at exploration 23-6. Industrial solvent methanol was detected at a depth of 10 feet (3.7 mg/kg) and industrial solvent o-xylenes was detected at depths of 10 feet (2.2 mg/kg) and 15 feet (0.79 mg/kg). The methanol concentration is below the industrial threshold and Protection of Groundwater SSL, but the o-xylenes concentration exceeds the Protection of Groundwater SSL of 0.19 mg/kg. Four VOC TICs were also detected at concentrations ranging from 0.26 mg/kg (Cyclohexane, 1-Ethyl-Methyl-, Cis-) to 5.8 mg/kg (Cyclohexane, 1,1,2,3-Tetramethyl-), and fourteen Semi-VOC TICs were detected at concentrations ranging from 3.3 mg/kg (Cyclopentane, 1-Methyl-2-(-Propenyl)-) to 1,200 mg/kg (total unknown hydrocarbons). Unknown VOC TICs were also detected at concentrations of 1.87 and 1.98 mg/kg and unknown Semi-VOC TICs were detected at concentrations of 32.9 and 49.5 mg/kg. Most laboratory reporting limits were not tabulated. Those that are tabulated are generally below industrial thresholds and above Protection of Groundwater SSLs (Appendix E, Tables OU8-P and OU8-PTIC, soil samples 23-4 through 23-6, 34-7 through 15).

Nine hydropunch samples were also collected during monitoring well installation. Samples were analyzed for VOCs with TICs and Semi-VOCs with TICs. These analyses yielded over 1,000 results. Sample results were reported as ND, except for a few Semi-VOCs detected at concentrations below EPA Tier 1 ESLs. Most laboratory reporting limits were not tabulated (Appendix E, Table OU8-1 and OU8-PTIC, hydropunch samples 34-7-HP through 34-12-HP and MW-16 through MW-18)

These wells were sampled and analyzed for VOCs with TICs and Semi-VOCs with TICs during three events over an 8-year period: 1997, 2001, and 2005 (Tables OU8-P and OU8-PTIC, groundwater samples MW-16 through MW-21). These analyses yielded over 1,400 results, of which all were ND, except for a few detections of diacetone alcohol, hexadonic acid, and unknown compounds, for which there are no applicable screening levels. Chloroform, however,

was detected in one sample in 2001 at a concentration of 2.58 ug/L, exceedingly the EPA Tapwater (0.22 ug/L) and Tier 1 Groundwater (2.3 ug/L) ESLs. Reporting limits were not tabulated, and Historical paper-copy reports have not yet been identified (Appendix E, Table OU8-1 and OU8-PTIC, groundwater samples MW-16 through MW-21).

Solvent Conclusions

Historical solvent-related groundwater data do not indicate solvent-related issues at OU 8.

- Of around 4,000 soil results, there were only 32 detections. Only five exceed industrial thresholds and 12 exceed Protection of Groundwater SSLs. All exceedances were limited to exploration 23-6, at depths of 10 to 15 feet bgs.
- Of around 2,500 groundwater results, there were only 15 detections. Only one exceeds EPA Tier 1 ESLs, and only marginally so. The exceeding analyte was not detected in subsequent analyses.
- While some reporting limits may exceed applicable ESLs, potential concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in only 47 detections above reporting limits of over 6,500 results would thus be expected to fall well below reporting limits.
- Phase II explorations target OU 8 to confirm expected petroleum-related natural attenuation. Solvent-related analyses are therefore also being performed to confirm Historical solvent results.

2017 Investigation

In December 2017 an additional site investigation was conducted to address historical investigation areas where data gaps were identified. Soil gas, soil, and groundwater data from the December 2017 investigation can be found on tables 2 through 4, and 6. Site figures for OU 8 are attached as OU1,5,8,9,11.P for pesticides and OU8.TPH for TPH.

TPH Data

During the December 2017 field investigation two soil gas samples were collected from OU 8 and analyzed for TPH. One co-located location with soil gas probes at five and fifteen feet bgs were analyzed for TPH gasoline range, diesel range, reference to kerosene, and JP4. Laboratory analysis reported both samples as non-detect below the laboratory method detection limit for all TPH analysis in OU 8 (Table 3).

Various soil locations were analyzed for various TPH constituents during the December 2017 field investigation. Three samples were analyzed for TPH gasoline and diesel in OU 8 with depths ranging from two feet bgs to 15 feet bgs. TPH as gasoline and diesel were reported as non-detect below the laboratory method detection limit for all three samples. One soil sample was analyzed for TPH motor oil, hydraulic oil, mineral oil, and kerosene at the two foot interval at the Site. Reported results show TPH as motor oil as the only detection in OU 8. The detected concentration for TPH as motor oil is reported as 34 mg/kg at OU-8-SV-01-2. The detected concentration of TPH as motor oil is reported below the risk based SSL of 89 mg/kg and the Region 9 industrial soil RSL of 440 mg/kg (Table 4).

Three hydropunch locations were advanced in OU 8 for analysis of TPH gasoline, diesel, motor oil, hydraulic oil, mineral oil, and kerosene. TPH as gasoline was detected in three out of three samples analyzed with concentrations ranging from 21J µg/L (trace) at OU-8-MW-16 to 50J µg/L (trace) at OU-8-MW-18. Detected concentrations of TPH as gasoline are reported below the establish Tier 1 ESL of 100 µg/L (Table 6).

TPH Conclusions

Detected concentrations of TPH in soil gas, soil, and ground water indicate that TPH concentrations have attenuated over time from historical concentrations. All detections are reported below their respective screening levels for soil gas, soil, and groundwater. Reported concentrations of groundwater are noted to be estimated concentrations between the laboratory method detection limit and the laboratory reporting limit. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

VOC-Related Data

During the December 2017 field investigation two soil gas samples were collected from OU 8 and analyzed for VOCs. One co-located location with soil gas probes at five and fifteen feet bgs were analyzed for full scan VOCs. Laboratory analysis of the soil gas detected concentrations of acetone, 2-propanol (leak tracer), 2-butanone, tetrahydrofuran, chloroform, 4-methyl-2-pentanone, toluene, tetrachloroethene (PCE), m,p-xylene, o-xylene, 4-ethyltoluene, 1,3,5-trimethylbenzene, and 1,2,4-trimethylbenzene. Reported concentrations of detected VOCs in soil gas are reported below DTSC Note 3 screening levels and Region 9 industrial air screening levels, with an applied attenuation factor of 0.001, for all detected VOC concentrations (Table 2).

During the December 2017 field investigation six soil samples were collected from OU 8 and analyzed for VOCs. Depths of the samples collected ranged from two feet bgs to 15 feet bgs from four boring locations. Laboratory analysis of the soil detected concentrations of acetone and 2-butanone. Reported concentrations of VOCs in soil were reported below risk based SSLs and industrial soil RSLs for all detected VOC concentrations (Table 4).

During the December 2017 field investigation three hydropunch samples were collected from OU 8 and analyzed for VOC solvents. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for all three samples (Table 6).

VOC-Related Conclusions

Detected concentrations of VOCs in soil gas, soil, and groundwater indicated that VOCs are not a concern in OU 8. Detected concentrations are reported below applicable screening levels for soil gas and soil, with groundwater being reported as non-detected below the laboratory method detection limit for all groundwater samples analyzed. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides Data

During the December 2017 field investigation four soil samples were collected from OU 8 at two feet bgs and analyzed for pesticides. Laboratory analysis of the soil samples detected concentrations of 4,4'-DDE. 4,4'-DDE was detected in two out of the four samples with

concentrations of 7.6J µg/kg (trace) at OU-8-SV-01-2 and 12J µg/kg (trace) at OU-8-MW-18-2. One of the two detected concentrations of 4,4'-DDE is reported above the risk based SSL of 11 µg/kg. All detections of pesticides in soil were reported below their respective Region 9 RSLs (Table 4).

During the December 2017 field investigation one hydropunch sample was collected from OU 8 and analyzed for pesticides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed sample (Table 6).

Pesticides Conclusions

Detected concentrations of pesticides in soil indicate that pesticides are a concern within the top two feet of soil at the site only. Of the four soil samples collected in the top two feet one sample is reported above the risk based SSL for pesticide constituents. Remaining soil and groundwater samples for pesticides are reported as non-detect below the laboratory method detection limit for each respective analyte in OU 8. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation or remediation. A soil management plan should be developed to mitigate and control the top two foot of soil at the Site for off site use only.

Herbicides Data

During the December 2017 field investigation one hydropunch sample was collected from OU 8 and analyzed for herbicides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed sample (Table 6).

Herbicides Conclusions

One groundwater sample was collected from OU 8 and analyzed for herbicides during the field investigation. The sample is reported as non-detect below the laboratory method detection limit. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

5.9 OPERABLE UNIT 9

Description

OU9 Corresponds to Sub-Recommendation 13.2 of the Closure Work Plan, which concerns a former under-ground beet flume. The Phase I identified potential for soil contamination via pesticides/herbicides. Phase II samples were collected and analyzed for pesticides and herbicides.

Historical Pesticides/Herbicides Data

Five soil samples were analyzed for organochlorine pesticides and chlorinated herbicides (Appendix E, Table OU9-PH, soil samples 13-1 and 13-10 through 13-13). These analyses yielded 180 results. Sample results were reported as ND, except for one 50 ug/kg detection of 2,4-DB and one 68 ug/kg detection of 4,4'-DDE. The 2,4-DB concentration is below the Industrial Threshold and Protection of Groundwater SSL. The 4,4'-DDE concentration is below the Industrial Threshold of 9,300 ug/kg but exceeds the Protection of Groundwater SSL of 11 ug/kg. Most ND reporting limits have not been tabulated. Those limits that have been tabulated are generally below Industrial Thresholds, except for those associated with a single sample that had anomalously high reporting limits.

Pesticide/Herbicide Conclusions

Historical pesticide/herbicide data do not indicate pesticide/herbicide issues at OU 9.

- Of around 180 soil results, there are only 2 detections. Both detections are below industrial thresholds, but one exceeds Protection of Groundwater SSLs.
- While some reporting limits exceed ESLs, potential concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in only two detections above reporting limits of around 180 results would thus be expected to fall well below reporting limits.
- Phase II explorations target OU 9 to confirm Historical pesticide/herbicide results. Soil and groundwater will be analyzed.

2017 Investigation

In December 2017 an additional site investigation was conducted to address historical investigation areas where data gaps were identified. Soil and groundwater data from the December 2017 investigation can be found on tables 4 and 6. Site figures for OU 9 are attached as OU1,5,8,9,11.P for pesticides.

TPH Data

During the December 2017 field investigation three soil samples were analyzed for TPH constituents. Samples were analyzed for TPH gasoline, diesel, motor oil, hydraulic oil, mineral oil, and kerosene in OU 9 with depths ranging from five feet bgs to 25 feet bgs. Laboratory analysis of the soil samples reported non-detect below the laboratory method detection limit for the three soil samples analyzed (Table 4).

TPH Conclusions

Three soil samples were collected from OU 9 and analyzed for various TPH constituents during the field investigation. The samples are reported as non-detect below the laboratory method detection limit for the three samples analyzed. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

VOC-Related Data

During the December 2017 field investigation four soil samples were collected from OU 9 and analyzed for VOCs. Depths of the samples collected ranged from two feet bgs to 25 feet bgs from two boring locations. Laboratory analysis of the soil detected concentrations of acetone, 2-butanone, and methylene chloride. Detected concentrations of VOCs in soil are reported below risk based SSLs and industrial soil RSLs for all detected VOC concentrations (Table 4).

VOC-Related Conclusions

Detected concentrations of VOCs in soil indicate that VOCs are not a concern in OU 9. Detected concentrations are reported below applicable screening levels for soil. Based upon

these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides Data

During the December 2017 field investigation two soil samples were collected from OU 9 at two feet bgs and 15 feet bgs and analyzed for pesticides (OU-9-13-12-2 and OU-9-13-12-15). Laboratory analysis of the soil samples detected concentrations of 4,4'-DDE and 4,4'-DDT in the two foot interval. Detected concentrations of pesticides in soil are reported below the risk based SSLs and industrial soil RSLs for all detected pesticide concentrations (Table 4).

During the December 2017 field investigation one hydropunch sample was collected from OU 9 and analyzed for pesticides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed sample (Table 6).

Pesticides Conclusions

Detected concentrations of pesticides in soil and groundwater indicate that pesticides are not a concern in OU 9. Detected concentrations are reported below applicable screening levels for soil, with groundwater concentrations being reported as non-detect below the laboratory method detection limit for groundwater samples. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Herbicides Data

During the December 2017 field investigation one soil sample was collected from OU 9 at 15 feet bgs and analyzed for herbicides. Laboratory analysis of the soil is reported as non-detect below the laboratory method detection limit for the analyzed sample (Table 4).

During the December 2017 field investigation one hydropunch sample was collected from OU 8 and analyzed for herbicides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed sample (Table 6).

Herbicides Conclusions

One soil and one groundwater sample was collected from OU 9 and analyzed for herbicides during the field investigation. The samples are reported as non-detect below the laboratory method detection limit for soil and groundwater. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

5.10 OPERABLE UNIT 10

Description

OU 10 Corresponds to Sub-Recommendation 17.1 of the Closure Work Plan, which concerns a solvent washdown pad. The Phase I identified potential for soil contamination via leaks/spills/improper disposal of petroleum- or solvent-related compounds. Phase II samples were collected and analyzed for petroleum- and solvent-related compounds.

Historical Petroleum Data

Six soil samples were collected and analyzed for TPEH, Fuel Fingerprint (EPA 8015M), MTBE, and BTEX (EPA 8260). These analyses yielded 96 results, of which all were reported as ND. All reporting limits were reported below industrial thresholds; however, TPPueh, TPHjp4, TPHg, MTBE, benzene, and ethylbenzene reporting limits exceed Protection of Groundwater SSLs (Appendix E, Table 10-P, soil samples 14-1 through 14-6).

Petroleum Conclusions

Historical petroleum-related soil data do not indicate petroleum-related issues at OU 10.

- All Historical petroleum-related soil and groundwater results are ND.
- While some reporting limits exceed Protection of Groundwater SSLs, potential soil concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in no detections above reporting limits of 96 results would thus be expected to fall below reporting limits.

- OU 10 is not targeted by petroleum-related Phase II exploration; however, Phase II exploration does target other portions of the Site where Historical data indicate petroleum issues. It is expected that Phase II data will demonstrate substantial natural attenuation, and that even the maximum OU 10 petroleum concentration theoretically possible given Historical reporting limits will reasonably be expected to have attenuated below modern reporting limits, even assuming much slower attenuation rates.

Historical Solvents Data

Six soil samples were collected and analyzed for Semi-VOCs (EPA 8240). These analyses resulted in 170 results, of which all were reported as ND. Most laboratory reporting limits are not digitally tabulated and are only available in paper-copy reports (Appendix E, Table 10-P, soil samples 14-1 through 14-6). To evaluate reporting limits against applicable screening levels, Kleinfelder used a random number generator to select and tabulate 4 results from each sample, resulting in 24 reporting limits, which is about 15% of the data. Kleinfelder estimated that at least 10% of the results should be spot checked to sufficiently to assess how reporting limits generally compare against screening levels. No spot-checked reporting limits exceed Industrial Thresholds; however, 12 of the 24 reporting limits exceed Protection of Groundwater SSLs (Appendix E, Table OU10-L).

Solvents Conclusions

Historical solvent-related data do not indicate solvent-related issues at OU 10.

- No solvents were detected out of 170 results from six soil samples.
- While some reporting limits exceed Protection of Groundwater SSLs, potential soil concentrations below reporting limits would be expected to be normally distributed. Such a distribution resulting in no detections above reporting limits of 170 results would thus be expected to fall below reporting limits.
- OU 10 is not targeted by solvent-related Phase II exploration.

5.11 OPERABLE UNIT 11

Description

OU 11 Corresponds to Sub-Recommendations 21.1 and 21.2 from the Closure Work Plan, which concern two rail spurs that enter the Site from its southeast corner and then run west toward its center. The Phase I identified potential for soil contamination via spills from rail cars of offsite metal- and petroleum-related compounds. The Phase I also identified potential for pesticide/herbicide use for rail spur maintenance. Phase II samples were collected and analyzed for metal- and petroleum-related compounds and pesticides/herbicides.

Historical Metal Data

Eleven soil samples were analyzed for CAM 17 metals. Concentrations were reported below industrial thresholds, with the exception of arsenic concentrations and laboratory reporting limits reported as exceeding the industrial threshold limits. Moreover, cobalt and mercury results and arsenic and thallium laboratory reporting limits exceed Protection of Groundwater SSLs (Appendix E, Table OU11-M, soil samples 6-6 through 6-13). Kleinfelder analyzed these metal concentrations against those from OU 7 (Appendix E, Table OU7-M, soil samples 12-8 through 12-16) and OU 11 (Appendix E, Table OU11-M, soil samples 6-6 through 6-13). Metal concentration distributions from OU 1 and OU 7 are very similar, despite samples being collected from two separate areas to assess potential for two separate means of potential contamination. This indicates OU 1 and OU 7 metal concentrations represent natural background concentrations. Some OU 11 metal concentrations exceed typical OU 1 and OU 7 concentrations. Specifically, arsenic, copper, lead, nickel, and zinc are all substantially higher, both when calculating average concentrations with and without NDs. Examination of concentration data indicates these above-average concentrations are not due to isolated, anomalously high results; the majority of results are typically 2- to 3-times higher than OU 1 and OU 7 averages. This indicates that these elevated metal concentrations are likely caused by Site operations identified in the Phase I rather than anomalous samples.

Additional waste extraction tests (Di-WETs) were performed as part of the initial Phase II analysis. WET testing was conducted for samples with elevated concentrations of arsenic, copper, and lead. The arsenic and copper results and one lead result did not indicate high-soluble metal concentrations. One lead result did, however, indicate relatively high-soluble lead (58 ug/L) (Appendix E, Table OU11-M, soil samples 6-7, 6-8, and 6-10). Correspondence

indicates that high-soluble lead soil was removed and that sample results and excavation details were supplied to the County, and our document review has located the proposal for this work, but sample results and excavation details have not been located.

Subsequent soil and groundwater samples were conducted during installation of monitoring well MW-13, which was located approximately 30 feet northwest of an OU 11 rail spur. Soil samples were collected at depths of 10 and 15 feet bgs and analyzed for CAM 17 metals. Most results were reported as ND, except for barium, chromium, copper, nickel, vanadium, and zinc. Concentrations are generally lower than surficial OU 11 concentrations and are generally similar to OU 1 and OU 7 concentrations (Appendix E, Table OU11-M, soil sample 23-1). These data further indicate that OU 1 and OU 7 metal concentrations represent natural background conditions. One groundwater sample was also collected and analyzed for CAM 17 metals. This groundwater result was reported as ND, except for barium (260 ug/L) and vanadium (20 ug/L). The vanadium concentration exceeds the Tier 1 ESL of 19 ug/L (Appendix E, Table OU11-M, water sample MW-13). These results are similar to hydropunch concentrations from OU 1, indicating that elevated metal concentrations in OU 11 surficial soil samples have not impacted groundwater (Appendix E, Table OU1-M, hydropunch samples 5-1-HP and 5-7-HP).

Metals Conclusions

Historical soil and groundwater metal data indicate metal issues at OU 11 are unlikely.

- Data indicates some metal concentrations in soil may exceed background conditions. Aside from one anomalous arsenic result, concentrations are below industrial thresholds. Many concentrations, however, exceed Protection of Groundwater SSLs.
- Solubility testing indicates limited potential for metals in soil to impact groundwater. This testing, however, is limited to only three metals.
- Groundwater data indicate that only vanadium exceeds Tier 1 ESLs, but vanadium concentrations in soil do not exceed Protection of Groundwater SSLs. This indicates metal concentrations in groundwater are unrelated to Site conditions.
- Phase II metal-related explorations will target OU 11. Additional groundwater and soil samples will be collected to confirm Historical results.

Petroleum/Solvents: Existing Data

Eight soil samples were analyzed for TPHd, TPHlo, and TPHueh. These analyses yielded 24 results. TPHd and TPHlo were reported as ND. TPHueh however, was detected in each of the eight samples at concentrations ranging from 1.3 to 70 mg/kg. These concentrations are all below the industrial thresholds of 440 mg/kg but usually exceed the Protection of Groundwater SSL of 1.5 mg/kg. Reporting limits are all below Protection of Groundwater SSLs (Appendix E, Table OU11-P, soil samples 6-6 through 6-13).

Petroleum Conclusions

Historical petroleum-related soil data indicate petroleum-related issues at OU 11 are unlikely.

- Historical soil data indicate TPHueh at concentrations below the industrial threshold but above Protection of Groundwater SSLs.
- Phase II explorations have been conducted at OU 11 to confirm Historical data and assess potential for groundwater contamination.

Historical Solvent-related Data

Eight soil samples were analyzed for Semi-VOC including TICs. These analyses yielded 600 results. Semi-VOCs results were reported as ND, and 14 TICs for which there are no established screening levels were detected[6]. Most laboratory reporting limits were not tabulated. Those that were tabulated were generally below industrial thresholds but above Protection of Groundwater SSLs (Appendix E, Table OU11-P, soil samples 6-6 through 6-13).

Subsequent soil and groundwater samples were analyzed during installation of monitoring well MW-13, which was located approximately 30 feet northwest of an OU 11 rail spur. Soil samples were collected at depths of 10 and 15 feet and analyzed for industrial solvents (Appendix E, Table OU8-P, soil sample 23-1), and a groundwater sample was also collected and analyzed for industrial solvents (Appendix E, Table OU8-P, water sample 23-1). These analyses yielded

[6] *Semi-VOC Cyclo-hexanone and an unknown semi-VOC were detected at concentrations below the Industrial Thresholds and Protection of Groundwater SSLs; however, these analytes were also detected in laboratory method blanks, strongly indicating that these concentrations were caused by laboratory cross-contamination.*

around 100 results, of which all were reported as ND. Laboratory reporting/detection limits were not tabulated, and paper-copy reports have yet to be located.

Solvents Conclusions

Historical solvent-related data do not indicate solvent-related issues at OU 11.

- Only 14 solvent-related compounds were detected out of around 700 solvent-related results.
- Detected compounds do not have established screening levels.
- Some reporting limits exceed applicable screening levels; however, Phase II explorations have been conducted to confirm Historical results.

Pesticides/Herbicides: Existing Data

Eight soil samples were analyzed for organochlorine pesticides and chlorinated herbicides. These analyses yielded 288 results. Most were reported as ND. Detections included 4,4'-DDE (1,500 ug/kg and 90 ug/kg), 4,4'-DDT (2,700 ug/kg), 2,4-D (120 ug/kg), and 2,4-DB (240 ug/kg and 220 ug/kg). These concentrations were reported below the industrial threshold, but the DDE, DDT, and 2,4-D results are above Protection of Groundwater SSLs. Most ND reporting limits have not been tabulated. Those limits that have been tabulated were generally below industrial thresholds, except for those associated with a single sample that had anomalously high reporting limits. Many reporting limits, however, were above Protection of Groundwater SSLs (Appendix E, Table OU11-PH, soil samples 6-6 through 6-13).

Pesticides/Herbicides Conclusions

Historical data indicate pesticide/herbicide issues are unlikely at OU 11.

- Detected pesticide/herbicide concentrations and ND reporting limits were below the industrial threshold; however, DDE, DDT, and 2-4-D concentrations exceed Protection of Groundwater SSLs. Many ND reporting limits also exceed Protection of Groundwater SSLs.

- Phase II explorations include soil and groundwater analyses to confirm soil and groundwater concentrations meet applicable screening levels.

2017 Investigation

In December 2017 an additional site investigation was conducted to address historical investigation areas where data gaps were identified. Soil gas, soil, and groundwater data from the December 2017 investigation can be found on 2 through 7. Site figures for OU 11 are attached as OU1, 5, 8, 9, 11.P for pesticides and OU11.M for metals.

Metals Data

During the December 2017 field investigation six soil samples were collected from OU 11 for metals analysis. Sample depth ranged from five feet bgs to 25 feet bgs from two boring locations. Laboratory analysis of soil samples detected various concentrations of arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, thallium, vanadium, and zinc. Arsenic was detected in six out of six samples at concentrations ranging from 1.1J mg/kg (trace) at OU-11-6-8-5 to 3 mg/kg at OU-11-6-7-5. Detected concentrations arsenic exceeded the risk based SSL of 0.0015 mg/kg and the DTSC Note 3 screening level of 0.36 mg/kg. With the exception of sample result OU-11-6-7-5, 3 mg/kg, arsenic detections did not exceed the industrial soil RSL. Cobalt was detected in six out of six samples at concentrations ranging from 3 mg/kg at OU-11-6-8-15 to 10 mg/kg at OU-11-6-8-25. Detected concentrations of cobalt exceeded the risk based SSL of 0.27 mg/kg. Detected concentrations of cobalt did not exceed the industrial soil RSL of 350 mg/kg. Mercury was detected in four out of six samples at concentrations ranging from 0.014J mg/kg (trace) at OU-11-6-8-5 to 0.035J mg/kg (trace) at OU-11-6-7-5. Two out of four detected concentrations of mercury were reported at or exceeded the risk based SSL of 0.033 mg/kg. Detected concentrations of mercury are reported below the industrial soil RSL of 46 mg/kg. Thallium was detected in six out of six samples at concentrations ranging from 0.070J mg/kg (trace) at OU-11-6-7-5 to 0.21J mg/kg (trace) at OU-11-6-7-25. Detected concentrations of thallium exceeded the risk based SSL of 0.014 mg/kg. Detected concentrations of thallium did not exceed the industrial soil RSL of 12 mg/kg. Remaining metals detections are reported below their respective risk based SSL screening levels and industrial soil RSLs (Table 5).

During the December 2017 field investigation two hydropunch samples were collected from OU 11 for metals analysis. Laboratory results reported antimony, arsenic, nickel, hexavalent chromium, lead, and thallium to be above applicable screening levels. Antimony was detected in one hydropunch sample, OU-11-6-7 at 21J µg/L (trace), above the established federal MCL and CA MCL of 6 µg/L, and the CA PHG of 1 µg/L. Arsenic was detected in both hydropunch samples in OU 11 at concentrations of 2.6J µg/L (trace) at OU-11-6-7 and 7.3 µg/L at OU-11-6-8, above the applicable established CA PHG and DTSC Note 3 screening levels of 0.004 and 0.0082 µg/L, respectively. Reported concentrations of arsenic in groundwater are below the federal MCL and CA MCL of 10 µg/L. Nickel was detected in both hydropunch samples in OU 11 at concentrations of 5.9J µg/L (trace) at OU-11-6-8 and 110 µg/L at OU-11-6-7. Groundwater sample OU-11-6-7 is reported above the CA PHG of 12 µg/L and the CA MCL of 100 µg/L. Hexavalent chromium was detected in one hydropunch sample in OU 11 at a concentration of 2.2 µg/L, above the CA PHG of 0.02 µg/L. Currently there is no established hexavalent chromium screening level for DTSC Note 3, federal MCLs, and CA MCLs. Lead was detected in one hydropunch sample in OU 11 at a concentration of 0.23J µg/L (trace) at OU-11-6-7, above the CA PHG of 0.2 µg/L and below the federal MCL and CA MCL of 15 µg/L. Thallium was detected in both hydropunch samples in OU 11 at concentrations of 0.31J µg/L (trace) at OU-11-6-7 and 1.2J µg/L (trace) at OU-11-6-8, above the CA PHG of 0.1 µg/L. Reported concentrations of thallium in groundwater are below the federal MCL and CA MCL of 2 µg/L. Remaining detections of metals in groundwater are not reported above applicable screening levels where established (Table 7).

Historical and 2017 field investigation metal results in soil were compared to the background concentrations of metals in soil for OU 11. A review of the SOLT Thesis indicate that detections of metals in soil are below background concentrations for the Site. Historical maximum detections of metals in OU 11 included arsenic 100 mg/kg, barium 120 mg/kg, cobalt 6 mg/kg, copper 60 mg/kg, lead 70 mg/kg, lead (wet) 58 µg/L, mercury 0.25 mg/kg, nickel 47 mg/kg, and zinc 520 mg/kg. During the December 2017 field investigation, maximum detected concentrations of metals that exceeded screening levels in OU 11 included arsenic 3 mg/kg, cobalt 10 mg/kg, mercury 0.035J mg/kg (trace), and thallium 0.21J mg/kg (trace) (Figure OU11.M).

Detected concentrations of metals in the SOLT Thesis indicate that the historical metal detections and December 2017 field investigation metal detections are within background levels for the site. Reported concentrations of arsenic in the SOLT Thesis indicate that arsenic was detected at concentrations ranging from 2.7 mg/kg to 27.9 mg/kg, with a mean concentration of

8.91 mg/kg for all samples analyzed. Reported concentrations of barium in the SOLT Thesis indicate that barium was detected at concentrations ranging from 450 mg/kg to 720 mg/kg, with a mean concentration of 602.04 mg/kg for all samples analyzed. Reported concentrations of cobalt in the SOLT Thesis indicate that cobalt was detected at concentrations ranging from 10.9 mg/kg to 25.5 mg/kg, with a mean concentration of 17.16 mg/kg for all samples analyzed. Reported concentration of copper in the SOLT Thesis indicate that copper was detected at 14.7 mg/kg to 104.5 mg/kg, with a mean concentration of 41.9 mg/kg for all samples analyzed. Reported concentration of lead in the SOLT Thesis indicate that lead was detected at 10.6 mg/kg to 1,540 mg/kg, with a mean concentration of 128 mg/kg for all samples analyzed. Reported concentrations of nickel in the SOLT Thesis indicate that nickel was detected at concentrations ranging from 23.5 mg/kg to 112.5 mg/kg, with a mean concentration of 64.91 mg/kg for all samples analyzed. Reported concentrations of thallium in the SOLT Thesis indicate that thallium was detected at concentrations ranging from 0.19 mg/kg to 0.79 mg/kg, with a mean concentration of 0.31 mg/kg for all samples analyzed. Reported concentrations of zinc in the SOLT Thesis indicate that zinc was detected at concentrations ranging from 52 mg/kg to 6,010 mg/kg, with a mean concentration of 215.8 mg/kg for all samples analyzed. Mercury was not analyzed as part of the SOLT Thesis.

Metals Conclusions

Detected concentrations of metal analytes in soil and groundwater indicate that concentrations are within background levels at the Site. Detected concentrations of metals from Historical reports and from the December 2017 investigation are noted to be within or below concentrations identified as background levels in the SOLT Thesis. Detections of metals in groundwater in OU 11 are noted to exceed only the CA PHG, with the exception of antimony and arsenic (Region 9 and CA MCL, and DTSC Note 3 screening level, respectively). Arsenic is the only metal detected that exceeds the risk based SSL (soil) and also exceeds the DTSC Note 3 screening level (water). Remaining detected metals that have exceedances of the SSL in soil do not exceed CA MCLs or federal MCLs in groundwater. These results indicate that concentrations of metals in soil do not have an impact on concentrations of metals in groundwater. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

TPH Data

During the December 2017 field investigation two soil gas samples were collected from OU 8 and analyzed for TPH. One co-located location with soil gas probes at five and fifteen feet bgs were analyzed for TPH gasoline range, diesel range, reference to kerosene, and JP4. Laboratory analysis reported both samples as non-detect below the laboratory method detection limit for all TPH analysis in OU 11 (Table 3).

Various soil locations were analyzed for various TPH constituents during the December 2017 field investigation. Twelve samples were analyzed for TPH gasoline and diesel in OU 11 with depths ranging from two feet bgs to 25 feet bgs. TPH as gasoline and diesel are reported as ND for all 12 samples. Eight soil samples were analyzed for TPH motor oil, hydraulic oil, mineral oil, and kerosene with depths ranging from two feet bgs to 25 feet bgs at the Site. Reported results show TPH as motor oil as the only detections four out of eight soil samples in OU 11 with concentrations ranging from 12 mg/kg at OU-11-6-7-15 to 44 mg/kg at OU-11-6-7-5. Detected concentrations of TPH as motor oil are reported below the risk based SSL of 89 mg/kg and the Region 9 industrial soil RSL of 440 mg/kg (Table 4).

During the December 2017 field investigation two hydropunch locations were advanced in OU 11 for analysis of TPH gasoline, diesel, motor oil, hydraulic oil, mineral oil, and kerosene. Laboratory analysis reported both samples as non-detect below the laboratory method detection limit for all TPH analysis in OU 11 (Table 6).

TPH Conclusions

Detected concentrations of TPH in soil gas, soil, and ground water indicate that TPH concentrations have attenuated over time from historical concentrations. All detections are reported below their respective screening levels, and in some cases as non-detect below laboratory method detection limits, for soil gas, soil, and groundwater. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

VOC-Related Data

During the December 2017 field investigation four soil gas samples were collected from OU 11 and analyzed for VOCs. Two co-located locations with soil gas probes at five and fifteen feet

bgs were analyzed for full scan VOCs. Laboratory analysis of the soil gas detected concentrations of ethanol, acetone, 2-propanol (leak tracer), 2-butanone, tetrahydrofuran, 2,2,4-trimethlypentane, 4-methyl-2-pentanone, toluene, tetrachloroethene (PCE), m,p-xylene, 4-ethyltoluene, and 1,2,4-trimethylbenzene. Reported concentrations of detected VOCs in soil gas are reported below DTSC Note 3 screening levels and Region 9 industrial air screening levels, with an applied attenuation factor of 0.001, for all detected VOC concentrations (Table 2).

During the December 2017 field investigation 14 soil samples were collected from OU 11 and analyzed for VOCs. Depths of the samples collected ranged from two feet bgs to 25 feet bgs from four boring locations. Laboratory analysis of the soil detected concentrations of acetone, 2-butanone, and methylene chloride. Methylene chloride was detected in two out of two samples at concentration of 3.2J µg/kg (trace) at OU-11-6-8-25 to 6.6J µg/kg (trace) at OU-11-6-7-25. Detected trace concentrations of methylene chloride are reported above the risk based SSL of 2.9 µg/kg and below the industrial soil RSL of 1,000 µg/kg in both samples. Reported concentrations of acetone and 2-butanone in soil are reported below risk based SSLs and industrial soil RSLs for all detected VOC concentrations (Table 4).

During the December 2017 field investigation two hydropunch samples were collected from OU 11 and analyzed for VOCs. Laboratory analysis of the groundwater detected concentrations of acetone and toluene. Detected concentrations of acetone and toluene in groundwater are reported below their respective screening levels, where established (Table 6).

VOC-Related Conclusions

Investigation data for VOCs at OU 11 are reported at non-detect below the laboratory method detection limit to low level concentrations for samples analyzed. Detections of methylene chloride in two soil samples on site at 25 feet bgs are the only samples to exceed applicable screening levels for VOCs. Methylene chloride was only found in soil samples analyzed on site, soil gas and ground water samples analyzed report non-detect below the laboratory method detection limit for methylene chloride, indicating that the analyte is not found in soil gas or ground water at the site. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides Data

During the December 2017 field investigation 10 soil samples were analyzed for pesticides in OU 11 at depths ranging from two feet bgs to 25 feet bgs. Laboratory results reported detections of 4,4'-DDE and 4,4'-DDT in some soil samples analyzed. 4,4,'-DDE was detected in three out of 10 soil samples analyzed at concentrations ranging from 6.1J µg/kg (trace) at OU-11-SV-01-2 to 12J µg/kg (trace) at OU-11-6-7-2. Detected concentrations are reported above the risk based SSL of 11 µg/kg in two of the three samples (OU-11-SV-02-2 11 µg/kg and OU-11-6-7-2 12J µg/kg). 4,4'-DDT was detected in one out of 10 soil samples analyzed. Detected concentrations of 4,4-DDT are reported below the risk based SSL of 77 µg/kg. All detections of pesticides are reported below their respective industrial soil RSLs (Table 4).

During the December 2017 field investigation two hydropunch samples were collected from OU 11 and analyzed for pesticides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed samples (Table 6).

Pesticides Conclusions

Detected concentrations of pesticides in soil indicate that pesticides are a concern within the top two feet of soil at the site only. Soil collected from deeper intervals at the Site in OU 11 (5, 15, 25 feet bgs) indicate that pesticides have been delineated vertically at the site and that pesticides are a concern in the top two feet of soil only. Of the four soil samples collected in the top two feet bgs two samples are reported above the risk based SSL for pesticide constituents. Remaining soil and groundwater samples for pesticides are reported as non-detect below the laboratory method detection limit for each respective analyte in OU 11. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation or remediation. A soil management plan should be developed to mitigate and control the top two feet of soil at the Site for offsite use only.

Herbicides Data

During the December 2017 field investigation six soil samples were collected from OU 11 at depths ranging from five feet bgs to 25 feet bgs and analyzed for herbicides. Laboratory analysis of the soil is reported as non-detect below the laboratory method detection limit for the analyzed sample (Table 4).

During the December 2017 field investigation two hydropunch samples were collected from OU 11 and analyzed for herbicides. Laboratory analysis of the groundwater reported non-detect below the laboratory method detection limit for the analyzed sample (Table 6).

Herbicides Conclusions

Six soil and two groundwater samples were collected from OU 11 and analyzed for herbicides during the field investigation. The samples are reported as non-detect below the laboratory method detection limit for soil and groundwater. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

6 EVALUATION OF SOIL GAS AS A CONTAMINANT SOURCE AFFECTING GROUNDWATER

Typically, on a hazardous material release site, the migration of volatile organic compounds (VOCs) from a groundwater source, through the vadose zone, and into overlying buildings is an important environmental fate process. The migration of VOCs in the soil gas phase from the vadose zone into groundwater, however, may also be important where protection of groundwater is an objective. The equilibrium concentration of a given VOC in groundwater based on a given soil gas concentration can be estimated using the Henry's law constant:

Equation 1

$$C_{gw} = \frac{C_{sv}}{H'}$$

Where:

Parameter	Symbol (units)
Soil gas concentration	C_{sv} (µg/m^3)
Groundwater concentration	C_{gw} (mg/kg)
Henry's law constant	H' (unitless, chemical-specific)

As an example, the maximum soil gas concentration of tetrachloroethene (PCE) (130 µg/m^3) reported in a groundwater sample from the Spreckels site (OU-11-SV-01-15 collected 12/22/2017) was used to calculate the equilibrium groundwater concentration using Equation 1:

$$C_{gw} = \frac{C_{sv}}{H'}$$

$$C_{gw} = \frac{130\ \frac{\mu g}{m^3}}{0.714}$$

$$C_{gw} = 182\ \frac{\mu g}{m^3} = 1.82\ \frac{\mu g}{L}$$

Similar calculations were performed based on the maximum concentrations reported for all VOCs in groundwater samples (Table 1). The estimated groundwater concentrations were also compared to relevant health-based screening levels. Groundwater concentrations less than

health-based screening levels are unlikely to pose a hazard that requires mitigation or remediation (SFRWQCB 2016; EPA 2018).

Analyte[a]	Maximum Soil Gas Concentration (µg/m^3)	Henry's Law Constant (unitless)[b]	Estimated Groundwater Concentration (C_{gw}) (µg/L)[c]	SFRWQCB ESL (µg/L)[d]	EPA Residential RSL (µg/L)[e]	Federal MCL (µg/L)
PCE	130	0.714	0.18	**0.06**	11	5
Acetone	1,000	0.00152	657.89	14,000	14,000	NA
2-Propanol	32	0.00033	96.97	NA	410	NA
2-Butanone	290	0.00218	133.03	5,600	5,600	NA
Chloroform	18	0.144	0.13	0.23	0.22	80
MIBK	110	0.00534	20.60	120	6,300	NA
Toluene	52	0.258	0.20	40	1,100	1,000
Ethylbenzene	6.8	0.305	0.02	1.5	1.5	700
m,p-Xylene	28	0.284	0.10	20	190	10,000
o-Xylene	9.5	0.2	0.05	20	190	10,000
1,3,5-TMB	12	0.225	0.05	NA	60	NA
1,2,4-TMB	30	0.236	0.13	NA	56	NA

[a] insufficient information was available for some VOCs and estimated groundwater concentrations could not be developed, including tetrahydrofuran, 4-ethyltoluene, and 2,2,4-trimethylpentane.
[b] Source of temperature adjusted H': EPA JE model
[c] Estimated groundwater concentration is the C_{eq} factor used below.
[c] https://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.html [accessed March 29, 2018]
[d] https://www.epa.gov/risk/regional-screening-levels-rsls [accessed March 29, 2018]
PCE, tetrachloroethene
TMB, trimethylbenzene
MIBK, Methyl-isobutyl-ketone (4-Methyl-2-pentanone)

Only the estimated concentration of PCE exceeded a health-based screening level. The estimated concentrations, however, assume that groundwater concentrations and soil gas concentrations are at equilibrium but equilibrium groundwater conditions are rarely reached given that diffusion from soil gas into groundwater occurs exceedingly slowly because the soil-groundwater interface is generally undisturbed and vertical mixing is negligible.

To address the screening level exceedance that may be associated with PCE soil gas migrating into groundwater, partitioning of soil gas into groundwater was modeled based on modification of Fick's first law (Hartman 1998)[7]:

[7] *Hartman B. 1998. The Downward Migration of Vapors. LUSTLine Bulletin 28. New England Interstate Water Pollution Control Commission. Lowell, MA.*

Equation 2

$$Flux = K_L(C_{eq} - C_{gw})$$

Where:

K_L = gas exchange coefficient (length/time)
C_{eq} = equilibrium concentration at the soil gas-groundwater interface
C_{gw} = background groundwater concentration of a given analyte

The gas exchange coefficient, K_L, represents the distance that an analyte could move vertically through groundwater per unit time. For groundwater velocities less than 100 feet per year and soil grain sizes less than 0.5 mm, molecular diffusion is the primary transport mechanism for vapor migration into groundwater and K_L can be estimated from Equation 3:

Equation 3

$$K_L = 1.1 \times \left(D_e \times \frac{d}{v}\right)^{1/2}$$

Where:

Parameter	Symbol (units)	Value	Source
Effective diffusivity	D_e (cm^2/s)	Calculated	Hartman (1998)
Horizontal distance over which soil gas and groundwater are in contact	d (cm)	500	Site-specific estimate, 5 meters
Horizontal groundwater velocity	V (cm/year)	304.8	Site-specific estimate, 10 feet per year

Effective diffusivity (D_e) is a function of air-filled soil porosity and can be approximated for soil gas-phase chemicals in the soil column using the following equation[8]:

Equation 4

$$D_e = \theta_a^2 \times D_a$$

Or in groundwater:

Equation 5

$$D_e = \theta_w^2 \times D_w$$

Where:

Parameter	Symbol (units)	Value	Source
Air-filled porosity	θ_a (L/kg)	0.32	EPA JE Model (= n - θ_w)
Diffusivity in air	D_a (cm^2/s)	0.072	PCE, New Jersey Chemical Properties Table[a]
Water-filled porosity	θ_w (L/kg)	0.054	EPA JE Model (based on SAND)
Diffusivity in water	D_w (cm^2/s)	8.2×10^{-6}	PCE, New Jersey Chemical Properties Table[a]

[a] http://www.nj.gov/dep/srp/guidance/rs/chemproperties.pdf

[8] *Papendick and Campbell 1981, cited at http://compost.css.cornell.edu/odors/inadeq.porosity.htmle*

Thus, the effective diffusivity for PCE in the soil gas-phase in soil (D_e) is approximately 0.0074 cm^2/s, and for PCE in groundwater, D_e is 2.4 x 10^{-8}.

Soil gas-phase chemicals migrate through the vadose zone quickly as compared to the rate of soil gas migration from soil into groundwater. The distance a gas-phase compound can migrate through the soil column can be estimated based on the following equation:

Equation 6

$$Distance = (2 \times D_e \times t)^{1/2}$$

Where:

D_e = effective diffusivity
t = time

Therefore, the distance that PCE will travel per year through the air-filled pore spaces of the vadose zone can be estimated as:

$$Distance = (2 \times D_e \times t)^{1/2}$$

$$Distance = \left(2 \times 0.0074 \frac{cm^2}{s} \times 31{,}536{,}000 \frac{s}{yr}\right)^{1/2}$$

$$Distance = 683 \frac{cm}{yr} \cong 22.4 \frac{ft}{yr}$$

Thus, a soil gas plume can easily move the distance from a subsurface source to the water table relatively quickly.

By contrast, the migration of soil gas into or out of groundwater generally occurs relatively slowly because this movement is a function of the rate at with soil gas can partition into and out of a liquid, and the groundwater surface area available for transfer. The approximate distance that PCE can migrate into groundwater is:

$$Distance = \left(2 \times \left(2.4\ x\ 10^{-8} \frac{cm^2}{s}\right) \times 31{,}536{,}000 \frac{s}{yr}\right)^{1/2}$$

$$Distance = 1.23 \frac{cm}{yr} \cong 0.48 \frac{in}{yr}$$

For the current analysis, the concentration of PCE in groundwater that could result from migration of PCE in soil gas was estimated based on the following assumptions and inputs:

1. Molecular diffusion is the most significant transport mechanism moving PCE from soil gas into groundwater.
2. Groundwater is migrating approximately 10 feet per year.
3. The water column available for mixing is 5 meters high.
4. The water table surface area in contact with soil gas is 5 meters by 50 meters (250 m^2)

The groundwater concentration of PCE due to migration of gas into groundwater can then be estimated as follows:

Equation 7

$$C_{gw} = \frac{Flux\ \frac{\mu g}{cm^2 - yr} \times Area\ (cm^2) \times Time(yr)}{Volume\ (L)}$$

Where:

$Flux = K_L(C_{ea} - C_w)$, assuming $C_w = 0$

$$Flux = K_L(C_{ea} - C_w)$$

$$K_L = 1.1 \times \left(D_e \times \frac{d}{v}\right)^{1/2}$$

$$K_L = 1.1 \times \left(2.4 \times 10^{-8} \frac{cm^2}{s} \times \frac{5{,}000\ cm}{304.8\ \frac{cm}{yr}}\right)^{1/2}$$

$$K_L = 1.1 \times \left(\left(2.4 \times 10^{-8} \frac{cm^2}{s}\right) \times \frac{5{,}000\ cm \times 31{,}536{,}000\ \frac{s}{yr}}{304.8\ cm}\right)^{1/2}$$

$$K_L = 3.87\ \frac{cm}{yr}$$

$Flux = K_L(C_{sg})$, assuming $C_w = 0$

$$Flux = 3.87 \frac{cm}{yr}\left(0.18 \frac{\mu g}{L}\right) \times \frac{1\ L}{1{,}000\ cm^3}$$

$$Flux = 3.87 \frac{cm}{yr}\left(0.18 \frac{\mu g}{L}\right) \times \frac{1\ L}{1{,}000\ cm^3}$$

$$Flux = 0.000697\ \left(\frac{\mu g}{cm^2 - yr}\right)$$

$$C_{gw} = \frac{Flux\ \frac{\mu g}{cm^2 - yr} \times Area\ (cm^2) \times Time(yr)}{Volume\ (L)}$$

$$C_{gw} = \frac{0.000697\ \frac{\mu g}{cm^2 - yr} \times 500{,}000\ (cm^2) \times 1(yr)}{1{,}250\ (m^3)} \times \frac{1\ m^3}{1{,}000\ L}$$

$$C_{gw} = 0.00028\ \frac{\mu g}{L}$$

Therefore, the concentration of PCE in groundwater after one year based on the maximum soil gas concentration reported on the subject site is 0.00028 µg/L, which is well below all health-based standards. In conclusion, soil gas conditions are unlikely to result in groundwater conditions that require mitigation or remediation.

7 CONCLUSIONS

Historical report and data review, including spot checking of historical laboratory data, was conducted as part of the proposed Phase II ESA. Phase II ESA were activities performed between November and December 2017 and again on March 6, 2018 at the Site. Investigation activities included passive soil gas, active soil gas, soil and groundwater sampling, and analysis.

The purpose of the historical review and spot check was to evaluate areas of the Site where past investigation activities and assessment was conducted. The Phase II ESA was conducted to fill in identified gaps of data from the historical report at areas of the Site where past activities may have chemically-impacted soil gas, soil, or groundwater, in preparation for Site redevelopment. Conclusions from the historical Phase II ESAs review and current Phase II ESA are discussed below.

7.1 LITHOLOGY

Near-surface deposits consist of a heterogeneous assemblage of fluvial deposits composed of sands, silts, and clays, and flood plain deposits composed of sands and silts. Groundwater was encountered on site at approximately 27 feet bgs at each hydropunch location.

7.2 HISTORICAL DATA REVIEW

A review of all historical documents was conducted as part of the Phase II ESA investigation to evaluate areas of concern at the site. Historical laboratory data was spot checked for accuracy against current screening level for constituents of concern for identified operable units. Spot checked data showed that constituents of concern that were reported as non-detect in historical reports contained reporting limits that varied to be below and above current screening levels. Samples collected during historical investigation activities are noted to be predominantly below laboratory reporting limits in operable units OU 1, 2, 3, 4, 6, and 10. Based upon review of historical reports and data for these operable units, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation. An assessment of remaining operable units is discussed below.

7.3 SOIL GAS

Soil gas concentrations were compared to the DTSC Note 3 screening levels and USEPA Region 9 RSLs for industrial air for TO-15 and the USEPA Region 9 RSLs for industrial air and SFBRWQCB Tier 1 ESLs table for TO-17 analysis. An attenuation factor of 0.001 for a future industrial site in California was applied to take into account the geologic column, future engineered barriers (concrete slab, asphalt, etc.), and dilution of soil gas with indoor air. All detected analytes in analyzed samples are reported below their respective RSLs.

Furthermore a model was created using Henry's law of constant to determine if the migration of VOCs in soil gas phase from the vadose is a contaminant source affecting groundwater at the Site. Using results from the soil gas sampling the model shows that soil gas conditions on site are unlikely to results in groundwater conditions that require mitigation or remediation. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

7.4 SOIL

7.4.1 Non-Metals

Petroleum hydrocarbons as gasoline, diesel, oil and grease were reported above the laboratory method detection limit in samples analyzed. Petroleum hydrocarbons as Motor Oil were detected on site above the laboratory method detection limit but below their respective SSLs. These non-detect and limited detection results show that petroleum hydrocarbons at the site are not exceeding the applicable SSLs, therefor Kleinfelder concludes concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Three VOCs were detected in soil samples analyzed at the Site: acetone, 2-butanone, and methylene chloride. Acetone was detected in nine out of 37 samples analyzed below its SSL of 29,000 µg/kg. 2-Butanone was detected in eight out of 37 samples analyzed on Site below its SSL of 1200 µg/kg. Methylene chloride was detected in four out of 37 samples on Site. Two detected concentrations are reported above the SSL of 2.9 µg/kg (3.2J and 6.6J at OU-11-6-8-25 and OU-11-6-7-25, respectively). Concentrations of methylene chloride exceeding the SSL are not corroborated through soil gas or groundwater data collected on site. All other VOCs, including VOCs as chlorinated solvents and oxygenates, are reported as non-detect below the

laboratory method detection limit for each respective analyte. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Three pesticides were detected in soil samples analyzed at the Site: 4,4'-DDE, 4,4,'-DDD, and 4,4'-DDT. 4,4'-DDE was detected in 13 out of 25 samples analyzed. Detected concentrations exceeded the SSL of 11 µg/kg in eight of the 13 samples. 4,4,'-DDD was detected in one out of 25 samples analyzed. Detected concentrations did not exceed the SSL of 7.5 µg/kg. 4,4'-DDT was detected in seven out of 25 samples analyzed. Detected concentrations did not exceed the SSL of 77 µg/kg. Detected pesticide exceedances of 4,4'-DDE are reported in shallow two-foot sample locations only. All other pesticides are reported as non-detect below the laboratory method detection limit for each respective analyte. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation or remediation. A soil management plan should be developed to mitigate and control the top two feet of soil at the Site for off-site use only.

Herbicides were not detected above the laboratory method detection limit in any of the seven samples analyzed for it. General chemistry analysis was done for soil samples in OU 1 to establish background levels and evaluate if there is a concern to soil within the operable unit in relation to the former leech lines. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

7.4.2 Metals

Sample results exceeded the SSLs for four metals detected at the Site: thallium, cobalt, arsenic, and mercury. Detected concentrations ranged five to 25 feet bgs at two sample locations in OU-11, the historical rail spur. Arsenic was detected above the SSL of 0.0015 mg/kg and the DTSC Note 3 screening level of 0.36 mg/kg in six samples analyzed, with five sampling being detected below the Region 9 RSL of 3 mg/kg for industrial soil. Cobalt was detected above the SSL of 0.27 mg/kg and below the Region 9 RSL of 350 mg/kg for industrial soil in six samples analyzed. Mercury was detected in four out of six samples analyzed. Detected concentrations of mercury reported as exceeding the SSL of 0.033 mg/kg are reported at location OU-11-6-7 at 5 and 25 feet, and below the DTSC Note 3 screening level of 4.5 mg/kg and the Region 9 RSL of 46 mg/kg for industrial soils. All detected concentrations of mercury are reported above the laboratory method detection limit but below the laboratory

reporting limit. Thallium was detected above the SSL of 0.014 mg/kg and below the Region 9 RSL of 12 mg/kg in six samples analyzed. All detections of thallium are noted as being between the laboratories method detection limit and the reporting limit.

All metal concentrations reported above their respective SSLs are reported below their respective RSLs for industrial soil, with the exception of one arsenic sample that is reported at the industrial soil RSL. Reported concentrations of metals detected above the SSLs are not reported above their respective MCLs for groundwater from groundwater samples collected at the Site. With the exception of the four metals discussed, soils sampled at the Site do not appear to be impacted by metals above the SSLs. The four metals identified above are not detected in groundwater above the established MCL for each respective analyte, indicating that soil on Site does not present a risk to groundwater. Furthermore, based upon comparison of detected sample results of metals to the SOLT Thesis, detected metals on site fall within background levels. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

7.5 GROUNDWATER

7.5.1 Non-Metals

TPH-gasoline was detected in seven of nine groundwater samples analyzed. Detected concentrations ranged from 13J to 50J µg/L, above the laboratory method detection limit but below the reporting limit. All concentrations are reported below the SFBRWQCB Tier 1 ESLs for TPH gasoline. TPH as diesel, motor oil, hydraulic oil, mineral oil, and kerosene are reported at non-detect. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Toluene, ethylbenzene, and total xylenes were detected in various ground water samples on site below their respective federal MCLs and CA MCLs. Benzene is reported above its CA PHG but below its federal MCL and CA MCL in sample analyzed. Detections were primarily located within OU 5, location of the former above ground storage tank. Toluene is the only analyte to have been detected in another operable unit (two detections in OU 11). Chloromethane was detected in one groundwater sample at location OU-5-MW-22 at a level of 0.21J µg/L, currently there is no established MCL for chloromethane. Acetone was detected in two groundwater

samples at both OU 11 groundwater sample locations. Currently there is no established MCL for acetone. Other VOCs are reported as non-detect below their respective laboratory method detection limits, including 1,2,3-TCP being reported as non-detect below 0.67 nanograms per liter in three samples. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

Pesticides and herbicides were not detected in any of the groundwater samples analyzed. Groundwater general chemistry analysis was performed in OU 1 samples to provide a general background for groundwater in the operable unit of the former leech lines. One sample is in exceedance of the federal MCL, CA MCL, and CA PHG for nitrate as N. Detected concentrations of nitrate as N in soil above the exceeded groundwater sample are noted to be low level detections below established screening levels. These results indicate that the detected exceedance of nitrate as N in groundwater is not related to the historical use of the septic tank and leech lines associated with the Spreckels facility. Screening levels are not currently established for remaining general chemistry analytes. Based upon these results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, or remediation.

7.5.2 Metals

Low concentrations of antimony are reported above its MCL of 6 µg/L in two out of four samples analyzed. Detected concentrations are reported in operable units 1 and 11 at concentrations of 26J and 110 (OU-11-6-7 and OU-1-5-1, respectively). Detected concentrations of Nickel are reported above its CA MCLs in three out of four samples analyzed. These groundwater concentrations are noted to be above historical groundwater concentrations from the same locations for both antimony and nickel. Current detected concentrations of metals in soil at the site have reported antimony as non-detect below the laboratory method detection limit and low-level concentrations of nickel. Nickel is not reported above any established screening levels for soil in any samples collected during the 2017 investigation. Detected concentrations of arsenic are reported above its DTSC Note 3 screening level in four out of four samples analyzed. Detected concentrations of hexavalent chromium, lead, and thallium are reported above their respective CA PHGs but below CA MCLs and federal MCLs where established. Low concentrations of silver, cobalt, chromium, molybdenum, arsenic, lead, selenium, barium, and beryllium were detected at various sample locations. Detected concentrations did not exceed their respective MCLs, where established.

Detected concentrations of metals in groundwater exceeding screening levels did not correspond with detected concentrations of metals in soil, indicating that soil on Site does not present a direct risk to groundwater and that groundwater is protected. This indicates that current concentrations of metals in groundwater at the Site are not a direct result of historical use or activities from the Spreckels facility. Based upon these sample results, Kleinfelder concludes that concentrations of the chemicals of concern do not pose a hazard that requires further investigation, mitigation, our remediation.

8 RECOMMENDATIONS

Based upon the results in soil gas, soil, and groundwater data collected during the Phase II ESA conducted in November, December 2017 and March 2018, a data review and spot check analysis from the historical reports, and a soil gas model utilizing Henry's Law of Constants, Kleinfelder concludes that concentrations of the chemicals of concern for previously identified activities and processes on Site do not pose a hazard that requires further investigation, mitigation, or remediation. Furthermore, Kleinfelder recommends no further action is required at the Site and that the CVRWQCB issue a closure letter for the Site with a Soil Management Plan (SMP) regarding the use of onsite soil and for off hauling purposes only at the earliest possible convenience.

9 LIMITATIONS

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

This report may be used only by the Client and the registered design professional in responsible charge and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) from the date of the report.

The work performed was based on project information provided by Client. If Client does not retain Kleinfelder to review any plans and specifications, including any revisions or modifications to the plans and specifications, Kleinfelder assumes no responsibility for the suitability of our recommendations. In addition, if there are any changes in the field to the plans and specifications, Client must obtain written approval from Kleinfelder's engineer that such changes do not affect our recommendations. Failure to do so will vitiate Kleinfelder's recommendations."

TABLES

Table 1 - Summary of Boring Locations Rationale
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Phase I			Water Board Petition	Kleinfelder Recommendations for Operable Units	Supporting Document Sections and Figures
Recommendation		Constituents of Concern	Sub-Recommendations		
OU 1	Analyze soil samples in vicinity of septic tanks and leach lines.	CAM 17 Metals, TPH, Solvents, Ethylene Glycol, VOCs, SVOCs, Pesticides, Herbicides, TPHd, TPHlo	7.2: Near Cane Slab	**Metals:** Phase II data appears to represent natural background conditions. Recommend no further action.	Report Section 5.1, Figure OU1.M
				Petroleum-related: Phase II data indicates no petroleum-related issues. Recommend no further action.	Report Section 5.1
				Volatile Organic Compounds: Potential VOCs associated with on site activites, recommend additional field exploration.	Report Section 5.1
				Pesticide: Sample for pesticides in top soil. Recommend additional field exploration.	Report Section 5.1, Figure OU1,5,8,9,11.P
				General Chemistry: The Board indicated it wants to review general chemistry data. Kleinfelder therefore recommends field exploration.	Report Section 5.1
OU 2	Conduct additional assessment at two removed-UST locations to obtain closure from San Joaquin County Environmental Health Department.	VOCs, BTEX, MTBE, TPHg, Ethylene Dibromide, Organic Lead	9.1: Former Factory and Historical Gasoline USTs	**Petroleum-related:** Phase II data indicate no petroleum-related issues. Recommend no further action.	Report Section 5.2
	Evaluate potential existence of two USTs indicated by Fire Insurance Maps.	VOCs, BTEX, MTBE, TPHg, Ethylene Dibromide, Organic Lead	10.1: Former Factory and Historical Gasoline USTs		
OU 3	Analyze soil at then-existing and former aboveground storage tank locations, associated piping, and then-existing and former hazardous materials storage locations.	TPHd, TPHmo	12.1: Former Drum and Waste Oil Storage Location	**Petroleum-related:** Phase II data indicate no petroleum-related issues. Recommend no further action.	Report Section 5.3
OU 4		TPHd, TPHmo	12.2: Fuel Oil & Existing/Former Product Lines	**Petroleum-related:** Phase II data indicate no petroleum-related issues. Recommend tabulate and analyze reporting limits.	Report Section 5.4
OU 5		TPHd, TPHmo, TPHg, BTEX, MTBE	12.3: Above Ground Diesel Fuel Tank	**Petroleum-related:** Phase II data indicate potential petroleum-related concentration. Recommend additional field exploration.	Report Section 5.5, Figure OU5.TPH
				Volatile Organic Compounds: potential VOCs associated with TPH, recommend additional field exploration.	Report Section 5.5
				Pesticide: Sample for pesticides in top soil. Recommend additional field exploration.	Report Section 5.5, Figure OU1,5,8,9,11.P
OU 6		TPHg, BTEX, MTBE	12.4: Above Ground Gasoline Convault	**Petroleum-related:** Phase II data indicate no petroleum-related issues. Recommend tabulate and analyze reporting limits.	Report Section 5.6
OU 7		pH, CAM 17 Metals, Sodium Hydroxide, Sulfuric Acid, Hydrochloric Acid	12.5: Acid/Caustic/Sulfuric Acid Storage	**Metals:** Phase II data appear to represent natural background conditions. Recommend no further action.	Report Section 5.7
OU 8	Analyze soils to evaluate potential contamination associated with underground structures.	Petroleum, VOCs, SVOCs	13.1: Slab Factory Drains	**Petroleum-related:** Phase II data indicate potential petroleum-related concentration. Recommend additional field exploration.	Report Section 5.8, Figure OU8.TPH
				Volatile Organic Compounds: Solvents	Report Section 5.8
				Pesticides/Herbicides: Phase II data indicate 2 detections in adjacent OU 9. Recommend reporting limits be tabulated and evaluated, sampling of soil for coverage of OU 8 and OU 9.	Report Section 5.8, Figure OU1,5,8,9,11.P
OU 9		Pesticides, Herbicides,	13.2: Former Underground Beet Flume	**Petroleum-related:** TPH samples collected to delinate adjacent OU 8.	Report Section 5.9
				Volatile Organic Compounds: VOCs collected to delinate adjacent OU 8.	Report Section 5.9
				Pesticides/Herbicides: Phase II data indicate 2 detections. Recommend reporting limits be tabulated and evaluated and field exlporation.	Report Section 5.9, Figure OU1,5,8,9,11.P
OU 10	Evaluate soils near solvent washdown pad, truck washing area, and historical "auto shed" areas.	VOCs, MTBE, TPHg, Total Extractable Hydrocarbons, semi-VOCs	17.1: Solvent Washdown Pad	**Petroleum-related:** Phase II data indicate no petroleum-related issues. Recommend no further action.	Report Section 5.10
OU 11	Visually inspect and potentially analyze soils near rail spurs for evidence of contamination.	CAM 17 Metals, TPHd, TPHlo, Pesticides, PCBs, Herbicides, SVOCs	21.1; Area of High Soluble Lead	**Petroleum-related:** Phase II data indicate potential petroleum-related concentration. Recommend additional field exploration.	Report Section 5.11
			21.2: Rest of Railroad Spurs	**Metals:** Phase II data indicate soluble lead and other elevated metals. Recommend field exploration.	Report Section 5.11, Figure OU11.M
				Pesticides/Herbicides: Phase II data indicate 2 detections. Recommend reporting limits be tabulated and evaluated, additional field exploration.	Report Section 5.11, Figure OU1,5,8,9,11.P

Notes:

TPH	total petroleum hydrocarbons
TPHg	total petroleum hydrocarbons as referenced to gasoline
TPHd	total petroleum hydrocarbons as referenced to diesel
TPHlo	total petroleum hydrocarbons as referenced to lubricating oil
TPHlo	total petroleum hydrocarbons as referenced to motor oil
BTEX	benzene, toluene, ethylbenzene and total xylenes
MTBE	methyl tert-butyl ether
VOCs	volatile organic compounds
SVOCs	semi-volatile organic compounds
USTs	underground storage tanks
PCBs	polychlorinated biphenols

Table 2 - Summay of VOC Results in Soil Gas
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	VOCs by USEPA Method TO-15 (µg/m^3)															
		Ethanol	Acetone	2-Propanol	2-Butanone (Methyl Ethyl Ketone)	Tetrahydrofuran	Chloroform	2,2,4-Trimethylpentane	4-Methyl-2-pentanone	Toluene	Tetrachloroethene	Ethylbenzene	m,p-Xylene	o-Xylene	4-Ethyltoluene	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	Other VOCs
DTSC Hero Note 3 Screening Levels[1]		**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**1.30E+06**	**2,000**	**NS**	**NS**	**NS**	**NS**	**180,000**	**180,000[2]**	**Various**
USEPA Region 9 RSL for Industrial Air[1]		**NS**	**1.4E+08**	**880,000**	**2.2E+07**	**8.8E+06**	**530**	**NS**	**1.3E+07**	**2.2E+07**	**47,000**	**4,900**	**440,000**	**440,000**	**NS**	**260,000**	**260,000**	**Various**
OU-5-SV-01-5	12/22/2017	<8.1	**1,000**	**32**	**290**	**350**	<5.2	<5.0	**110**	**52**	<7.3	**6.8**	**28**	**9.5**	**18**	**11**	**30**	ND
OU-5-SV-01-15	12/22/2017	<8.1	<26	<10	<13	**5.5**	<5.2	<5.0	<4.4	<4.0	**10**	<4.7	<4.7	<4.7	<5.3	<5.3	<5.3	ND
OU-5-SV-02-5	12/22/2017	<8.6	**220**	<11	**41**	**180**	<5.5	<5.3	**36**	**32**	<7.7	**5.2**	**23**	**7.3**	**14**	**12**	**28**	ND
OU-5-SV-02-15	12/22/2017	**8.6**	**90**	<11	**25**	**99**	<5.4	<5.2	**41**	**6.3**	<7.6	<4.8	<4.8	<4.8	<5.5	<5.5	**6.4**	ND
OU-8-SV-01-5	12/22/2017	<8.0	**380**	**21**	**97**	**370**	<5.2	<5.0	**99**	**31**	**16**	<4.6	**12**	**5.2**	**12**	**6.8**	**20**	ND
OU-8-SV-01-15	12/22/2017	<8.0	<25	<10	<12	<3.1	**18**	<5.0	<4.4	<4.0	**25**	<4.6	<4.6	<4.6	<5.2	<5.2	<5.2	ND
OU-11-SV-01-5	12/22/2017	<8.6	**140**	<11	**42**	**130**	<5.6	<5.3	**4.9**	**6.9**	**48**	<4.9	<5.0	<5.0	<5.6	<5.6	<5.6	ND
OU-11-SV-01-15	12/22/2017	<8.0	**26**	<10	**21**	**35**	<5.2	<4.9	**20**	<4.0	**130**	<4.6	<4.6	<4.6	<5.2	<5.2	<5.2	ND
OU-11-SV-02-5	12/22/2017	<14	**570**	<18	**70**	**310**	<9.1	<8.7	**35**	**16**	<13	<8.1	**12**	<8.1	**11**	<9.2	**17**	ND
OU-11-SV-02-15	12/22/2017	**8.5**	<26	**10 J**	<13	**10**	<5.3	**5.8**	<4.4	<4.1	<7.3	<4.7	<4.7	<4.7	<5.3	<5.3	<5.3	ND
AB-122217	12/22/2017	**9.1**	<22	<8.9	<11	<2.7	<4.4	<4.2	<3.7	<3.4	<6.2	<4.0	<4.0	<4.0	<4.5	<4.5	<4.5	ND

Note:
µg/m3: Microgram per meters cubed
<8.1 Indicates sample was not detected above laboratory method detection limit
ND: Indicates samples were not detected during reporting
NS: No established standard for screening levels
J: Indicates sample was detected above the laboratory method detection limit but below the laboratory reporting limit
USEPA: United States Environmental Protection Agency
DTSC: Department of Toxic Substances Control
Hero Note 3: DTSC Human Health Risk Assessment Screening Levels, Note 3, published February 2018
RSL: Regional Screening Level
VOC: Volatile Organic Compund
1: Attenuation factor of 0.001 for industrial air applied
2: Screening levels for 1,2,4- TMB were derived from screening levels for 1,3,5- Trimethylbenzene

Table 3 - Summay of TPH Results in Soil Vapor
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	TPH by USEPA Method TO-17 (µg/m3)			
		TPH (Gasoline Range)	TPH (Diesel Range C10-C22)	TPH (Kerosene)	TPH (JP4 Range)
USEPA Region 9 RSL for Industrial Air[1] (TPH, Aliphatic)		**2.6E+06**	**4.4E+05**	**NS**	**NS**
USEPA Region 9 RSL for Industrial Air[1] (TPH, Aromatic)		**1.3E+05**	**1.3E+04**	**NS**	**NS**
SFBRWQCB ESLs For Soil Vapor[1]		**5.0E+07**	**6.8E+07**	**6.8E+07**	**6.8E+07**
OU-5-SV-01-5	12/22/2017	<5000	**10,000**	**7,800**	**11,000**
OU-5-SV-01-15	12/22/2017	<5000	<5000	<5000	<5000
OU-5-SV-02-5	12/22/2017	<5000	<5000	<5000	<5000
OU-5-SV-02-15	12/22/2017	<5000	**6,000**	<5000	**6,600**
OU-8-SV-01-5	12/22/2017	<5000	<5000	<5000	<5000
OU-8-SV-01-15	12/22/2017	<5000	<5000	<5000	<5000
OU-11-SV-01-5	12/22/2017	<5000	<5000	<5000	<5000
OU-11-SV-01-15	12/22/2017	<5000	<5000	<5000	<5000
OU-11-SV-02-5	12/22/2017	<5000	<5000	<5000	<5000
OU-11-SV-02-15	12/22/2017	<5000	<5000	<5000	<5000
AB-122217	12/22/2017	<5000	<5000	<5000	**5,800**

Note:

µg/m3:	Microgram per meters cubed
<5000	Indicates sample was not detected above laboratory method detection limit
SFBRWQCB ESLs:	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels
USEPA:	United States Environmental Protection Agency
TPH:	Total Petroleum Hydrocarbons
NS:	No established standard for screening levels
1:	Attenuation factor of 0.001 for industrial air applied

Table 4 - Summay of Non-Metal Results in Soil
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	TPH by USEPA Method 8015 (mg/kg)		VOC by USEPA Method 8260B (µg/kg)				Pesticide by USEPA Method 8081(µg/kg)				Herbicide By USEAP Method 8151A (mg/kg)	General Chemistry by Various USEPA Methods (300.0, 6010B, SM4500-NH3F-1997, SM4500-P E)											
		Motor Oil	Other TPH	Acetone	2-Butanone	Methylene chloride	Other VOCS	4,4´-DDD	4,4´-DDE	4,4´-DDT	Other Pesticides		Nitrate as N (mg/kg)	Total Alkalinity (mg/L)	Bicarbonate as CaCO3 (mg/L)	Carbonate as CaCO3 (mg/L)	Hydroxide as CaCO3 (mg/L)	Chloride (mg/kg)	Sulfate as SO4 (mg/kg)	Potassium (mg/kg)	Sodium (mg/kg)	Ammonia as N (mg/kg)	Total Kjeldahl Nitrogen (mg/kg)	Orthophosphate as PO4 (mg/kg)
USEAP Region 9 Regional Screening Levels Risk Based SSLs		**89[1]**	**Various**	**29,000**	**1,200**	**2.9**	**Various**	**7.5**	**11**	**77**	**Various**	**Various**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
USEAP Region 9 Regional Screening Levels Industrial Soil		**440**	**Various**	**670,000**	**190,000**	**1,000**	**Various**	**9,600**	**9,300**	**8,500**	**Various**	**Various**	**1,900,000[2]**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
OU-1-5-1-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.96	**30J**	<1.2	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-1-5-1-5	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**81**	**170**	**170**	<0.50	<0.50	**120**	**160**	**1,700**	**230**	**10**	**270**	**11**
OU-1-5-1-15	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**26**	**12**	**12**	<0.50	<0.50	**42**	**7.8**	**710**	**88**	**19**	**9.9J**	**2.6**
OU-1-5-1-25	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**1.4J**	**31**	**31**	<0.50	<0.50	**37**	**42**	**1,100**	**220**	<8.2	**41**	**0.19**
OU-1-5-2-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.48	**16J**	**9.7J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-1-5-2-5	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**24**	**87**	**87**	<0.50	<0.50	**9.6**	**82**	**1,600**	**100**	<8.2	**67**	**35**
OU-1-5-2-15	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**23**	**12**	**12**	<0.50	<0.50	**7.2**	**35**	**680**	**180**	**16**	**26**	**5.2**
OU-1-5-2-25	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**9.6**	**20**	**20**	<0.50	<0.50	**61**	**56**	**890**	**140**	<8.2	**16J**	**0.82**
SV-01	12/19/2017	**7.7**	ND	<27	<11	<0.90	ND	<0.096	<0.058	**1.3J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-SV-01-5	12/19/2017	--	ND	**38J**	**13J**	**1.7J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-SV-01-15	12/19/2017	--	ND	**29J**	**12J**	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-SV-02-2	12/19/2017	**25**	ND	<27	<11	<0.90	ND	<0.48	**15J**	**8.9J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-SV-02-5	12/19/2017	--	ND	**35J**	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-SV-02-15	12/19/2017	--	ND	**30J**	**12J**	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-24-2	12/19/2017	--	--	<27	<11	<0.90	ND	<0.48	**8.6J**	<0.60	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-15-2	12/20/2017	--	--	<27	<11	<0.90	ND	<0.096	**200**	**8.1**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-15-5	3/6/2018	--	--	--	--	--	--	**1.5**	**8**	**1.2**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-12-42-2	12/20/2017	--	--	<27	<11	<0.90	ND	<0.096	**1.8J**	<0.12	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-22-2	12/20/2017	--	--	<27	<11	<0.90	ND	<0.096	**27**	**6**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-22-5	12/20/2017	--	--	<27	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-SV-01-2	12/19/2017	**34**	ND	<27	<11	<0.90	ND	<0.48	**7.6J**	<0.60	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-SV-01-5	12/19/2017	--	ND	<27	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-SV-01-15	12/19/2017	--	ND	**29J**	**12J**	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-16-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-17-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.19	<0.12	<0.24	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-18-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.48	**12J**	<0.60	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-9-13-12-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.48	**8.3J**	**11J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-9-13-12-5	12/27/2017	<0.11	ND	<27	**12J**	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-9-13-12-15	12/27/2017	<0.11	ND	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-9-13-12-25	12/27/2017	<0.11	ND	**29J**	**12J**	**2.3J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-01-2	12/19/2017	**19**	ND	<27	<11	<0.90	ND	<0.19	**6.1J**	**4.0J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-01-5	12/19/2017	--	ND	<27	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-01-15	12/19/2017	--	ND	<27	**12J**	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-02-2	12/19/2017	**15**	ND	<27	<11	<0.90	ND	<0.19	**11**	<0.24	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-02-5	12/19/2017	--	ND	<27	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-SV-02-15	12/19/2017	--	ND	**29J**	<11	<0.90	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-7-2	12/27/2017	--	--	<27	<11	<0.90	ND	<0.48	**12J**	<0.60	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-7-5	12/27/2017	**44**	ND	**30J**	<11	<0.90	ND	<0.48	<0.29	<0.60	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-7-15	12/27/2017	**12**	ND	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-7-25	12/27/2017	<0.11	ND	**28J**	<11	**6.6J**	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-8-2	12/20/2017	--	--	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-8-5	12/20/2017	<0.11	ND	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-8-15	12/20/2017	<0.11	ND	<27	<11	<0.90	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-8-25	12/20/2017	<0.11	ND	<27	**12J**	**3.2J**	ND	<0.096	<0.058	<0.12	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--

Note:

mg/kg:	Milligrams per Kilogram
--:	Indicates sample was not analyzed
<0.11	Indicates sample was not detected above laboratory method detection limit
ND:	Indicates samples were not detected during reporting
NS:	No established standard for screening levels
1	Indicates the conservative USEPA Region 9 RSL Risk Based SSL For TPH Aromatic (High) was used over the Alaphatic (High)
2	Indicates the USEAP Region 9 RSL for Nitrate was applied
J:	Indicates sample was detected above the laboratory method detection limit but below the laboratory reporting limit
	Highlight indicates sample exceeded the USEPA Region 9 SSLs for the identified analyte
USEPA:	United States Environmental Protection Agency
SSL:	Protection of Groundwater Screening Level
RSL:	Regional Screening Level
VOC:	Volatile Organic Compund
TPH	Total Petroleum Hydrocarbons
N:	Nitrate as Nitrogen
CaCO3:	Calcium Carbonate
SO4:	Sulfate
PO4:	Phosphate

Table 5 - Summay of Metal Results in Soil
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	CAM 17 Metals by USEPA Method 6010B (mg/kg)															
		Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Thallium	Vanadium	Zinc	Other Metals
USEPA Region 9 Regional Screening Levels Risk Based SSLs		**0.0015**	**160**	**19**	**0.69**	**180,000**	**0.27**	**28**	**14**	**0.033**	**2**	**26**	**0.52**	**0.014**	**86**	**370**	**Various**
DTSC Hero Note 3 Screening Levels		**0.36**	**NS**	**210**	**7.3**	**170,000**	**NS**	**NS**	**320**	**4.5**	**NS**	**3,100**	**NS**	**NS**	**1,000**	**NS**	**Various**
USEPA Region 9 Regional Screening Levels Industrial Soil		**3**	**220,000**	**2,300**	**980**	**1.8E+06**	**350**	**47,000**	**800**	**46**	**5,800**	**22,000**	**5,800**	**12**	**5,800**	**350,000**	**Various**
OU-11-6-7-5	12/27/2017	**3**	**130**	**0.12J**	**0.52J**	**21**	**4.6**	**20**	**10**	**0.035J**	**0.80J**	**16**	<0.21	**0.070J**	**29**	**39**	ND
OU-11-6-7-15	12/27/2017	**1.3J**	**51**	**0.16J**	<0.31	**5.2**	**4.1**	**6.5**	**3.0J**	<0.0072	**0.20J**	**7.3**	<0.21	**0.12J**	**28**	**31**	ND
OU-11-6-7-25	12/27/2017	**2.2**	**120**	**0.43J**	**0.67J**	**20**	**9**	**21**	**11**	**0.033J**	**0.18J**	**22**	<0.21	**0.21J**	**55**	**66**	ND
OU-11-6-8-5	12/20/2017	**1.1J**	**78**	**0.29J**	<0.31	**10**	**5.4**	**7.9**	**3.6J**	**0.014J**	**0.21J**	**9.8**	**0.22J**	**0.16J**	**31**	**39**	ND
OU-11-6-8-15	12/20/2017	**1.4J**	**48**	<0.12	<0.31	**4.5**	**3**	**5**	**3.7J**	<0.0072	**0.48J**	**5.4**	<0.21	**0.10J**	**18**	**25**	ND
OU-11-6-8-25	12/20/2017	**2.7**	**120**	**0.35J**	**0.46J**	**16**	**10**	**15**	**8.2**	**0.016J**	**0.42J**	**21**	<0.21	**0.16J**	**56**	**49**	ND

Note:

mg/kg:	Milligrams per Kilogram
<0.12	Indicates sample was not detected above laboratory method detection limit
ND:	Indicates samples were not detected during reporting
NS:	No established standard for screening levels
J:	Indicates sample was detected above the laboratory method detection limit but below the laboratory reporting limit.
	Highlight indicates sample reported at or exceeded the USEPA Region 9 SSLs for the identified analyte.
USEPA:	United States Environmental Protection Agency
SSL:	Protection of Groundwater Screening Level
DTSC:	Department of Toxic Substances Control
Hero Note 3:	DTSC Human Health Risk Assessment Screening Levels, Note 3, published February 2018
CAM 17:	California Title-22 Metals

Table 6 - Summay of Non-Metal Results in Groundwater
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	TPH by USEPA Method 8015M		VOCs by USEPA Method 8260B (µg/L)							Pesticides by USEPA Method 8081 (µg/L)	Herbicides by USEPA Method 8151A (µg/L)	General Chemistry by Various USEPA Methods (300.0, 6010B, SM4500-NH3F-1997, SM4500-P E) (mg/L)											
		Gasoline (µg/L)	Other TPH	Acetone	Chloromethane	Benzene	Toluene	Ethylbenzene	Xylenes (total)	Other VOCs			Nitrate as N	Total Alkalinity	Bicarbonate as CaCO3	Carbonate as CaCO3	Hydroxide as CaCO3	Potassium	Sodium	Chloride	Sulfate as SO4	Ammonia as N	Total Kjeldahl Nitrogen	Orthophosphate as PO4
SFBRWQCB Tier 1 ESLs and USEPA Region 9 Regional Screening Level MCLs		**100**	**Various**	**NS**	**NS**	**5**	**1,000**	**700**	**10,000**	**Various**	**Various**	**Various**	**10**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
California MCL		**NS**	**NS**	**NS**	**NS**	**1**	**150**	**300**	**1,750**	**Various**	**Various**	**Various**	**10**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**500**	**500**	**NS**	**NS**	**NS**
California PHG		**NS**	**NS**	**NS**	**NS**	**0.15**	**150**	**300**	**1,800**	**Various**	**Various**	**Various**	**10**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
OU-1-5-1-GW	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**0.18J**	**600**	**600**	<0.50	<0.50	**31**	**160**	**210**	**200**	<0.025	**0.19**	<0.0051
OU-1-5-2-GW	12/28/2017	--	--	--	--	--	--	--	--	--	--	--	**74**	**480**	**480**	<0.50	<0.50	**59**	**200**	**460**	**350**	**0.84**	**1.2**	**0.014**
OU-5-MW-15-GW	12/20/2017	**13J**	ND	--	<0.056	**0.22J**	**0.77**	<0.10	<0.33	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-22-GW	12/20/2017	**30J**	ND	--	**0.21J**	**0.57**	**1.6**	**0.16J**	<0.33	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-MW-24-GW	12/20/2017	**23J**	ND	--	<0.056	**0.93**	**2**	**0.24J**	**0.58J**	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-5-12-42-GW	12/20/2017	**13J**	ND	--	<0.056	<0.11	**0.74**	<0.10	<0.33	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-16-GW	12/27/2017	**21J**	ND	--	<0.056	--	--	--	--	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-17-GW	12/27/2017	**22J**	ND	--	<0.056	--	--	--	--	ND	--	--	--	--	--	--	--	--	--	--	--	--	--	--
OU-8-MW-18-GW	12/27/2017	**50J**	ND	--	<0.056	--	--	--	--	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-9-13-12-GW	12/27/2017	--	--	--	--	--	--	--	--	--	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-7-GW	12/27/2017	<10	ND	**5.7J**	<0.056	<0.11	**0.5**	<0.10	<0.33	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--
OU-11-6-8-GW	12/20/2017	<10	ND	**10**	<0.056	<0.11	**0.61**	<0.10	<0.33	ND	ND	ND	--	--	--	--	--	--	--	--	--	--	--	--

Note:

µg/L:	Microgram per Liter
mg/L:	Milligrams per Liter
--:	Indicates sample was not analyzed
<10	Indicates sample was not detected above laboratory method detection limit
ND:	Indicates samples were not detected during reporting
NS:	No established standard for screening levels
J:	Indicates sample was detected above the laboratory method detection limit but below the laboratory reporting limit.
	Highlight indicates sample exceeded California PHG for identified analyte
SFBRWQCB ESLs:	San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels
USEPA:	United States Environmental Protection Agency
MCL:	Maximum Contamination Level
PHG:	Public Health Goal
VOC:	Volatile Organic Compund
TPH:	Total Petroleum Hydrocarbons
N:	Nitrate as Nitrogen
CaCO3:	Calcium Carbonate
SO4:	Sulfate

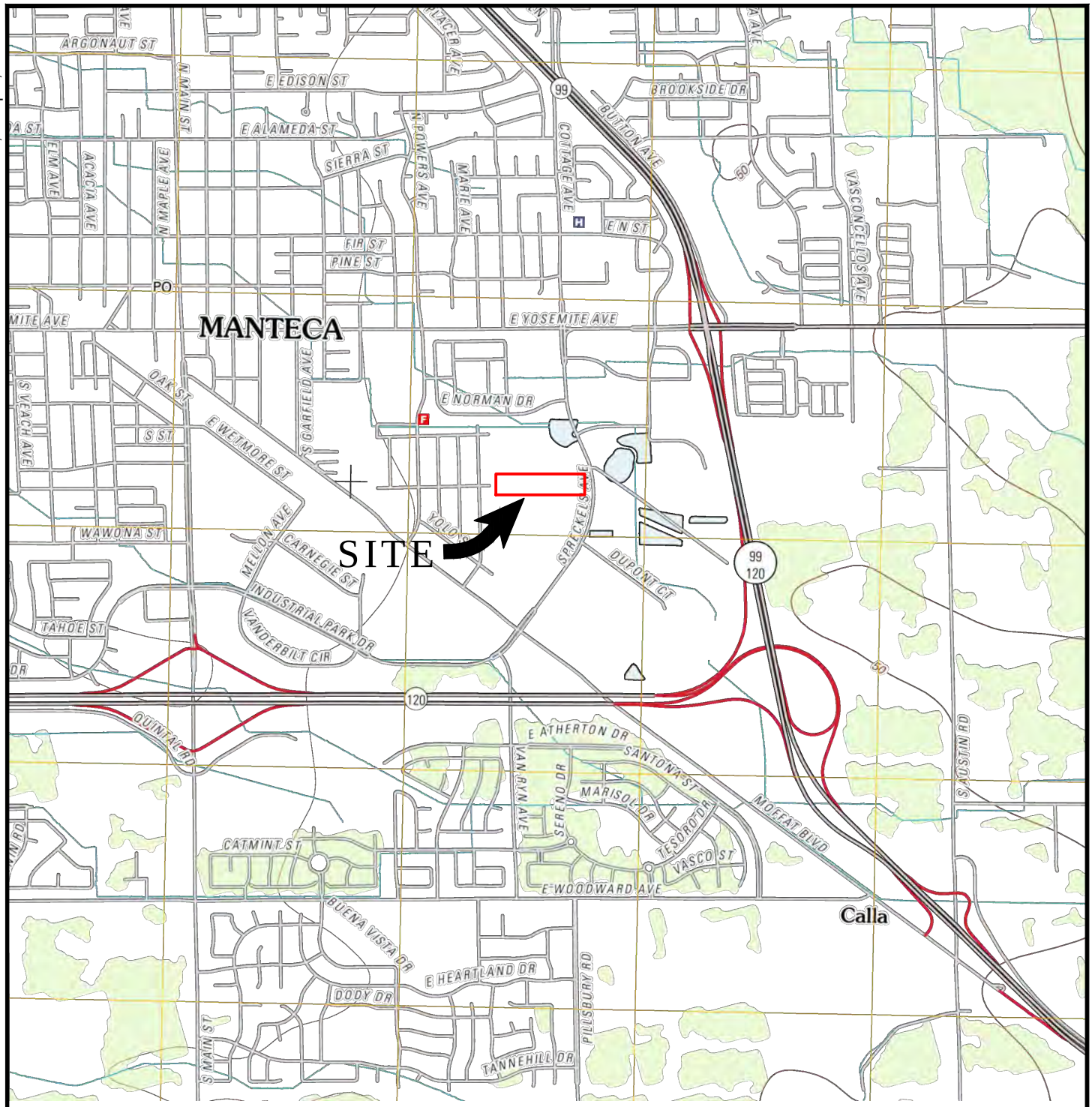
Table 7 - Summay of Metal Results in Groundwater
Former Spreckels Sugar-Processing Factory
407 Spreckels Ave
Manteca, California

Sample ID	Date	CAM17 Metals by USEPA Method 6010A and EPA 200 series (µg/L)													
		Antimony	Arsenic	Barium	Beryllium	Nickel	Silver	Chromium	Cobalt	Hexavalent Chromium	Lead	Molybdenum	Selenium	Thallium	Other Metals
DTSC Hero Note 3 Screening Levels		**NS**	**0.0082**	**NS**	**4**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**Various**
USEPA Region 9 MCLs		**6**	**10**	**2,000**	**4**	**NS**	**NS**	**100**	**NS**	**NS**	**15**	**NS**	**50**	**2**	**Various**
California MCLs		**6**	**10**	**1,000**	**4**	**100**	**NS**	**50**	**NS**	**NS**	**15**	**NS**	**50**	**2**	**Various**
California PHGs		**1**	**0.004**	**2,000**	**1**	**12**	**NS**	**NS**	**NS**	**0.02**	**0.2**	**NS**	**30**	**0.1**	**Various**
OU-1-5-1-GW	12/28/2017	**110**	**7.7**	**650**	**0.37J**	**150**	<2.8	**3.0J**	<2.5	<0.29	**0.46J**	**37**	**7.8**	**0.33J**	ND
OU-1-5-2-GW	12/28/2017	<2.2	**3.3J**	**130**	<0.18	**190**	**35**	**7.9J**	**57**	<0.29	**0.68J**	**85**	**5.9**	**0.32J**	ND
OU-11-6-7-GW	12/27/2017	**26J**	**2.6J**	**160**	<0.18	**110**	<2.8	**4.1J**	<2.5	**2.2**	**0.23J**	**35**	**9.1**	**0.31J**	ND
OU-11-6-8-GW	12/20/2017	<2.2	**7.3**	**110**	<0.31	**5.9J**	**3.0J**	<1.6	**4.3J**	<0.29	<0.23	**63**	**1.6J**	**1.2J**	ND

Note:

µg/L:	Microgram per Liter
<2.2	Indicates sample was not detected above laboratory method detection limit
ND:	Indicates samples were not detected during reporting
NS:	No established standard for screening levels
J:	Indicates sample was detected above the laboratory method detection limit but below the laboratory reporting limit
	Highlight indicates sample exceeded California PHG for identified analyte
USEPA:	United States Environmental Protection Agency
DTSC:	Department of Toxic Substances Control
Hero Note 3:	DTSC Human Health Risk Assessment Screening Levels, Note 3, published February 2018
MCL:	Maximum Contamination Level
PHG:	Public Health Goal
CAM 17:	California Title-22 Metals

FIGURES



REFERENCE:
Stockton East Quadrangle California-San Joaquin Co.
7.5-Minute Series

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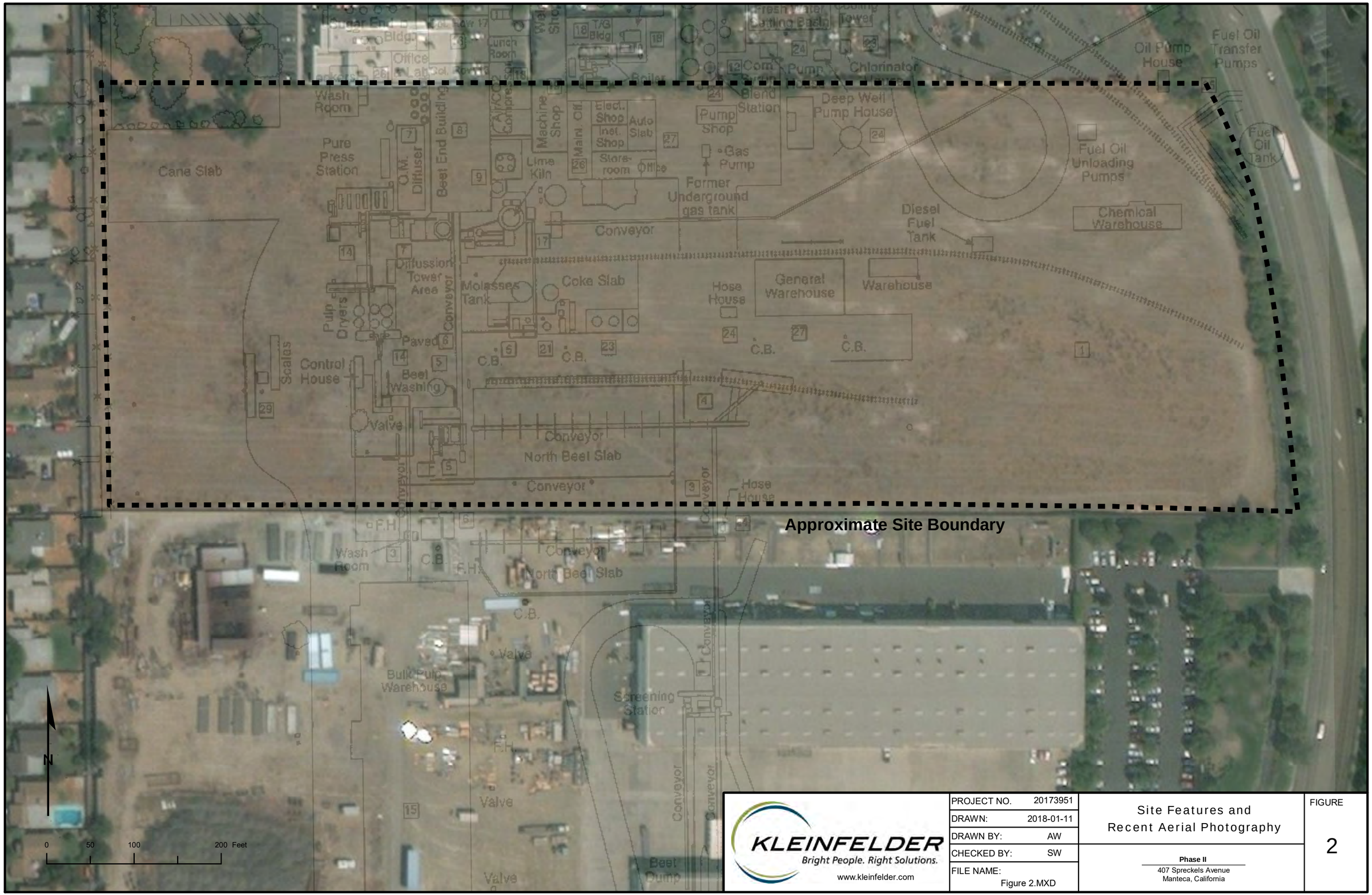
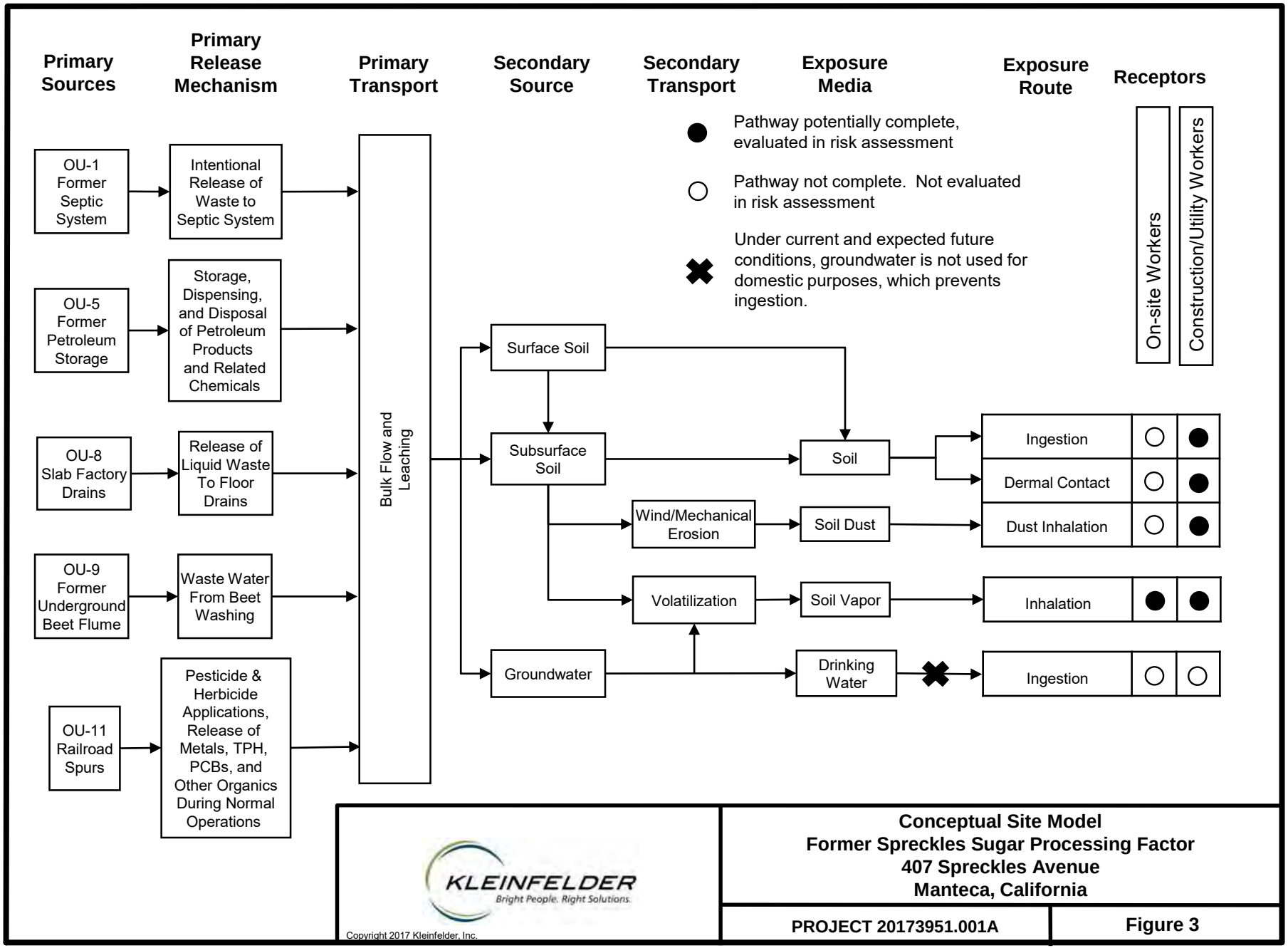
PROJECT NO. 20173951	SITE VICINITY MAP
DRAWN: 6/9/2017	
DRAWN BY: G.G.	
CHECKED BY: D.H.	Former Spreckels Sugar Plant #2 407 Spreckels Ave Manteca, California
FILE NAME: STO17D040.CAD	

FIGURE
1

PLOTTED: 09 Jun 2017, 5:05pm, GGomez
CAD FILE: W:\2017\20173951\PLANS\ LAYOUT: FIGURE 1
XRef: 0956BASE
ATTACHED IMAGES:
ATTACHED XREFS:
OFFICE_NAME



KLEINFELDER Bright People. Right Solutions. www.kleinfelder.com	PROJECT NO. 20173951 DRAWN: 2018-01-11 DRAWN BY: AW CHECKED BY: SW FILE NAME: Figure 2.MXD	Site Features and Recent Aerial Photography **Phase II** 407 Spreckels Avenue Manteca, California	FIGURE 2



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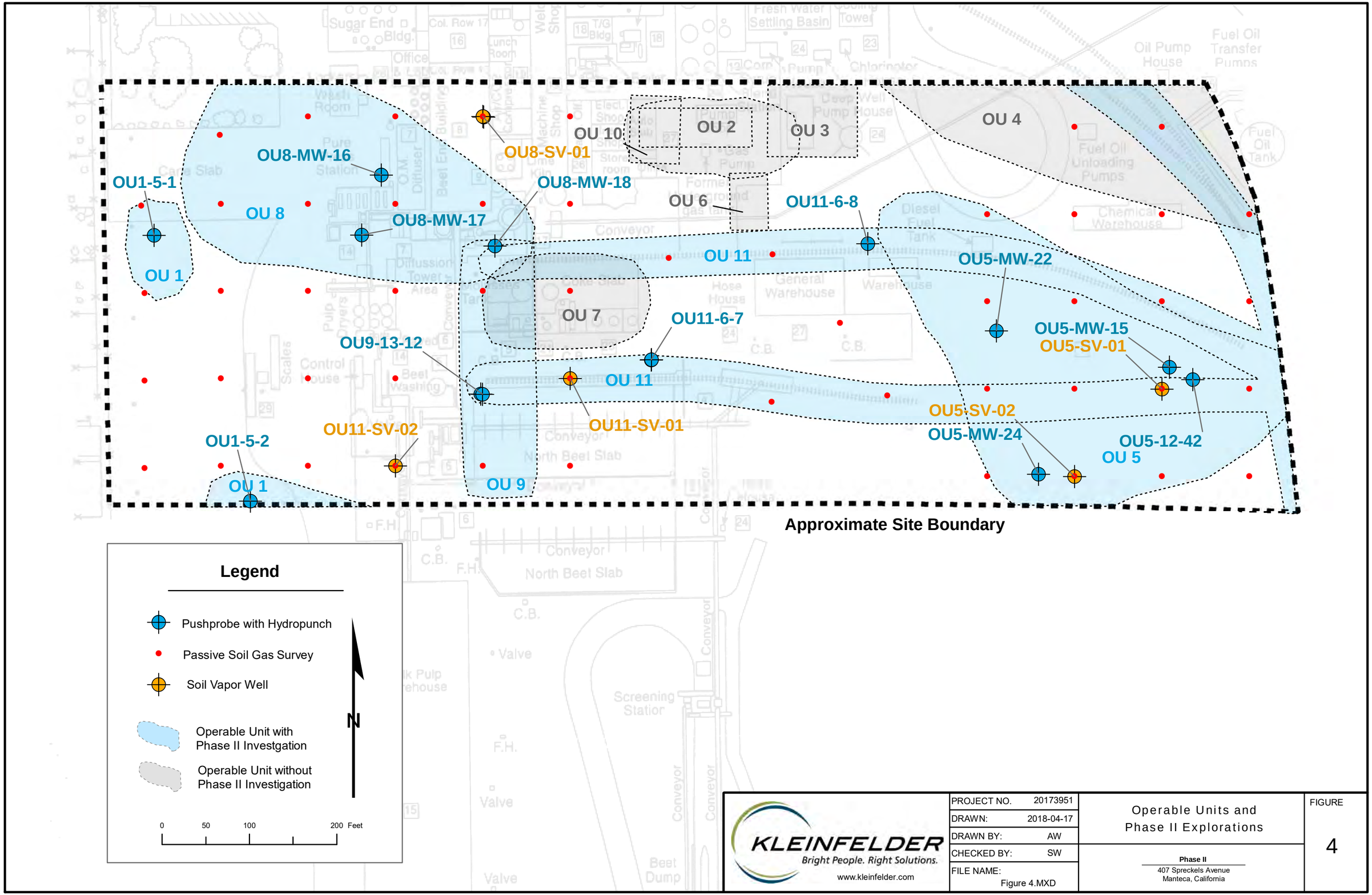
Conceptual Site Model
Former Spreckles Sugar Processing Factor
407 Spreckles Avenue
Manteca, California

PROJECT 20173951.001A

Figure 3



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PROJECT NO.	20173951
DRAWN:	2018-04-17
DRAWN BY:	AW
CHECKED BY:	SW
FILE NAME:	Figure 4.MXD

Operable Units and Phase II Explorations

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE
4

Legend

Phase II Exploration

Historical Exploration

Operable Unit 1

Applicable Screening Levels	4,4'-DDE	4,4'-DDT	2,4-D
Industrial Soil RSL	9,300 ug/kg	8,300 ug/kg	9,600,000 mg/kg
Protection of GW SSL	11 ug/kg	77 ug/kg	18 mg/kg
Lowest Applicable GW ESL	NS	NS	NS

Blank: Sample was not tested for analyte.

Gray Text: Concentration is below applicable screening levels

Black Text: Concentration exceeds Protection of GW SSL

0 70 140 280 Feet

N

		4,4'-DDE
Phase II: OU8-SV-01	2017: 2 ft	7.6J ug/kg

		4,4'-DDE
Previous: 13-12	1997: 10 ft	ND
Phase II: OU8-MW-18	2017: 2 ft	12J ug/kg

		4,4'-DDE
Phase II: OU5-MW-22	2017: 2 ft	27 ug/kg

		4,4'-DDE
Phase II: OU5-MW-15	2017: 2 ft	200 ug/kg
	2018: 5 ft	8 ug/kg

		4,4'-DDE
Phase II: OU5-12-42	2017: 2 ft	1.8J ug/kg

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-6	1997: 0.5 ft	ND	ND	ND

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-8	1997: 0.5 ft	ND	ND	ND
Phase II: OU11-6-8	2017: 2 ft	<0.058 ug/kg	<0.12 ug/kg	
	2017: 5 ft	<0.058 ug/kg	<0.12 ug/kg	<0.0015 mg/kg
	2017: 15 ft	<0.058 ug/kg	<0.12 ug/kg	<0.0015 mg/kg
	2017: 25 ft	<0.058 ug/kg	<0.12 ug/kg	<0.0015 mg/kg
	2017: GW	<0.017 ug/L	<0.023 ug/L	<0.61 ug/L

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-11	1997: 0.5 ft	ND	ND	ND

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-12	1997: 0.5 ft	ND	ND	ND

		4,4'-DDE
Phase II: OU8-MW-16	2017: 2 ft	<0.58 ug/kg

		4,4'-DDE
Phase II: OU8-MW-17	2017: 2 ft	<0.12 ug/kg

OU 8

OU 1

OU 11

OU 9

OU 5

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-9	1997: 0.5 ft	ND	ND	120 mg/kg

		4,4'-DDE
Phase II: OU1-5-2	2017: 2 ft	16J ug/kg

		4,4'-DDE
Previous: 13-1	1997: 10 ft	ND

		4,4'-DDE
Previous: 13-10	1997: 10 ft	ND

		4,4'-DDE
Phase II: OU1-5-1	2017: 2 ft	30J ug/kg

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-7	1997: 0.5 ft	ND	1,500 ug/kg	ND
Phase II: OU11-6-7	2017: 2 ft	12J ug/kg	<0.60 ug/kg	
	2017: 5 ft	<0.29 ug/kg	<0.60 ug/kg	<0.015 mg/kg
	2017: 15 ft	<0.058 ug/kg	<0.12 ug/kg	<0.0015 mg/kg
	2017: 25 ft	<0.058 ug/kg	<0.12 ug/kg	<0.0015 mg/kg
	2017: GW	<0.29 ug/L	<0.4 ug/L	<1.2 ug/L

		4,4'-DDE	4,4'-DDT	2,4-D
Previous: 6-10	1997: 0.5 ft	ND	ND	ND

		4,4'-DDE
Phase II: OU5-SV-01	2017: 2 ft	<0.058 ug/kg

		4,4'-DDE
Phase II: OU5-SV-02	2017: 2 ft	15J ug/kg

		4,4'-DDE	4,4'-DDT
Phase II: OU11-SV-01	2017: 2 ft	6.1J ug/kg	4.0J ug/kg

		4,4'-DDE
Phase II: OU5-MW-24	2017: 2 ft	8.6 ug/kg

		4,4'-DDE
Previous: 13-12	1997: 10 ft	ND
Phase II: OU9-13-12	2017: 2 ft	8.3J ug/kg
	2017: 15 ft	<0.058 ug/kg
	2017: GW	<0.15 ug/L

		4,4'-DDE
Previous: 13-13	1997: 10 ft	ND

		4,4'-DDE	4,4'-DDT
Phase II: OU11-SV-02	2017: 2 ft	11 ug/kg	<0.24 ug/kg

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PROJECT NO.	20173951
DRAWN:	2018-04-17
DRAWN BY:	AW
CHECKED BY:	EP
FILE NAME:	OU1,5,8,9,11.P.MXD

Historical vs Phase II Results
Operable Units 1, 5, 8, 9, and 11: Pesticides

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE

OU1,5,8,9,11.P

Legend

Phase II Exploration

Historical Exploration

Operable Unit 1

Applicable Screening Levels				
	Antimony	**Cobalt**	**Mercury**	**Nickel**
Industrial Soil RSL	470 mg/kg	350 mg/kg	46 mg/kg	22,000 mg/kg
Protection of GW SSL	0.27 mg/kg	0.27 mg.kg	0.33 mg/kg	26 mg/kg
Lowest Applicable GW ESL	6 ug/L	NS	2 ug/L	100 ug/L

Gray Text: Concentration is below applicable screening levels

Black Text: Concentration exceeds Protection of GW SSL

Red Text: Concentration exceeds Industial Soil RSL or Lowest Applicable GW ESL

0 50 100 200 Feet

		Antimony	Cobalt	Mercury	Nickel
Previous: 5-7	1996: 10 feet	ND	4.4 mg/kg	0.06 mg/kg	4.7 mg/kg
	1996: 15 feet	ND	2.2 mg/kg	0.13 mg/kg	4.5 mg/kg
	1996: GW	ND	ND	ND	ND
Phase II: OU1-5-2	2017: GW	<2.2 ug/L	57 ug/L	<0.15 ug/L	**190 ug/L**

		Antimony	Cobalt	Mercury	Nickel
Previous: 5-1	1996: 10 feet	ND	2.7 mg/kg	ND	3.9 mg/kg
	1996: 15 feet	ND	2.7 mg/kg	ND	3.9 mg/kg
	1996: GW	ND	ND	ND	20 ug/L
Phase II: OU1-5-1	2017: GW	**110 ug/L**	<2.5 ug/L	<0.15 ug/L	**150 ug/L**

Approximate Site Boundary

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PROJECT NO.	20173951
DRAWN:	2018-04-02
DRAWN BY:	AW
CHECKED BY:	EP
FILE NAME:	OU1.M.MXD

Historical vs Phase II Results
Operable Unit 1: Metals

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE

OU1.M

Legend

Phase II Exploration

Historical Exploration

Operable Unit 1

Applicable Screening Levels		
	TPHueh/d/mo	TPHg
Industrial Soil RSL	440 mg/kg	420 mg/kg
Protection of GW SSL	1.5 mg/kg	0.017 mg.kg
Lowest Applicable GW ESL	100 ug/L	100 ug/L

Blank: Sample was not tested for analyte.

Gray Text: Concentration is below applicable screening levels

Black Text: Concentration exceeds Protection of GW SSL

Red Text: Concentration exceeds Industrial Soil RSL or Lowest Applicable GW ESL

0 45 90 180 Feet

Approximate Site Boundary

		TPHueh/d/mo	TPHg
Previous: MW-22	1997: GW	460 ug/L	
	2001: GW	849 ug/L	
	2003: GW	<50 ug/L	
	2005: GW	<500 ug/L	
Phase II: OU5-MW-22	2017: GW	<0.03 ug/L	30J ug/L

		TPHueh/d/mo	TPHg
Previous: MW-15	1997: GW	3,200 ug/L	
	2001: GW	764 ug/L	
	2003: GW	764 ug/L	
	2005: GW	<500 ug/L	
Phase II: OU5-MW-15	2017: GW	<0.03 ug/L	13J ug/L

		TPHueh/d/mo	TPHg
Previous: 12-42	1997: 10 ft	ND	ND
	1997: 15 ft	ND	ND
	1997: GW	4,900 ug/L	
Phase II: OU5-12-42	2017: GW	<0.03 ug/L	13J ug/L

		TPHueh/d/mo	TPHg
Previous: 12-40	1997: 2 ft	ND	ND
	1997: 5 ft	ND	ND

		TPHueh/d/mo	TPHg
Previous: 12-39	1997: 5 ft	ND	ND
	1997: 10 ft	ND	ND

		TPHueh/d/mo	TPHg
Phase II: OU5-SV-02	2017: 2 ft	25 mg/kg	<0.032 mg/kg
	2017: 5 ft		<0.032 mg/kg
	2017: 15 ft		<0.032 mg/kg

		TPHueh/d/mo	TPHg
Previous: 12-41	1997: 10 ft	ND	ND
	1997: 15 ft	2,800 mg/kg	40 mg/kg

		TPHueh/d/mo	TPHg
Previous: MW-24	1997: GW	360 ug/L	
	2001: GW	529 ug/L	
	2003: GW		
	2005: GW		
Phase II: OU5-MW-24	2017: GW	<0.03 ug/L	23J ug/L

		TPHueh/d/mo	TPHg
Phase II: OU5-SV-01	2017: 2 ft	7.7 mg/kg	<0.032 mg/kg
	2017: 5 ft		<0.032 mg/kg
	2017: 15 ft		<0.032 mg/kg

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PROJECT NO.	20173951
DRAWN:	2018-04-06
DRAWN BY:	AW
CHECKED BY:	EP
FILE NAME:	OU1.M.MXD

Historical vs Phase II Results
Operable Unit 5: TPH

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE

OU5.TPH

Legend

Phase II Exploration

Historical Exploration

Operable Unit 8

Applicable Screening Levels		
	TPHueh/d/mo	TPHk
Industrial Soil RSL	440 mg/kg	420 mg/kg
Protection of GW SSL	1.5 mg/kg	0.017 mg.kg
Lowest Applicable GW ESL	100 ug/L	100 ug/L

Blank: Sample was not tested for analyte.

Gray Text: Concentration is below applicable screening levels

Black Text: Concentration exceeds Protection of GW SSL

Red Text: Concentration exceeds Industrial Soil RSL or Lowest Applicable GW ESL

0 45 90 180 Feet

		TPHueh/d/mo	TPHk
Previous: MW-20 / 34-14	1997: 10 ft	<2 mg/kg	<1 mg/kg
	1997: 15 ft	<2 mg/kg	<1 mg/kg
	1997: GW	360 ug/L	<50 ug/L
	2001: GW	160 ug/L	
	2003: GW	74 ug/L	
	2005: GW	<500 ug/L	

		TPHueh/d/mo	TPHk
Previous: MW-16 / 23-4	1997: 10 ft	<2 mg/kg	<1 mg/kg
	1997: 15 ft	<2 mg/kg	<1 mg/kg
	1997: GW	250 ug/L	<50 ug/L
	2001: GW	245 ug/L	
	2003: GW	95 ug/L	
	2005: GW	<500 ug/L	
Phase II: OU8-MW-16	2017: GW	<0.03 ug/L	<0.0036 ug/L

		TPHueh/d/mo	TPHk
Phase II: OU8-SV-01	2017: 2 ft	34 mg/kg	<0.056 mg/kg

		TPHueh/d/mo	TPHk
Previous: 13-16	1997: 5 ft	ND	ND

		TPHueh/d/mo	TPHk
Previous: MW-19 / 34-13	1997: 10 ft	<2 mg/kg	<1 mg/kg
	1997: 15 ft	<2 mg/kg	<1 mg/kg
	1997: GW	280 ug/L	<50 ug/L
	2001: GW	<100 ug/L	
	2003: GW	700 ug/L	
	2005: GW	<500 ug/L	

		TPHueh/d/mo	TPHk
Previous: 13-18	1997: 10 ft	4,800 mg/kg	ND
	1997: 15 ft	ND	ND
	1997: 20 ft	37 mg/kg	ND

		TPHueh/d/mo	TPHk
Previous: MW-17 / 23-5	1997: 10 ft	<2 mg/kg	<1 mg/kg
	1997: 15 ft	<2 mg/kg	<1 mg/kg
	1997: GW	260 ug/L	<50 ug/L
	2001: GW	580 ug/L	
	2003: GW	120 ug/L	
	2005: GW	<500 ug/L	
Phase II: OU8-MW-17	2017: GW	<0.03 ug/L	<0.0036 ug/L

		TPHueh/d/mo	TPHk
Previous: 13-19	1997: 5 ft	9.5 mg/kg	<1 mg/kg
	1997: 10 ft	910 mg/kg	<1 mg/kg
	1997: 12 ft	49 mg/kg	<1 mg/kg
	1997: 10 ft	1,600 mg/kg	<1 mg/kg

		TPHueh/d/mo	TPHk
Previous: 13-17	1997: 15 ft	ND	ND
	1997: 20 ft	ND	ND

		TPHueh/d/mo	TPHk
Previous: MW-18 / 23-6	1997: 10 ft	<2 mg/kg	<1 mg/kg
	1997: 10 ft	<2 mg/kg	3,900 mg/kg
	1997: 15 ft	<2 mg/kg	1,400 mg/kg
	1997: GW	2,900 ug/L	<50 ug/L
	2001: GW		
	2003: GW		
	2005: GW		
Phase II: OU8-MW-18	2017: GW	<0.03 ug/L	<0.0036 ug/L

Approximate Site Boundary

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PROJECT NO.	20173951
DRAWN:	2018-04-06
DRAWN BY:	AW
CHECKED BY:	EP
FILE NAME:	OU8.M.MXD

Historical vs Phase II Results
Operable Unit 8: TPH

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE

OU8.TPH

Legend

Phase II Exploration

Historical Exploration

Operable Unit 1

Gray Text: Concentration is below applicable screening levels

Black Text: Concentration exceeds Protection of GW SSL

Red Text: Concentration exceeds Industial Soil RSL or Lowest Applicable GW ESL

0 70 140 280 Feet

Approximate Site Boundary

Applicable Screening Levels

	Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Industial Soil RSL	470 mg/kg	3 mg/kg	220,000 mg/kg	350 mg/kg	350 mg/kg	800 mg/kg	46 mg/kg	22,000 mg/kg	12 mg/kg	350,000 mg/kg
Protection of GW SSL	0.27 mg/kg	0.0015 mg/kg	82 mg/kg	0.27 mg.kg	28 mg/kg	14 mg/kg	0.033 mg/kg	26 mg/kg	0.014 mg/kg	370 mg/kg
Lowest Applicable GW ESL	6 ug/L	10 ug/L	1,000 ug/L	NS	1,300 ug/L	15 ug/L	2 ug/L	100 ug/L	2 ug/L	NS

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-12	1996: 0.5 feet	ND	5.6 mg/kg	82 mg/kg	4.4 mg/kg	60 mg/kg	44 mg/kg	0.25 mg/kg	21 mg/kg	<5 mg/kg	50 mg/kg

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-11	1996: 0.5 feet	ND	<10 mg/kg	120 mg/kg	4.7 mg/kg	33 mg/kg	22 mg/kg	0.047 mg/kg	11 mg/kg	<2.5 mg/kg	54 mg/kg

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-6	1996: 0.5 feet	ND	<2.5 mg/kg	45 mg/kg	ND	56 mg/kg	4.6 mg/kg	0.021 mg/kg	47 mg/kg	<15 mg/kg	72 mg/kg

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-8	1996: 0.5 feet	ND	<2.5 mg/kg	61 mg/kg	2 mg/kg	22 mg/kg	65 mg/kg (WET: 58 ug/L)	0.14 mg/kg	16 mg/kg	<5 mg/kg	520 mg/kg
Phase II: OU11-6-8	2017: 5 ft	<0.39 mg/kg	1.1J mg/kg	78 mg/kg	5.4 mg/kg	7.9 mg/kg	3.6J mg/kg	0.014J mg/kg	9.8 mg/kg	0.16J mg/kg	39 mg/kg
	2017: 10 ft	<0.39 mg/kg	1.4J mg/kg	48 mg/kg	3 mg/kg	5 mg/kg	3.7J mg/kg	<0.0072 mg/kg	5.4 mg/kg	0.10J mg/kg	25 mg/kg
	2017: 15 ft	<0.39 mg/kg	2.7 mg/kg	120 mg/kg	10 mg/kg	15 mg/kg	8.2 mg/kg	0.016J mg/kg	21 mg/kg	0.16J mg/kg	49 mg/kg
	2017: GW	<2.2 ug/L	7.3 ug/L	110 ug/L	4.3J ug/L	<3.1 ug/L	<0.23 ug/L	<0.15 ug/L	5.9J ug/L	1.2J ug/L	<1.9 ug/L

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-7	1996: 0.5 feet	ND	100 mg/kg (WET: 4.9 ug/L)	120 mg/kg	6 mg/kg	170 mg/kg	70 mg/kg (WET: 1.9 ug/L)	0.070 mg.kg	22 mg/kg	<10 mg/kg	92 mg/kg
Phase II: OU11-6-7	2017: 5 ft	<0.39 mg/kg	3 mg/kg	130 mg/kg	4.6 mg/kg	20 mg/kg	10 mg/kg	0.035J mg/kg	16 mg/kg	0.07J mg/kg	39 mg/kg
	2017: 10 ft	<0.39 mg/kg	1.3J mg/kg	51 mg/kg	4.1 mg/kg	6.5 mg/kg	3J mg/kg	<0.0072 mg/kg	7.3 mg/kg	0.12J mg/kg	31 mg/kg
	2017: 15 ft	<0.39 mg/kg	2.2 mg/kg	120 mg/kg	9 mg/kg	21 mg/kg	11 mg/kg	0.033J mg/kg	22 mg/kg	0.21J mg/kg	66 mg/kg
	2017: GW	26J ug/L	2.6J ug/L	160 ug/L	<2.5 ug/L	<3.1 ug/L	0.23J ug/L	<0.15 ug/L	110 ug/L	1.2J ug/L	<1.9 ug/L

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-10	1996: 0.5 feet	ND	<2.5 mg/kg	51 mg/kg	3.6 mg/kg	340 mg/kg (WET: 1.9 ug/L)	25 mg/kg	0.23 mg/kg	8.4 mg/kg	<5 mg/kg	76 mg/kg

		Antimony	Arsenic	Barium	Cobalt	Copper	Lead	Mercury	Nickel	Thallium	Zinc
Previous: 6-9	1996: 0.5 feet	ND	<2.5 mg/kg	52 mg/kg	2.8 mg/kg	12 mg/kg	18 mg/kg	0.042 mg/kg	10 mg/kg	<10 mg/kg	34 mg/kg

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PROJECT NO.	20173951
DRAWN:	2018-03-30
DRAWN BY:	AW
CHECKED BY:	EP
FILE NAME:	OU1.M.MXD

Historical vs Phase II Results
Operable Unit 11: Metals

Phase II
407 Spreckels Avenue
Manteca, California

FIGURE

OU11.M

July 3, 2017
Kleinfelder Project No. 20173951.001A

Amy Ha, PE
Water Resources Control Engineer
Private Site Cleanup Unit
Central Valley Regional Water Quality Control Board
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

Sent Via email (Amy.Ha@Waterboards.ca.gov)

SUBJECT: Summary of Past Phase II Findings
APN 022-125-035,
407 Spreckels Avenue
Manteca, California

Dear Ms. Ha:

INTRODUCTION

On behalf of AKF Development Holdings LLC (AKF), Kleinfelder has applied for a Memorandum of Agreement (MOA) and Request for Agency Oversight with the Regional Water Quality Control Board (RWQCB) Spills, Leaks, Investigation and Clean-up (SLIC) Unit. This was done to provide agency oversight and closure in connection with a 14.83-acre parcel undeveloped parcel (APN 022-125-035) of industrial-zoned land located at 407 Spreckels Avenue in Manteca, California (Site, see Figures 1 and 2). This application was subsequently accepted and the RWQCB has agreed to provide regulatory oversight for the Site.

Kleinfelder is now working with AKF and RWQCB to re-assess and re-evaluate data collected for initial Phase II and related investigations that did not receive regulatory closure due to lack of funding for the San Joaquin County Environmental Health Department (SJC/EHD) to continue regulatory oversight. Previous correspondence (Application for Memorandum of Agreement dated April 17, 2017) detailed closure status of Phase I recommendations concerning the Site. As per the RWQCB's request, Kleinfelder on behalf of AKF subsequently forwarded a master table summarizing past analytical results and reporting limits which exceeded various screening levels, along with figures depicting former soil and groundwater sampling points. After a cursory review, the RWQCB requested further summary of our findings, which is provided in this letter and attached Figures 3-1 through 3-5. Figure 4 is included to depict locations of former monitoring wells.

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FINDINGS

Kleinfelder's evaluation indicates four areas of concern (Figure 3-1):

1. The Former Diesel Aboveground Storage Tank (AST) Area (Figure 3-2)
2. The Former Rail Spur Area (Figure 3-3)
3. The Former Underground Storage Tank (UST) Area (Figure 3-4)
4. The Former Slab Drain Area (Figure 3-5)

In each of these cases, either analytical results exceeded current industrial regulatory thresholds, or laboratory reporting limits exceeded current industrial regulatory thresholds. These areas of concern (AOCs) are detailed below.

Former Diesel AST Area

- Results Exceeded Thresholds: Total Petroleum Hydrocarbon (TPH) expressed as diesel (TPHd) concentrations in one soil sample and one groundwater sample exceed thresholds.
- Reporting Limits Exceeded Thresholds: NA
- Evidence of Attenuation: Subsequent groundwater sampling indicated TPHd had attenuated by 2005.

Eight soil samples and one groundwater sample were collected and analyzed at various depths at four separate locations associated with the former diesel AST area. TPHd was noted in one soil sample (12-41 at a depth of 15 feet) and one nearby groundwater sample (12-42). TPHd was not detected in remaining soil samples analyzed.

The concentration noted in sample 12-41 was 2,800 mg/kg, which exceeds the most conservative industrial soil RSL of 440 mg/kg (Aliphatic Medium), and the concentration noted in the Sample 12-42 was 4,900 microgram per liter (µg/L), which exceeds the Tap Water and Groundwater Protection SSL RSL thresholds. Subsequent groundwater sampling of nearby groundwater monitoring wells, however, indicated decreasing TPHd concentrations (STO5R1330, provided in previous communication). Between 2001 and 2003, TPHd was detected at concentrations ranging from 610 to 764 µg/L. By 2005, TPHd was not detected (< 500 µg/l).

Former Rail Spur Area

- Results Exceeded Thresholds: Total arsenic concentrations at many locations exceeded thresholds in shallow soil at the Site. Total lead was not noted above soil screening levels
- Reporting Limits Exceeded Thresholds: PCBs and thallium were not detected, but laboratory reporting limits sometimes exceeded thresholds. Organochlorine Pesticides (OCPs) were usually not detected. Where detected, concentrations did not exceed industrial thresholds. Some laboratory reporting limits, however, exceeded thresholds.
- Evidence of Remediation: Soil with elevated lead concentrations was excavated and disposed offsite.

An arsenic concentration of 100 mg/kg was noted in Sample 6-7. This concentration exceeds the Industrial HHRA Cancer Endpoint (0.36 mg/kg) and non-Cancer Endpoint (4.2 mg/kg) and Industrial RSL Soil (3 mg/kg) thresholds. This concentration is anomalously high compared with all other sample data. Arsenic was not detected in most analyzed samples, and the second highest concentration was 5.6 mg/kg. Based on published background data in California values of 5.6 mg/kg and less are considered within the range of background arsenic concentrations (e.g., Hunter, P.M. and Davis, B.K., 2001. Naturally Occurring Concentrations of Inorganic Chemicals in Ground Water and Soil at California Air Force Installations, The Toxicologist, Suppl. To Toxicol. Sciences 60:432).

Lead was detected in sample 6-7 at a concentration of 70 mg/kg and 6-8 at 65 mg/kg. These concentrations were noted below residential soil RSL thresholds. However total lead was noted above 10 x the California Soluble Threshold Limit Concentration (STLC) (≥50 mg/kg) in 6-7 and 6-8, which triggers soluble testing assuming hazardous waste characterization at a landfill disposal facility. Based on the California Waste Extraction Test (WET) testing, location 6-8 at 0.5 feet exceeded hazardous waste limits assuming disposal at a landfill.

Thallium was not detected in any analyzed samples pertaining to the parcel or the railroad area of concern. Thallium reporting limits were typically 2.5 to 10 mg/kg which is below the RSL threshold of 12 mg/kg. For sample 6-6, the thallium reporting limit was 15 mg/kg, which exceeds the industrial soil RSL threshold of 12 mg/kg.

Former UST Area

- Results Exceeded Thresholds: NA.
- Reporting Limits Exceeded Thresholds: Organic lead was not detected, but reporting limits exceed thresholds.
- Evidence of Remediation: NA.

The reporting limit for organic lead was 0.15 mg/kg. No organic lead was detected exceeding this concentration. This reporting limit, however, exceeds the HHRA non-cancer endpoint (0.0033 mg/kg) and RSL industrial soil (0.12 mg/kg) thresholds. The primary Constituents of Potential Concern including TPH as gasoline (TPHg), benzene, toluene, ethylbenzene and total xylene (BTEX) and methyl tert-butyl ether (MTBE) were not detected in this Area of Concern (AOC).

Former Slab Drain Area

- Results Exceeded Thresholds: TPH-UEH concentrations in three soil samples.
- Reporting Limits Exceeded Thresholds: NA
- Evidence of Remediation: Subsequent groundwater sampling indicated TPH-UEH had attenuated by 2005.

Seven soil samples were collected at various depths at two separate locations associated with the former slab drain area. TPH-UEH was noted in six of the seven soil samples. Concentrations ranged from 9.5 mg/kg to 4,800 mg/kg. Three samples exceeded the industrial soil RSL threshold of 440 mg/kg: Sample 13-18 at 10 feet (4,800 mg/kg), Sample 13-19 at 12 feet (910 mg/kg), and Sample 13-19 at 20 feet (1,600 mg/kg). Subsequent groundwater sampling of nearby groundwater monitoring wells, however, indicated decreasing TPH-UEH concentrations. Between

1997 and 2001, TPH-UEH was detected at concentrations ranging from 250 to 508 µg/L. By 2005, TPH-UEH was detected at concentrations ranging from 4.85 to 9.95 µg/L.

LIMITATIONS

Kleinfelder has prepared this letter in accordance with the generally accepted standards of care, which exist in San Joaquin County, California at the time of writing. It should be recognized that definition and evaluation of geologic and chemical subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and/or historic conditions applicable to the Site. The findings and conclusions of this assessment are based on field observations and analytical results obtained from soil samples collected from the Site. Kleinfelder should be notified for additional consultation if the client wishes to reduce the uncertainties beyond the level associated with this report. No warranty, expressed or implied, is made.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive investigations yield more information, which may help understand and manage the level of risk. Since detailed investigation and analysis involves greater expense, our clients participate in determining levels of service which provide adequate information for their purposes at acceptable levels of risk. AKF has reviewed this letter and additional assessment details and determined that it does not need or want a greater level of service than what was provided.

Regulations and professional standards applicable to Kleinfelder's services are continually evolving. Techniques are, by necessity, often new and relatively untried. Different professionals may reasonably adopt different approaches to similar problems. Therefore, no warranty or guarantee expressed or implied, will be included in Kleinfelder's scope of service.

During the course of the performance of Kleinfelder's services, hazardous materials may have been discovered. Kleinfelder will assume no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury that results from pre-existing hazardous materials being encountered or present on the project Site, or from the discovery of such hazardous materials.

Nothing contained in this letter should be construed or interpreted as requiring Kleinfelder to assume the status of an owner, operator, generator, or person who arranges for storage or treatment of hazardous materials within the meaning of any governmental statute, regulation or order.

This document may be used only by the client and intended regulator and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated document be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this document by any unauthorized party. Any party other than the client or regulatory agencies with jurisdiction over this project, who would like to use this report shall notify Kleinfelder, Inc. of such intended use in writing for permission.

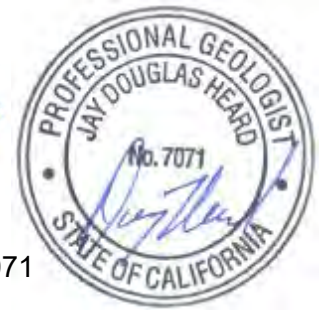
CLOSING

Project construction was anticipated to begin initially this month. Therefore we greatly appreciate the RWQCB's help towards obtaining closure and unnecessary delay in development of this Site. If you have any questions regarding this letter or require additional assistance, please contact Doug Heard at (209) 948-1345. Thank you.

Sincerely,

KLEINFELDER, INC.

Anthony Wohletz
Staff Geologist



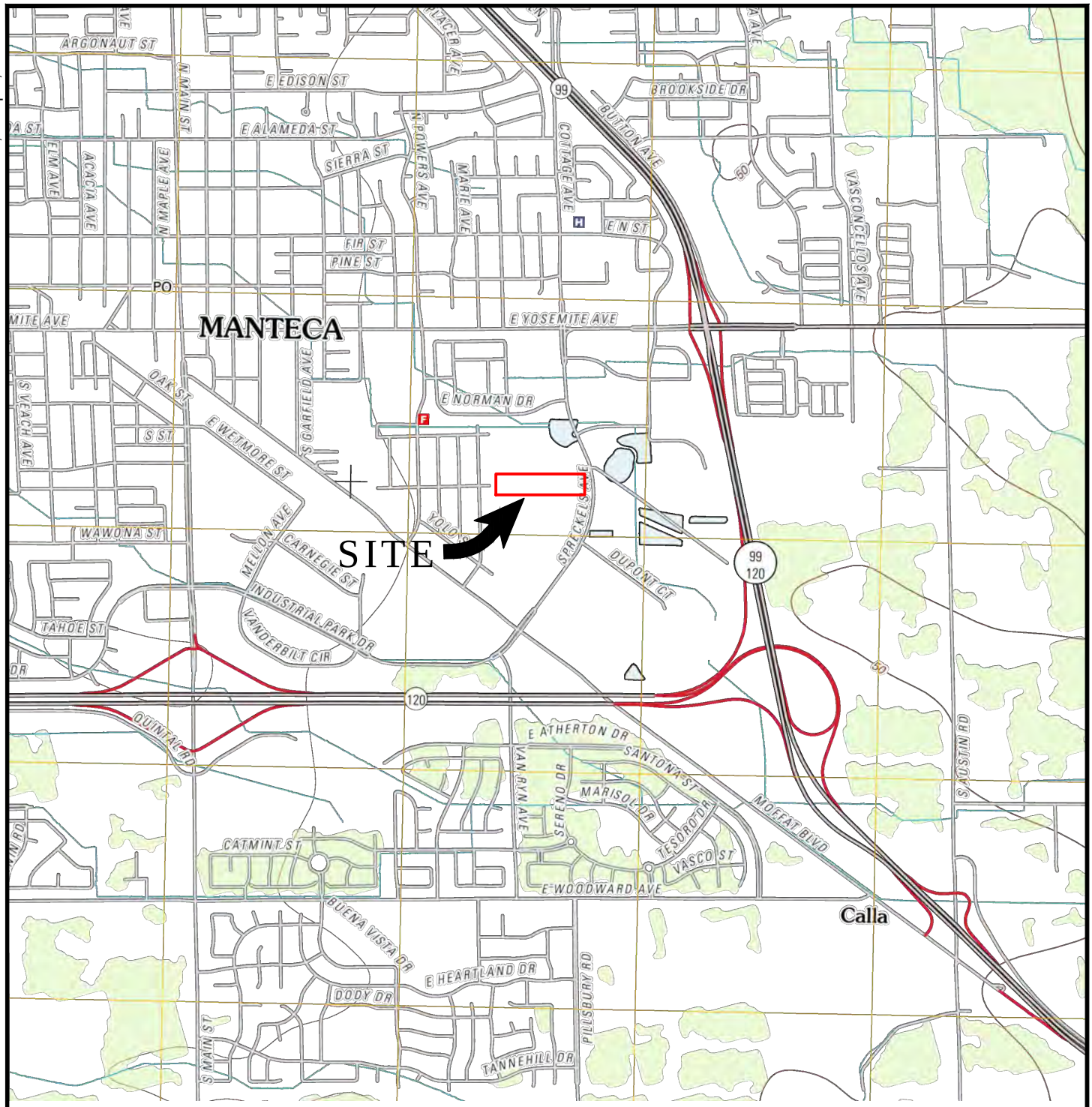
Doug Heard, P.G., No. 7071
Senior Geologist

DH:bn

cc: Mark Klaver, PG - Kleinfelder

Attachments:

Figure 1	Location Map
Figure 2	Site Map
Figure 3-1	Areas of Concern Map
Figure 3-2	Former Diesel AST Area
Figure 3-3	Former Rail Spur Area
Figure 3-4	Former UST Area
Figure 3-5	Former Slab Drain Area
Figure 4	Former Monitoring Well Locations



REFERENCE:
Stockton East Quadrangle California-San Joaquin Co.
7.5-Minute Series

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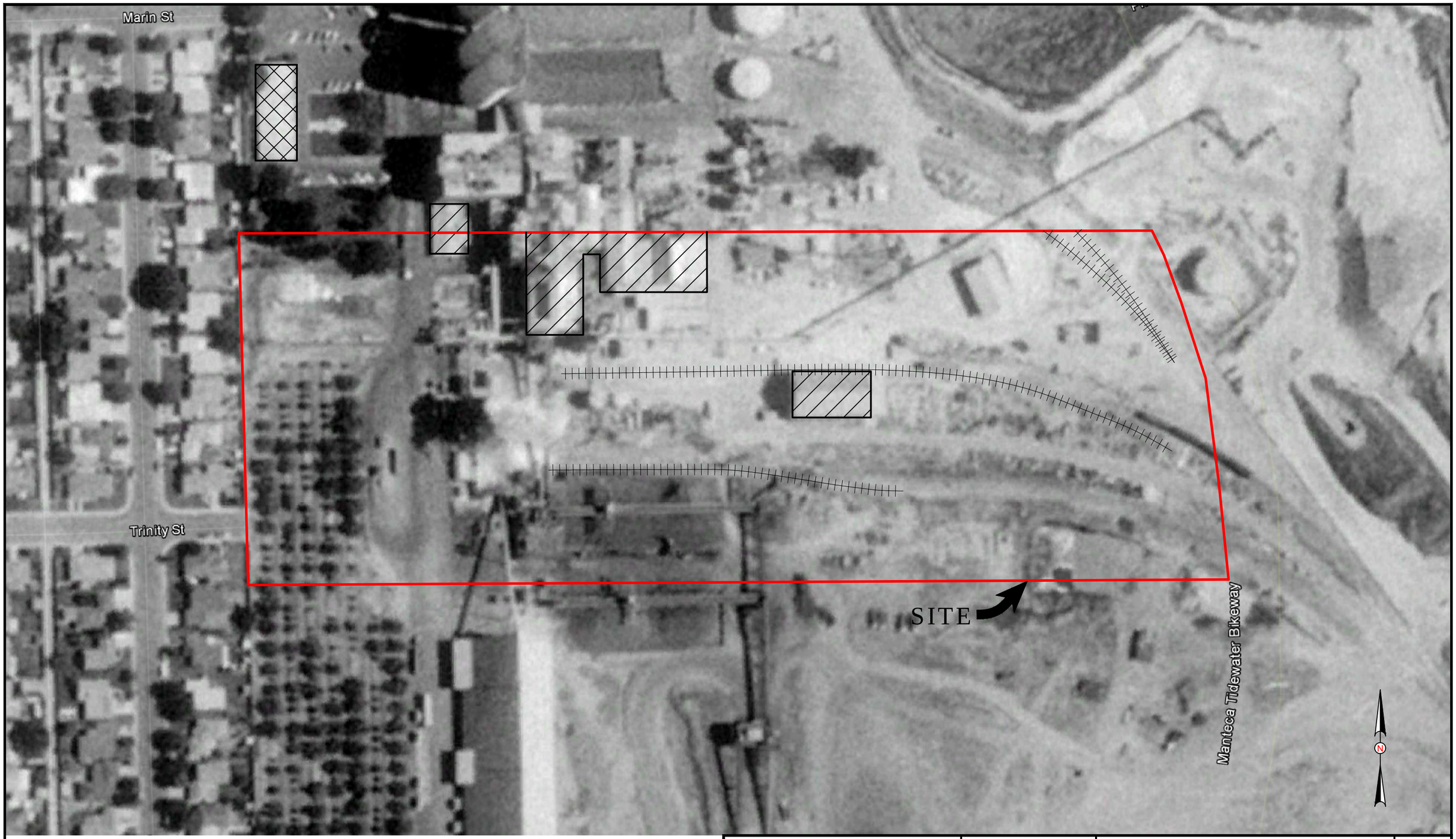
PROJECT NO. 20173951	SITE VICINITY MAP
DRAWN: 6/9/2017	
DRAWN BY: G.G.	
CHECKED BY: D.H.	Former Spreckels Sugar Plant #2 407 Spreckels Ave Manteca, California
FILE NAME: STO17D040.CAD	

FIGURE
1

PLOTTED: 09 Jun 2017, 5:05pm, GGomez
CAD FILE: W:\2017\20173951\PLANS\ LAYOUT: FIGURE 1
XRef: 0956BASE
ATTACHED IMAGES:
ATTACHED XREFS:
OFFICE_NAME



0 130 260

SCALE: 1" = 130' SCALE IN FEET

Existing Building

Former Structure

REFERENCE:
Produced by Google Earth Pro, dated 2017

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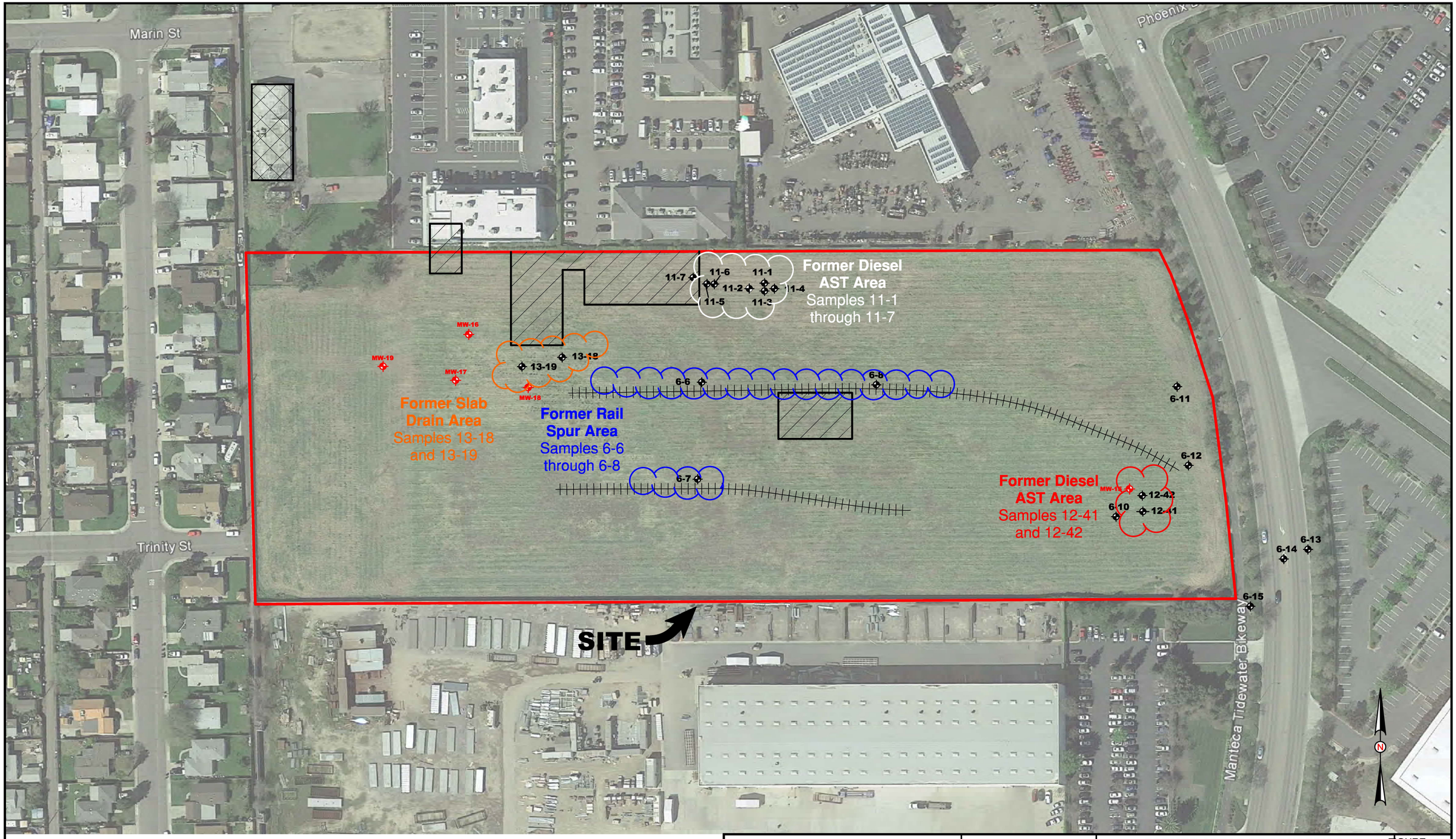
PROJECT NO.	20173951
DRAWN:	6/9/2017
DRAWN BY:	G.G.
CHECKED BY:	D.H.
FILE NAME:	STO17D040.CAD

FORMER PLANT FEATURES
MAY 1993 AERIAL PHOTOGRAPH

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
2



0 130 260

SCALE: 1" = 130' SCALE IN FEET

Existing Building

Former Structure

Rail Spur

REFERENCE:
Produced by Google Earth Pro, dated 2017

KLEINFELDER
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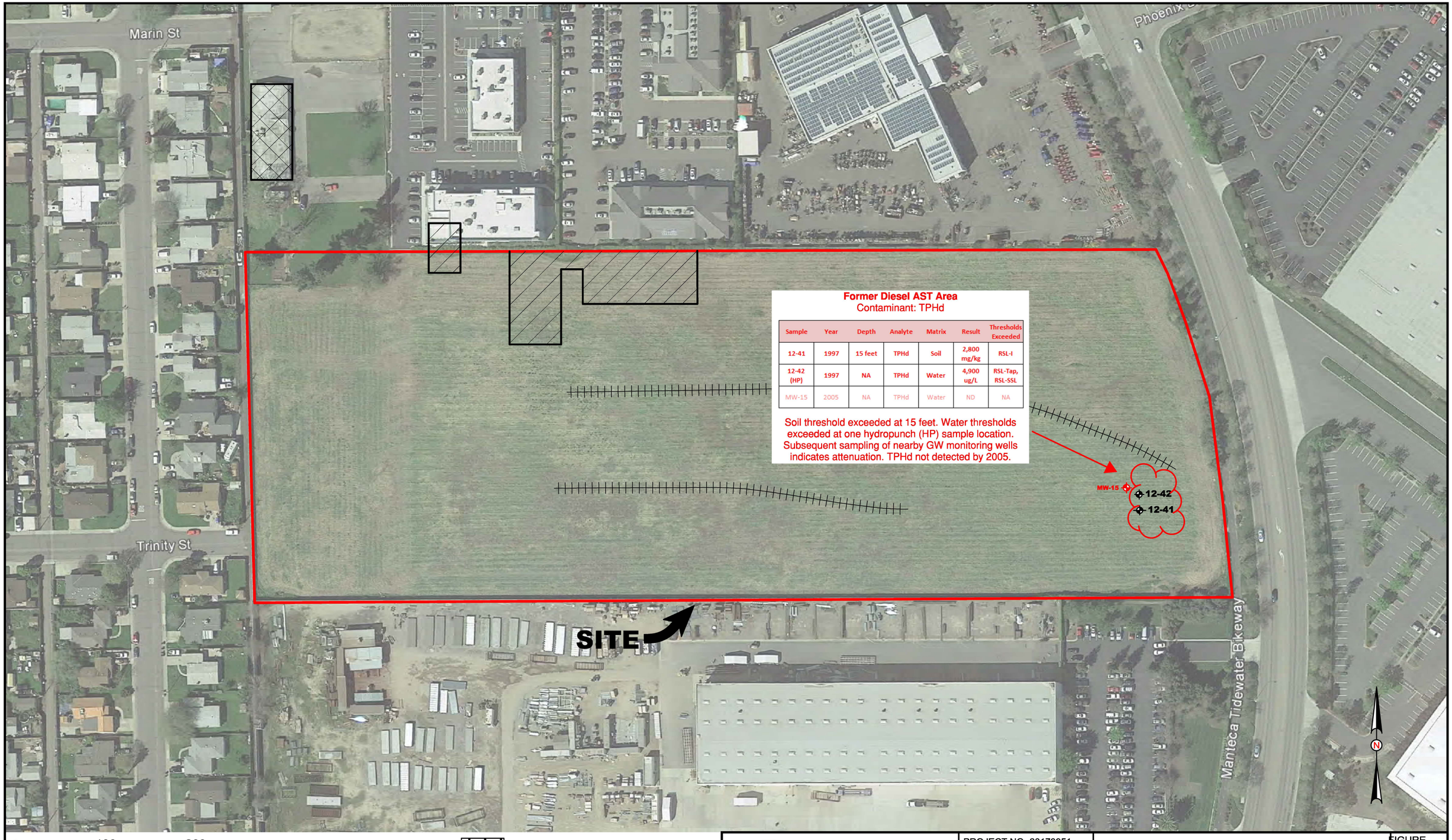
PROJECT NO.	20173951
DRAWN:	6/9/2017
DRAWN BY:	G.G.
CHECKED BY:	D.H.
FILE NAME:	STO17D040.CAD

FORMER AREAS OF CONCERN & APPROXIMATE SAMPLING LOCATIONS MARCH 2016 AERIAL PHOTOGRAPH

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
3-1



Former Diesel AST Area
Contaminant: TPHd

Sample	Year	Depth	Analyte	Matrix	Result	Thresholds Exceeded
12-41	1997	15 feet	TPHd	Soil	2,800 mg/kg	RSL-I
12-42 (HP)	1997	NA	TPHd	Water	4,900 ug/L	RSL-Tap, RSL-SSL
MW-15	2005	NA	TPHd	Water	ND	NA

Soil threshold exceeded at 15 feet. Water thresholds exceeded at one hydropunch (HP) sample location. Subsequent sampling of nearby GW monitoring wells indicates attenuation. TPHd not detected by 2005.

0 130 260
SCALE: 1" = 130' SCALE IN FEET

Existing Building
Former Structure
Rail Spur

REFERENCE:
Produced by Google Earth Pro, dated 2017

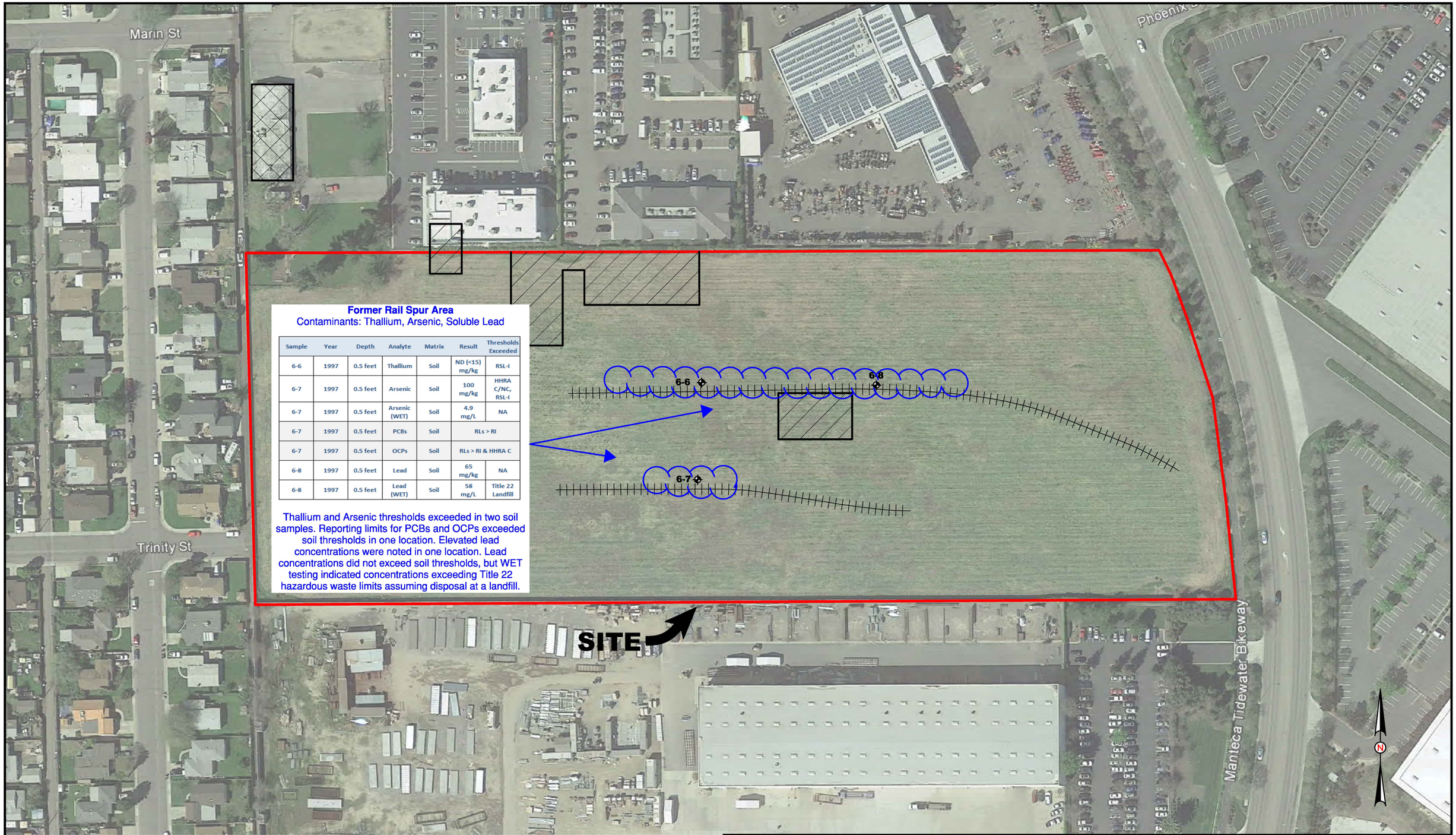
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20173951
DRAWN: 6/9/2017
DRAWN BY: G.G.
CHECKED BY: D.H.
FILE NAME: STO17D040.CAD

Former Diesel AST Area

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
3-2



Former Rail Spur Area
Contaminants: Thallium, Arsenic, Soluble Lead

Sample	Year	Depth	Analyte	Matrix	Result	Thresholds Exceeded
6-6	1997	0.5 feet	Thallium	Soil	ND (<15) mg/kg	RSL-I
6-7	1997	0.5 feet	Arsenic	Soil	100 mg/kg	HHRA C/NC, RSL-I
6-7	1997	0.5 feet	Arsenic (WET)	Soil	4.9 mg/L	NA
6-7	1997	0.5 feet	PCBs	Soil	RLs > RI	
6-7	1997	0.5 feet	OCPs	Soil	RLs > RI & HHRA C	
6-8	1997	0.5 feet	Lead	Soil	65 mg/kg	NA
6-8	1997	0.5 feet	Lead (WET)	Soil	58 mg/L	Title 22 Landfill

Thallium and Arsenic thresholds exceeded in two soil samples. Reporting limits for PCBs and OCPs exceeded soil thresholds in one location. Elevated lead concentrations were noted in one location. Lead concentrations did not exceed soil thresholds, but WET testing indicated concentrations exceeding Title 22 hazardous waste limits assuming disposal at a landfill.

0 130 260
SCALE: 1" = 130' SCALE IN FEET

REFERENCE:
Produced by Google Earth Pro, dated 2017

Existing Building
Former Structure
Rail Spur

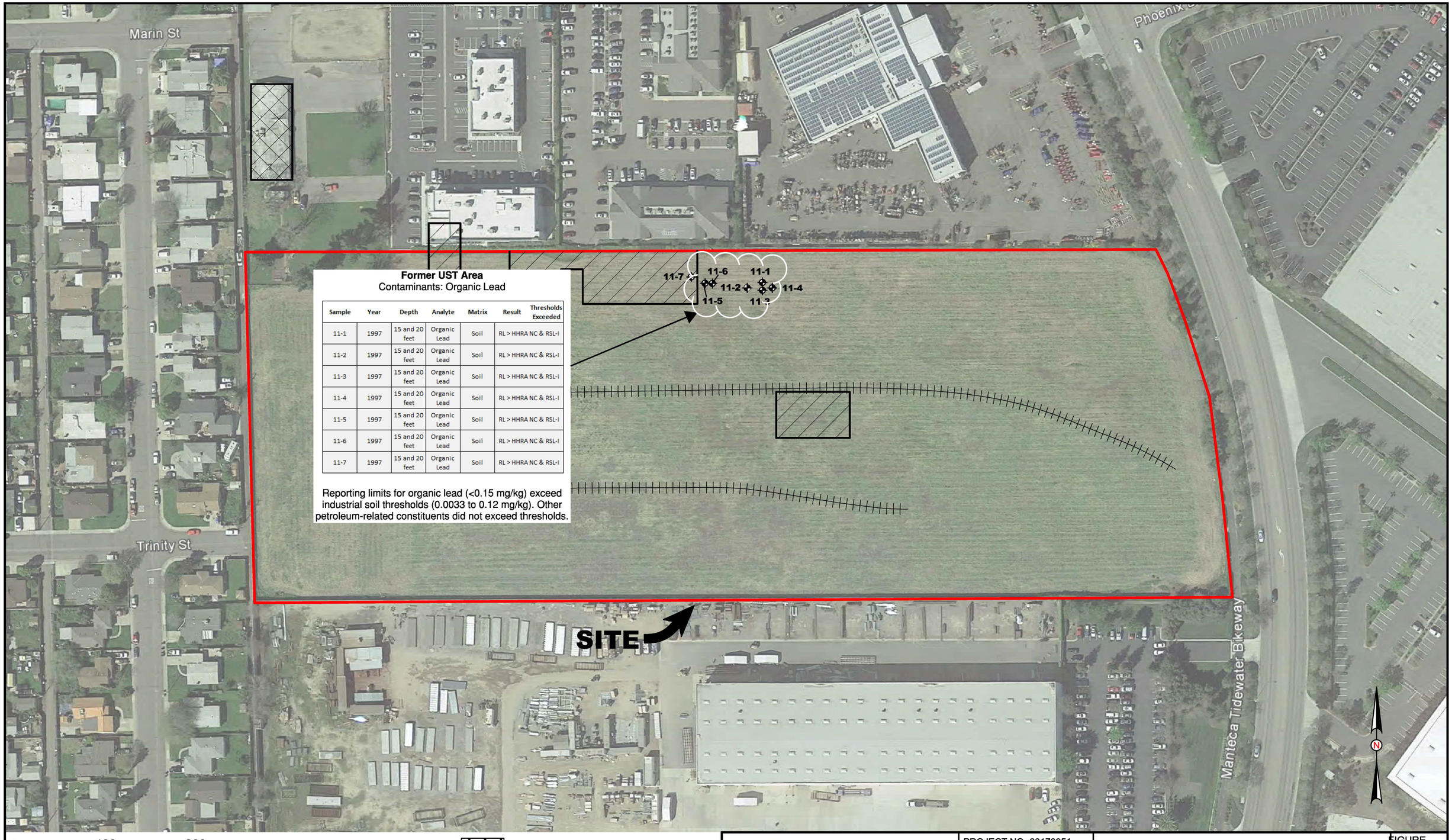
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20173951	
DRAWN: 6/9/2017	
DRAWN BY: G.G.	
CHECKED BY: D.H.	
FILE NAME: STO17D040.CAD	

Former Rail Spur Area

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
3-3



Former UST Area
Contaminants: Organic Lead

Sample	Year	Depth	Analyte	Matrix	Result	Thresholds Exceeded
11-1	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-2	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-3	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-4	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-5	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-6	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	
11-7	1997	15 and 20 feet	Organic Lead	Soil	RL > HHRA NC & RSL-I	

Reporting limits for organic lead (<0.15 mg/kg) exceed industrial soil thresholds (0.0033 to 0.12 mg/kg). Other petroleum-related constituents did not exceed thresholds.

0 130 260
SCALE: 1" = 130' SCALE IN FEET

REFERENCE:
Produced by Google Earth Pro, dated 2017

Existing Building
Former Structure
Rail Spur

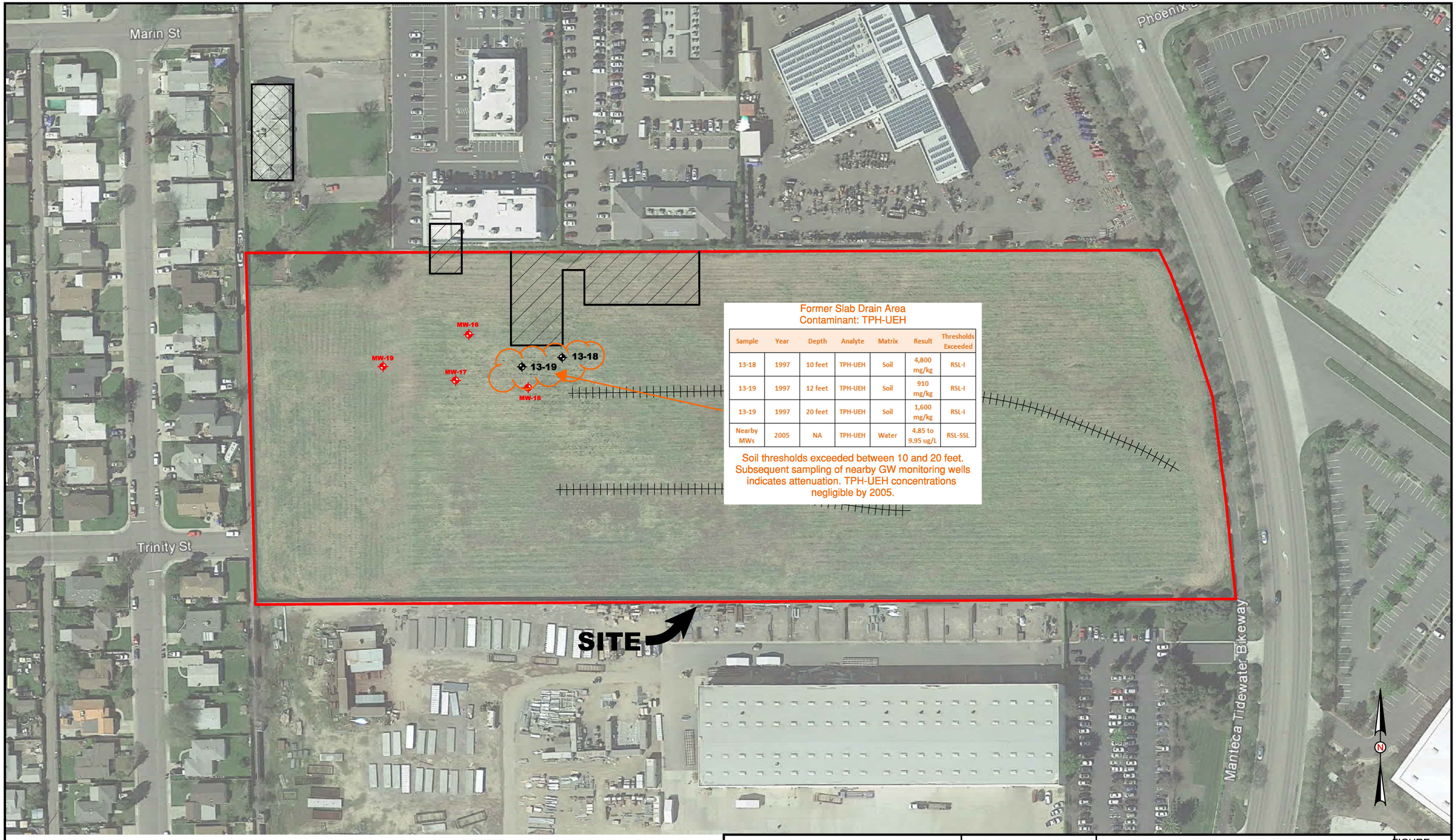
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20173951	
DRAWN: 6/9/2017	
DRAWN BY: G.G.	
CHECKED BY: D.H.	
FILE NAME: STO17D040.CAD	

Former UST Area

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
3-4



Former Slab Drain Area
Contaminant: TPH-UEH

Sample	Year	Depth	Analyte	Matrix	Result	Thresholds Exceeded
13-18	1997	10 feet	TPH-UEH	Soil	4,800 mg/kg	RSL-I
13-19	1997	12 feet	TPH-UEH	Soil	910 mg/kg	RSL-I
13-19	1997	20 feet	TPH-UEH	Soil	1,600 mg/kg	RSL-I
Nearby MWs	2005	NA	TPH-UEH	Water	4.85 to 9.95 ug/L	RSL-SSL

Soil thresholds exceeded between 10 and 20 feet. Subsequent sampling of nearby GW monitoring wells indicates attenuation. TPH-UEH concentrations negligible by 2005.

0 130 260

SCALE: 1" = 130' SCALE IN FEET

REFERENCE:
Produced by Google Earth Pro, dated 2017

Existing Building
Former Structure
Rail Spur

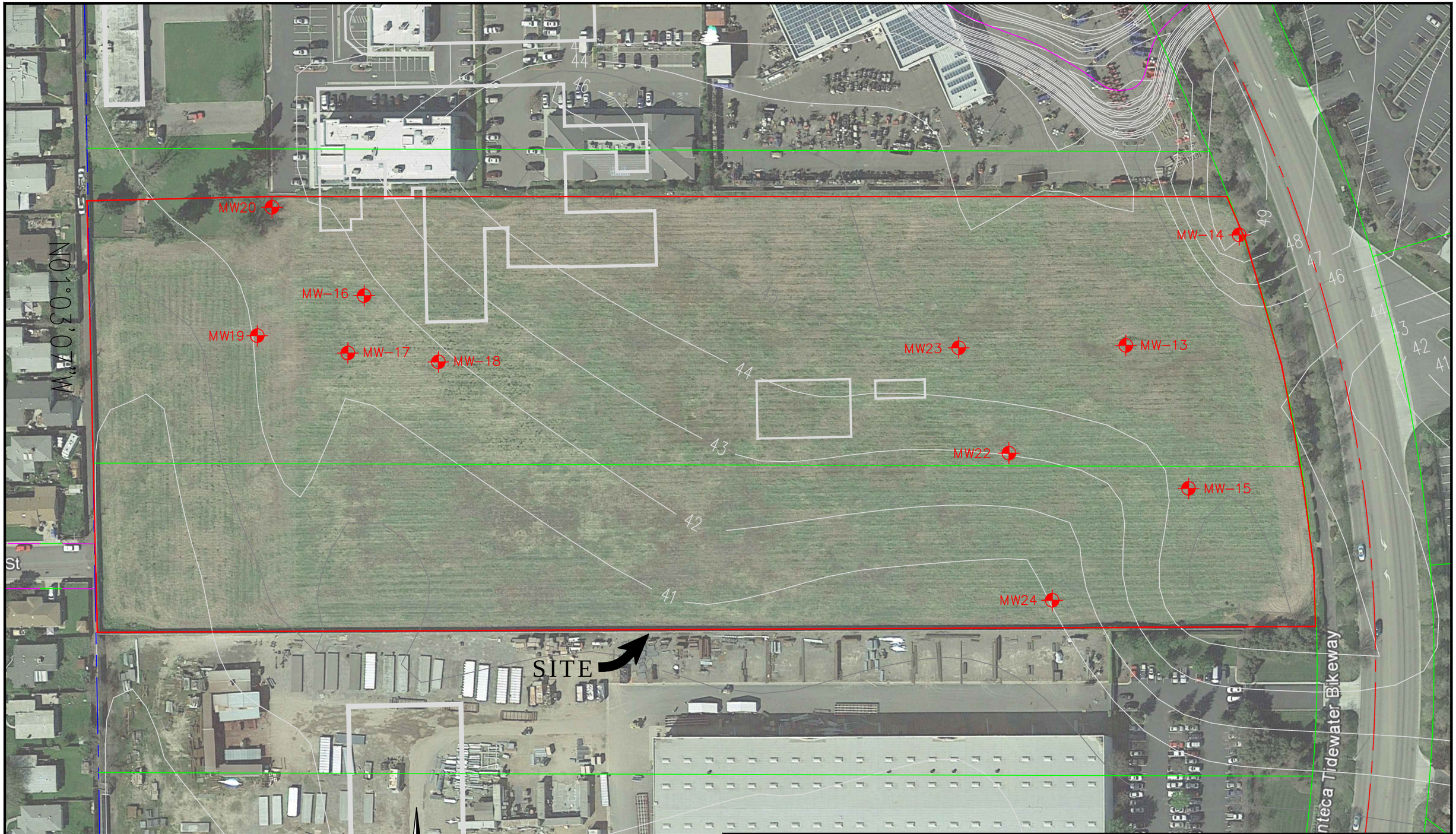
KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20173951
DRAWN: 6/9/2017
DRAWN BY: G.G.
CHECKED BY: D.H.
FILE NAME: STO17D040.CAD

Former Slab Drain Area

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
3-5



0 104 208

SCALE: 1" = 104' SCALE IN FEET

REFERENCE:
Produced by Google Earth Pro, dated 2017

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 20173951	
DRAWN: 6/9/2017	
DRAWN BY: G.G.	
CHECKED BY: D.H.	
FILE NAME: STO17D040.CAD	

FORMER MONITORING WELL LOCATIONS
MARCH 2016 AERIAL PHOTOGRAPH

Former Spreckels Sugar Plant #2
407 Spreckels Ave
Manteca, California

FIGURE
4

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

26 July 2018

William Filios
AKF Development Holdings, LLC
1463 Moffat Blvd
Manteca, CA 95206

NO FURTHER ACTION DETERMINATION, FORMER SPRECKELS SUGAR-PROCESSING FACTORY PARCEL 35, MANTECA, SAN JOAQUIN COUNTY

Central Valley Water Board staff has reviewed the 6 April 2018 *Phase II Environmental Assessment Report* (Phase II ESA Report) prepared by Kleinfelder Inc. on behalf of AKF Development Holdings, LLC for the Former Spreckels Sugar-Processing Factory Parcel 35 in Manteca (Site). The Phase II ESA Report documents completion of the recent site investigation activities and requests No Further Action for the Site. Central Valley Water Board staff has concurred with this request as provided in the enclosed Technical Memorandum.

During June 2018, Kleinfelder mailed a Central Valley Water Board fact sheet to property owners and residents within 500 feet of the Site. The fact sheet notified interested persons of their opportunity to provide comments on the proposed No Further Action for the Site. No comments were received during the 30-day public comment period ending on 16 July 2018.

Issuance of a No Further Action Determination does not preclude future action by the Central Valley Water Board if subsequent monitoring, testing, or analysis at the site indicates that the remedial action standards and objectives were not achieved; a new or previously undiscovered release occurs onsite; new information indicates that further site investigation and remedial action are required to prevent a significant risk to human health and safety, the environment, or water quality; or the responsible party induced the Central Valley Water Board to issue this No Further Action Determination by fraud, negligence, or intentional nondisclosure or misrepresentation.

If you have questions about this letter, you may call Bill Brattain at (916) 464-4622. Please note that staff oversight charges for work associated with this No Further Action letter will be billed on the second and third quarter 2018 invoices, in the same manner as previously billed.

For Andrew Altevogt
PATRICK PULUPA
Executive Officer

Enclosure: Technical Memorandum

cc: Eric Peirce, Kleinfelder Inc., Stockton

CALIFORNIA
Water Boards

EDMUND G. BROWN JR.
GOVERNOR

MATTHEW RODRIQUEZ
SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

TO: Stewart Black, P.G.
Program Manager
Site and Groundwater Cleanup

FROM: William Brattain, P.E.
Private Sites Cleanup Unit

SIGNATURE: _____

Steven Meeks, P.E.
Chief, Private Sites Cleanup Unit

SIGNATURE: _____

DATE: 30 May 2018

SUBJECT: ***RECOMMENDATION FOR NO FURTHER ACTION, FORMER SPRECKELS SUGAR-PROCESSING FACTORY PARCEL 35, MANTECA, SAN JOAQUIN COUNTY***

Rationale: AKF Development Holdings LLC, the current owner of the Former Spreckels Sugar-Processing Factory Parcel 35, has submitted a Phase II Environmental Site Assessment Report (Phase II ESA Report) prepared by Kleinfelder, Inc. The Phase II ESA Report was submitted in accordance with an approved work plan to investigate soil, soil vapor, and groundwater to fill data gaps identified during review of previous investigation data, most of which was collected since the closure of the factory in 1996.

For purposes of investigation, Parcel 35 (which consists of 14.83 acres of the larger 350-acre former Spreckels facility) was divided into eleven operable units (OU-1 through OU-11) corresponding to former site features. Each operable unit has been investigated to determine if soil, soil vapor, or groundwater contain contaminants associated with the former sugar-processing operations at levels that are a threat to public health or the environment. The Phase II ESA Report provides an assessment of all the new and historical data and concludes that concentrations of chemicals of concern at the site do not pose a hazard that requires further investigation, mitigation, or remediation, and recommends no further action other than a deed restriction requiring a soil management plan for any soils taken offsite. The planned use for the property is a large industrial warehouse with slab on grade foundation and a deed restriction will be recorded requiring a soil management plan for any site soils taken offsite.

Central Valley Water Board staff has reviewed the Phase II ESA Report, and concurs with the conclusions and recommendations. Information regarding the review of the data and concurrence with the recommendations is included in this technical memorandum, below.

Issues: Although presently cleared of former structures, the area of the Parcel 35 was once situated in one of the more active areas of the historic plant where sugar beet processing operations took place. Former structures/areas of Parcel 35 where releases occurred or may have occurred included above-ground fuel storage tanks (ASTs), gasoline underground storage tanks (USTs), product lines, a drum and waste oil storage area, septic leach field lines, an underground beet flume, a beet seed warehouse, an acid/caustic storage area, a solvents washdown pad, an auto shed, and former railroad spurs. Primary constituents of concern include petroleum hydrocarbons, solvents, volatile organic compounds (VOCs), pesticides/herbicides, and metals. Other constituents also included for analysis in some locations included semi-volatile organic compounds, poly-chlorinated biphenyls, acids, ethylene glycol, and nitrate. Previous investigations had found groundwater impacts primarily consisting of petroleum hydrocarbons and

elevated levels of certain other constituents in soil and groundwater in some locations. The additional Phase II ESA investigation was designed to investigate areas where there were insufficient data or where impacts had previously been found and not remediated by excavation or other methods.

Setting: Parcel 35 is zoned light industrial and has APN# 022-125-035, which encompasses 14.83-acres at 407 Spreckels Avenue in Manteca. Parcel 35 is situated within an area that was once formerly part of a larger property approximately 350 acres in size once owned and operated by the Spreckels beginning in the 1920s. The abandoned facilities of the former sugar plant operations were demolished in the 1990s to prepare the land for redevelopment. Redevelopment activities within the former plant area have taken place over the past 15 years and are mostly completed. The area surrounding the site is commercial or light industrial to the north, south, and east with residential areas to the west and northwest. Depth to groundwater was approximately 27 feet below ground surface during the recent investigation.

Source: As stated above, the sources or potential sources of contamination are from multiple former site areas and resulted in Parcel 35 being broken down into eleven separate operable units for purposes of investigation and any needed remediation. Sources of known releases included USTs and ASTs, and historical spills along the railroad spurs; however, other former site features have also been investigated as listed in the "Issues" section of this memorandum, above.

Actions: Cleanup actions at Parcel 35 have included removal of all buildings, structures, tanks, equipment, and other former site features associated with the former sugar-processing facility. Limited soil excavations have also been conducted associated with the removal of former USTs and waste oil tanks, as well as certain locations along the former railroad spurs. Numerous site investigations have also been conducted including historical soil and/or groundwater assessments documented in reports for the former USTs, ASTs, underground beet flume and seed warehouse, vehicle solvent washdown areas, and the former septic system. New soil, soil vapor, and groundwater data have also been collected in 2017 and 2018 in accordance with an approved work plan to fill data gaps in the conceptual site model.

The investigation to collect additional data was conducted during November and December 2017, and one follow-up soil sample was collected in March 2018. The investigation included a passive soil vapor survey using 53 shallow soil gas samples placed in a grid over the entire site area to identify areas needing active soil vapor samples. Active soil vapor samples were then collected at ten locations. Soil and groundwater samples were collected from soil borings at 11 locations.

Results of the soil, soil vapor, and groundwater samples were compared with all applicable screening levels and water quality objectives for each constituent analyzed. All soil vapor samples were below applicable screening levels. All soil samples were below screening levels except for some of the shallow soil samples that contained the pesticide dichlorodiphenyldichloroethylene (4,4'-DDE) at concentrations above the risk-based screening level for protection of groundwater of 11 micrograms per kilogram (ug/kg). In each case, the deeper soil samples from those locations were below the screening level indicating 4,4'-DDE has not migrated below the shallow soil zone and is not a threat to groundwater. The highest detected concentration of 4,4'-DDE of 200 ug/kg in shallow soil is well below the USEPA regional screening level of 2,000 ug/kg for residential soil and 9,300 ug/kg for industrial soil. Site soils also contain three metals (arsenic, cobalt, and thallium) that are also above screening levels for groundwater protection, but these metals are naturally occurring and at background levels for the area.

Groundwater samples were generally below all applicable water quality objectives except for one location exceeding the maximum contaminant level (MCL) for nitrate as N and two locations where the MCL for nickel and/or antimony was exceeded. The exceedance for nitrate at a concentration

of 74 milligrams per liter was in the OU-1 area at the south end of the site associated with former septic leach lines. The corresponding soil data at that location indicated very low levels of nitrate in the soil indicating no ongoing source of nitrate in this area. Other groundwater samples at the site had very low levels of nitrate indicating the area exceeding the MCL is very limited and not a threat to any drinking water wells. The two locations where groundwater exceeded the MCL for nickel and/or antimony were also at OU-1; however, these metals were not detected in the soil at these locations and were also not detected in the groundwater in samples collected in 1996 at the same locations when the sugar-processing plant had only recently ceased operations. The detections therefore appear to be anomalous and not related to the historical use of the sugar-processing facility. A similar conclusion is stated in the Phase II ESA Report.

It is also worth noting that areas where groundwater was formerly impacted by petroleum constituents at concentrations up to 4,900 micrograms per liter (ug/L) in samples collected between 1997 and 2003 were less than the 50 ug/L reporting limit in the 2017 samples. This indicates that the impacts from petroleum constituents have naturally degraded over time and are no longer a threat to water quality.

Extent defined: Yes. Concentrations of petroleum hydrocarbons in groundwater have naturally attenuated to below reporting limits. The location where nitrate exceeds the MCL is limited to a small area at the southern end of the site and is not associated with nitrate in soil at that location indicating no ongoing source of nitrate is present. The two locations where nickel and/or antimony were detected above the MCL are also not associated with the presence of those metals in the soil and appear to be anomalous since they were not detected in groundwater at those locations previously.

Estimated Residual Mass: The mass of contaminants in soil is negligible since only one pesticide constituent was detected in shallow soils above the screening level for protection of groundwater and was not detected in deeper soils. Remaining mass of petroleum constituents in groundwater is also negligible as they have naturally degraded to below reporting limits.

Threat to Groundwater: The only contaminant remaining in soil that is above a groundwater protection screening level is 4,4'-DDE at a maximum concentration of 200 ug/kg, and is only present in shallow soil in a limited area. Metals including arsenic, cobalt, and thallium are also above screening levels for groundwater protection, but these metals are naturally occurring and at background levels for the area. No threat to groundwater is indicated from these constituents for soil that remains onsite.

Threat to Human Health:

- Vapor Intrusion Hazard: All soil vapor samples were below both industrial and residential applicable screening levels for all constituents. The data indicate that vapor intrusion is not a threat at this site.

- Dermal Contact Hazard: Dermal contact hazards are also considered low at this site. Concentrations of constituents of concern were below levels that would be a dermal contact hazard.

Summary: Extensive soil, soil vapor, and groundwater sampling indicates no significant threats to public health or the environment from remaining constituents of concern at the property. A deed restriction will be recorded requiring a soil management plan for any soil taken offsite to prevent potential water quality impacts from site soils containing 4,4'-DDE and naturally occurring metals above screening levels for protection of groundwater. Therefore, the site warrants a no further action determination once the deed restriction has been recorded.

RECORDING REQUESTED BY:

2018 JUL -9 PM 3:05

AKF Development Holdings, LLC
1463 Moffat Blvd
Manteca, CA 95206

Doc #: 2018-081874
07/25/2018 08:34:16 AM
Page: 1 of 12 Fee: $0
Steve J. Bestolarides
San Joaquin County Recorders
Paid By: SHOWN ON DOCUMENT

WHEN RECORDED, MAIL TO:

California Regional Water Quality Control Board, Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, California 95670-6114
ATTN: Cleanup Program Manager

(Space Above This Line For Recorder's Use Only)

COVENANT AND AGREEMENT TO RESTRICT USE OF PROPERTY

ENVIRONMENTAL RESTRICTION

(Re: 407 Spreckels Avenue, Manteca, San Joaquin County

APN: 221-250-350-000

This Covenant and Agreement ("**Covenant**") is made by and between AKF Development Holdings, LLC ("**Owner**"), and the California Regional Water Quality Control Board, Central Valley Region ("**Central Valley Water Board**"). Collectively the Owner and the Central Valley Water Board are referred to as the "Parties." The Property, which is situated in San Joaquin County, State of California and depicted in **Exhibit A** attached hereto and incorporated herein by this reference ("**Property**").

Pursuant to Civil Code section 1471 and Water Code section 13307.1, the Central Valley Water Board has determined that this Covenant is reasonably necessary to protect present or future human health or safety or the environment as a result of potential risk related to the possible presence on the land of hazardous materials, as defined in Health & Safety Code section 25260, and, pursuant to Civil Code section 1471 and Water Code sections 13304 and 13307.1, use of the Property shall be restricted as set forth in this Covenant.

ARTICLE I

STATEMENT OF FACTS

1.01 Property Description. The Property, totaling approximately 14.83 acres, is depicted in Exhibit A and described in **Exhibit B**, respectively. The Property was a sugar-processing facility from the 1920s to 1996 when the facility was closed and decommissioning actions began. The Property is a currently unoccupied. The Property address is 407 Spreckels Avenue, Manteca.

1.02 Environmental Conditions. Investigations at the Property indicate limited areas of shallow soil contamination with the pesticide dichlorodiphenyldichloroethylene (4,4'-DDE) at concentrations above the risk-based screening level for protection of groundwater of 11 micrograms per kilogram. Other limited areas also had levels of metals (arsenic, cobalt, and thallium) that exceed the risk-based screening level for protection of groundwater, but these metals are naturally occurring and at background levels for the area. As such, there are no cleanup requirements for these soils if they remain onsite. However, if taken offsite and placed where they could be a threat to groundwater in an area with different conditions such as shallow groundwater or where naturally occurring metals in soil are at levels below the screening level for protection of groundwater, a soil management plan will be required for any soil to be taken offsite to prevent potential contamination of other offsite locations.

ARTICLE II

DEFINITIONS

2.01 Central Valley Water Board. "Central Valley Water Board" shall mean the Regional Water Quality Control Board, Central Valley Region, and shall include its successor agencies, if any.

2.02 Owner. "Owner" means AKF Development Holdings, LLC, its successors in interest, including heirs and assigns, who at any time hold title to or an ownership interest in all or any portion of the Property, during the time of such ownership.

2.03 Occupant. "Occupant" means Owner and any person or entity entitled by ownership, leasehold, or other legal relationship to the right to occupy any portion of the Property.

2.04 Improvements. "Improvements" includes, but is not limited to: buildings, structures, roads, driveways, sidewalks, improved parking areas, wells, pipelines, or other utilities.

ARTICLE III

GENERAL PROVISIONS

3.01 Restrictions to Run with the Land. This Covenant sets forth protective provisions, covenants, restrictions, and conditions (collectively, "**Restrictions**"), subject to which the Property and every portion thereof shall be improved, held, used, occupied, leased, sold, hypothecated, encumbered, and/or conveyed. Each and every Restriction: (a) runs with the land pursuant to Civil Code section 1471; (b) inures to the benefit of and passes with each and every portion of the Property; (c) is for the benefit of, and is enforceable by the Central Valley Water Board; and (d) is imposed upon the entire Property unless expressly stated as applicable only to a specific portion thereof.

3.02 Binding upon Owners / Occupants. This Covenant binds all Owners/Occupants of the Property, their heirs, successors, and assignees, and the agents, employees, and lessees of the Owners/Occupants, heirs, successors, and assignees. Pursuant to Civil Code section 1471, subdivision (b), all successive Owners/Occupants of the Property are expressly bound hereby for the benefit of the State.

3.03 Written Notification of Hazardous Substance Release. Written notice of the existence of this Covenant shall be given to the buyer, lessee, or sublessee of the Property prior to the sale, lease or sublease of the Property.

3.04 Incorporation into Deeds and Leases. This Covenant shall be incorporated by reference in each and every deed and lease for any portion of the Property.

3.05 Conveyance of Property. The Owner shall, no later than thirty (30) days after any conveyance, provide written notice to the Central Valley Water Board of any

change in ownership of the Property (excluding leases, and mortgages, liens, and other non-possessory encumbrances). The written notice shall include the name and mailing address of the new owner of the Property and shall reference the site name and site code as listed on page one of this Covenant. The notice shall also include the Assessor's Parcel Number ("**APN**") noted on page one or, if the APN has changed, the APN assigned at the time of transfer. If the new owner's Property has been assigned a different APN, each such APN that covers the Property must be provided. The Central Valley Water Board does not, by reason of this Covenant, have authority to approve, disapprove, or otherwise affect any proposed conveyance, except as otherwise provided by law, by administrative order, or by a specific provision of this Covenant.

ARTICLE IV

RESTRICTIONS

4.01 Soil Management. The following restrictions apply to soils on the Property:

(1) Any soils brought to the surface by digging, grading, excavation, or trenching that are to be taken offsite shall be managed in accordance with all applicable provisions of state and federal law, and in accordance with a soil management plan that has been submitted to the Central Valley Water Board for concurrence.

4.02 Access for the Central Valley Water Board. The Central Valley Water Board shall have reasonable right of entry and access to the Property defined for inspection, monitoring, and other activities consistent with the purposes of this Covenant as deemed necessary by the Central Valley Water Board to protect the public health or safety or the environment, including access to all monitoring wells, until such time as those wells are abandoned. Such access shall be during normal business hours and shall not unduly disrupt ongoing operations at the Property. The Central Valley Water Board shall to the extent possible provide advance notice to, and coordinate with, the Owner, lessee, or sublessee of the Property, as appropriate, regarding access requirements.

ARTICLE V

ENFORCEMENT

5.01 Enforcement. Failure of the Owner or Occupant to comply with this Covenant shall be grounds for the Central Valley Water Board to require modification or removal of any Improvements constructed or placed upon any portion of the Property in violation of this Covenant. Violation of this Covenant, including but not limited to, failure to submit, or the submission of any false statement, record or report to the Central Valley Water Board, shall be grounds for the Central Valley Water Board to pursue administrative, civil or criminal actions, as provided by law.

5.02 Nothing in this Covenant is intended to preempt the State's authority to implement and enforce applicable laws.

ARTICLE VI

VARIANCE, TERMINATION, AND TERM

6.01 Variance. The Owner, or any other aggrieved person, may apply to Central Valley Water Board for a written variance from the provisions of this Covenant. The Central Valley Water Board will grant the variance only after finding that such a variance would be protective of human health, safety and the environment.

6.02 Termination or Modification. The Owner, or any other aggrieved person, may apply to the Central Valley Water Board for a termination or modification of one or more terms of this Covenant as they apply to all or any portion of the Property.

6.03 Term. This Covenant shall continue in effect in perpetuity unless ended in accordance with the Termination paragraph above, by law, or by the State in the exercise of its discretion. The parties agree that the State shall terminate this Covenant if and when it is determined by the Central Valley Water Board, that this Covenant is no longer reasonably necessary to protect present or future human health or safety or the environment as a result of potential risk related to the possible presence on the land of hazardous materials. This Covenant may also be terminated at an earlier point in time in accordance with the provisions of Section 6.02, above.

ARTICLE VII

MISCELLANEOUS

7.01 No Dedication or Taking. Nothing set forth in this Covenant shall be construed to be a gift or dedication, or offer of a gift or dedication, of the Property, or any portion thereof to the general public or anyone else for any purpose whatsoever. Further, nothing set forth in this Covenant shall be construed to affect a taking under state or federal law.

7.02 Notices. Whenever any person gives or serves any notice ("notice" as used here includes any demand or other communication with respect to this Covenant), each such notice shall be in writing and shall be deemed effective: when delivered, if personally delivered to the person being served or three (3) business days after deposit in the mail, if mailed by United States mail, postage paid, certified, return receipt requested:

To: Cleanup Program Manager
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive #200
Rancho Cordova, CA 95670-6114

And,

To Owner: William Filios (or current owner contact)
AKF Development Holdings, LLC
1463 Moffat Blvd
Manteca, CA 95206

Any party may change its address or the individual to whose attention a notice is to be sent by giving written notice in compliance with this paragraph.

7.03 Partial Invalidity. If any portion of the Restrictions or other term set forth herein is determined by a court of competent jurisdiction to be invalid for any reason, the surviving portions of this Covenant shall remain in full force and effect as if such portion found invalid had not been included.

7.04 Exhibits. All exhibits referenced in this Covenant are deemed incorporated into this Covenant by reference.

7.05 Statutory References. All statutory references include successor provisions.

7.06 Recordation. The Owner shall record this Covenant, with all referenced Exhibits, in the County of San Joaquin within ten (10) days of the Owner's receipt of a fully executed original.

7.07 Approvals. Where the approval or concurrence of the Central Valley Water Board is required under this Covenant, such approval shall not be unreasonably withheld.

IN WITNESS WHEREOF, the parties execute this Covenant as of the date set forth above.

AKF Development Holdings, LLC

By: _____

William Filios, Principal and Manager

Date: 7/3/18

STATE OF CALIFORNIA

COUNTY OF _____ See Attached

On this _____ day of _____, in the year _____,

before me _____, personally appeared

_____,

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

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

STATE OF CALIFORNIA
COUNTY OF SAN JOAQUIN

On this 3rd day of July, 2018, before me, Shelby B. Gacer, Notary Public, personally appeared WILLIAM FILIOS, who 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.

I certify under penalty of perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Shelby B. Gacer
Notary's Signature

SHELBY B. GACER
Notary Public - California
San Joaquin County
Commission # 2237256
My Comm. Expires Apr 7, 2022

California Regional Water Quality Control Board, Central Valley Region

Patrick Pulupa

Signature: _____

Title: Executive Officer

Date: July 13, 2018

CERTIFICATE OF ACKNOWLEDGMENT

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California
County of SACRAMENTO

On 7/13/2018 before me, KIRAN LANFRANCHI-RIZZARDI (NOTARY)
(insert name and title of the officer)

personally appeared PATRICK PULUPA,
who 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.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

KIRAN LANFRANCHI-RIZZARDI
Notary Public - California
Sacramento County
Commission # 2126658
My Comm. Expires Sep 14, 2019

Signature _____ (Seal)

EXHIBITS

Exhibit A: Plate showing Boundary of Property restricted by this covenant.

Exhibit B: Legal Description of Property restricted by this covenant.

EXHIBIT A

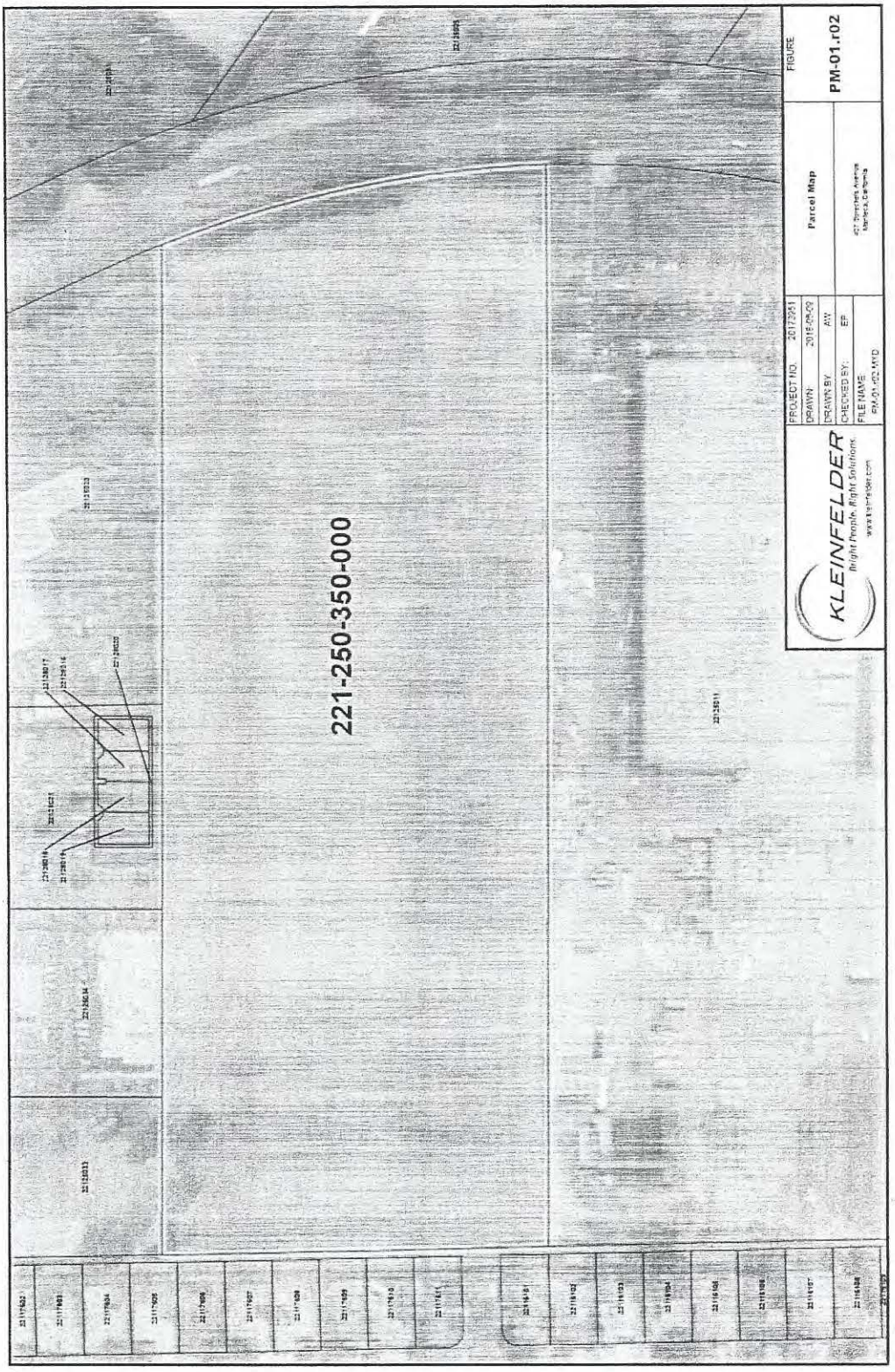

221-250-350-000
KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com
PROJECT NO. 20173941
DRAWN 2018-05-09
DRAWN BY AW
CHECKED BY EP
FILENAME PM-01.r02.MXD
Parcel Map
FIGURE
PM-01.r02

EXHIBIT B

Legal Description of Property Restricted by this Covenant:

Real property in the City of Manteca, Count of San Joaquin, State of California, described as follows:

Parcel 3 as shown on lot line of adjustment or parcel merger No. LLA-10-47-03, as evidenced by document recorded March 22, 2010 as instrument No. 2010-040014 of official records, being more particularly described as follows:

Being a portion of the northeast ¼ of section 4 and a portion of the northwest ¼ of section 3, township 2 south, range 7 east, Mount Diablo base and meridian, City of Manteca, San Joaquin County, State of California, being described as follows:

Beginning at the southwest corner of parcel "A" as described in the grant deed recorded as document number 2005-269399, San Joaquin County of Records; thence south 89°49' 48" east, 1,268.73 feet; thence along the arc of a non-tangent curve concave to the southwest, whose radius bears south 19° 55' 28" west, having a radius of 1.435.00 feet, though a central angle of 19° 55' 28", an arc length of 499.02 feet; thence north 89° 49' 48" west, 1,357.66 feet; thence north 01° 04' 09" west, 486.56 feet to the point of beginning.

APN: 221-250-350-000

APPENDIX B
2019 SAN FRANCISCO BAY REGIONAL WATER QUALITY CONTROL BOARD ENVIRONMENTAL SCREENING LEVELS

SOIL MANAGEMENT PLAN
407 Spreckels Avenue
Manteca, California

Farallon PN: 1071-133

Tier 1 ESLs [1]

2019 (Rev. 2)

Based on a generic conceptual site model designed for use at most sites[2]

Chemicals	CAS No.	Groundwater (µg/L)	Soil (mg/kg)	Subslab / Soil Gas (µg/m^3)	Indoor Air (µg/m^3)
Acenaphthene [PAH]	83-32-9	1.5E+01	1.2E+01	1.7E+04	5.1E+02
Acenaphthylene [PAH]	208-96-8	1.5E+01	6.4E+00	--	--
Acetone	67-64-1	1.5E+03	9.2E-01	1.0E+06	3.1E+04
Aldrin	309-00-2	1.4E-04	2.4E-03	1.9E-02	5.7E-04
Anthracene [PAH]	120-12-7	7.3E-01	1.9E+00	--	--
Antimony	7440-36-0	6.0E+00	1.1E+01	--	--
Arsenic	7440-38-2	1.0E+01	6.7E-02	--	--
Barium	7440-39-3	1.0E+03	3.9E+02	--	--
Benzene	71-43-2	4.2E-01	2.5E-02	3.2E+00	9.7E-02
Benzo[a]anthracene [PAH]	56-55-3	1.7E-02	6.3E-01	3.1E-01	9.2E-03
Benzo[b]fluoranthene [PAH]	205-99-2	4.9E-02	1.1E+00	--	--
Benzo[k]fluoranthene [PAH]	207-08-9	4.9E-02	2.8E+00	--	--
Benzo[g,h,i]perylene [PAH]	191-24-2	1.0E-01	2.5E+00	--	--
Benzo[a]pyrene [PAH]	50-32-8	1.4E-02	1.1E-01	--	--
Beryllium	7440-41-7	2.7E+00	5.0E+00	--	--
1,1-Biphenyl	92-52-4	5.0E-01	4.2E-01	1.4E+01	4.2E-01
Bis(2-chloroethyl) ether	111-44-4	6.3E-03	3.4E-05	1.3E-01	4.0E-03
Bis(2-chloro-1-methylethyl) ether	108-60-1	3.6E-01	5.1E-03	9.4E+00	2.8E-01
Bis(2-ethylhexyl) phthalate	117-81-7	4.0E+00	8.0E-01	--	--
Boron	7440-42-8	1.6E+00	1.2E+02	--	--
Bromodichloromethane	75-27-4	8.7E-01	1.6E-02	2.5E+00	7.6E-02
Bromoform (Tribromomethane)	75-25-2	8.0E+01	6.9E-01	8.5E+01	2.6E+00
Bromomethane	74-83-9	7.5E+00	3.6E-01	1.7E+02	5.2E+00
Cadmium (soil)	7440-43-9	--	1.9E+00	--	--
Cadmium (water)	7440-43-9	2.5E-01	--	--	--
Carbon tetrachloride	56-23-5	4.3E-01	7.6E-02	1.6E+01	4.7E-01
Chlordane	12789-03-6	5.9E-04	8.5E-03	2.8E-01	8.3E-03
p-Chloroaniline	106-47-8	3.6E-01	6.7E-03	--	--
Chlorobenzene	108-90-7	2.5E+01	1.4E+00	1.7E+03	5.2E+01
Chloroethane	75-00-3	1.6E+01	1.2E+00	3.5E+05	1.0E+04
Chloroform	67-66-3	8.1E-01	2.3E-02	4.1E+00	1.2E-01
Chloromethane	74-87-3	1.9E+02	1.1E+01	3.1E+03	9.4E+01
2-Chlorophenol	95-57-8	1.8E-01	1.2E-02	6.3E+02	1.9E+01
Chromium (total)	7440-47-3	5.0E+01	1.6E+02	--	--
Chromium III	16065-83-1	1.8E+02	1.2E+05	--	--
Chromium VI	18540-29-9	2.0E-02	3.0E-01	--	--
Chrysene [PAH]	218-01-9	4.9E-02	2.2E+00	--	--
Cobalt	7440-48-4	3.0E+00	2.3E+01	--	--
Copper	7440-50-8	3.1E+00	1.8E+02	--	--
Cyanide	57-12-5	1.0E+00	3.4E-03	2.8E+01	8.3E-01
Dibenz[a,h]anthracene [PAH]	53-70-3	2.5E-02	1.1E-01	--	--
Dibromochloromethane	124-48-1	3.4E+01	3.5E-01	--	--
1,2-dibromo-3-chloropropane	96-12-8	2.8E-02	5.9E-04	5.6E-03	1.7E-04
1,2-Dibromoethane	106-93-4	5.0E-02	5.3E-04	1.6E-01	4.7E-03
1,2-Dichlorobenzene	95-50-1	1.4E+01	1.0E+00	7.0E+03	2.1E+02
1,3-Dichlorobenzene	541-73-1	6.5E+01	6.0E+00	--	--
1,4-Dichlorobenzene	106-46-7	2.6E+00	2.0E-01	8.5E+00	2.6E-01
3,3-Dichlorobenzidine	91-94-1	4.6E-02	2.5E-02	--	--
DDD	72-54-8	8.4E-04	2.7E+00	--	--
DDE	72-55-9	5.9E-04	3.3E-01	9.6E-01	2.9E-02
DDT	50-29-3	5.9E-04	1.1E-03	--	--
1,1-Dichloroethane	75-34-3	5.0E+00	2.0E-01	5.8E+01	1.8E+00
1,2-Dichloroethane	107-06-2	5.0E-01	7.0E-03	3.6E+00	1.1E-01
1,1-Dichloroethene	75-35-4	3.2E+00	5.4E-01	2.4E+03	7.3E+01
cis-1,2-Dichloroethene	156-59-2	6.0E+00	1.9E-01	2.8E+02	8.3E+00
trans-1,2-Dichloroethene	156-60-5	1.0E+01	6.5E-01	2.8E+03	8.3E+01
2,4-Dichlorophenol	120-83-2	3.0E-01	7.5E-03	4.7E+04	1.4E+03

Tier 1 ESLs [1]

2019 (Rev. 2)

Based on a generic conceptual site model designed for use at most sites[2]

Chemicals	CAS No.	Groundwater (µg/L)	Soil (mg/kg)	Subslab / Soil Gas (µg/m^3)	Indoor Air (µg/m^3)
1,2-Dichloropropane	78-87-5	2.3E+00	6.5E-02	9.4E+00	2.8E-01
1,3-Dichloropropene	542-75-6	5.0E-01	1.7E-02	5.8E+00	1.8E-01
Dieldrin	60-57-1	1.4E-04	4.6E-04	2.0E-02	6.1E-04
Diethyl phthalate	84-66-2	1.5E+00	2.5E-02	--	--
Dimethyl phthalate	131-11-3	1.5E+00	3.5E-02	--	--
2,4-Dimethylphenol	105-67-9	1.0E+02	8.1E+00	3.3E+01	1.0E+00
2,4-Dinitrophenol	51-28-5	3.9E+01	3.0E+00	--	--
2,4-Dinitrotoluene	121-14-2	2.4E-01	2.3E-02	--	--
1,4-Dioxane	123-91-1	3.8E-01	1.7E-04	1.2E+01	3.6E-01
Dioxin (2,3,7,8-TCDD)	1746-01-6	1.4E-08	4.8E-06	2.5E-06	7.4E-08
Endosulfan	115-29-7	8.7E-03	9.8E-03	--	--
Endrin	72-20-8	2.3E-03	1.1E-03	--	--
Ethylbenzene	100-41-4	3.5E+00	4.3E-01	3.7E+01	1.1E+00
Fluoranthene [PAH]	206-44-0	8.0E+00	6.9E-01	--	--
Fluorene [PAH]	86-73-7	3.9E+00	6.0E+00	--	--
Heptachlor	76-44-8	2.1E-04	1.2E-01	7.2E-02	2.2E-03
Heptachlor epoxide	1024-57-3	1.1E-04	1.8E-04	3.6E-02	1.1E-03
Hexachlorobenzene	118-74-1	7.7E-04	8.0E-04	1.8E-01	5.5E-03
Hexachlorobutadiene	87-68-3	1.4E-01	2.8E-02	4.3E+00	1.3E-01
g-Hexachlorocyclohexane (Lindane)	58-89-9	1.6E-02	7.4E-03	--	--
Hexachloroethane	67-72-1	3.3E-01	1.9E-02	8.5E+00	2.6E-01
Indeno[1,2,3-c,d]pyrene [PAH]	193-39-5	4.9E-02	4.8E-01	--	--
Lead	7439-92-1	2.5E+00	3.2E+01	--	--
Mercury (elemental)	7439-97-6	2.5E-02	1.3E+01	1.0E+00	3.1E-02
Methoxychlor	72-43-5	3.0E-03	1.3E-02	--	--
Methylene chloride	75-09-2	5.0E+00	1.2E-01	3.4E+01	1.0E+00
Methyl ethyl ketone	78-93-3	5.6E+03	6.1E+00	1.7E+05	5.2E+03
Methyl isobutyl ketone	108-10-1	1.2E+02	3.6E-01	1.4E+04	4.2E+02
Methyl mercury	22967-92-6	3.0E-03	3.4E-02	--	--
2-Methylnaphthalene	91-57-6	2.1E+00	8.8E-01	2.3E+03	6.8E+01
Methyl tertiary butyl ether (MTBE)	1634-04-4	5.0E+00	2.8E-02	3.6E+02	1.1E+01
Molybdenum	7439-98-7	1.0E+02	6.9E+00	--	--
Naphthalene [PAH]	91-20-3	1.7E-01	4.2E-02	2.8E+00	8.3E-02
Nickel	7440-02-0	8.2E+00	8.6E+01	--	--
Pentachlorophenol	87-86-5	1.0E+00	1.3E-02	--	--
Perchlorate	7790-98-9	6.0E+00	5.5E+01	--	--
Petroleum - Gasoline	--	1.0E+02	1.0E+02	3.3E+03	1.0E+02
Petroleum - Stoddard Solvent	--	1.0E+02	1.0E+02	1.1E+04	3.3E+02
Petroleum - Jet Fuel	--	1.0E+02	1.0E+02	1.1E+04	3.3E+02
Petroleum - Diesel	--	1.0E+02	2.6E+02	8.9E+03	2.7E+02
Petroleum - HOPs	--	1.0E+02	--	--	--
Petroleum - Motor Oil	--	--	1.6E+03	--	--
Phenanthrene [PAH]	85-01-8	4.6E+00	7.8E+00	1.8E+03	5.5E+01
Phenol	108-95-2	5.0E+00	1.6E-01	5.2E+03	1.6E+02
Polychlorinated biphenyls (PCBs)	1336-36-3	1.7E-04	2.3E-01	1.6E-01	4.9E-03
Pyrene [PAH]	129-00-0	2.0E+00	4.5E+01	--	--
Selenium	7782-49-2	5.0E-01	2.4E+00	--	--
Silver	7440-22-4	1.9E-01	2.5E+01	--	--
Styrene	100-42-5	1.0E+01	9.2E-01	3.1E+04	9.4E+02
tert-Butyl alcohol	75-65-0	1.2E+01	7.5E-02	--	--
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	1.7E-02	1.3E+01	3.8E-01
1,1,2,2-Tetrachloroethane	79-34-5	1.0E+00	1.8E-02	1.6E+00	4.8E-02
Tetrachloroethene	127-18-4	6.4E-01	8.0E-02	1.5E+01	4.6E-01
Thallium	7440-28-0	2.0E+00	7.8E-01	--	--
Toluene	108-88-3	4.0E+01	3.2E+00	1.0E+04	3.1E+02
Toxaphene	8001-35-2	2.0E-04	5.1E-01	--	--
1,2,4-Trichlorobenzene	120-82-1	5.0E+00	1.2E+00	7.0E+01	2.1E+00

Tier 1 ESLs [1]

2019 (Rev. 2)

Based on a generic conceptual site model designed for use at most sites[2]

Chemicals	CAS No.	Groundwater (µg/L)	Soil (mg/kg)	Subslab / Soil Gas (µg/m^3)	Indoor Air (µg/m^3)
1,1,1-Trichloroethane	71-55-6	6.2E+01	7.0E+00	3.5E+04	1.0E+03
1,1,2-Trichloroethane	79-00-5	5.0E+00	7.6E-02	5.8E+00	1.8E-01
Trichloroethene	79-01-6	1.2E+00	8.5E-02	1.6E+01	4.8E-01
2,4,5-Trichlorophenol	95-95-4	1.1E+01	2.9E+00	--	--
2,4,6-Trichlorophenol	88-06-2	6.3E-01	4.0E-02	1.0E+01	3.0E-01
1,2,3-Trichloropropane	96-18-4	5.0E-03	1.1E-04	1.0E+01	3.1E-01
Vanadium	7440-62-2	1.9E+01	1.8E+01	--	--
Vinyl chloride	75-01-4	8.6E-03	1.5E-03	3.2E-01	9.5E-03
Xylenes	1330-20-7	2.0E+01	2.1E+00	3.5E+03	1.0E+02
Zinc	7440-66-6	8.1E+01	3.4E+02	--	--

Notes:

1 - ESLs are developed based on methodologies discussed in the User's Guide. Evaluation of laboratory detection limits and naturally occurring background or ambient concentrations should be independently conducted. See User's Guide Chapter 12 (Additional Considerations) for further information.

2 - Generic Conceptual Site Model - See User's Guide Chapter 2. Input settings are:
Land Use = Residential
Groundwater Use = Drinking Water Resource
MCL Priority over Risk-Based Levels = Yes
Discharge to Surface Water = Saltwater & Freshwater
Vegetation Level = Substantial
Soil Exposure Depth = Shallow

Abbreviations:

DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethene
DDT - Dichlorodiphenyltrichloroethane
HOPs - Hydrocarbon Oxidation Products (biodegradation metabolites and photo-oxidation products of petroleum hydrocarbons). See User's Guide Chapter 4 for further information.
PAH - Polycyclic aromatic hydrocarbon
TCDD - Tetrachlorodibenzodioxin

2019 (Rev. 2)	Summary of Groundwater ESLs (µg/L)															
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table GW-1)			Aquatic Habitat Goal Levels (Table GW-2)			Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3)				Gross Contam-ination Levels (GW-4)	Odor Nuisance Levels (Table GW-5)		GW Tier 1 ESL	Basis
								Residential		Commercial/Industrial						
		MCL Priority[1]	Tapwater Cancer Risk	Tapwater Non-cancer Hazard	Fresh Water Ecotox	Saltwater Ecotox	Seafood Ingestion Human Health	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard		Drinking Water	Non-Drinking Water		
Acenaphthene [PAH]	83-32-9	5.3E+02	--	5.3E+02	2.3E+01	1.5E+01	2.7E+03	--	--	--	--	2.0E+03	2.0E+01	2.0E+02	1.5E+01	Aquatic Habitat
Acenaphthylene [PAH]	208-96-8	--	--	--	--	1.5E+01	--	--	--	--	--	2.0E+03	--	--	1.5E+01	Aquatic Habitat
Acetone	67-64-1	1.4E+04	--	1.4E+04	1.5E+03	--	--	--	2.3E+07	--	9.7E+07	5.0E+04	2.0E+04	2.0E+05	1.5E+03	Aquatic Habitat
Aldrin	309-00-2	9.2E-04	9.2E-04	2.0E-03	3.0E-01	1.3E-01	1.4E-04	3.2E-01	--	1.4E+00	--	8.5E+00	1.7E+01	1.7E+02	1.4E-04	Aquatic Habitat
Anthracene [PAH]	120-12-7	1.8E+03	--	1.8E+03	7.3E-01	1.5E+01	1.1E+05	--	--	--	--	2.2E+01	--	--	7.3E-01	Aquatic Habitat
Antimony	7440-36-0	6.0E+00	--	1.0E+00	3.0E+01	5.0E+02	4.3E+03	--	--	--	--	5.0E+04	--	--	6.0E+00	MCL
Arsenic	7440-38-2	1.0E+01	4.0E-03	7.0E-02	1.5E+02	3.6E+01	--	--	--	--	--	5.0E+04	--	--	1.0E+01	MCL
Barium	7440-39-3	1.0E+03	--	2.0E+03	--	--	--	--	--	--	--	5.0E+04	--	--	1.0E+03	MCL
Benzene	71-43-2	1.0E+00	1.5E-01	5.7E+00	4.6E+01	3.5E+02	7.1E+01	4.2E-01	1.4E+01	1.8E+00	5.7E+01	5.0E+04	1.7E+02	2.0E+04	4.2E-01	Vapor Intrusion
Benzo[a]anthracene [PAH]	56-55-3	1.7E-02	1.7E-02	--	2.7E-02	1.5E+01	4.9E-02	1.9E+01	--	2.3E+02	--	4.7E+00	--	--	1.7E-02	Tap Canc-Risk
Benzo[b]fluoranthene [PAH]	205-99-2	2.5E-01	2.5E-01	--	--	1.5E+01	4.9E-02	--	--	--	--	7.5E-01	--	--	4.9E-02	Aquatic Habitat
Benzo[k]fluoranthene [PAH]	207-08-9	2.5E+00	2.5E+00	--	3.7E+00	1.5E+01	4.9E-02	--	--	--	--	4.0E-01	--	--	4.9E-02	Aquatic Habitat
Benzo[g,h,i]perylene [PAH]	191-24-2	--	--	--	1.0E-01	1.5E+01	--	--	--	--	--	1.3E-01	--	--	1.0E-01	Aquatic Habitat
Benzo[a]pyrene [PAH]	50-32-8	2.0E-01	7.0E-03	6.0E+00	1.4E-02	1.5E+01	4.9E-02	--	--	--	--	8.0E-01	--	--	1.4E-02	Aquatic Habitat
Beryllium	7440-41-7	4.0E+00	--	1.0E+00	2.7E+00	--	--	--	--	--	--	5.0E+04	--	--	2.7E+00	Aquatic Habitat
1,1-Biphenyl	92-52-4	8.3E-01	3.8E+00	8.3E-01	1.4E+01	--	--	--	3.2E+01	--	1.3E+02	3.8E+03	5.0E-01	5.0E+00	5.0E-01	Odor/Nuis
Bis(2-chloroethyl) ether	111-44-4	6.3E-03	6.3E-03	--	6.1E+01	--	1.4E+00	5.6E+00	--	2.5E+01	--	5.0E+04	3.6E+02	3.6E+03	6.3E-03	Tap Canc-Risk
Bis(2-chloro-1-methylethyl) ether	108-60-1	3.6E-01	3.6E-01	7.1E+02	6.1E+01	--	1.7E+05	9.4E+01	--	4.1E+02	--	5.0E+04	3.2E+02	3.2E+03	3.6E-01	Tap Canc-Risk
Bis(2-ethylhexyl) phthalate	117-81-7	4.0E+00	5.6E+00	4.0E+02	3.2E+01	--	5.9E+00	--	--	--	--	1.4E+02	--	--	4.0E+00	MCL
Boron	7440-42-8	1.0E+03	--	1.0E+03	1.6E+00	--	--	--	--	--	--	5.0E+04	--	--	1.6E+00	Aquatic Habitat
Bromodichloromethane	75-27-4	8.0E+01	1.2E-01	3.8E+02	1.1E+03	3.2E+03	--	8.7E-01	--	3.8E+00	--	5.0E+04	--	--	8.7E-01	Vapor Intrusion
Bromoform (Tribromomethane)	75-25-2	8.0E+01	2.9E+00	3.8E+02	1.1E+03	3.2E+03	3.6E+02	1.2E+02	--	5.1E+02	--	5.0E+04	5.1E+02	5.1E+03	8.0E+01	MCL
Bromomethane	74-83-9	7.5E+00	--	7.5E+00	1.6E+02	3.2E+03	4.0E+03	--	1.7E+01	--	7.3E+01	5.0E+04	--	--	7.5E+00	Tap NC-Hazard
Cadmium (soil)	7440-43-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium (water)	7440-43-9	5.0E+00	--	4.0E-02	2.5E-01	9.3E+00	--	--	--	--	--	5.0E+04	--	--	2.5E-01	Aquatic Habitat
Carbon tetrachloride	56-23-5	5.0E-01	1.0E-01	3.6E+01	2.4E+02	3.2E+03	4.4E+00	4.3E-01	3.8E+01	1.9E+00	1.6E+02	5.0E+04	5.2E+02	5.2E+03	4.3E-01	Vapor Intrusion
Chlordane	12789-03-6	1.0E-01	1.3E-02	1.3E+00	4.3E-03	4.0E-03	5.9E-04	4.1E+00	3.7E+02	1.8E+01	1.5E+03	2.8E+01	2.5E+00	2.5E+01	5.9E-04	Aquatic Habitat
p-Chloroaniline	106-47-8	3.6E-01	3.6E-01	7.6E+01	5.0E+00	--	--	--	--	--	--	5.0E+04	--	--	3.6E-01	Tap Canc-Risk
Chlorobenzene	108-90-7	7.0E+01	--	7.0E+01	2.5E+01	6.5E+01	2.1E+04	--	4.0E+02	--	1.7E+03	5.0E+04	5.0E+01	5.0E+02	2.5E+01	Aquatic Habitat
Chloroethane	75-00-3	2.1E+04	--	2.1E+04	--	--	--	--	2.3E+04	--	9.7E+04	5.0E+04	1.6E+01	1.6E+02	1.6E+01	Odor/Nuis
Chloroform	67-66-3	8.0E+01	2.2E-01	9.7E+01	6.2E+02	3.2E+03	--	8.1E-01	6.8E+02	3.6E+00	2.9E+03	5.0E+04	2.4E+03	2.4E+04	8.1E-01	Vapor Intrusion
Chloromethane	74-87-3	1.9E+02	--	1.9E+02	1.1E+03	3.2E+03	--	--	2.6E+02	--	1.1E+03	5.0E+04	--	--	1.9E+02	Tap NC-Hazard
2-Chlorophenol	95-57-8	9.1E+01	--	9.1E+01	4.4E+02	--	4.0E+02	--	--	--	--	5.0E+04	1.8E-01	1.8E+00	1.8E-01	Odor/Nuis
Chromium (total)	7440-47-3	5.0E+01	--	--	1.8E+02	--	--	--	--	--	--	5.0E+04	--	--	5.0E+01	MCL
Chromium III	16065-83-1	2.2E+04	--	2.2E+04	1.8E+02	1.0E+03	--	--	--	--	--	5.0E+04	--	--	1.8E+02	Aquatic Habitat
Chromium VI	18540-29-9	2.0E-02	2.0E-02	4.4E+01	1.1E+01	5.0E+01	--	--	--	--	--	5.0E+04	--	--	2.0E-02	Tap Canc-Risk

2019 (Rev. 2)		Summary of Groundwater ESLs (µg/L)														
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table GW-1)			Aquatic Habitat Goal Levels (Table GW-2)			Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3)				Gross Contam-ination Levels (GW-4)	Odor Nuisance Levels (Table GW-5)		GW Tier 1 ESL	Basis
								Residential		Commercial/Industrial						
		MCL Priority[1]	Tapwater Cancer Risk	Tapwater Non-cancer Hazard	Fresh Water Ecotox	Saltwater Ecotox	Seafood Ingestion Human Health	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard		Drinking Water	Non-Drinking Water		
Chrysene [PAH]	218-01-9	2.5E+01	2.5E+01	--	3.5E-01	1.5E+01	4.9E-02	--	--	--	--	1.0E+00	--	--	4.9E-02	Aquatic Habitat
Cobalt	7440-48-4	6.0E+00	--	6.0E+00	3.0E+00	--	--	--	--	--	--	5.0E+04	--	--	3.0E+00	Aquatic Habitat
Copper	7440-50-8	1.0E+03	--	3.0E+02	9.0E+00	3.1E+00	--	--	--	--	--	5.0E+04	1.0E+03	--	3.1E+00	Aquatic Habitat
Cyanide	57-12-5	1.5E+02	--	1.5E+00	5.2E+00	1.0E+00	2.2E+05	--	2.0E+02	--	8.3E+02	5.0E+04	1.7E+02	1.7E+03	1.0E+00	Aquatic Habitat
Dibenz[a,h]anthracene [PAH]	53-70-3	2.5E-02	2.5E-02	--	7.5E+00	1.5E+01	4.9E-02	--	--	--	--	1.3E+00	--	--	2.5E-02	Tap Canc-Risk
Dibromochloromethane	124-48-1	8.0E+01	8.7E-01	3.8E+02	1.1E+03	3.2E+03	3.4E+01	--	--	--	--	5.0E+04	--	--	3.4E+01	Aquatic Habitat
1,2-dibromo-3-chloropropane	96-12-8	2.0E-01	3.0E-04	3.7E-01	--	--	--	2.8E-02	3.5E+01	3.4E-01	1.5E+02	5.0E+04	1.0E+01	1.0E+02	2.8E-02	Vapor Intrusion
1,2-Dibromoethane	106-93-4	5.0E-02	7.5E-03	1.7E+00	1.4E+03	--	--	1.7E-01	3.1E+01	7.6E-01	1.3E+02	5.0E+04	--	--	5.0E-02	MCL
1,2-Dichlorobenzene	95-50-1	1.0E+02	--	3.0E+02	1.4E+01	6.5E+01	1.7E+04	--	2.7E+03	--	1.1E+04	5.0E+04	1.0E+02	1.0E+02	1.4E+01	Aquatic Habitat
1,3-Dichlorobenzene	541-73-1	6.0E+02	--	6.0E+02	7.1E+01	6.5E+01	2.6E+03	--	--	--	--	5.0E+04	--	--	6.5E+01	Aquatic Habitat
1,4-Dichlorobenzene	106-46-7	5.0E+00	4.8E-01	5.7E+02	1.5E+01	6.5E+01	2.6E+03	2.6E+00	8.4E+03	1.1E+01	3.5E+04	4.1E+04	5.0E+00	1.1E+02	2.6E+00	Vapor Intrusion
3,3-Dichlorobenzidine	91-94-1	4.6E-02	4.6E-02	--	2.5E+02	--	7.7E-02	--	--	--	--	1.6E+03	--	--	4.6E-02	Tap Canc-Risk
DDD	72-54-8	3.1E-02	3.1E-02	--	1.0E-03	1.0E-03	8.4E-04	--	--	--	--	4.5E+01	--	--	8.4E-04	Aquatic Habitat
DDE	72-55-9	4.6E-02	4.6E-02	--	1.0E-03	1.0E-03	5.9E-04	1.7E+01	--	7.4E+01	--	2.0E+01	--	--	5.9E-04	Aquatic Habitat
DDT	50-29-3	2.3E-01	2.3E-01	1.0E+01	1.0E-03	1.0E-03	5.9E-04	--	--	--	--	2.8E+00	3.5E+02	3.5E+03	5.9E-04	Aquatic Habitat
1,1-Dichloroethane	75-34-3	5.0E+00	2.7E+00	3.8E+03	4.7E+01	--	--	7.6E+00	--	3.3E+01	--	5.0E+04	--	--	5.0E+00	MCL
1,2-Dichloroethane	107-06-2	5.0E-01	1.7E-01	1.3E+01	1.0E+04	1.1E+04	9.9E+01	2.2E+00	1.5E+02	9.8E+00	6.4E+02	5.0E+04	7.0E+03	2.0E+05	5.0E-01	MCL
1,1-Dichloroethene	75-35-4	6.0E+00	--	1.0E+01	2.5E+01	2.2E+04	3.2E+00	--	6.6E+01	--	2.8E+02	5.0E+04	1.5E+03	1.5E+04	3.2E+00	Aquatic Habitat
cis-1,2-Dichloroethene	156-59-2	6.0E+00	--	1.1E+01	5.9E+02	2.2E+04	--	--	4.9E+01	--	2.1E+02	5.0E+04	--	--	6.0E+00	MCL
trans-1,2-Dichloroethene	156-60-5	1.0E+01	--	5.0E+01	5.9E+02	2.2E+04	1.4E+05	--	2.2E+02	--	9.2E+02	5.0E+04	2.6E+02	2.6E+03	1.0E+01	MCL
2,4-Dichlorophenol	120-83-2	4.6E+01	--	4.6E+01	1.8E+02	--	7.9E+02	--	--	--	--	5.0E+04	3.0E-01	3.0E+00	3.0E-01	Odor/Nuis
1,2-Dichloropropane	78-87-5	5.0E+00	4.4E-01	8.3E+00	2.9E+03	1.5E+03	3.9E+01	2.3E+00	3.5E+01	1.0E+01	1.5E+02	5.0E+04	1.0E+01	1.0E+02	2.3E+00	Vapor Intrusion
1,3-Dichloropropene	542-75-6	5.0E-01	2.0E-01	3.9E+01	1.2E+02	7.9E+01	1.7E+03	1.2E+00	1.4E+02	5.1E+00	5.8E+02	5.0E+04	--	--	5.0E-01	MCL
Dieldrin	60-57-1	7.1E-04	7.1E-04	2.0E-03	5.6E-02	1.9E-03	1.4E-04	1.5E+00	--	6.5E+00	--	1.0E+02	4.1E+01	4.1E+02	1.4E-04	Aquatic Habitat
Diethyl phthalate	84-66-2	1.5E+04	--	1.5E+04	1.5E+00	1.7E+00	1.2E+05	--	--	--	--	5.0E+04	--	--	1.5E+00	Aquatic Habitat
Dimethyl phthalate	131-11-3	--	--	--	1.5E+00	1.7E+00	2.9E+06	--	--	--	--	5.0E+04	--	--	1.5E+00	Aquatic Habitat
2,4-Dimethylphenol	105-67-9	1.0E+02	--	1.0E+02	5.3E+02	1.1E+02	2.3E+03	--	--	--	--	5.0E+04	4.0E+02	4.0E+03	1.0E+02	Tap NC-Hazard
2,4-Dinitrophenol	51-28-5	3.9E+01	--	3.9E+01	7.5E+01	4.9E+02	1.4E+04	--	--	--	--	5.0E+04	--	--	3.9E+01	Tap NC-Hazard
2,4-Dinitrotoluene	121-14-2	2.4E-01	2.4E-01	3.8E+01	1.2E+02	1.9E+02	9.1E+00	--	--	--	--	5.0E+04	--	--	2.4E-01	Tap Canc-Risk
1,4-Dioxane	123-91-1	3.8E-01	3.8E-01	5.7E+01	3.4E+05	5.0E+05	--	1.8E+03	1.6E+05	8.0E+03	6.6E+05	5.0E+04	2.3E+05	--	3.8E-01	Tap Canc-Risk
Dioxin (2,3,7,8-TCDD)	1746-01-6	3.0E-05	1.2E-07	1.2E-05	5.0E-06	--	1.4E-08	3.7E-05	2.1E-02	1.6E-04	8.8E-02	1.0E-01	--	--	1.4E-08	Aquatic Habitat
Endosulfan	115-29-7	1.0E+02	--	1.0E+02	5.6E-02	8.7E-03	2.4E+02	--	--	--	--	1.7E+02	--	--	8.7E-03	Aquatic Habitat
Endrin	72-20-8	2.0E+00	--	3.0E-01	3.6E-02	2.3E-03	8.1E-01	--	--	--	--	1.3E+02	4.1E+01	4.1E+02	2.3E-03	Aquatic Habitat
Ethylbenzene	100-41-4	3.0E+01	1.5E+00	3.0E+02	2.9E+02	4.3E+01	2.9E+04	3.5E+00	3.3E+03	1.5E+01	1.4E+04	5.0E+04	3.0E+01	3.0E+02	3.5E+00	Vapor Intrusion
Fluoranthene [PAH]	206-44-0	8.0E+02	--	8.0E+02	8.1E+00	8.0E+00	3.7E+02	--	--	--	--	1.3E+02	--	--	8.0E+00	Aquatic Habitat
Fluorene [PAH]	86-73-7	2.9E+02	--	2.9E+02	3.9E+00	1.5E+01	1.4E+04	--	--	--	--	8.5E+02	--	--	3.9E+00	Aquatic Habitat

2019 (Rev. 2)		Summary of Groundwater ESLs (µg/L)														
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table GW-1)			Aquatic Habitat Goal Levels (Table GW-2)			Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3)				Gross Contam-ination Levels (GW-4)	Odor Nuisance Levels (Table GW-5)		GW Tier 1 ESL	Basis
								Residential		Commercial/Industrial						
		MCL Priority[1]	Tapwater Cancer Risk	Tapwater Non-cancer Hazard	Fresh Water Ecotox	Saltwater Ecotox	Seafood Ingestion Human Health	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard		Drinking Water	Non-Drinking Water		
Heptachlor	76-44-8	1.0E-02	1.4E-03	1.3E+00	3.8E-03	3.6E-03	2.1E-04	1.8E-01	--	7.9E-01	--	9.0E+01	2.0E+01	2.0E+02	2.1E-04	Aquatic Habitat
Heptachlor epoxide	1024-57-3	1.0E-02	1.4E-03	1.2E-01	3.8E-03	3.6E-03	1.1E-04	1.3E+00	--	5.5E+00	--	1.0E+02	--	--	1.1E-04	Aquatic Habitat
Hexachlorobenzene	118-74-1	1.0E+00	8.8E-03	1.6E+01	3.7E+00	6.5E+01	7.7E-04	7.9E-02	--	3.4E-01	--	3.1E+00	3.0E+03	3.0E+04	7.7E-04	Aquatic Habitat
Hexachlorobutadiene	87-68-3	1.4E-01	1.4E-01	6.5E+00	4.7E+00	3.2E+00	5.0E+01	3.0E-01	--	1.3E+00	--	1.6E+03	6.0E+00	6.0E+01	1.4E-01	Tap Canc-Risk
g-Hexachlorocyclohexane (Lindane)	58-89-9	2.0E-01	3.2E-02	3.6E+00	8.0E-02	1.6E-02	6.3E-02	--	--	--	--	3.7E+03	1.2E+04	1.2E+05	1.6E-02	Aquatic Habitat
Hexachloroethane	67-72-1	3.3E-01	3.3E-01	6.2E+00	1.2E+01	9.4E+01	8.9E+00	1.6E+00	2.0E+02	7.0E+00	8.2E+02	2.5E+04	1.0E+01	1.0E+02	3.3E-01	Tap Canc-Risk
Indeno[1,2,3-c,d]pyrene [PAH]	193-39-5	2.5E-01	2.5E-01	--	--	1.5E+01	4.9E-02	--	--	--	--	9.5E-02	--	--	4.9E-02	Aquatic Habitat
Lead	7439-92-1	1.5E+01	9.2E+00	2.0E-01	2.5E+00	8.1E+00	--	--	--	--	--	5.0E+04	--	--	2.5E+00	Aquatic Habitat
Mercury (elemental)	7439-97-6	2.0E+00	--	6.1E-02	2.5E-02	2.5E-02	5.1E-02	--	8.9E-02	--	3.8E-01	3.0E+01	--	--	2.5E-02	Aquatic Habitat
Methoxychlor	72-43-5	3.0E+01	--	9.0E-02	1.9E-02	3.0E-03	--	--	--	--	--	5.0E+01	4.7E+03	4.7E+04	3.0E-03	Aquatic Habitat
Methylene chloride	75-09-2	5.0E+00	9.3E-01	1.0E+02	2.2E+03	3.2E+03	1.6E+03	7.8E+00	3.2E+03	9.4E+01	1.3E+04	5.0E+04	9.1E+03	9.1E+04	5.0E+00	MCL
Methyl ethyl ketone	78-93-3	5.6E+03	--	5.6E+03	1.4E+04	--	--	--	2.3E+06	--	9.5E+06	5.0E+04	8.4E+03	8.4E+04	5.6E+03	Tap NC-Hazard
Methyl isobutyl ketone	108-10-1	1.2E+02	--	1.2E+02	1.7E+02	--	--	--	5.6E+05	--	2.3E+06	5.0E+04	1.3E+03	1.3E+04	1.2E+02	Tap NC-Hazard
Methyl mercury	22967-92-6	2.0E+00	--	2.0E+00	3.0E-03	--	--	--	--	--	--	5.0E+04	--	--	3.0E-03	Aquatic Habitat
2-Methylnaphthalene	91-57-6	3.6E+01	--	3.6E+01	2.1E+00	3.0E+01	--	--	--	--	--	1.3E+04	1.0E+01	1.0E+02	2.1E+00	Aquatic Habitat
Methyl tertiary butyl ether (MTBE)	1634-04-4	5.0E+00	1.3E+01	6.3E+03	6.6E+04	8.0E+03	--	4.5E+02	1.3E+05	2.0E+03	5.5E+05	5.0E+04	5.0E+00	1.8E+03	5.0E+00	Odor/Nuis
Molybdenum	7439-98-7	1.0E+02	--	1.0E+02	2.4E+02	--	--	--	--	--	--	5.0E+04	--	--	1.0E+02	Tap NC-Hazard
Naphthalene [PAH]	91-20-3	1.7E-01	1.7E-01	6.1E+00	2.4E+01	1.5E+01	--	4.6E+00	1.7E+02	2.0E+01	7.3E+02	1.6E+04	2.1E+01	2.1E+02	1.7E-01	Tap Canc-Risk
Nickel	7440-02-0	1.0E+02	1.2E+01	2.2E+02	5.2E+01	8.2E+00	4.6E+03	--	--	--	--	5.0E+04	--	--	8.2E+00	Aquatic Habitat
Pentachlorophenol	87-86-5	1.0E+00	4.0E-02	2.3E+01	1.5E+01	7.9E+00	8.2E+00	--	--	--	--	7.0E+03	3.0E+01	5.9E+03	1.0E+00	MCL
Perchlorate	7790-98-9	6.0E+00	--	1.0E+00	6.0E+02	--	--	--	--	--	--	5.0E+04	--	--	6.0E+00	MCL
Petroleum - Gasoline	--	7.6E+02	--	7.6E+02	4.4E+02	3.7E+03	--	--	--	--	--	5.0E+04	1.0E+02	5.0E+03	1.0E+02	Odor/Nuis
Petroleum - Stoddard Solvent	--	2.1E+02	--	2.1E+02	6.4E+02	6.4E+02	--	--	--	--	--	2.5E+03	1.0E+02	5.0E+03	1.0E+02	Odor/Nuis
Petroleum - Jet Fuel	--	2.1E+02	--	2.1E+02	6.4E+02	6.4E+02	--	--	--	--	--	2.5E+03	1.0E+02	5.0E+03	1.0E+02	Odor/Nuis
Petroleum - Diesel	--	2.0E+02	--	2.0E+02	6.4E+02	6.4E+02	--	--	--	--	--	2.5E+03	1.0E+02	5.0E+03	1.0E+02	Odor/Nuis
Petroleum - HOPs	--	4.1E+02	--	4.1E+02	5.1E+02	5.1E+02	--	--	--	--	--	5.0E+04	1.0E+02	5.0E+03	1.0E+02	Odor/Nuis
Petroleum - Motor Oil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phenanthrene [PAH]	85-01-8	--	--	--	6.3E+00	4.6E+00	--	--	--	--	--	4.1E+02	1.0E+03	1.0E+04	4.6E+00	Aquatic Habitat
Phenol	108-95-2	4.2E+03	--	4.2E+03	1.3E+03	5.8E+02	4.6E+06	--	--	--	--	5.0E+04	5.0E+00	7.9E+04	5.0E+00	Odor/Nuis
Polychlorinated biphenyls (PCBs)	1336-36-3	5.0E-01	1.9E-03	--	1.4E-02	3.0E-02	1.7E-04	2.9E-01	--	1.3E+00	--	3.5E+02	--	--	1.7E-04	Aquatic Habitat
Pyrene [PAH]	129-00-0	1.2E+02	--	1.2E+02	2.0E+00	1.5E+01	1.1E+04	--	--	--	--	7.0E+01	--	--	2.0E+00	Aquatic Habitat
Selenium	7782-49-2	5.0E+01	--	3.0E+01	5.0E+00	5.0E-01	--	--	--	--	--	5.0E+04	--	--	5.0E-01	Aquatic Habitat
Silver	7440-22-4	1.0E+02	--	9.4E+01	3.4E+00	1.9E-01	--	--	--	--	--	5.0E+04	1.0E+02	--	1.9E-01	Aquatic Habitat
Styrene	100-42-5	1.0E+01	5.0E-01	1.1E+03	--	--	--	--	8.5E+03	--	3.6E+04	5.0E+04	1.0E+01	1.1E+02	1.0E+01	Odor/Nuis
tert-Butyl alcohol	75-65-0	1.2E+01	1.2E+01	--	1.8E+04	--	--	--	--	--	--	5.0E+04	--	--	1.2E+01	Tap Canc-Risk
1,1,1,2-Tetrachloroethane	630-20-6	5.7E-01	5.7E-01	4.8E+02	9.3E+02	--	--	3.8E+00	--	1.7E+01	--	5.0E+04	--	--	5.7E-01	Tap Canc-Risk

2019 (Rev. 2)		Summary of Groundwater ESLs (µg/L)														
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table GW-1)			Aquatic Habitat Goal Levels (Table GW-2)			Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3)				Gross Contam-ination Levels (GW-4)	Odor Nuisance Levels (Table GW-5)		GW Tier 1 ESL	Basis
								Residential		Commercial/Industrial						
		MCL Priority[1]	Tapwater Cancer Risk	Tapwater Non-cancer Hazard	Fresh Water Ecotox	Saltwater Ecotox	Seafood Ingestion Human Health	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard		Drinking Water	Non-Drinking Water		
1,1,2,2-Tetrachloroethane	79-34-5	1.0E+00	7.6E-02	3.6E+02	4.2E+02	9.0E+02	1.1E+01	3.2E+00	--	1.4E+01	--	5.0E+04	5.0E+02	5.0E+03	1.0E+00	MCL
Tetrachloroethene	127-18-4	5.0E+00	6.0E-02	4.1E+01	1.2E+02	2.3E+02	8.9E+00	6.4E-01	5.8E+01	2.8E+00	2.4E+02	5.0E+04	1.7E+02	3.0E+03	6.4E-01	Vapor Intrusion
Thallium	7440-28-0	2.0E+00	--	1.0E-01	2.0E+01	2.1E+02	6.3E+00	--	--	--	--	5.0E+04	--	--	2.0E+00	MCL
Toluene	108-88-3	4.0E+01	--	1.5E+02	1.3E+02	2.5E+03	2.0E+05	--	1.2E+03	--	4.9E+03	5.0E+04	4.0E+01	4.0E+02	4.0E+01	Odor/Nuis
Toxaphene	8001-35-2	3.0E+00	3.0E-02	--	2.0E-04	2.0E-04	7.5E-04	--	--	--	--	2.8E+02	1.4E+02	1.4E+02	2.0E-04	Aquatic Habitat
1,2,4-Trichlorobenzene	120-82-1	5.0E+00	1.1E+00	4.0E+00	2.5E+01	6.5E+01	--	--	3.6E+01	--	1.5E+02	2.5E+04	3.0E+03	3.0E+04	5.0E+00	MCL
1,1,1-Trichloroethane	71-55-6	2.0E+02	--	1.0E+03	6.2E+01	3.1E+03	--	--	1.5E+03	--	6.3E+03	5.0E+04	9.7E+02	5.0E+05	6.2E+01	Aquatic Habitat
1,1,2-Trichloroethane	79-00-5	5.0E+00	2.8E-01	4.1E-01	4.7E+03	--	4.2E+01	5.2E+00	6.1E+00	2.3E+01	2.6E+01	5.0E+04	--	--	5.0E+00	MCL
Trichloroethene	79-01-6	5.0E+00	4.9E-01	2.8E+00	3.6E+02	2.0E+02	8.1E+01	1.2E+00	5.2E+00	7.5E+00	2.2E+01	5.0E+04	3.1E+02	1.0E+05	1.2E+00	Vapor Intrusion
2,4,5-Trichlorophenol	95-95-4	--	--	1.2E+03	6.3E+01	1.1E+01	--	--	--	--	--	5.0E+04	2.0E+02	2.0E+03	1.1E+01	Aquatic Habitat
2,4,6-Trichlorophenol	88-06-2	6.3E-01	6.3E-01	1.2E+01	4.9E+02	--	6.5E+00	--	--	--	--	5.0E+04	1.0E+02	1.0E+03	6.3E-01	Tap Canc-Risk
1,2,3-Trichloropropane	96-18-4	5.0E-03	7.0E-04	6.2E-01	2.7E+03	6.0E-03	--	--	2.2E+01	--	9.4E+01	5.0E+04	--	--	5.0E-03	MCL
Vanadium	7440-62-2	--	--	5.0E+01	1.9E+01	--	--	--	--	--	--	5.0E+04	--	--	1.9E+01	Aquatic Habitat
Vinyl chloride	75-01-4	5.0E-01	9.7E-03	4.4E+01	7.8E+02	--	5.3E+02	8.6E-03	9.5E+01	1.4E-01	4.0E+02	5.0E+04	3.4E+03	3.4E+04	8.6E-03	Vapor Intrusion
Xylenes	1330-20-7	2.0E+01	--	1.9E+02	--	1.0E+02	--	--	3.9E+02	--	1.6E+03	5.0E+04	2.0E+01	5.3E+03	2.0E+01	Odor/Nuis
Zinc	7440-66-6	5.0E+03	--	6.0E+03	1.2E+02	8.1E+01	--	--	--	--	--	5.0E+04	5.0E+03	--	8.1E+01	Aquatic Habitat

Notes:

1 - "MCL Priority" lists all available MCL values. If no MCL values are available, the lower of the cancer and noncancer tapwater direct exposure levels is listed.

- Cadium (Soil) - No groundwater values are listed since groundwater ESLs only apply to dissolved chemicals.

- Petroleum Motor Oil is composed of large carbon chain compounds (C24-C36+) having negligible solubility. Detections in water samples typically are Petroleum HOPs, nonaqueous phase liquid (NAPL or free product), contaminated sediment entrained in the water sample, or naturally occurring compounds. Review the chromatograms to help determine the nature of the compounds being detected. See User's Guide Chapter 4.

Abbreviations:

Canc - Cancer
Contam - Contamination
DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethene
DDT - Dichlorodiphenyltrichloroethane
HOPs - Hydrocarbon Oxidation Products (biodegradation metabolites and photo-oxidation products of petroleum hydrocarbons). See User's Guide Chapter 4 for further information.
MCL - Maximum Contaminant Level
NC - Noncancer
Odor/Nuis - Odor Nuisance
PAH - Polycyclic aromatic hydrocarbon
Tap - Tapwater
TCDD - Tetrachlorodibenzodioxin

2019 (Rev. 2)	Summary of Soil ESLs (mg/kg)																
		Direct Exposure Human Health Risk Levels (Table S-1)						Terrestrial Habitat Levels (Table S-2)		Leaching to Groundwater Levels (Table S-3)			Odor Nuisance Levels (Table S-5)				
Chemicals	CAS No.	Residential: Shallow Soil Exposure		Commerical/ Industrial: Shallow Soil Exposure		Construction Worker: Any Land Use/ Any Depth Soil Exposure		Significantly Vegetated Area	Minimally Vegetated Area	Drinking Water	Non-drinking Water	Gross Contamination Levels (Table S-4)	Res: Shallow Soil Exposure	Com/Ind: Shallow Soil Exposure	Any Land Use: Any Soil Exposure (CW)	Soil Tier 1 ESL	Basis
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Examples: Parkland or single family homes with yards	Examples: High density residential or commercial/ industrial areas								
Acenaphthene [PAH]	83-32-9	--	3.6E+03	--	4.5E+04	--	1.0E+04	6.6E+03	4.6E+04	1.2E+01	1.2E+01	1.2E+02	1.0E+03	2.5E+03	2.5E+03	1.2E+01	Leaching
Acenaphthylene [PAH]	208-96-8	--	--	--	--	--	--	--	--	6.4E+00	6.4E+00	5.9E+01	5.0E+02	1.0E+03	1.0E+03	6.4E+00	Leaching
Acetone	67-64-1	--	6.1E+04	--	6.7E+05	--	2.7E+05	5.6E+01	5.6E+01	9.2E-01	9.2E-01	1.1E+05	5.0E+02	1.0E+03	1.0E+03	9.2E-01	Leaching
Aldrin	309-00-2	3.5E-02	2.1E+00	1.5E-01	2.9E+01	1.0E+00	7.4E+00	2.4E-03	1.0E-01	8.4E+00	8.4E+00	8.4E+00	1.0E+03	2.5E+03	2.5E+03	2.4E-03	Terr Habitat
Anthracene [PAH]	120-12-7	--	1.8E+04	--	2.3E+05	--	5.0E+04	3.1E+00	4.0E+01	1.9E+00	1.9E+00	4.1E+00	5.0E+02	1.0E+03	1.0E+03	1.9E+00	Leaching
Antimony	7440-36-0	--	1.1E+01	--	1.6E+02	--	5.0E+01	2.5E+01	5.0E+01	--	--	--	--	--	--	1.1E+01	NC-Hazard
Arsenic	7440-38-2	6.7E-02	2.6E-01	3.1E-01	3.6E+00	2.0E+00	9.8E-01	2.5E+01	5.0E+01	--	--	--	--	--	--	6.7E-02	Canc-Risk
Barium	7440-39-3	--	1.5E+04	--	2.2E+05	--	3.0E+03	3.9E+02	6.7E+02	--	--	--	--	--	--	3.9E+02	Terr Habitat
Benzene	71-43-2	3.3E-01	1.1E+01	1.4E+00	4.7E+01	3.3E+01	4.5E+01	6.0E+01	3.1E+02	2.5E-02	2.5E-02	1.9E+03	5.0E+02	1.0E+03	1.0E+03	2.5E-02	Leaching
Benzo[a]anthracene [PAH]	56-55-3	1.1E+00	--	2.0E+01	--	1.1E+02	--	6.3E-01	1.3E+00	1.0E+01	1.0E+01	1.0E+01	5.0E+02	1.0E+03	1.0E+03	6.3E-01	Terr Habitat
Benzo[a]pyrene [PAH]	50-32-8	1.1E-01	1.8E+01	2.1E+00	2.2E+02	1.1E+01	1.0E+01	2.5E+01	9.0E+01	5.7E+00	5.7E+00	5.7E+00	5.0E+02	1.0E+03	1.0E+03	1.1E-01	Canc-Risk
Benzo[b]fluoranthene [PAH]	205-99-2	1.1E+00	--	2.1E+01	--	1.1E+02	--	--	--	5.4E+00	7.5E+01	5.4E+00	5.0E+02	1.0E+03	1.0E+03	1.1E+00	Canc-Risk
Benzo[g,h,i]perylene [PAH]	191-24-2	--	--	--	--	--	--	8.3E+00	1.7E+01	2.7E+01	2.7E+01	2.5E+00	5.0E+02	1.0E+03	1.0E+03	2.5E+00	Gross Contam
Benzo[k]fluoranthene [PAH]	207-08-9	1.1E+01	--	2.1E+02	--	9.1E+02	--	9.5E+00	1.9E+01	4.8E+00	3.9E+01	2.8E+00	5.0E+02	1.0E+03	1.0E+03	2.8E+00	Gross Contam
Beryllium	7440-41-7	1.6E+03	1.6E+01	6.9E+03	2.3E+02	1.8E+02	2.7E+01	5.0E+00	1.0E+01	--	--	--	--	--	--	5.0E+00	Terr Habitat
1,1-Biphenyl	92-52-4	6.8E+01	4.7E+01	2.9E+02	2.0E+02	1.7E+03	1.8E+02	--	--	4.2E-01	4.2E+00	2.3E+02	5.0E+02	1.0E+03	1.0E+03	4.2E-01	Leaching
Bis(2-chloroethyl) ether	111-44-4	1.0E-01	--	4.7E-01	--	6.4E+00	--	--	--	3.4E-05	3.1E-02	5.0E+03	5.0E+02	1.0E+03	1.0E+03	3.4E-05	Leaching
Bis(2-chloro-1-methylethyl) ether	108-60-1	5.0E+00	3.1E+03	2.3E+01	4.7E+04	2.7E+02	1.4E+04	--	--	5.1E-03	8.7E-01	1.0E+03	5.0E+02	1.0E+03	1.0E+03	5.1E-03	Leaching
Bis(2-ethylhexyl) phthalate	117-81-7	3.9E+01	1.3E+03	1.6E+02	1.6E+04	9.5E+02	3.8E+03	8.0E-01	3.5E+01	1.9E+02	6.4E+02	1.9E+02	5.0E+02	1.0E+03	1.0E+03	8.0E-01	Terr Habitat
Boron	7440-42-8	--	1.6E+04	--	2.3E+05	--	4.5E+04	1.2E+02	1.2E+02	--	--	--	--	--	--	1.2E+02	Terr Habitat
Bromodichloromethane	75-27-4	2.9E-01	1.6E+03	1.3E+00	2.3E+04	2.8E+01	7.1E+03	--	--	1.6E-02	1.6E-02	9.3E+02	1.0E+03	2.5E+03	2.5E+03	1.6E-02	Leaching
Bromoform (Tribromomethane)	75-25-2	1.8E+01	1.6E+03	8.0E+01	2.3E+04	1.2E+03	7.1E+03	--	--	6.9E-01	1.0E+00	9.2E+02	5.0E+02	1.0E+03	1.0E+03	6.9E-01	Leaching
Bromomethane	74-83-9	--	6.9E+00	--	3.0E+01	--	2.9E+01	--	--	3.6E-01	8.3E-01	3.5E+03	5.0E+02	1.0E+03	1.0E+03	3.6E-01	Leaching
Cadmium (soil)	7440-43-9	9.1E+02	7.8E+01	4.0E+03	1.1E+03	1.1E+02	5.1E+01	1.9E+00	1.9E+00	--	--	--	--	--	--	1.9E+00	Terr Habitat
Cadmium (water)	7440-43-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	56-23-5	6.2E-01	5.3E+01	2.7E+00	2.5E+02	5.3E+01	2.2E+02	7.3E+00	1.5E+01	7.6E-02	7.6E-02	4.5E+02	5.0E+02	1.0E+03	1.0E+03	7.6E-02	Leaching
Chlordane	12789-03-6	4.8E-01	3.6E+01	2.2E+00	5.0E+02	1.4E+01	1.3E+02	8.5E-03	8.5E-03	2.3E+01	2.3E+01	2.3E+01	1.0E+03	2.5E+03	2.5E+03	8.5E-03	Terr Habitat
p-Chloroaniline	106-47-8	3.5E+00	3.1E+02	1.6E+01	4.7E+03	1.2E+02	1.4E+03	2.5E+01	5.0E+01	6.7E-03	9.1E-02	3.0E+03	5.0E+02	1.0E+03	1.0E+03	6.7E-03	Leaching
Chlorobenzene	108-90-7	--	2.7E+02	--	1.3E+03	--	1.2E+03	7.5E+00	1.5E+01	1.4E+00	1.4E+00	7.5E+02	5.0E+02	1.0E+03	1.0E+03	1.4E+00	Leaching
Chloroethane	75-00-3	--	1.4E+04	--	5.9E+04	--	5.9E+04	--	--	1.2E+00	1.2E+01	2.1E+03	5.0E+02	1.0E+03	1.0E+03	1.2E+00	Leaching
Chloroform	67-66-3	3.2E-01	2.0E+02	1.4E+00	1.0E+03	3.4E+01	8.6E+02	4.3E+01	8.5E+01	2.3E-02	2.3E-02	2.6E+03	5.0E+02	1.0E+03	1.0E+03	2.3E-02	Leaching
Chloromethane	74-87-3	--	1.1E+02	--	4.7E+02	--	4.7E+02	--	--	1.1E+01	1.5E+01	1.3E+03	1.0E+02	5.0E+02	5.0E+02	1.1E+01	Leaching
2-Chlorophenol	95-57-8	--	3.9E+02	--	5.8E+03	--	1.8E+03	2.0E+00	3.9E+00	1.2E-02	1.2E-01	2.7E+04	1.0E+02	5.0E+02	5.0E+02	1.2E-02	Leaching
Chromium (total)	7440-47-3	--	--	--	--	--	--	1.6E+02	1.6E+02	--	--	--	--	--	--	1.6E+02	Terr Habitat
Chromium III	16065-83-1	--	1.2E+05	--	1.8E+06	--	5.3E+05	--	--	--	--	--	--	--	--	1.2E+05	NC-Hazard
Chromium VI	18540-29-9	3.0E-01	2.3E+02	6.2E+00	3.5E+03	2.8E+00	4.0E+02	1.0E+01	1.0E+01	--	--	--	--	--	--	3.0E-01	Canc-Risk
Chrysene [PAH]	218-01-9	1.1E+02	--	2.1E+03	--	9.1E+03	--	8.8E+00	1.8E+01	2.2E+00	1.0E+01	2.2E+00	5.0E+02	1.0E+03	1.0E+03	2.2E+00	Leaching
Cobalt	7440-48-4	4.2E+02	2.3E+01	1.9E+03	3.5E+02	4.9E+01	2.8E+01	5.0E+01	1.0E+02	--	--	--	--	--	--	2.3E+01	NC-Hazard
Copper	7440-50-8	--	3.1E+03	--	4.7E+04	--	1.4E+04	1.8E+02	3.0E+02	--	--	--	--	--	--	1.8E+02	Terr Habitat
Cyanide	57-12-5	--	5.5E+00	--	2.5E+01	--	2.2E+01	1.1E-01	1.1E-01	3.4E-03	3.4E-03	1.9E+04	1.0E+02	5.0E+02	5.0E+02	3.4E-03	Leaching
Dibenz[a,h]anthracene [PAH]	53-70-3	1.1E-01	--	2.1E+00	--	1.1E+01	--	--	--	2.9E+01	3.9E+02	2.9E+01	5.0E+02	1.0E+03	1.0E+03	1.1E-01	Canc-Risk
Dibromochloromethane	124-48-1	8.3E+00	1.6E+03	3.9E+01	2.3E+04	2.9E+02	7.1E+03	--	--	3.5E-01	1.1E+01	8.0E+02	1.0E+02	5.0E+02	5.0E+02	3.5E-01	Leaching
1,2-dibromo-3-chloropropane	96-12-8	4.4E-03	4.8E+00	5.9E-02	2.6E+01	1.1E+00	2.0E+01	--	--	5.9E-04	5.9E-04	9.9E+02	5.0E+02	1.0E+03	1.0E+03	5.9E-04	Leaching
1,2-Dibromoethane	106-93-4	3.6E-02	7.2E+00	1.6E-01	3.0E+01	3.3E+00	3.0E+01	--	--	5.3E-04	1.9E-03	1.3E+03	5.0E+02	1.0E+03	1.0E+03	5.3E-04	Leaching

2019 (Rev. 2)		Summary of Soil ESLs (mg/kg)															
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table S-1)						Terrestrial Habitat Levels (Table S-2)		Leaching to Groundwater Levels (Table S-3)		Gross Contamination Levels (Table S-4)	Odor Nuisance Levels (Table S-5)			Soil Tier 1 ESL	Basis
		Residential: Shallow Soil Exposure		Commerical/ Industrial: Shallow Soil Exposure		Construction Worker: Any Land Use/ Any Depth Soil Exposure		Significantly Vegetated Area	Minimally Vegetated Area	Drinking Water	Non-drinking Water		Res: Shallow Soil Exposure	Com/Ind: Shallow Soil Exposure	Any Land Use: Any Soil Exposure (CW)		
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Examples: Parkland or single family homes with yards	Examples: High density residential or commercial/ industrial areas								
1,2-Dichlorobenzene	95-50-1	--	1.8E+03	--	9.4E+03	--	7.8E+03	4.3E+00	8.5E+00	1.0E+00	1.0E+00	3.8E+02	1.0E+03	2.5E+03	2.5E+03	1.0E+00	Leaching
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	6.0E+00	1.2E+01	7.4E+00	7.4E+00	6.1E+02	1.0E+02	5.0E+02	5.0E+02	6.0E+00	Terr Habitat
1,4-Dichlorobenzene	106-46-7	2.6E+00	3.4E+03	1.2E+01	2.6E+04	2.8E+02	1.5E+04	4.5E+00	9.0E+00	2.0E-01	2.0E-01	1.9E+02	5.0E+02	1.0E+03	1.0E+03	2.0E-01	Leaching
3,3-Dichlorobenzidine	91-94-1	5.8E-01	--	2.7E+00	--	2.0E+01	--	--	--	2.5E-02	1.3E+02	6.0E+01	5.0E+02	1.0E+03	1.0E+03	2.5E-02	Leaching
DDD	72-54-8	2.7E+00	--	1.2E+01	--	8.1E+01	--	8.5E+00	1.7E+01	6.5E+01	6.5E+01	6.5E+01	5.0E+02	1.0E+03	1.0E+03	2.7E+00	Canc-Risk
DDE	72-55-9	1.8E+00	--	8.3E+00	--	5.7E+01	--	3.3E-01	6.5E-01	2.9E+01	2.9E+01	2.9E+01	5.0E+02	1.0E+03	1.0E+03	3.3E-01	Terr Habitat
DDT	50-29-3	1.9E+00	3.7E+01	8.5E+00	5.2E+02	5.7E+01	1.4E+02	1.1E-03	7.8E+00	5.6E+00	5.6E+00	5.6E+00	5.0E+02	1.0E+03	1.0E+03	1.1E-03	Terr Habitat
1,1-Dichloroethane	75-34-3	3.6E+00	1.6E+04	1.6E+01	2.3E+05	3.7E+02	7.1E+04	1.1E+01	2.1E+01	2.0E-01	3.1E-01	1.7E+03	5.0E+02	1.0E+03	1.0E+03	2.0E-01	Leaching
1,2-Dichloroethane	107-06-2	4.7E-01	3.2E+01	2.1E+00	1.4E+02	4.5E+01	1.3E+02	2.9E+01	2.9E+01	7.0E-03	3.1E-02	3.0E+03	1.0E+02	5.0E+02	5.0E+02	7.0E-03	Leaching
1,1-Dichloroethene	75-35-4	--	8.3E+01	--	3.5E+02	--	3.5E+02	4.3E+01	1.3E+02	5.4E-01	4.2E+00	1.2E+03	5.0E+02	1.0E+03	1.0E+03	5.4E-01	Leaching
cis-1,2-Dichloroethene	156-59-2	--	1.9E+01	--	8.5E+01	--	7.8E+01	8.4E+01	9.4E+02	1.9E-01	1.6E+00	2.4E+03	1.0E+02	5.0E+02	5.0E+02	1.9E-01	Leaching
trans-1,2-Dichloroethene	156-60-5	--	1.3E+02	--	6.0E+02	--	5.7E+02	8.4E+01	9.4E+02	6.5E-01	1.4E+01	1.9E+03	5.0E+02	1.0E+03	1.0E+03	6.5E-01	Leaching
2,4-Dichlorophenol	120-83-2	--	2.3E+02	--	3.5E+03	--	1.1E+03	2.1E+00	--	7.5E-03	7.5E-02	5.6E+03	5.0E+02	1.0E+03	1.0E+03	7.5E-03	Leaching
1,2-Dichloropropane	78-87-5	1.0E+00	1.6E+01	4.4E+00	6.6E+01	9.9E+01	6.6E+01	3.1E+01	6.3E+01	6.5E-02	6.5E-02	1.4E+03	1.0E+02	5.0E+02	5.0E+02	6.5E-02	Leaching
1,3-Dichloropropene	542-75-6	5.7E-01	7.2E+01	2.5E+00	3.1E+02	5.3E+01	3.0E+02	3.1E+01	6.3E+01	1.7E-02	4.0E-02	1.6E+03	5.0E+02	1.0E+03	1.0E+03	1.7E-02	Leaching
Dieldrin	60-57-1	3.7E-02	3.5E+00	1.6E-01	4.8E+01	1.1E+00	1.2E+01	9.6E-04	1.1E-01	4.6E-04	6.3E-03	2.4E+01	5.0E+02	1.0E+03	1.0E+03	4.6E-04	Leaching
Diethyl phthalate	84-66-2	--	5.1E+04	--	6.6E+05	--	1.5E+05	1.3E+01	2.7E+01	2.5E-02	2.5E-02	7.7E+02	5.0E+02	1.0E+03	1.0E+03	2.5E-02	Leaching
Dimethyl phthalate	131-11-3	--	--	--	--	--	--	2.1E+01	4.2E+01	3.5E-02	3.5E-02	4.7E+03	5.0E+02	1.0E+03	1.0E+03	3.5E-02	Leaching
2,4-Dimethylphenol	105-67-9	--	1.6E+03	--	2.3E+04	--	7.1E+03	--	--	8.1E+00	8.9E+00	2.4E+04	1.0E+02	5.0E+02	5.0E+02	8.1E+00	Leaching
2,4-Dinitrophenol	51-28-5	--	1.6E+02	--	2.3E+03	--	7.1E+02	--	--	3.0E+00	5.7E+00	8.0E+03	5.0E+02	1.0E+03	1.0E+03	3.0E+00	Leaching
2,4-Dinitrotoluene	121-14-2	2.2E+00	1.6E+02	1.1E+01	2.3E+03	7.9E+01	7.1E+02	--	--	2.3E-02	1.1E+01	7.2E+02	5.0E+02	1.0E+03	1.0E+03	2.3E-02	Leaching
1,4-Dioxane	123-91-1	4.7E+00	8.1E+02	2.2E+01	4.5E+03	2.1E+02	3.4E+03	1.8E+00	1.8E+00	1.7E-04	8.4E-01	1.2E+05	5.0E+02	1.0E+03	1.0E+03	1.7E-04	Leaching
Dioxin (2,3,7,8-TCDD)	1746-01-6	4.8E-06	5.1E-05	2.2E-05	7.2E-04	1.5E-04	2.0E-04	1.3E-05	9.9E-05	3.0E-01	3.0E-01	3.0E-01	5.0E+02	1.0E+03	1.0E+03	4.8E-06	Canc-Risk
Endosulfan	115-29-7	--	4.2E+02	--	5.8E+03	--	1.5E+03	2.3E-02	3.8E-01	9.8E-03	9.8E-03	1.3E+01	5.0E+02	1.0E+03	1.0E+03	9.8E-03	Leaching
Endrin	72-20-8	--	2.1E+01	--	2.9E+02	--	7.4E+01	1.1E-03	1.1E-03	7.6E-03	7.6E-03	3.0E+01	5.0E+02	1.0E+03	1.0E+03	1.1E-03	Terr Habitat
Ethylbenzene	100-41-4	5.9E+00	3.4E+03	2.6E+01	2.1E+04	5.4E+02	1.5E+04	9.0E+01	4.3E+02	4.3E-01	4.3E-01	4.9E+02	5.0E+02	1.0E+03	1.0E+03	4.3E-01	Leaching
Fluoranthene [PAH]	206-44-0	--	2.4E+03	--	3.0E+04	--	6.7E+03	6.9E-01	1.2E+05	8.6E+01	8.6E+01	8.6E+01	5.0E+02	1.0E+03	1.0E+03	6.9E-01	Terr Habitat
Fluorene [PAH]	86-73-7	--	2.4E+03	--	3.0E+04	--	6.7E+03	--	--	6.0E+00	6.0E+00	9.4E+01	5.0E+02	1.0E+03	1.0E+03	6.0E+00	Leaching
Heptachlor	76-44-8	1.2E-01	3.5E+01	5.3E-01	4.8E+02	3.7E+00	1.2E+02	2.5E-01	5.0E-01	4.4E+01	4.4E+01	4.4E+01	1.0E+03	2.5E+03	2.5E+03	1.2E-01	Canc-Risk
Heptachlor epoxide	1024-57-3	6.2E-02	9.1E-01	2.8E-01	1.3E+01	1.9E+00	3.2E+00	--	--	1.8E-04	6.0E-03	1.2E+01	1.0E+03	2.5E+03	2.5E+03	1.8E-04	Leaching
Hexachlorobenzene	118-74-1	1.8E-01	5.6E+01	7.8E-01	7.7E+02	7.7E+00	2.0E+02	1.3E+02	2.5E+02	8.0E-04	8.2E-02	2.3E-01	5.0E+02	1.0E+03	1.0E+03	8.0E-04	Leaching
Hexachlorobutadiene	87-68-3	1.2E+00	7.8E+01	5.3E+00	1.2E+03	1.0E+02	3.5E+02	--	--	2.8E-02	6.2E-02	1.7E+01	5.0E+02	1.0E+03	1.0E+03	2.8E-02	Leaching
g-Hexachlorocyclohexane (Lindane)	58-89-9	5.5E-01	2.1E+01	2.5E+00	2.9E+02	1.6E+01	7.4E+01	7.4E+00	1.5E+01	7.4E-03	7.4E-03	1.2E+02	5.0E+02	1.0E+03	1.0E+03	7.4E-03	Leaching
Hexachloroethane	67-72-1	1.8E+00	3.8E+01	7.8E+00	3.7E+02	1.3E+02	1.2E+02	--	--	1.9E-02	9.2E-02	6.7E+01	5.0E+02	1.0E+03	1.0E+03	1.9E-02	Leaching
Indeno[1,2,3-c,d]pyrene [PAH]	193-39-5	1.1E+00	--	2.1E+01	--	1.1E+02	--	4.8E-01	9.5E-01	1.6E+01	3.2E+01	2.3E+00	5.0E+02	1.0E+03	1.0E+03	4.8E-01	Terr Habitat
Lead	7439-92-1	8.2E+01	8.0E+01	3.8E+02	3.2E+02	2.7E+03	1.6E+02	3.2E+01	3.2E+01	--	--	--	--	--	--	3.2E+01	Terr Habitat
Mercury (elemental)	7439-97-6	--	1.3E+01	--	1.9E+02	--	4.4E+01	1.5E+01	2.0E+01	--	--	--	5.0E+02	1.0E+03	1.0E+03	1.3E+01	NC-Hazard
Methoxychlor	72-43-5	--	3.5E+02	--	4.8E+03	--	1.2E+03	1.3E-01	4.1E+03	1.3E-02	1.3E-02	1.6E+01	5.0E+02	1.0E+03	1.0E+03	1.3E-02	Leaching
Methylene chloride	75-09-2	1.9E+00	3.1E+02	2.5E+01	2.5E+03	4.9E+02	1.4E+03	9.8E-01	2.0E+00	1.2E-01	1.9E-01	3.3E+03	5.0E+02	1.0E+03	1.0E+03	1.2E-01	Leaching
Methyl ethyl ketone	78-93-3	--	2.7E+04	--	2.0E+05	--	1.2E+05	4.4E+01	8.8E+01	6.1E+00	1.5E+01	2.8E+04	5.0E+02	1.0E+03	1.0E+03	6.1E+00	Leaching
Methyl isobutyl ketone	108-10-1	--	3.4E+04	--	1.4E+05	--	1.4E+05	--	--	3.6E-01	5.1E-01	3.4E+03	1.0E+02	5.0E+02	5.0E+02	3.6E-01	Leaching
Methyl mercury	22967-92-6	--	6.3E+00	--	8.2E+01	--	1.9E+01	3.4E-02	3.4E-02	--	--	--	1.0E+02	5.0E+02	5.0E+02	3.4E-02	Terr Habitat
2-Methylnaphthalene	91-57-6	--	2.4E+02	--	3.0E+03	--	6.7E+02	--	--	8.8E-01	8.8E-01	3.8E+02	5.0E+02	1.0E+03	1.0E+03	8.8E-01	Leaching
Methyl tertiary butyl ether (MTBE)	1634-04-4	4.7E+01	1.6E+04	2.1E+02	6.6E+04	4.1E+03	6.5E+04	3.1E+01	6.3E+01	2.8E-02	2.5E+00	9.0E+03	1.0E+02	5.0E+02	5.0E+02	2.8E-02	Leaching

2019 (Rev. 2)	Summary of Soil ESLs (mg/kg)																
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table S-1)						Terrestrial Habitat Levels (Table S-2)		Leaching to Groundwater Levels (Table S-3)		Gross Contamination Levels (Table S-4)	Odor Nuisance Levels (Table S-5)			Soil Tier 1 ESL	Basis
		Residential: Shallow Soil Exposure		Commerical/ Industrial: Shallow Soil Exposure		Construction Worker: Any Land Use/ Any Depth Soil Exposure		Significantly Vegetated Area	Minimally Vegetated Area	Drinking Water	Non-drinking Water		Res: Shallow Soil Exposure	Com/Ind: Shallow Soil Exposure	Any Land Use: Any Soil Exposure (CW)		
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Examples: Parkland or single family homes with yards	Examples: High density residential or commercial/ industrial areas								
Molybdenum	7439-98-7	--	3.9E+02	--	5.8E+03	--	1.8E+03	6.9E+00	4.0E+01	--	--	--	--	--	--	6.9E+00	Terr Habitat
Naphthalene [PAH]	91-20-3	3.8E+00	1.3E+02	1.7E+01	5.8E+02	4.0E+02	5.0E+02	7.5E-01	2.8E+01	4.2E-02	1.2E+00	2.8E+02	5.0E+02	1.0E+03	1.0E+03	4.2E-02	Leaching
Nickel	7440-02-0	1.5E+04	8.2E+02	6.4E+04	1.1E+04	1.7E+03	8.6E+01	1.3E+02	3.4E+02	--	--	--	--	--	--	8.6E+01	NC-Hazard
Pentachlorophenol	87-86-5	1.0E+00	2.5E+02	4.0E+00	2.8E+03	2.0E+01	5.6E+02	1.3E-02	3.9E+01	9.8E-02	7.7E-01	5.1E+01	5.0E+02	1.0E+03	1.0E+03	1.3E-02	Terr Habitat
Perchlorate	7790-98-9	--	5.5E+01	--	8.2E+02	--	2.5E+02	--	--	--	--	--	--	--	--	5.5E+01	NC-Hazard
Petroleum - Gasoline	--	--	4.3E+02	--	2.0E+03	--	1.8E+03	1.2E+02	1.2E+02	1.1E+03	4.9E+03	1.0E+03	1.0E+02	5.0E+02	5.0E+02	1.0E+02	Odor/Nuis
Petroleum - Stoddard Solvent	--	--	2.6E+02	--	1.4E+03	--	1.1E+03	2.6E+02	2.6E+02	1.3E+03	8.0E+03	2.3E+03	1.0E+02	5.0E+02	5.0E+02	1.0E+02	Odor/Nuis
Petroleum - Jet Fuel	--	--	2.7E+02	--	1.4E+03	--	1.1E+03	2.6E+02	2.6E+02	1.3E+03	8.0E+03	2.3E+03	1.0E+02	5.0E+02	5.0E+02	1.0E+02	Odor/Nuis
Petroleum - Diesel	--	--	2.6E+02	--	1.2E+03	--	1.1E+03	2.6E+02	2.6E+02	1.1E+03	7.3E+03	2.3E+03	5.0E+02	1.0E+03	1.0E+03	2.6E+02	NC-Hazard
Petroleum - HOPs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum - Motor Oil	--	--	1.2E+04	--	1.8E+05	--	5.4E+04	1.6E+03	1.6E+03	--	--	5.1E+03	--	--	--	1.6E+03	Terr Habitat
Phenanthrene [PAH]	85-01-8	--	--	--	--	--	--	7.8E+00	1.6E+01	1.1E+01	1.1E+01	6.9E+01	5.0E+02	1.0E+03	1.0E+03	7.8E+00	Terr Habitat
Phenol	108-95-2	--	2.3E+04	--	3.5E+05	--	9.8E+04	9.4E+00	9.4E+00	1.6E-01	1.8E+01	1.0E+05	5.0E+02	1.0E+03	1.0E+03	1.6E-01	Leaching
Polychlorinated biphenyls (PCBs)	1336-36-3	2.3E-01	--	9.4E-01	--	5.5E+00	--	1.1E+00	1.1E+00	3.3E+02	3.3E+02	3.3E+02	5.0E+02	1.0E+03	1.0E+03	2.3E-01	Canc-Risk
Pyrene [PAH]	129-00-0	--	1.8E+03	--	2.3E+04	--	5.0E+03	4.7E+03	9.9E+04	4.5E+01	4.5E+01	4.5E+01	5.0E+02	1.0E+03	1.0E+03	4.5E+01	Leaching
Selenium	7782-49-2	--	3.9E+02	--	5.8E+03	--	1.7E+03	2.4E+00	5.5E+00	--	--	--	--	--	--	2.4E+00	Terr Habitat
Silver	7440-22-4	--	3.9E+02	--	5.8E+03	--	1.8E+03	2.5E+01	5.0E+01	--	--	--	--	--	--	2.5E+01	Terr Habitat
Styrene	100-42-5	--	5.7E+03	--	3.3E+04	--	2.5E+04	2.2E+01	4.3E+01	9.2E-01	1.0E+01	8.7E+02	5.0E+02	1.0E+03	1.0E+03	9.2E-01	Leaching
tert-Butyl alcohol	75-65-0	--	--	--	--	--	--	--	--	7.5E-02	1.1E+02	3.2E+05	1.0E+02	5.0E+02	5.0E+02	7.5E-02	Leaching
1,1,1,2-Tetrachloroethane	630-20-6	2.0E+00	2.3E+03	8.9E+00	3.5E+04	1.9E+02	1.1E+04	--	--	1.7E-02	1.1E-01	7.0E+02	1.0E+02	5.0E+02	5.0E+02	1.7E-02	Leaching
1,1,2,2-Tetrachloroethane	79-34-5	6.1E-01	1.6E+03	2.7E+00	2.3E+04	4.9E+01	7.1E+03	--	--	1.8E-02	5.8E-02	1.9E+03	5.0E+02	1.0E+03	1.0E+03	1.8E-02	Leaching
Tetrachloroethene	127-18-4	5.9E-01	8.2E+01	2.7E+00	3.9E+02	3.3E+01	3.5E+02	4.5E+00	4.3E+01	8.0E-02	8.0E-02	1.7E+02	5.0E+02	1.0E+03	1.0E+03	8.0E-02	Leaching
Thallium	7440-28-0	--	7.8E-01	--	1.2E+01	--	3.5E+00	1.8E+00	4.5E+00	--	--	--	--	--	--	7.8E-01	NC-Hazard
Toluene	108-88-3	--	1.1E+03	--	5.3E+03	--	4.7E+03	1.4E+02	6.6E+02	3.2E+00	1.0E+01	8.1E+02	5.0E+02	1.0E+03	1.0E+03	3.2E+00	Leaching
Toxaphene	8001-35-2	5.1E-01	--	2.2E+00	--	1.4E+01	--	--	--	2.5E+02	2.5E+02	2.5E+02	5.0E+02	1.0E+03	1.0E+03	5.1E-01	Canc-Risk
1,2,4-Trichlorobenzene	120-82-1	2.4E+01	5.9E+01	1.1E+02	2.6E+02	8.5E+02	2.4E+02	1.6E+01	3.0E+01	1.2E+00	6.0E+00	4.2E+02	5.0E+02	1.0E+03	1.0E+03	1.2E+00	Leaching
1,1,1-Trichloroethane	71-55-6	--	1.7E+03	--	7.3E+03	--	7.2E+03	2.2E+01	4.4E+01	7.0E+00	7.0E+00	6.5E+02	5.0E+02	1.0E+03	1.0E+03	7.0E+00	Leaching
1,1,2-Trichloroethane	79-00-5	1.2E+00	1.5E+00	5.1E+00	6.4E+00	1.1E+02	6.3E+00	1.0E+02	2.0E+02	7.6E-02	7.9E-02	2.2E+03	1.0E+02	5.0E+02	5.0E+02	7.6E-02	Leaching
Trichloroethene	79-01-6	9.5E-01	4.2E+00	6.1E+00	1.9E+01	1.3E+02	1.8E+01	8.1E+00	2.5E+02	8.5E-02	8.5E-02	7.0E+02	5.0E+02	1.0E+03	1.0E+03	8.5E-02	Leaching
2,4,5-Trichlorophenol	95-95-4	--	7.8E+03	--	1.2E+05	--	3.5E+04	5.5E+00	1.0E+01	2.9E+00	2.9E+00	1.2E+04	5.0E+02	1.0E+03	1.0E+03	2.9E+00	Leaching
2,4,6-Trichlorophenol	88-06-2	9.9E+00	7.8E+01	4.7E+01	1.2E+03	3.5E+02	3.5E+02	5.5E+00	1.0E+01	4.0E-02	3.1E+01	1.9E+03	1.0E+02	5.0E+02	5.0E+02	4.0E-02	Leaching
1,2,3-Trichloropropane	96-18-4	2.3E-02	4.9E+00	1.1E-01	2.1E+01	8.3E-01	2.0E+01	--	--	1.1E-04	1.3E-04	1.4E+03	1.0E+02	5.0E+02	5.0E+02	1.1E-04	Leaching
Vanadium	7440-62-2	--	3.9E+02	--	5.8E+03	--	4.7E+02	1.8E+01	1.8E+01	--	--	--	--	--	--	1.8E+01	Terr Habitat
Vinyl chloride	75-01-4	8.3E-03	7.0E+01	1.5E-01	3.8E+02	3.4E+00	3.0E+02	4.3E+00	8.5E+00	1.5E-03	1.5E-03	3.9E+03	5.0E+02	1.0E+03	1.0E+03	1.5E-03	Leaching
Xylenes	1330-20-7	--	5.8E+02	--	2.5E+03	--	2.4E+03	5.5E+01	2.1E+02	2.1E+00	1.0E+01	2.7E+02	5.0E+02	1.0E+03	1.0E+03	2.1E+00	Leaching
Zinc	7440-66-6	--	2.3E+04	--	3.5E+05	--	1.1E+05	3.4E+02	3.4E+02	--	--	--	--	--	--	3.4E+02	Terr Habitat

Notes:

- Cadmium (Water): Groundwater levels do not apply to cadmium in soil so no soil level are listed.
- Petroleum - HOPs: Soil ESLs have not been developed at this time.

Abbreviations:

Canc - Cancer
Com/Ind - Commercial/Industrial
Contam - Contamination
CW - Construction Worker
DDD - Dichlorodiphenyldichloroethane

2019 (Rev. 2)		Summary of Soil ESLs (mg/kg)															
Chemicals	CAS No.	Direct Exposure Human Health Risk Levels (Table S-1)						Terrestrial Habitat Levels (Table S-2)		Leaching to Groundwater Levels (Table S-3)		Gross Contamination Levels (Table S-4)	Odor Nuisance Levels (Table S-5)			Soil Tier 1 ESL	Basis
		Residential: Shallow Soil Exposure		Commerical/ Industrial: Shallow Soil Exposure		Construction Worker: Any Land Use/ Any Depth Soil Exposure		Significantly Vegetated Area	Minimally Vegetated Area	Drinking Water	Non-drinking Water		Res: Shallow Soil Exposure	Com/Ind: Shallow Soil Exposure	Any Land Use: Any Soil Exposure (CW)		
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard	Examples: Parkland or single family homes with yards	Examples: High density residential or commercial/ industrial areas								

DDE - Dichlorodiphenyldichloroethene
DDT - Dichlorodiphenyltrichloroethane
Exp - Exposure
HOPs - Hydrocarbon Oxidation Products (biodegradation metabolites and photo-oxidation products of petroleum hydrocarbons). See User's Guide Chapter 4 for further information.
NC - Noncancer
Odor/Nuis - Odor Nuisance
PAH - Polycyclic aromatic hydrocarbon
Res - Residential
TCDD - Tetrachlorodibenzodioxin
Terr - Terrestrial

2019 (Rev. 2)		Summary of Vapor ESLs													
		Subslab/ Soil Gas (µg/m^3)							Indoor Air (µg/m^3)						
Chemicals	CAS No.	Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels (Table SG-1)				Subslab/ Soil Gas Vapor Intrusion: Odor Nuisance Levels (Table SG-2)	Tier 1 ESL	Basis	Direct Exposure Human Health Risk Levels (Table IA-1)				Odor Nuisance Levels (Table IA-2)	Tier 1 ESL	Basis
		Residential		Commercial/ Industrial					Residential		Commercial/ Industrial				
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard				Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard			
Acenaphthene [PAH]	83-32-9	--	--	--	--	1.7E+04	1.7E+04	Odor/Nuis	--	--	--	--	5.1E+02	5.1E+02	Nuis/Odor
Acenaphthylene [PAH]	208-96-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Acetone	67-64-1	--	1.1E+06	--	4.5E+06	1.0E+06	1.0E+06	Odor/Nuis	--	3.2E+04	--	1.4E+05	3.1E+04	3.1E+04	Nuis/Odor
Aldrin	309-00-2	1.9E-02	--	8.3E-02	--	8.8E+03	1.9E-02	Canc-Risk	5.7E-04	--	2.5E-03	--	2.6E+02	5.7E-04	Canc-Risk
Anthracene [PAH]	120-12-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Antimony	7440-36-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Arsenic	7440-38-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Barium	7440-39-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzene	71-43-2	3.2E+00	1.0E+02	1.4E+01	4.4E+02	1.6E+05	3.2E+00	Canc-Risk	9.7E-02	3.1E+00	4.2E-01	1.3E+01	4.9E+03	9.7E-02	Canc-Risk
Benzo[a]anthracene [PAH]	56-55-3	3.1E-01	--	3.7E+00	--	--	3.1E-01	Canc-Risk	9.2E-03	--	1.1E-01	--	--	9.2E-03	Canc-Risk
Benzo[a]pyrene [PAH]	50-32-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[b]fluoranthene [PAH]	205-99-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[g,h,i]perylene [PAH]	191-24-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Benzo[k]fluoranthene [PAH]	207-08-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Beryllium	7440-41-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Biphenyl	92-52-4	--	1.4E+01	--	5.8E+01	2.0E+03	1.4E+01	NC-Hazard	--	4.2E-01	--	1.8E+00	6.0E+01	4.2E-01	NC-Hazard
Bis(2-chloroethyl) ether	111-44-4	1.3E-01	--	5.8E-01	--	9.6E+03	1.3E-01	Canc-Risk	4.0E-03	--	1.7E-02	--	2.9E+02	4.0E-03	Canc-Risk
Bis(2-chloro-1-methylethyl) ether	108-60-1	9.4E+00	--	4.1E+01	--	7.5E+04	9.4E+00	Canc-Risk	2.8E-01	--	1.2E+00	--	2.2E+03	2.8E-01	Canc-Risk
Bis(2-ethylhexyl) phthalate	117-81-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Boron	7440-42-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromodichloromethane	75-27-4	2.5E+00	--	1.1E+01	--	3.7E+08	2.5E+00	Canc-Risk	7.6E-02	--	3.3E-01	--	1.1E+07	7.6E-02	Canc-Risk
Bromoform (Tribromomethane)	75-25-2	8.5E+01	--	3.7E+02	--	4.5E+05	8.5E+01	Canc-Risk	2.6E+00	--	1.1E+01	--	1.3E+04	2.6E+00	Canc-Risk
Bromomethane	74-83-9	--	1.7E+02	--	7.3E+02	2.7E+06	1.7E+02	NC-Hazard	--	5.2E+00	--	2.2E+01	8.0E+04	5.2E+00	NC-Hazard
Cadmium (soil)	7440-43-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cadmium (water)	7440-43-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Carbon tetrachloride	56-23-5	1.6E+01	1.4E+03	6.8E+01	5.8E+03	2.1E+06	1.6E+01	Canc-Risk	4.7E-01	4.2E+01	2.0E+00	1.8E+02	6.3E+04	4.7E-01	Canc-Risk
Chlordane	12789-03-6	2.8E-01	2.4E+01	1.2E+00	1.0E+02	2.8E+02	2.8E-01	Canc-Risk	8.3E-03	7.3E-01	3.6E-02	3.1E+00	8.4E+00	8.3E-03	Canc-Risk
p-Chloroaniline	106-47-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chlorobenzene	108-90-7	--	1.7E+03	--	7.3E+03	3.3E+04	1.7E+03	NC-Hazard	--	5.2E+01	--	2.2E+02	1.0E+03	5.2E+01	NC-Hazard
Chloroethane	75-00-3	--	3.5E+05	--	1.5E+06	1.3E+07	3.5E+05	NC-Hazard	--	1.0E+04	--	4.4E+04	3.8E+05	1.0E+04	NC-Hazard
Chloroform	67-66-3	4.1E+00	3.4E+03	1.8E+01	1.4E+04	1.4E+07	4.1E+00	Canc-Risk	1.2E-01	1.0E+02	5.3E-01	4.3E+02	4.2E+05	1.2E-01	Canc-Risk
Chloromethane	74-87-3	--	3.1E+03	--	1.3E+04	--	3.1E+03	NC-Hazard	--	9.4E+01	--	3.9E+02	--	9.4E+01	NC-Hazard
2-Chlorophenol	95-57-8	--	--	--	--	6.3E+02	6.3E+02	Odor/Nuis	--	--	--	--	1.9E+01	1.9E+01	Nuis/Odor

2019 (Rev. 2)		Summary of Vapor ESLs													
		Subslab/ Soil Gas (µg/m^3)							Indoor Air (µg/m^3)						
Chemicals	CAS No.	Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels (Table SG-1)				Subslab/ Soil Gas Vapor Intrusion: Odor Nuisance Levels (Table SG-2)	Tier 1 ESL	Basis	Direct Exposure Human Health Risk Levels (Table IA-1)				Odor Nuisance Levels (Table IA-2)	Tier 1 ESL	Basis
		Residential		Commercial/ Industrial					Residential		Commercial/ Industrial				
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard				Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard			
Chromium (total)	7440-47-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium III	16065-83-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chromium VI	18540-29-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Chrysene [PAH]	218-01-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cobalt	7440-48-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Copper	7440-50-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide	57-12-5	--	2.8E+01	--	1.2E+02	2.2E+04	2.8E+01	NC-Hazard	--	8.3E-01	--	3.5E+00	6.5E+02	8.3E-01	NC-Hazard
Dibenz[a,h]anthracene [PAH]	53-70-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dibromochloromethane	124-48-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-dibromo-3-chloropropane	96-12-8	5.6E-03	7.0E+00	6.8E-02	2.9E+01	--	5.6E-03	Canc-Risk	1.7E-04	2.1E-01	2.0E-03	8.8E-01	--	1.7E-04	Canc-Risk
1,2-Dibromoethane	106-93-4	1.6E-01	2.8E+01	6.8E-01	1.2E+02	6.7E+06	1.6E-01	Canc-Risk	4.7E-03	8.3E-01	2.0E-02	3.5E+00	2.0E+05	4.7E-03	Canc-Risk
1,2-Dichlorobenzene	95-50-1	--	7.0E+03	--	2.9E+04	1.0E+07	7.0E+03	NC-Hazard	--	2.1E+02	--	8.8E+02	3.1E+05	2.1E+02	NC-Hazard
1,3-Dichlorobenzene	541-73-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	106-46-7	8.5E+00	2.8E+04	3.7E+01	1.2E+05	3.7E+04	8.5E+00	Canc-Risk	2.6E-01	8.3E+02	1.1E+00	3.5E+03	1.1E+03	2.6E-01	Canc-Risk
3,3-Dichlorobenzidine	91-94-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DDD	72-54-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DDE	72-55-9	9.6E-01	--	4.2E+00	--	--	9.6E-01	Canc-Risk	2.9E-02	--	1.3E-01	--	--	2.9E-02	Canc-Risk
DDT	50-29-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethane	75-34-3	5.8E+01	--	2.6E+02	--	4.2E+06	5.8E+01	Canc-Risk	1.8E+00	--	7.7E+00	--	1.3E+05	1.8E+00	Canc-Risk
1,2-Dichloroethane	107-06-2	3.6E+00	2.4E+02	1.6E+01	1.0E+03	8.1E+04	3.6E+00	Canc-Risk	1.1E-01	7.3E+00	4.7E-01	3.1E+01	2.4E+03	1.1E-01	Canc-Risk
1,1-Dichloroethene	75-35-4	--	2.4E+03	--	1.0E+04	6.7E+07	2.4E+03	NC-Hazard	--	7.3E+01	--	3.1E+02	2.0E+06	7.3E+01	NC-Hazard
cis-1,2-Dichloroethene	156-59-2	--	2.8E+02	--	1.2E+03	--	2.8E+02	NC-Hazard	--	8.3E+00	--	3.5E+01	--	8.3E+00	NC-Hazard
trans-1,2-Dichloroethene	156-60-5	--	2.8E+03	--	1.2E+04	2.2E+06	2.8E+03	NC-Hazard	--	8.3E+01	--	3.5E+02	6.7E+04	8.3E+01	NC-Hazard
2,4-Dichlorophenol	120-83-2	--	--	--	--	4.7E+04	4.7E+04	Odor/Nuis	--	--	--	--	1.4E+03	1.4E+03	Nuis/Odor
1,2-Dichloropropane	78-87-5	9.4E+00	1.4E+02	4.1E+01	5.8E+02	4.0E+04	9.4E+00	Canc-Risk	2.8E-01	4.2E+00	1.2E+00	1.8E+01	1.2E+03	2.8E-01	Canc-Risk
1,3-Dichloropropene	542-75-6	5.8E+00	7.0E+02	2.6E+01	2.9E+03	1.4E+05	5.8E+00	Canc-Risk	1.8E-01	2.1E+01	7.7E-01	8.8E+01	4.2E+03	1.8E-01	Canc-Risk
Dieldrin	60-57-1	2.0E-02	--	8.9E-02	--	--	2.0E-02	Canc-Risk	6.1E-04	--	2.7E-03	--	--	6.1E-04	Canc-Risk
Diethyl phthalate	84-66-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dimethyl phthalate	131-11-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dimethylphenol	105-67-9	--	--	--	--	3.3E+01	3.3E+01	Odor/Nuis	--	--	--	--	1.0E+00	1.0E+00	Nuis/Odor
2,4-Dinitrophenol	51-28-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4-Dinitrotoluene	121-14-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane	123-91-1	1.2E+01	1.0E+03	5.3E+01	4.4E+03	2.0E+07	1.2E+01	Canc-Risk	3.6E-01	3.1E+01	1.6E+00	1.3E+02	6.1E+05	3.6E-01	Canc-Risk

2019 (Rev. 2)		Summary of Vapor ESLs													
		Subslab/ Soil Gas (µg/m^3)							Indoor Air (µg/m^3)						
Chemicals	CAS No.	Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels (Table SG-1)				Subslab/ Soil Gas Vapor Intrusion: Odor Nuisance Levels (Table SG-2)	Tier 1 ESL	Basis	Direct Exposure Human Health Risk Levels (Table IA-1)				Odor Nuisance Levels (Table IA-2)	Tier 1 ESL	Basis
		Residential		Commercial/ Industrial					Residential		Commercial/ Industrial				
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard				Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard			
Dioxin (2,3,7,8-TCDD)	1746-01-6	2.5E-06	1.4E-03	1.1E-05	5.8E-03	--	2.5E-06	Canc-Risk	7.4E-08	4.2E-05	3.2E-07	1.8E-04	--	7.4E-08	Canc-Risk
Endosulfan	115-29-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Endrin	72-20-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethylbenzene	100-41-4	3.7E+01	3.5E+04	1.6E+02	1.5E+05	6.7E+04	3.7E+01	Canc-Risk	1.1E+00	1.0E+03	4.9E+00	4.4E+03	2.0E+03	1.1E+00	Canc-Risk
Fluoranthene [PAH]	206-44-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fluorene [PAH]	86-73-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Heptachlor	76-44-8	7.2E-02	--	3.1E-01	--	1.0E+04	7.2E-02	Canc-Risk	2.2E-03	--	9.4E-03	--	3.0E+02	2.2E-03	Canc-Risk
Heptachlor epoxide	1024-57-3	3.6E-02	--	1.6E-01	--	1.0E+04	3.6E-02	Canc-Risk	1.1E-03	--	4.7E-03	--	3.0E+02	1.1E-03	Canc-Risk
Hexachlorobenzene	118-74-1	1.8E-01	--	8.0E-01	--	--	1.8E-01	Canc-Risk	5.5E-03	--	2.4E-02	--	--	5.5E-03	Canc-Risk
Hexachlorobutadiene	87-68-3	4.3E+00	--	1.9E+01	--	4.0E+05	4.3E+00	Canc-Risk	1.3E-01	--	5.6E-01	--	1.2E+04	1.3E-01	Canc-Risk
g-Hexachlorocyclohexane (Lindane)	58-89-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachloroethane	67-72-1	8.5E+00	1.0E+03	3.7E+01	4.4E+03	--	8.5E+00	Canc-Risk	2.6E-01	3.1E+01	1.1E+00	1.3E+02	--	2.6E-01	Canc-Risk
Indeno[1,2,3-c,d]pyrene [PAH]	193-39-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Lead	7439-92-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Mercury (elemental)	7439-97-6	--	1.0E+00	--	4.4E+00	--	1.0E+00	NC-Hazard	--	3.1E-02	--	1.3E-01	--	3.1E-02	NC-Hazard
Methoxychlor	72-43-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methylene chloride	75-09-2	3.4E+01	1.4E+04	4.1E+02	5.8E+04	1.9E+07	3.4E+01	Canc-Risk	1.0E+00	4.2E+02	1.2E+01	1.8E+03	5.6E+05	1.0E+00	Canc-Risk
Methyl ethyl ketone	78-93-3	--	1.7E+05	--	7.3E+05	1.1E+06	1.7E+05	NC-Hazard	--	5.2E+03	--	2.2E+04	3.2E+04	5.2E+03	NC-Hazard
Methyl isobutyl ketone	108-10-1	--	1.0E+05	--	4.4E+05	1.4E+04	1.4E+04	Odor/Nuis	--	3.1E+03	--	1.3E+04	4.2E+02	4.2E+02	Nuis/Odor
Methyl mercury	22967-92-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	91-57-6	--	--	--	--	2.3E+03	2.3E+03	Odor/Nuis	--	--	--	--	6.8E+01	6.8E+01	Nuis/Odor
Methyl tertiary butyl ether (MTBE)	1634-04-4	3.6E+02	1.0E+05	1.6E+03	4.4E+05	1.8E+04	3.6E+02	Canc-Risk	1.1E+01	3.1E+03	4.7E+01	1.3E+04	5.3E+02	1.1E+01	Canc-Risk
Molybdenum	7439-98-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Naphthalene [PAH]	91-20-3	2.8E+00	1.0E+02	1.2E+01	4.4E+02	1.5E+04	2.8E+00	Canc-Risk	8.3E-02	3.1E+00	3.6E-01	1.3E+01	4.4E+02	8.3E-02	Canc-Risk
Nickel	7440-02-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Pentachlorophenol	87-86-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Perchlorate	7790-98-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum - Gasoline	--	--	2.0E+04	--	8.3E+04	3.3E+03	3.3E+03	Odor/Nuis	--	6.0E+02	--	2.5E+03	1.0E+02	1.0E+02	Nuis/Odor
Petroleum - Stoddard Solvent	--	--	1.1E+04	--	4.6E+04	3.3E+04	1.1E+04	NC-Hazard	--	3.3E+02	--	1.4E+03	1.0E+03	3.3E+02	NC-Hazard
Petroleum - Jet Fuel	--	--	1.1E+04	--	4.6E+04	3.3E+04	1.1E+04	NC-Hazard	--	3.3E+02	--	1.4E+03	1.0E+03	3.3E+02	NC-Hazard
Petroleum - Diesel	--	--	8.9E+03	--	3.7E+04	3.3E+04	8.9E+03	NC-Hazard	--	2.7E+02	--	1.1E+03	1.0E+03	2.7E+02	NC-Hazard
Petroleum - HOPs	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Petroleum - Motor Oil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

2019 (Rev. 2)		Summary of Vapor ESLs													
		Subslab/ Soil Gas (µg/m^3)							Indoor Air (µg/m^3)						
Chemicals	CAS No.	Subslab/Soil Gas Vapor Intrusion: Human Health Risk Levels (Table SG-1)				Subslab/ Soil Gas Vapor Intrusion: Odor Nuisance Levels (Table SG-2)	Tier 1 ESL	Basis	Direct Exposure Human Health Risk Levels (Table IA-1)				Odor Nuisance Levels (Table IA-2)	Tier 1 ESL	Basis
		Residential		Commercial/ Industrial					Residential		Commercial/ Industrial				
		Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard				Cancer Risk	Non-cancer Hazard	Cancer Risk	Non-cancer Hazard			
Phenanthrene [PAH]	85-01-8	--	--	--	--	1.8E+03	1.8E+03	Odor/Nuis	--	--	--	--	5.5E+01	5.5E+01	Nuis/Odor
Phenol	108-95-2	--	--	--	--	5.2E+03	5.2E+03	Odor/Nuis	--	--	--	--	1.6E+02	1.6E+02	Nuis/Odor
Polychlorinated biphenyls (PCBs)	1336-36-3	1.6E-01	--	7.2E-01	--	--	1.6E-01	Canc-Risk	4.9E-03	--	2.2E-02	--	--	4.9E-03	Canc-Risk
Pyrene [PAH]	129-00-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Selenium	7782-49-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Silver	7440-22-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Styrene	100-42-5	--	3.1E+04	--	1.3E+05	4.5E+04	3.1E+04	NC-Hazard	--	9.4E+02	--	3.9E+03	1.4E+03	9.4E+02	NC-Hazard
tert-Butyl alcohol	75-65-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1,2-Tetrachloroethane	630-20-6	1.3E+01	--	5.5E+01	--	--	1.3E+01	Canc-Risk	3.8E-01	--	1.7E+00	--	--	3.8E-01	Canc-Risk
1,1,2,2-Tetrachloroethane	79-34-5	1.6E+00	--	7.0E+00	--	3.5E+05	1.6E+00	Canc-Risk	4.8E-02	--	2.1E-01	--	1.0E+04	4.8E-02	Canc-Risk
Tetrachloroethene	127-18-4	1.5E+01	1.4E+03	6.7E+01	5.8E+03	1.1E+06	1.5E+01	Canc-Risk	4.6E-01	4.2E+01	2.0E+00	1.8E+02	3.2E+04	4.6E-01	Canc-Risk
Thallium	7440-28-0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	108-88-3	--	1.0E+04	--	4.4E+04	1.0E+06	1.0E+04	NC-Hazard	--	3.1E+02	--	1.3E+03	3.0E+04	3.1E+02	NC-Hazard
Toxaphene	8001-35-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2,4-Trichlorobenzene	120-82-1	--	7.0E+01	--	2.9E+02	7.3E+05	7.0E+01	NC-Hazard	--	2.1E+00	--	8.8E+00	2.2E+04	2.1E+00	NC-Hazard
1,1,1-Trichloroethane	71-55-6	--	3.5E+04	--	1.5E+05	2.2E+06	3.5E+04	NC-Hazard	--	1.0E+03	--	4.4E+03	6.5E+04	1.0E+03	NC-Hazard
1,1,2-Trichloroethane	79-00-5	5.8E+00	7.0E+00	2.6E+01	2.9E+01	--	5.8E+00	Canc-Risk	1.8E-01	2.1E-01	7.7E-01	8.8E-01	--	1.8E-01	Canc-Risk
Trichloroethene	79-01-6	1.6E+01	7.0E+01	1.0E+02	2.9E+02	4.5E+07	1.6E+01	Canc-Risk	4.8E-01	2.1E+00	3.0E+00	8.8E+00	1.4E+06	4.8E-01	Canc-Risk
2,4,5-Trichlorophenol	95-95-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2,4,6-Trichlorophenol	88-06-2	--	--	--	--	1.0E+01	1.0E+01	Odor/Nuis	--	--	--	--	3.0E-01	3.0E-01	Nuis/Odor
1,2,3-Trichloropropane	96-18-4	--	1.0E+01	--	4.4E+01	--	1.0E+01	NC-Hazard	--	3.1E-01	--	1.3E+00	--	3.1E-01	NC-Hazard
Vanadium	7440-62-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	75-01-4	3.2E-01	3.5E+03	5.2E+00	1.5E+04	2.6E+07	3.2E-01	Canc-Risk	9.5E-03	1.0E+02	1.6E-01	4.4E+02	7.7E+05	9.5E-03	Canc-Risk
Xylenes	1330-20-7	--	3.5E+03	--	1.5E+04	1.5E+04	3.5E+03	NC-Hazard	--	1.0E+02	--	4.4E+02	4.4E+02	1.0E+02	NC-Hazard
Zinc	7440-66-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Abbreviations:
Canc-Risk - Cancer
DDD - Dichlorodiphenyldichloroethane
DDE - Dichlorodiphenyldichloroethene
DDT - Dichlorodiphenyltrichloroethane
HOPs - Hydrocarbon Oxidation Products (biodegradation metabolites and photo-oxidation products of petroleum hydrocarbons). See User's Guide Chapter 4 for further information.
NC - Noncancer
Odor/Nuis - Odor Nuisance
PAH - Polycyclic aromatic hydrocarbon
TCDD - Tetrachlorodibenzodioxin

2019 (Rev. 2)	Short-Term Action Levels for Trichloroethene (TCE)						
Land Use	**Groundwater Trigger Level (µg/L)**	**Subslab/ Soil Gas Trigger Level ($µg/m^3$)**	**Trigger Level Response Action**	**Indoor Air Accelerated Response Level ($µg/m^3$)**	**Accelerated Response Action**	**Indoor Air Urgent Response Level ($µg/m^3$)**	**Urgent Response Action**
Residential	5.0E+00	6.7E+01	Expedite Indoor Air Sampling	2.0E+00	Mitigation* within Weeks	6.0E+00	Mitigation* within Days
Commercial	2.0E+01	2.7E+02		8.0E+00		2.4E+01	

Notes:

User's Guide Chapter 6 presents the basis for the short-term action levels for TCE in groundwater, soil gas, and indoor air.

Also see the USEPA Region 9 Memorandum Response Action Levels and Recommendations to Address Near-Term Inhalation Exposures to TCE in Air from Subsurface Vapor Intrusion (USEPA 2014d).

***Mitigation** - Responses include but are not limited to the following:

- Residential: prompt mitigation such as increasing ventilation, sealing potential conduits, or treating indoor air
- Commercial: prompt mitigation such as increasing use of HVAC (e.g., increasing outdoor air intake, increasing building pressurization), sealing potential conduits, or treating indoor air

APPENDIX C
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL CLEAN IMPORTED FILL MATERIAL INFORMATION ADVISORY

SOIL MANAGEMENT PLAN
407 Spreckels Avenue
Manteca, California

Farallon PN: 1071-133

Information Advisory
Clean Imported Fill Material

October 2001

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

It is DTSC's mission to restore, protect and enhance the environment, to ensure public health, environmental quality and economic vitality, by regulating hazardous waste, conducting and overseeing cleanups, and developing and promoting pollution prevention.

State of California

California Environmental Protection Agency

Executive Summary

This fact sheet has been prepared to ensure that inappropriate fill material is not introduced onto sensitive land use properties under the oversight of the DTSC or applicable regulatory authorities. Sensitive land use properties include those that contain facilities such as hospitals, homes, day care centers, and schools. This document only focuses on human health concerns and ecological issues are not addressed. It identifies those types of land use activities that may be appropriate when determining whether a site may be used as a fill material source area. It also provides guidelines for the appropriate types of analyses that should be performed relative to the former land use, and for the number of samples that should be collected and analyzed based on the estimated volume of fill material that will need to be used. The information provided in this fact sheet is not regulatory in nature, rather is to be used as a guide, and in most situations the final decision as to the acceptability of fill material for a sensitive land use property is made on a case-by-case basis by the appropriate regulatory agency.

Introduction

The use of imported fill material has recently come under scrutiny because of the instances where contaminated soil has been brought onto an otherwise clean site. However, there are currently no established standards in the statutes or regulations that address environmental requirements for imported fill material. Therefore, the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) has prepared this fact sheet to identify procedures that can be used to minimize the possibility of introducing contaminated soil onto a site that requires imported fill material. Such sites include those that are undergoing site remediation, corrective action, and closure activities overseen by DTSC or the appropriate regulatory agency. These procedures may also apply to construction projects that will result in sensitive land uses. The intent of this fact sheet is to protect people who live on or otherwise use a sensitive land use property. By using this fact sheet as a guide, the reader will minimize the chance of introducing fill material that may result in potential risk to human health or the environment at some future time.

Overview

Both natural and manmade fill materials are used for a variety of purposes. Fill material properties are commonly controlled to meet the necessary site specific engineering specifications. Because most sites requiring fill material are located in or near urban areas, the fill materials are often obtained from construction projects that generate an excess of soil, and from demolition debris (asphalt, broken concrete, etc.). However, materials from those types of sites may or may not be appropriate, depending on the proposed use of the fill, and the quality of the assessment and/or mitigation measures, if necessary. Therefore, unless material from construction projects can be demonstrated to be free of contamination and/or appropriate for the proposed use, the use of that material as fill should be avoided.

Selecting Fill Material

In general, the fill source area should be located in nonindustrial areas, and not from sites undergoing an environmental cleanup. Nonindustrial sites include those that were previously undeveloped, or used solely for residential or agricultural purposes. If the source is from an agricultural area, care should be taken to insure that the fill does not include former agricultural waste process byproducts such as manure or other decomposed organic material. Undesirable sources of fill material include industrial and/or commercial sites where hazardous ma-

Potential Contaminants Based on the Fill Source Area

Fill Source:	Target Compounds
Land near to an existing freeway	Lead (EPA methods 6010B or 7471A), PAHs (EPA method 8310)
Land near a mining area or rock quarry	Heavy Metals (EPA methods 6010B and 7471A), asbestos (polarized light microscopy), pH
Agricultural land	Pesticides (Organochlorine Pesticides: EPA method 8081A or 8080A; Organophosphorus Pesticides: EPA method 8141A; Chlorinated Herbicides: EPA method 8151A), heavy metals (EPA methods 6010B and 7471A)
Residential/acceptable commercial land	VOCs (EPA method 8021 or 8260B, as appropriate and combined with collection by EPA Method 5035), semi-VOCs (EPA method 8270C), TPH (modified EPA method 8015), PCBs (EPA method 8082 or 8080A), heavy metals including lead (EPA methods 6010B and 7471A), asbestos (OSHA Method ID-191)

**The recommended analyses should be performed in accordance with USEPA SW-846 methods (1996). Other possible analyses include Hexavalent Chromium: EPA method 7199*

Recommended Fill Material Sampling Schedule

Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every 1/2 acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	**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

terials were used, handled or stored as part of the business operations, or unpaved parking areas where petroleum hydrocarbons could have been spilled or leaked into the soil. Undesirable commercial sites include former gasoline service stations, retail strip malls that contained dry cleaners or photographic processing facilities, paint stores, auto repair and/or painting facilities. Undesirable industrial facilities include metal processing shops, manufacturing facilities, aerospace facilities, oil refineries, waste treatment plants, etc. Alternatives to using fill from construction sites include the use of fill material obtained from a commercial supplier of fill material or from soil pits in rural or suburban areas. However, care should be taken to ensure that those materials are also uncontaminated.

Documentation and Analysis

In order to minimize the potential of introducing contaminated fill material onto a site, it is necessary to verify through documentation that the fill source is appropriate and/or to have the fill material analyzed for potential contaminants based on the location and history of the source area. Fill documentation should include detailed information on the previous use of the land from where the fill is taken, whether an environmental site assessment was performed and its findings, and the results of any testing performed. It is recommended that any such documentation should be signed by an appropriately licensed (CA-registered) individual. If such documentation is not available or is inadequate, samples of the fill material should be chemically analyzed. Analysis of the fill material should be based on the source of the fill and knowledge of the prior land use.

Detectable amounts of compounds of concern within the fill material should be evaluated for risk in accordance with the DTSC Preliminary Endangerment Assessment (PEA) Guidance Manual. If

metal analyses are performed, only those metals (CAM 17 / Title 22) to which risk levels have been assigned need to be evaluated. At present, the DTSC is working to establish California Screening Levels (CSL) to determine whether some compounds of concern pose a risk. Until such time as these CSL values are established, DTSC recommends that the DTSC PEA Guidance Manual or an equivalent process be referenced. This guidance may include the Regional Water Quality Control Board's (RWQCB) guidelines for reuse of non-hazardous petroleum hydrocarbon contaminated soil as applied to Total Petroleum Hydrocarbons (TPH) only. The RWQCB guidelines should not be used for volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCS). In addition, a standard laboratory data package, including a summary of the QA/QC (Quality Assurance/Quality Control) sample results should also accompany all analytical reports.

When possible, representative samples should be collected at the borrow area while the potential fill material is still in place, and analyzed prior to removal from the borrow area. In addition to performing the appropriate analyses of the fill material, an appropriate number of samples should also be determined based on the approximate volume or area of soil to be used as fill material. The table above can be used as a guide to determine the number of samples needed to adequately characterize the fill material when sampled at the borrow site.

Alternative Sampling

A Phase I or PEA may be conducted prior to sampling to determine whether the borrow area may have been impacted by previous activities on the property. After the property has been evaluated, any sampling that may be required can be determined during a meeting with DTSC or appropriate regulatory agency. However, if it is not possible to analyze the fill material at the borrow area or determine that it is appropriate for use via a Phase I or PEA, it is recommended that one (1) sample per truckload be collected and analyzed for all compounds of concern to ensure that the imported soil is uncontaminated and acceptable. (See chart on Potential Contaminants Based on the Fill Source Area for appropriate analyses). This sampling frequency may be modified upon consultation with the DTSC or appropriate regulatory agency if all of the fill material is derived from a common borrow area. However, fill material that is not characterized at the borrow area will need to be stockpiled either on or off-site until the analyses have been completed. In addition, should contaminants exceeding acceptance criteria be identified in the stockpiled fill material, that material will be deemed unacceptable and new fill material will need to be obtained, sampled and analyzed. Therefore, the DTSC recommends that all sampling and analyses should be completed prior to delivery to the site to ensure the soil is free of contamination, and to eliminate unnecessary transportation charges for unacceptable fill material.

Composite sampling for fill material characterization may or may not be appropriate, depending on quality and homogeneity of source/borrow area, and compounds of concern. Compositing samples for volatile and semivolatile constituents is not acceptable. Composite sampling for heavy metals, pesticides, herbicides or PAH's from unanalyzed stockpiled soil is also unacceptable, unless it is stockpiled at the borrow area and originates from the same source area. In addition, if samples are composited, they should be from the same soil layer, and not from different soil layers.

When very large volumes of fill material are anticipated, or when larger areas are being considered as borrow areas, the DTSC recommends that a Phase I or PEA be conducted on the area to ensure that the borrow area has not been impacted by previous activities on the property. After the property has been evaluated, any sampling that may be required can be determined during a meeting with the DTSC.

For further information, call Richard Coffman, Ph.D., R.G., at (818) 551-2175.