Appendix A

Notice of Preparation - Scoping Comments

CITY OF REDONDO BEACH

Community Development Department

NOTICE OF PREPARATION

DATE: March 25, 2021

PROJECT TITLE: 100-132 North Catalina Avenue Project
Environmental Assessment Number: EIR-2021-01

PROJECT LOCATION: The 100-132 North Catalina Avenue Project site is located at 100, 112, 116, 124, 126, and 132 North Catalina Avenue in the city of Redondo Beach

PROJECT APPLICANT: Catalina Fund, LLC
1221 Hermosa Avenue, Suite 101
Hermosa Beach, California 90254

PROJECT APPLICANT: City of Redondo Beach
415 Diamond Street
Redondo Beach, California 90277

The City of Redondo Beach (City) is the lead agency and, after conducting an Initial Study for the 100-132 North Catalina Avenue Project (project), has determined that it will prepare an Environmental Impact Report. In compliance with Section 15082 of the California Environmental Quality (CEQA) Guidelines, the City of Redondo Beach is sending this Notice of Preparation (NOP) to responsible agencies, interested parties, and trustee agencies responsible for natural resources that may be affected by the project.

PROJECT LOCATION AND ENVIRONMENTAL SETTING

The project site encompasses 54,739 square feet (sf), or approximately 1.26 acres, and consists of six adjacent parcels. The project site is bordered by North Catalina Avenue to the west, commercial buildings and Diamond Street to the north, residential buildings and North Broadway to the east, and Emerald Street to the south.

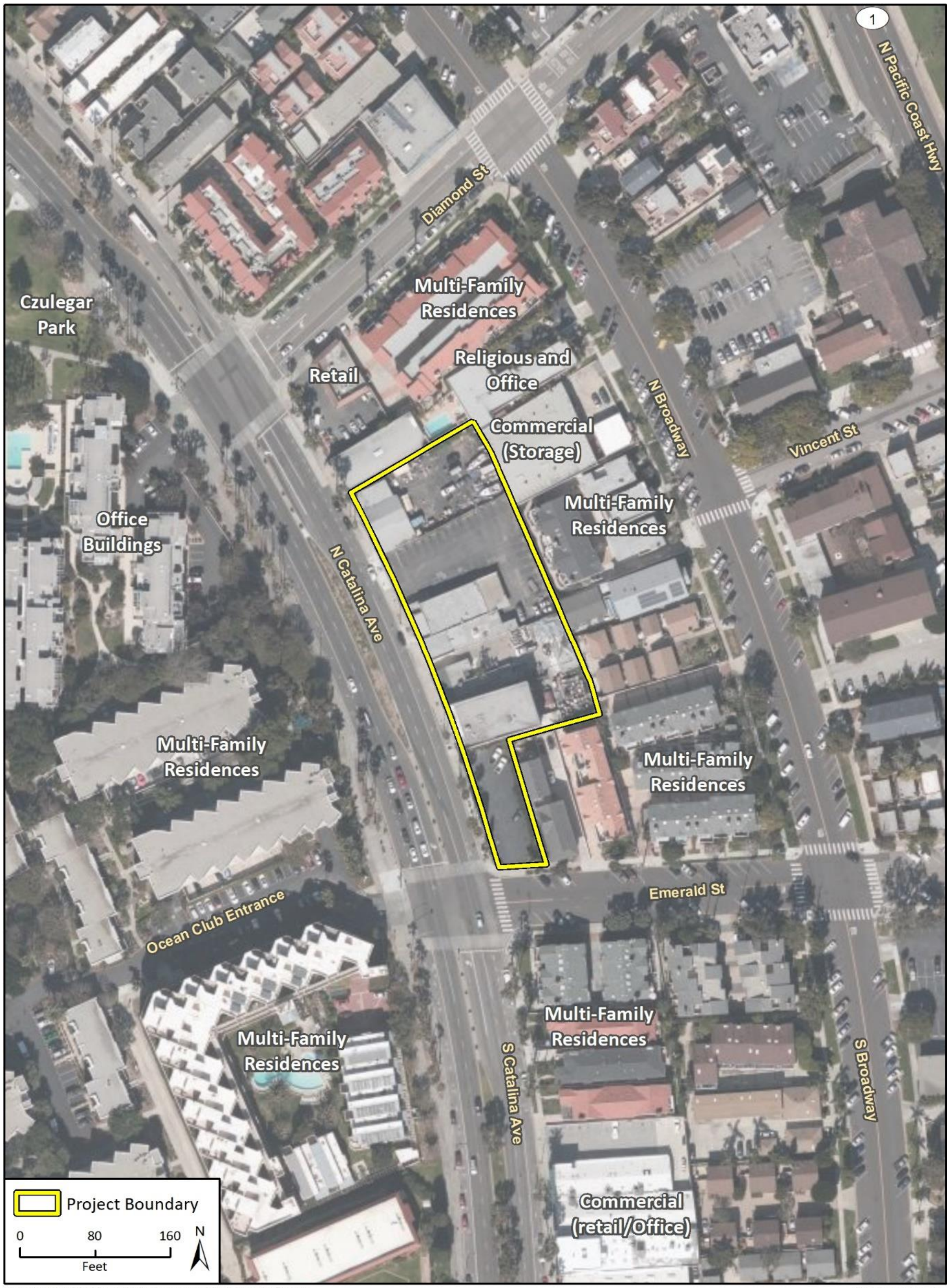

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Fig 2 Project Location

PROJECT SUMMARY

The project involves the demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue; the rehabilitation and re-use of the buildings between 124 and 132 North Catalina Avenue for commercial uses (i.e., coffee shop and tasting room); adaptive re-use of the building at 112 North Catalina Avenue for residential use; and the demolition of the shed located at the rear end of 116 North Catalina Avenue. The project also involves the construction of 22 three-story townhomes, four units in the former Masonic Lodge building and four units in a new three-story apartment building, for a combined total of 30 residential units on the project site.

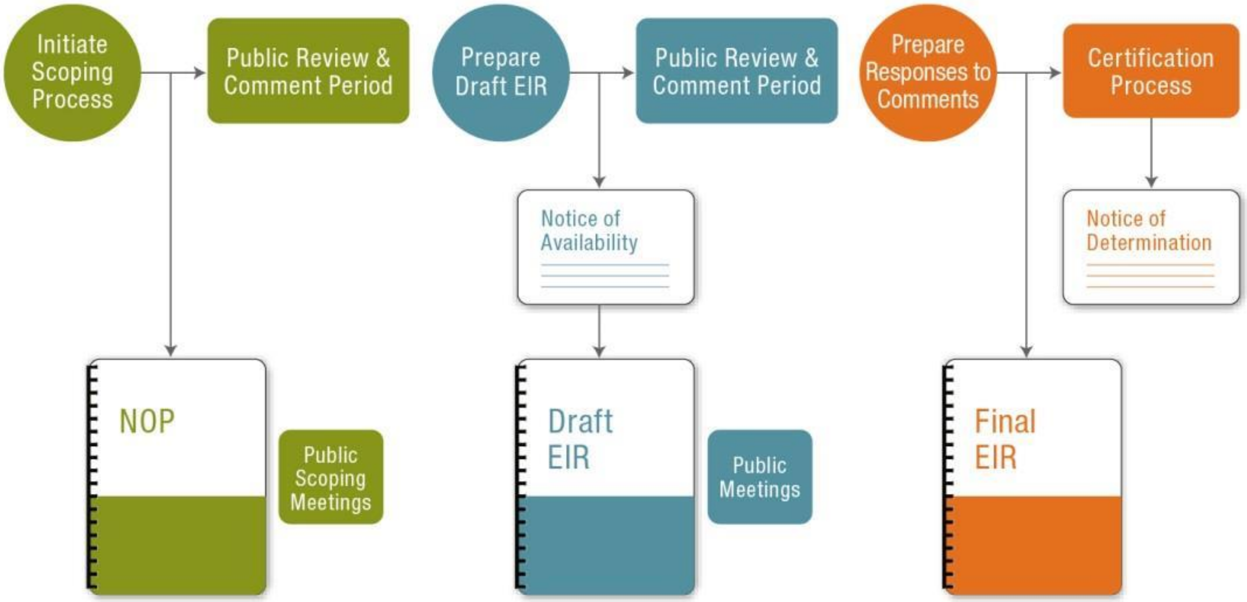
The 22 townhomes would be situated east of the commercial buildings fronting North Catalina Avenue, whereas the residential apartment building would be adjacent to (south of) the commercial buildings and would front both North Catalina Avenue and Emerald Street. The proposed townhomes would consist of three two-bedroom units, 15 five-bedroom units, one six-bedroom unit, and three seven-bedroom units ranging from approximately 1,022 to 3,148 sf each. The proposed apartment building would consist of five, four two-bedroom units ranging from approximately 800 to 1,500 sf and three, four-bedroom units ranging from approximately 1,300 to 1,318 sf each. Of the 30 proposed residential units, four two-bedroom units would be designated as affordable housing units. Overall, the proposed project would consist of 49,311 sf in total gross residential floor area. The project would also include 14,631 sf of open space, consisting of 11,629 sf of private space (i.e., roof decks and balconies), a 1,252-sf deck, 525 sf roof lounge, and 1,115 sf of common space (i.e., courtyard).

ENTITLEMENT REQUIREMENTS AND DISCRETIONARY APPROVALS

Discretionary approvals from various agencies are required for implementation of the proposed project. Approval of the remediation plan is required from the Los Angeles County Fire Department. The project requires Preservation Commission consideration of local historic district designation and Certificate of Appropriateness and Planning Commission consideration of Coastal Development, Planning Commission Design Review, and Conditional Use Permits. The applicant requests designation of four commercial buildings as contributors to a potential local landmark district and a parking variance to allow for less parking than required for adaptive reuse of commercial structures. The project would also use the State Density Bonus as outlined in SB 1818 and approval of an Affordable Housing Agreement. As part of the Density Bonus application the following concessions and incentives are requested:

- Mixed Use Zoning for adaptive reuse of non-residential structures
- Lot Consolidation of conforming lots
- Three-story residential structure(s)

CEQA PROCESS



POTENTIAL PROJECT IMPACTS

Because of the requested entitlement requirements identified above, and based on the Initial Study determination, an EIR is necessary for the proposed project. Based on a preliminary assessment of potential environmental impacts that may occur as a result of the project, the areas of potential environmental impact to be addressed in the EIR will include at least the following:

- Air Quality
- Biological Resources
- Cultural Resources
- Geology/Soils
- Hazards/Hazardous Materials
- Noise
- Transportation
- Tribal Cultural Resources

Environmental issues that do not rise to the level of significant impacts will be addressed in the EIR in a separate section entitled “Impacts Found to Be Less Than Significant.”
Additionally, Section 15126.6 of the CEQA Guidelines states: “an EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible.”

The EIR shall consider Alternatives that can reduce the projects potential impacts, such as development of the project site with the General Plan land use and allowable Zoning build-out potential, or an alternative such as a reduced project design, a project similar to the proposed project with less density.

POTENTIAL PROJECT IMPACTS

This NOP is being distributed to solicit written comments regarding the scope and content of the environmental analysis to be included in the EIR. The City has prepared this NOP in accordance with the State CEQA Guidelines.

The review period for this NOP is from March 25, 2021 to April 26, 2021. Due to the time limits mandated by State law, your response must be sent at the earliest possible date, but not later than April 26, 2021. Please direct all written comments to the following address:

Antonio Gardea, Senior Planner
Community Development Department
City of Redondo Beach
415 Diamond Street
Redondo Beach, California 90277
Phone: (310) 318-0637 x2248
FAX: (310) 372-8021
antonio.gardea@redondo.org

SCOPING MEETING

To assist in local participation, a Scoping Meeting will be held to present the proposed project and to solicit suggestions from the public and responsible agencies on the content of the Draft EIR. The Scoping Meeting will be held on Thursday, April 8, 2021 on at 6:30 pm. View documents related to this project on the City's website at www.redondo.org. Navigate to Departments > click on Community Development > click on the link for the Catalina Village Project. The meeting will be conducted via Zoom. To register, click on the link on the project webpage, or send an email to PlanningRedondo@redondo.org requesting the link to register for the meeting.

Date: March 25, 2021 Signature:
Antonio Gardea, Senior Planner

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY Gavin Newsom, Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 7 – Office of Regional Planning
100 S. MAIN STREET, MS 16
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Making Conservation
a California Way of Life.

April 5, 2021

Antonio Gardea
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

RE: 100-132 North Catalina Avenue Project –
Notice of Preparation of an Environmental
Impact Report (NOP)
SCH # 2021030597
GTS # 07-LA-2021-03533
Vic. LA-1/PM: 19.864

Dear Antonio Gardea:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced NOP. The purpose of the proposed Project is the demolition of approximately 8,929 square feet of existing buildings located between 112 and 132 N. Catalina Ave; the rehabilitation and re-use of the buildings between 124 and 132 N. Catalina Ave for commercial use; adaptive re-use of the building at 112 N. Catalina Ave for residential use; and demolition of the shed located at the rear end of 116 N. Catalina Ave. The project also involves the construction of 22 three-story townhomes and four units in the former Masonic Lodge building and four units in a new three-story apartment building, consisting of eight units, for a combined total of 30 units on the project site. The City of Redondo Beach is the Lead Agency under the California Environmental Quality Act (CEQA).

The Project is located approximately 500 feet from State Route 1 (SR-1) in Los Angeles County. From reviewing the NOP, Caltrans has the following comments:

- Senate Bill 743 (2013) mandates that Vehicle Miles Traveled (VMT) be used as the primary metric in identifying transportation impacts of all future development projects under CEQA, starting July 1, 2020. For information on determining transportation impacts in terms of VMT on the State Highway System, see the *Technical Advisory on Evaluating Transportation Impacts in CEQA* by the California Governor's Office of Planning and Research (OPR), dated December 2018: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf.
- The City can also refer to Caltrans' updated *VMT-Focused Transportation Impact Study Guide* (TISG), dated May 2020 and released on Caltrans' website in July 2020: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-05-20-approved-vmt-focused-tisg-a11y.pdf. Caltrans' new TISG is largely based on the OPR 2018 Technical Advisory.
- Caltrans looks forward to reviewing the VMT analysis for this project. As discussed in Caltrans' new TISG, Caltrans strongly recommends undertaking project VMT analysis, significance determination, and potential mitigation in a manner consistent with OPR's Technical Advisory.
- The updated TISG states, "Additional future guidance will include the basis for requesting transportation impact analysis that is not based on VMT. This guidance will include a simplified

safety analysis approach that reduces risks to all road users and that focuses on multi-modal conflict analysis as well as access management issues." Since releasing the TISG, Caltrans has released interim safety analysis guidance, dated December 2020 and found here, for the City's reference: https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-12-22-updated-interim-ldigr-safety-review-guidance-a11y.pdf.

- Caltrans encourages lead agencies to complete traffic safety impact analysis in the California Environmental Quality Act (CEQA) review process so that, through partnerships and collaboration, California can reach zero fatalities and serious injuries by 2050.

The following information is included for your consideration. The mission of Caltrans is to provide a safe and reliable transportation network that serves all people and respects the environment. Furthermore, Caltrans encourages Lead Agencies to implement Transportation Demand Management (TDM) strategies that reduce VMT and Greenhouse Gas (GHG) emissions. For more TDM options, please refer to:

- The 2010 *Quantifying Greenhouse Gas Mitigation Measures* report by the California Air Pollution Control Officers Association (CAPCOA), available at http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf, or
- *Integrating Demand Management into the Transportation Planning Process: A Desk Reference* (Chapter 8) by the Federal Highway Administration (FHWA), available at https://ops.fhwa.dot.gov/publications/fhwahop12035/index.htm.

Also, any transportation of heavy construction equipment and/or materials which requires use of oversized-transport vehicles on State highways will need a Caltrans transportation permit. Caltrans recommends that the project limit construction traffic to off-peak periods to minimize the potential impact on State facilities. If construction traffic is expected to cause delays on any State facilities, please submit a construction traffic control plan detailing these delays for Caltrans' review.

If you have any questions about these comments, please contact Mayra Jimon, the project coordinator, at Mayra.Jimon@dot.ca.gov, and refer to GTS # 07-LA-2021-03533.

Sincerely,

Anthony Higgins for

MIYA EDMONSON
IGR/CEQA Branch Chief
cc: Scott Morgan, State Clearinghouse

STATE OF CALIFORNIA **Gavin Newsom, Governor**

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

March 29, 2021

Antonio Gardea
City of Redondo Beach
415 Diamond Street
Redondo Beach, CA 90277

Re: 2021030597, 100-132 North Catalina Avenue Project, Los Angeles County

Dear Mr. Gardea:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:

- **a.** A brief description of the project.
- **b.** The lead agency contact information.
- **c.** Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
- **d.** A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).

- **a.** For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:

- **a.** Alternatives to the project.
- **b.** Recommended mitigation measures.
- **c.** Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:

- **a.** Type of environmental review necessary.
- **b.** Significance of the tribal cultural resources.
- **c.** Significance of the project's impacts on tribal cultural resources.
- **d.** If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:

- **a.** Whether the proposed project has a significant impact on an identified tribal cultural resource.
- **b.** Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:

- **a.** The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
- **b.** A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:

- **a.** Avoidance and preservation of the resources in place, including, but not limited to:
  - **i.** Planning and construction to avoid the resources and protect the cultural and natural context.
  - **ii.** Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
- **b.** Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
  - **i.** Protecting the cultural character and integrity of the resource.
  - **ii.** Protecting the traditional use of the resource.
  - **iii.** Protecting the confidentiality of the resource.
- **c.** Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
- **d.** Protecting the resource. (Pub. Resource Code §21084.3 (b)).
- **e.** Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
- **f.** Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:

- **a.** The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
- **b.** The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
- **c.** The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    - **a.** The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    - **b.** Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/.

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    - **a.** If part or all of the APE has been previously surveyed for cultural resources.
    - **b.** If any known cultural resources have already been recorded on or adjacent to the APE.
    - **c.** If the probability is low, moderate, or high that cultural resources are located in the APE.
    - **d.** If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    - **a.** The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    - **b.** The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

  a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

  b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

  a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

  b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

  c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

cc: State Clearinghouse

South Coast
Air Quality Management District
South Coast AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA E-MAIL:
antonio.gardea@redondo.org
Antonio Gardea, Senior Planner
City of Redondo Beach, Community Development Department
415 Diamond Street
Redondo Beach, California 90277

April 20, 2021

Notice of Preparation of a Draft Environmental Impact Report for the 100-132 North Catalina Avenue Project (Proposed Project)

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. Our comments are recommendations on the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (EIR). Please send a copy of the Draft EIR upon its completion and public release directly to South Coast AQMD as copies of the Draft EIR submitted to the State Clearinghouse are not forwarded. **In addition, please send all appendices and technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all emission calculation spreadsheets, and air quality modeling and health risk assessment input and output files (not PDF files). Any delays in providing all supporting documentation for our review will require additional review time beyond the end of the comment period.**

CEQA Air Quality Analysis

Staff recommends that the Lead Agency use South Coast AQMD's CEQA Air Quality Handbook and website[1] as guidance when preparing the air quality and greenhouse gas analyses. It is also recommended that the Lead Agency use the CalEEMod[2] land use emissions software, which can estimate pollutant emissions from typical land use development and is the only software model maintained by the California Air Pollution Control Officers Association.

South Coast AQMD has developed both regional and localized significance thresholds. South Coast AQMD staff recommends that the Lead Agency quantify criteria pollutant emissions and compare the emissions to South Coast AQMD's CEQA regional pollutant emissions significance thresholds[3] and localized significance thresholds (LSTs)[4] to determine the Proposed Project's air quality impacts. The localized analysis can be conducted by either using the LST screening tables or performing dispersion modeling.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road

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[1] South Coast AQMD's CEQA Handbook and other resources for preparing air quality analyses can be found at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook.

[2] CalEEMod is available free of charge at: www.caleemod.com.

[3] South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

[4] South Coast AQMD's guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips, and hauling trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers and air pollution control devices), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, emissions from the overlapping construction and operational activities should be combined and compared to South Coast AQMD's regional air quality CEQA ***operational*** thresholds to determine the level of significance.

If the Proposed Project generates diesel emissions from long-term construction or attracts diesel-fueled vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment[5].

Mitigation Measures

In the event that the Proposed Project results in significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized to minimize these impacts. Any impacts resulting from mitigation measures must also be analyzed. Several resources to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project include South Coast AQMD's CEQA Air Quality Handbook[1], South Coast AQMD's Mitigation Monitoring and Reporting Plan for the 2016 Air Quality Management Plan[6], and Southern California Association of Government's Mitigation Monitoring and Reporting Plan for the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy[7].

South Coast AQMD staff is available to work with the Lead Agency to ensure that air quality, greenhouse gas, and health risk impacts from the Proposed Project are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
LAC210330-04
Control Number

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[5] South Coast AQMD's guidance for performing a mobile source health risk assessment can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

[6] South Coast AQMD's 2016 Air Quality Management Plan can be found at: http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2017/2017-mar3-035.pdf (starting on page 86).

[7] Southern California Association of Governments' 2020-2045 RTP/SCS can be found at: https://www.connectsocal.org/Documents/PEIR/certified/Exhibit-A_ConnectSoCal_PEIR.pdf.

HOA QUESTIONS AND CONCERNS REGARDING THE CATALINA VILLAGE PROJECT		
DATE: APRIL 26, 2021	TIME: 5:00PM PST	LOCATION: ZOOM CALL

PURPOSE	Concerns from HOA regarding The Catalina Village Project
ADDRESS	131, 135, 129 (Units A-D) N Broadway Redondo Beach 90277 (Unit balconies face the project)

#	TOPICS
1.	Target rent and impact to surrounding home values
2.	Multiple room floorplans
3.	Parking
4.	Rooftop decks, privacy and noise
5.	Direction of new unit balconies and lighting
6.	No smoking units
7.	Distance from new units to our wall and balcony
8.	Duration of project

#	TOPIC DETAIL
1.	Target rent and impact to surrounding home values What is the target rent? There is a concern that it will lower the value of surrounding homes.
2.	Multiple room floorplans The floorplans being socialized are 5-7-bedroom units. There is a strong concern that the units will bring in college students with multiple roommates into a now family residential area. On the previous call there was an assumption that these units would attract multi-generational families and work from home tenants. Is there a study/analysis that proves this theory?
3.	Parking With the proposal of 5-7-bedroom floorplans, how will 1-2 parking spaces be sufficient for those units? There is concern that the parking will spill over into the residential neighborhoods, limiting parking for guests and church patrons.
4.	Rooftop decks, privacy and noise Will these units have a rooftop deck? There is a strong concern that this will infringe on the privacy of the surrounding homes. This will bring noise into a now quiet residential area.
5.	Direction of new unit balconies and lighting What direction will the new balconies face? The preference of the surrounding homes would be to face them toward Catalina. This will ensure the existing homes will retain their privacy and also mitigate light pollution. There is also a request to have downward facing lighting and low wattage that would not illuminate the homes around it.
6.	No smoking units Preference for no smoking units as these will be very close to already existing housing.
7.	Distance from new units to our wall and balcony What will the distance be between the new units and our existing wall and balconies? Will there be a backyard in the new units?
8.	Duration of project Understanding that the project will still need to go through Scope and Design, how long will the Development and Implementation timeline be? (physical construction)

HOA MEMBERS			
Chris Munoz (President)	310-318-7648	Amy Hudson	415-225-5085
Karen Kaminskas (Vice President)	310-489-1907	Jenny Swanson	310-944-4057
Kendall Bateman (Treasurer)	310-245-4244	Reyna Leiva	310-420-1945
Gina Fisher (Secretary)	949-630-6188		

From: Jane Abrams
Sent: Sunday, April 25, 2021 4:58 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina Village - Mixed Use Project for 100-132N Catalina Ave Redondo Beach 90277

Hello Antonio,

I understand from the project documents posted under Planning on the City web site that you are the City of Redondo Beach Senior Planner who is receiving public comments/questions on the proposed Mixed Use project, Catalina Village for 100 - 132 N Catalina Avenue, Redondo Beach.

As a 24 year resident and property owner in the City of Redondo, I am writing you with my concerns and questions about this proposed project.

I have a question about the Zoning for the location of the proposed project. If the R-3A zoning (low density multi-family) currently applies,why has there been just Commercial uses there for years? Also, is the Density Bonus that is being requested allowing for added density and the Mix of residential and Commercial uses and height at 3 stories? Other recent Mixed Use projects in the City of Redondo Beach have been in the MU-3A zones (One South and Legado).
My understanding of City Zoning is that a Ballot Measure would have to be presented to the City of Redondo Beach voters at a Municipal Election to change zoning in areas of the City to allow for Mixed Use?.

The Environmental Impact Report that is required for this proposed project needs to address the potentially significant impacts from increased noise from the 30 residential units and commercial activity will have on the surrounding residences and businesses. There will definitely be increased noise from delivery trucks, moving vans, trash hauling trucks, and persons associated with the project outdoor activities and roof decks. Will the proposed Tasting Room and/or Coffee shop include outdoor dining or lounge space with any live music or entertainment?

Other potential significant impacts may involve Hazards and Hazardous Materials. The EIR needs to address possible soil contamination on the site from past business operations. Catalina Dry Cleaners operated a dry cleaning business for many years at 124 N Catalina Ave. Have any studies been made about the hazards or hazardous materials (chemicals or solvents) related to this long time business? There have also been stone and tile fabrication and wood working operations on the site of these future proposed rental units. The demolition will also involve removal of asbestos and lead paint from several of the existing buildings on the site. The EIR will need to address this requirement.

I also have concerns about the Parking variance that will be allowed because of the Density Bonus. The posted documents state that there will be 66 parking spaces on site for the 30 residential units and 11 spaces for the commercial activity. How many of the 66 spaces will be designated for visitors? If the 4 to 7 bedroom units have more than 2 vehicles per unit, where will the additional vehicles find on site parking? Where will employees of the Tasting Room and Coffee Shop park during business hours? The current parking summary shows that there is a potential for a parking space shortage for this project. Also where will delivery vehicles park while servicing these businesses ? There is also mention of 7 spaces on the street. Since these limited spaces are public and are not reserved for residential or commercial or even for Catalina Village, why are they be included in the parking summary? This proposed project will be located in an already densely populated area close to the beach and pier areas where there is very limited street parking. This parking variance will definitely have a significant impact on this area of Catalina Ave.

Utility related questions:

Will added Sewer Lines be required for the construction of this project? Also will there be new SC Edison utility lines installed underground to service the 30 units and commercial businesses?

Thank you for your attention to my concerns and questions.

Sincerely,

Jane Abrams
416 Avenue G, Unit 1
Redondo Beach, CA 90277

From: Debra Allsopp
Sent: Sunday, April 25, 2021 10:03 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina Village

Please NO MORE PARKING VARIANCES! Parking needs to be on their project property NOT our public streets. Parking variances lead to parking nightmare for tenant and local residents. This density is killing our neighborhood and making people miserable. Tenants and residents shouldn't have to circle and circle to find Parking If parking's assigned on their property we can avoid this frustration.

Debra Allsopp

From: Debra Allsopp
Sent: Sunday, April 25, 2021 10:17 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina village.

2 issues -

parking. 30 units so does that mean 60 or more parking spots within the project?

Accessibility. How will townhouses be accessible? I know some young women (30s) who live in the area looking for housing that's better suited to their wheelchairs. Or are you building yet another project That excludes the disabled and seniors? Isn't it time any new housing have a percentage of accessible housing?

Debra Allsopp

From: Barbara Epstein <justbarb56@gmail.com>
Sent: Sunday, May 2, 2021 2:10 PM
To: CityClerk <CityClerk@redondo.org>; Brandy Forbes <Brandy.Forbes@redondo.org>
Subject: Planning Commission. Re: Catalina Village

Please forward to the Planning Commission.

I missed the notice about the plans for Catalina Village, the development in the 100 N. block on Catalina. I know the comment period has passed, but would like to share a few thoughts with you.

While the design looks pleasant, it is also very dense. I am wondering if the builders can include some healthy, open, green space on the site.
Also, the people of Redondo Beach have been working with the city to increase our tree canopy. Is there a way the builders could include more trees in their plan? This would improve aesthetics, capture carbon, and improve air quality in the area.
The neighbors greatly appreciate that the existing coffee shop will be preserved and expanded. It will add a valuable amenity to the project and the neighborhood.

Thank You,

Barbara Epstein
230 The Village
Redondo Beach
justbarb56@gmail.com

From: Bradley Fritz <bradleyfritz@hotmail.com>
Sent: Wednesday, March 31, 2021 8:52 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina Village Project Comment / Request

Good evening Antonio,

I'm requesting that you require the project to put up noise control baffles similar to those on PCH at the Sketchers project in MB. Our condominium complex is kitty corner to the backside of the project. I'm hopeful that this will help mitigate sound and dust.

I've included a local company that does this kind of work.

I'm looking forward to the virtual meeting.

Brad Fritz

https://www.environmental-noise-control.com/about/

From: Carl Schlack <carlwschlack@cs.com>
Sent: Monday, April 12, 2021 2:04 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina Village Project

Mr. Gardea,

We watched the YouTube Catalina Project Presentation for the environmental impact process. I have a few questions about the Catalina Village Project.

Are there architectural drawings of the project other than the flat maps exhibited in the presentation? We also want to know the name of the developer for the project. Do the first steps of the process consider over-development for the land size given the proposed architecture and number of units and mixed-use retail planned? Is there ever a concern about the capital resources the developer brings to the project. The statement made that the developer is designing this as a low-cost project using as many bedrooms as possible per unit to achieve a classification of low-income California housing project status without regard to the entire neighborhood. The noise and dirt from the development need a local neighborhood environmental plan—also an explanation on how it will be managed. Parking is a huge issue, and the developer's avoidance of having no underground parking is a massive issue. The BeachLife Music Festival will reoccur this Fall an event that adds traffic.

My one significant question is why to pursue environmental impact research when the project seems so poorly thought out?

You're helping in enabling me to understand the process is appreciated

Carl Schlack
Mobile 310-874-8260
320 The Village

From: andrew sellers
Sent: Sunday, April 25, 2021 7:32 PM
To: Antonio Gardea <Antonio.Gardea@redondo.org>
Subject: Catalina Village Project EIR Comments

Good Day,
As a long time resident and Navy veteran I strongly oppose the Catalina Village Project that will require an EIR. This area is already a densely are and do not agree with the requests for deviation from protocol.

V/R
Andrew Sellers
643 Ave B
Redondo Beach
UNITED STATES US NAVY (retired)

Appendix B

Initial Study

100-132 North Catalina Avenue Project

Initial Study

prepared by

City of Redondo Beach
Community Development Department
415 Diamond Street
Redondo Beach, California 90277
Contact: Antonio Gardea, AICP, Senior Planner

prepared with the assistance of

Rincon Consultants, Inc.
250 East 1st Street, Suite 1400
Los Angeles, California 90012

March 2021

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

100-132 North Catalina Avenue Project

Initial Study

prepared by

City of Redondo Beach
Community Development Department
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Redondo Beach, California 90277
Contact: Antonio Gardea, AICP, Senior Planner

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250 East 1st Street, Suite 1400
Los Angeles, California 90012

March 2021

rincon
RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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Table of Contents

Initial Study 1
- 1. Project Title 1
- 2. Lead Agency Name and Address 1
- 3. Contact Person and Phone Number 1
- 4. Project Sponsor’s Name and Address 1
- 5. Project Location 1
- 7. General Plan Designation 4
- 8. Zoning 4
- 9. Description of Project 4
- 10. Surrounding Land Uses and Setting 18
- 11. Required Approvals 18
- 12. Other Public Agencies Whose Approval is Required 18
- 13. Have California Native American Tribes Traditionally and Culturally Affiliated with the Project Area Requested Consultation Pursuant to Public Resources Code Section 21080.3.1? 18

Environmental Factors Potentially Affected 19

Determination 19

Environmental Checklist 21
- 1 Aesthetics 21
- 2 Agriculture and Forestry Resources 25
- 3 Air Quality 27
- 4 Biological Resources 33
- 5 Cultural Resources 37
- 6 Energy 39
- 7 Geology and Soils 43
- 8 Greenhouse Gas Emissions 49
- 9 Hazards and Hazardous Materials 61
- 10 Hydrology and Water Quality 65
- 11 Land Use and Planning 71
- 12 Mineral Resources 73
- 13 Noise 75
- 14 Population and Housing 77
- 15 Public Services 79
- 16 Recreation 83
- 17 Transportation 85
- 18 Tribal Cultural Resources 87
- 19 Utilities and Service Systems 89
- 20 Wildfire 95
- 21 Mandatory Findings of Significance 97

References 101
- Bibliography 101
- List of Preparers 107

Tables

Table 1 Project Summary 7
Table 2 Health Effects Associated with Non-Attainment Criteria Pollutants 28
Table 3 SCAQMD Regional Significance Thresholds 29
Table 4 SCAQMD LSTs for Construction Emissions 30
Table 5 Estimated Fuel Consumption during Construction 39
Table 6 Estimated Project and Existing Annual Operational Energy Consumption 41
Table 7 SCE Energy Intensity Factors 52
Table 8 Project Consistency with Applicable SCAG 2020-2045 RTP/SCS Strategies 55
Table 9 Consistency with Applicable CAP Goals and Measures 57
Table 10 Estimated Construction GHG Emissions 58
Table 11 Combined Annual Emissions of Greenhouse Gases 58
Table 12 Normal Year Water Supply and Demand Comparison 91
Table 13 Solid Waste Disposal Facilities 92

Figures

Figure 1 Regional Location 2
Figure 2 Project Location 3
Figure 3 View of Northern Project Site Frontage along North Catalina Avenue, Looking Northeast 5
Figure 4 View of Commercial Use on Parcels along North Catalina Avenue, Looking Southeast 5
Figure 5 View of Existing Commercial Use on Parcels along North Catalina Avenue, Looking Northeast 6
Figure 6 View of Southern Project Site Frontage at the North Catalina Avenue and Emerald Street Intersection, Looking East 6
Figure 7 Illustrative Site Plan 8
Figure 8 Project Elevations – Tasting Room 9
Figure 9 Project Elevations – Coffee Shop 10
Figure 10 Project Elevations – Apartment Building 11
Figure 11 Project Elevations – Townhomes (Eastern Elevation) 12
Figure 12 Project Elevations – Townhomes (Western Elevation) 13
Figure 13 Project Rendering – View of Tasting Room and Coffee Shop, looking northeast 14
Figure 14 Project Rendering – View of Apartment Building, looking northeast 15

Figure 15 View of Existing Multi-family Residences South of the Intersection of Catalina Avenue and Emerald Street, Looking East 17
Figure 16 View of Existing Multi-family Residences south of the Intersection of Catalina Avenue and Emerald Street, Looking West 17

Appendices

Appendix IS-1 Air Quality/Greenhouse Gas Modeling Results
Appendix IS-2 Energy Calculations
Appendix IS-3 Geotechnical Engineering Investigation
Appendix IS-4 Trip Generation
Appendix IS-5 Will Serve Letter

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Initial Study

1. Project Title

100-132 North Catalina Avenue Project

2. Lead Agency Name and Address

Community Development Department
City of Redondo Beach
415 Diamond Street
Redondo Beach, California 90277

3. Contact Person and Phone Number

Antonio Gardea, AICP, Senior Planner
(310) 318-0637 x2248

4. Project Sponsor's Name and Address

Catalina Fund, LLC
1221 Hermosa Avenue
Suite 101
Hermosa Beach, California 90254

5. Project Location

The project site is located at 100, 112, 116, 124, 126, and 132 North Catalina Avenue in the city of Redondo Beach, California. The project site encompasses 54,739 square feet (sf), or approximately 1.26 acres, and consists of six adjacent parcels, which are identified as Assessor Parcel Numbers (APNs) 7505-005-012, 7505-005-019, 7505-005-021, 7505-005-008, 7505-005-007, and 7505-005-006. The project site is bordered by North Catalina Avenue to the west, commercial buildings and Diamond Street to the north, residential buildings and North Broadway to the east, and Emerald Street to the south. The site is regionally accessible from Pacific Coast Highway (State Route 1, or SR-1) and the San Diego Freeway (Interstate 405, or I-405) and locally accessible from Catalina Avenue and Torrance Boulevard. Figure 1 shows the location of the project site in the region and Figure 2 depicts the location of the site in its neighborhood context.

Figure 1 Regional Location

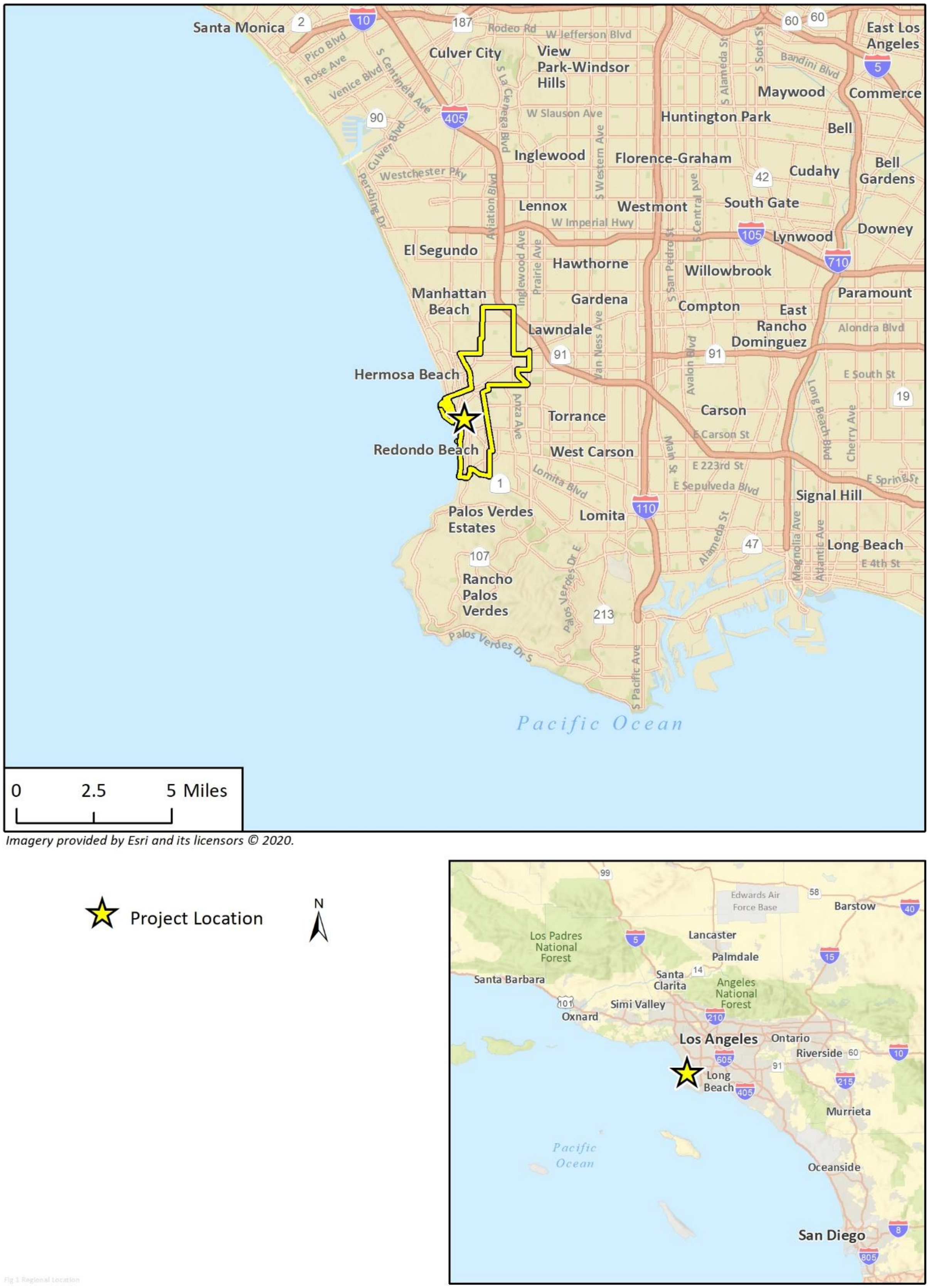

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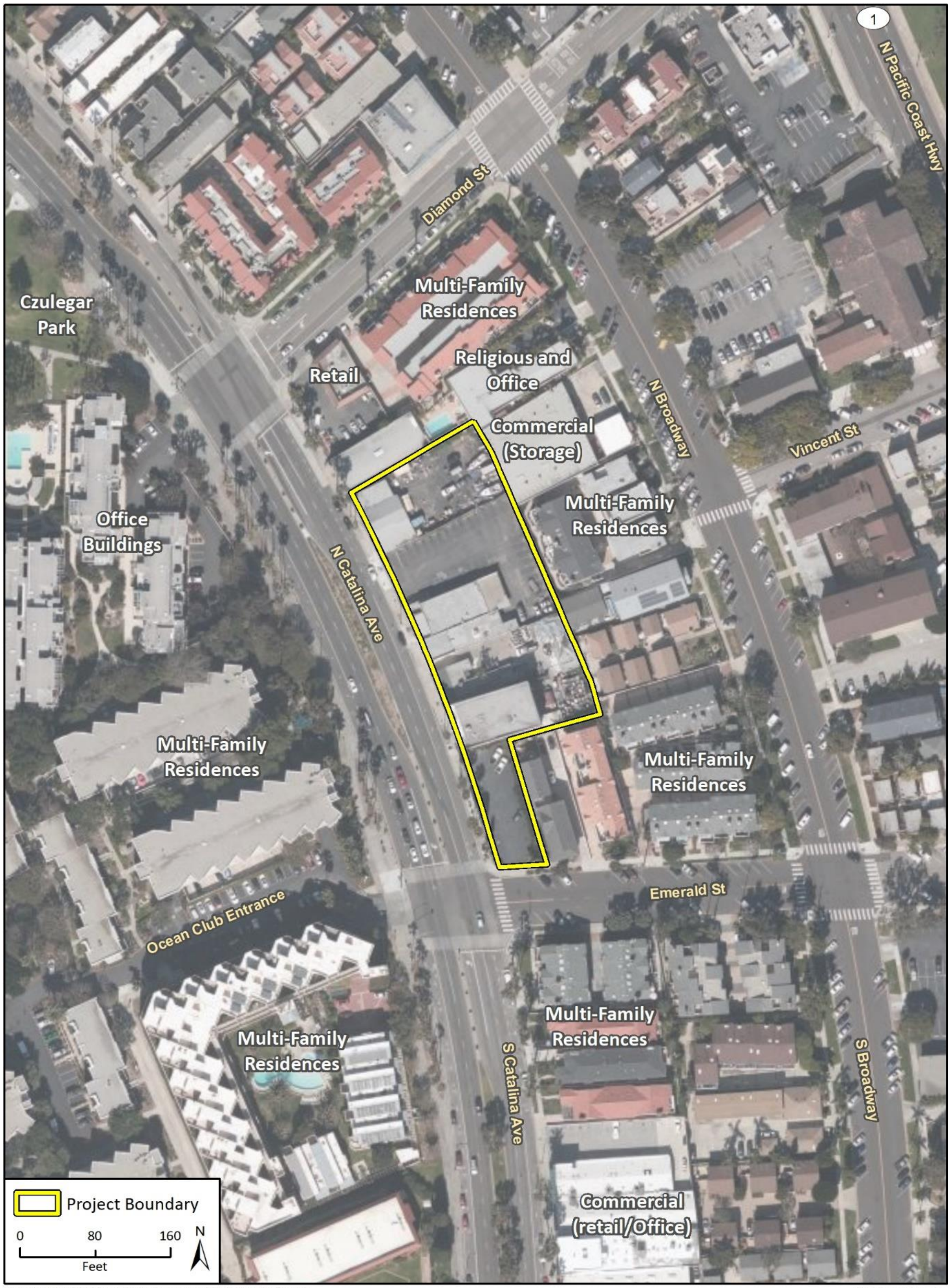
Fig 1 Regional Location

Figure 2 Project Location



Imagery provided by Microsoft Bing and its licensors © 2020.

Fig 2 Project Location

6. Existing Setting

The project site is in an urban area, which has been previously graded and developed, and is surrounded by roads and urban structures (i.e., residential, office, and commercial buildings). Existing development on the site includes five buildings that front on Catalina Avenue, including four one-story structures (116, 124, 126, and 132 North Catalina Avenue) and one two-story structure (112 North Catalina Avenue) as well as associated surface parking lots. The project site was recently occupied by 2 For 1 Frame Store and American International Stone & Tile Inc. (112 North Catalina Avenue), Pacifica Tile & Granite and His Life Woodworks (116 North Catalina Avenue), Catalina Cleaners (124 North Catalina Avenue), Catalina Coffee was in operation until 2018 (126 North Catalina Avenue), and the industrial building is presently used as a clothing retailer, Vintage Dirty Laundry (132 North Catalina Avenue). On-site operations have consisted of dry cleaning, a movie rental/prop service, granite and tile fabricating and design, woodworking, picture framing developments, and stone and tile fabrication. The 2020 Covid-19 pandemic has result in closures of the frame store, cabinet shop and dry cleaner. The structure at 132 North Catalina Avenue was historically used as a blacksmith and ironworks shop that was associated with the Redondo Railway. The southern end of the site (100 North Catalina Avenue) consists of a surface parking lot, and there is a shed on the east side of the project site at rear end of 116 North Catalina Avenue. Figure 3 through Figure 6 show photos of the existing conditions at the project site.

7. General Plan Designation

Low Density Multi-Family Residential

8. Zoning

(R-3A) Low-Density Multifamily Housing

9. Description of Project

The 100-132 North Catalina Avenue Project (hereafter referred to as “proposed project” or “project”) involves the demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue; the rehabilitation and re-use of the buildings between 124 and 132 North Catalina Avenue for commercial uses (i.e., coffee shop and tasting room); adaptive re-use of the building at 112 North Catalina Avenue for residential use; and the demolition of the shed located at the rear end of 116 North Catalina Avenue. The project also involves the construction of 22 three-story townhomes, four units in the former Masonic Lodge building and four units in a new three-story apartment building, for a combined total of 30 residential units on the project site.

The 22 townhomes would be situated east of the commercial buildings fronting North Catalina Avenue, whereas the residential apartment building would be adjacent to (south of) the commercial buildings and would front both North Catalina Avenue and Emerald Street. The proposed townhomes would consist of three two-bedroom units, 15 five-bedroom units, one six-bedroom unit, and three seven-bedroom units ranging from approximately 1,022 to 3,148 sf each. The proposed apartment building would consist of four two-bedroom units ranging from approximately

Figure 3 View of Northern Project Site Frontage along North Catalina Avenue, Looking Northeast

Source: Withee Malcolm Architects 2020

Figure 4 View of Commercial Use on Parcels along North Catalina Avenue, Looking Southeast

Source: Withee Malcolm Architects 2020

Figure 5 View of Existing Commercial Use on Parcels along North Catalina Avenue, Looking Northeast

Source: Withee Malcolm Architects 2020

Figure 6 View of Southern Project Site Frontage at the North Catalina Avenue and Emerald Street Intersection, Looking East

Source: Withee Malcolm Architects 2020

800 to 1,500 sf and four four-bedroom units ranging from approximately 1,300 to 1,318 sf each. Of the 30 proposed residential units, four two-bedroom units would be designated as affordable housing units. Overall, the proposed project would consist of 49,311 sf in total gross residential floor area. The project would also include 14,631 sf of open space, consisting of 11,629 sf of private space (i.e., roof decks and balconies), a 1,252-sf deck, 525 sf roof lounge, and 1,115 sf of common space (i.e., courtyard). In addition, rehabilitation and reusage of the existing commercial buildings would retain 3,063 sf of commercial/retail space in the form of a tasting room and coffee shop. Table 1 provides details of the proposed project while Figure 7 through Figure 14 show the project site plan, elevations, and renderings.

Table 1 Project Summary

Project Summary (Gross Floor Area)	
Residential	49,311 sf
Commercial (Coffee Shop)	1,784 sf
Commercial (Tasting Room)	1,279 sf
Total	**52,374 sf**
Parking Summary	
Residential	66 stalls
Commercial	11 stalls
Public Spaces/Street Parking	7 stalls[1]
Total	**84 stalls**
Site Summary	
Gross Lot Area	54,739 sf
Covered Lot Area	22,821 sf
Lot Coverage	41.69%
Residential Unit Summary	
2-bedroom units	8 units[2]
4-bedroom units	3 units
5-bedroom units	15 units
6-bedroom units	1 unit
7-bedroom units	3 units
Total	**30 units**
Open Space Summary	
Private	11,629 sf
Deck	1,352 sf
Roof Lounge	535 sf
Common	1,115 sf
Total	**14,631 sf**

[1] Additional seven public street parking spaces available in front of the proposed retail/commercial uses.

[2] Includes four affordable units.

Figure 7 Illustrative Site Plan

Source: Withee Malcom Architects, 2020.

Figure 8 Project Elevations – Tasting Room

Source: *Withee Malcom Architects, 2020.*

Figure 9 Project Elevations – Coffee Shop

Source: Withee Malcom Architects, 2020.

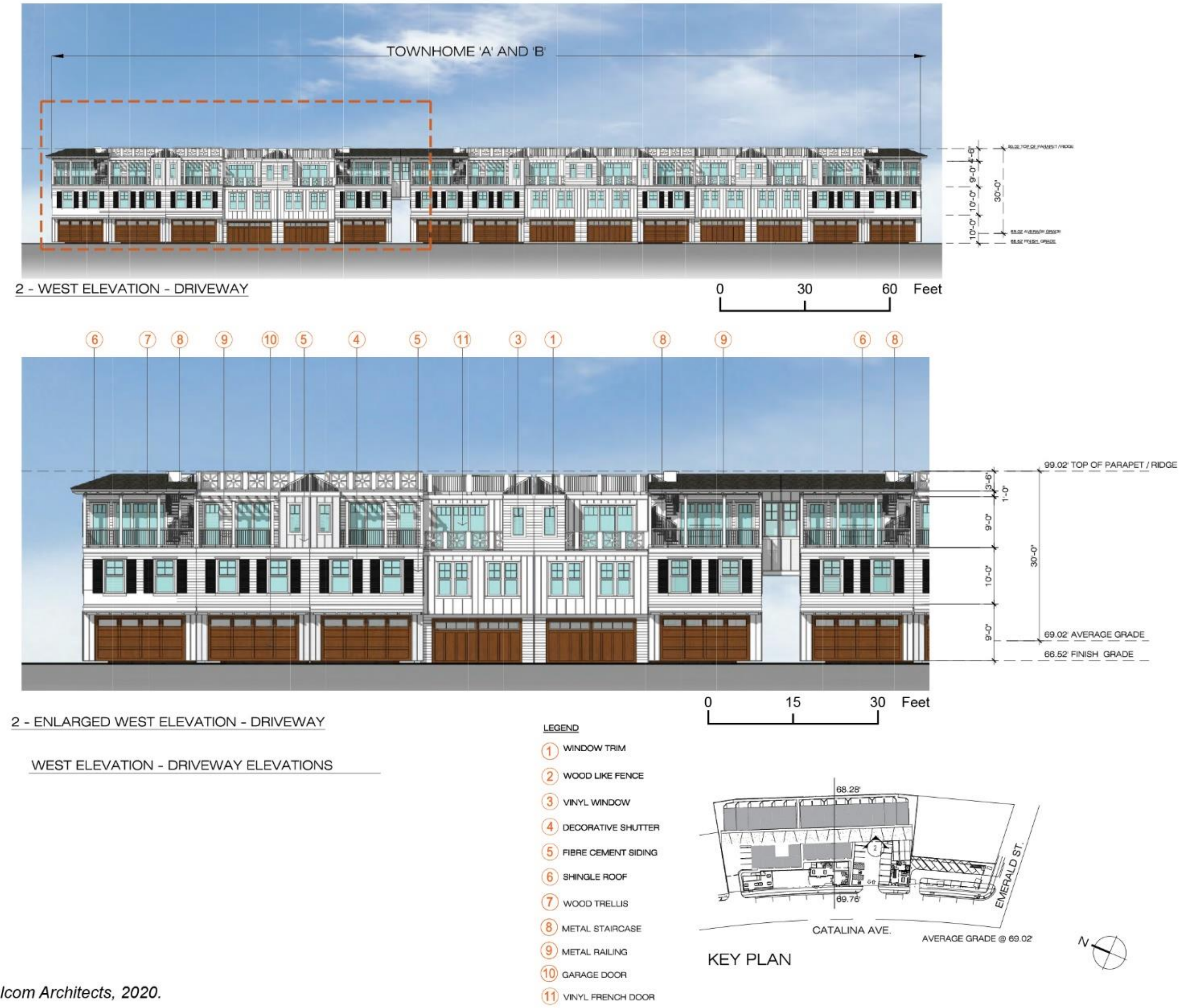
Figure 10 Project Elevations – Apartment Building

Source: Withee Malcom Architects, 2020.

Figure 11 Project Elevations – Townhomes (Eastern Elevation)

Source: Withee Malcom Architects, 2020.

Figure 12 Project Elevations – Townhomes (Western Elevation)



Source: Withee Malcom Architects, 2020.

Figure 13 Project Rendering – View of Tasting Room and Coffee Shop, looking northeast

Source: Withee Malcom Architects, 2020.

Figure 14 Project Rendering – View of Apartment Building, looking northeast

Source: Withee Malcom Architects, 2020.

Infrastructure Improvements

Associated improvements to the project site would include, but are not limited to, surface parking areas, an internal vehicle alleyway, internal pathways, landscaping (includes native plants), cool roofing, a courtyard, utility infrastructure, and exterior lighting. The proposed project would include new curb, gutter, sidewalks, bicycle parking, planting, fencing, and landscaping to the project site's frontages along North Catalina Avenue and Emerald Street and would add a pedestrian path and planting along a private residential corridor on the easternmost portion of the project site.

In addition, the project would comply with Chapter 7.113 of the Redondo Beach Municipal Code (RBMC) which regulates the implementation of low impact development (LID) strategies for projects in the City of Redondo Beach.

Access and Parking

Vehicles would be able to access the proposed townhome buildings and associated at-grade parking via North Catalina Avenue and the proposed interior alleyway. Vehicles would also be able to access at-grade parking associated with the proposed residential apartment building via Emerald Street and North Catalina Avenue. The proposed project would provide a total of 77 on-site parking stalls; consisting of 66 residential parking spaces (44 private garage and 22 at-grade), 11 commercial parking spaces (eight standard spaces and three tandem spaces). As a result of reconfiguration of the curb cuts, seven on-street parking spaces are retained in front of the proposed commercial development. Parking garages would be equipped with electric vehicle (EV) charging stations, which would provide approximately 10 percent of total residential parking. The proposed project would provide 22 bicycle parking spaces for residents and an additional 15 bicycle racks for guests. Pedestrians would be able to access the commercial and residential buildings on the project site via sidewalks along Emerald Street and North Catalina Avenue and via the proposed internal pathways within the project site.

Construction

The construction process would include demolition of approximately 8,929 sf of existing buildings on the properties located between 112 and 132 North Catalina Avenue; rehabilitation and reuse of the existing non-residential buildings located at 112 North Catalina Avenue and between 124 and 132 North Catalina Avenue; and demolition of the shed located at the rear end of 116 North Catalina Avenue. Construction phasing would include demolition, site preparation, grading, building construction, asphalt paving, and architectural coating. The grading phase would include an estimated 1,625 cubic yards (cy) of cut soil which would be reused as fill on the site, 2,534 cy of fill soil, and 6,235 cy of over-excavation and re-compaction. 909 cy of soil would be imported to the project site during construction. Construction of the project is anticipated to occur over an approximately 20-month period, which would begin in September 2021. The project would open for operation by mid-2023. Construction hours would comply with Section 4-24.503 of the RBMC.

Figure 15 View of Existing Multi-family Residences South of the Intersection of Catalina Avenue and Emerald Street, Looking East

Source: Withee Malcolm Architects 2020

Figure 16 View of Existing Multi-family Residences south of the Intersection of Catalina Avenue and Emerald Street, Looking West

Source: Withee Malcolm Architects 2020

10. Surrounding Land Uses and Setting

The project site is in an urban area and is surrounded by residential and retail/commercial uses. Land uses surrounding the project site consist of multi-family residences and retail/commercial uses to the north, single- and multi-family residences and retail/commercial uses to the east, multi-family residences to the south across Emerald Street, and multi-family residences and King Harbor and the Redondo Beach Pier area to the west. Figure 15 and Figure 16 depict photos of surrounding uses and conditions.

11. Required Approvals

The project would use the State Density Bonus as outlined in SB 1818 for the following concessions and incentives:

- Mixed Use Zoning for adaptive reuse of non-residential structures
- Lot Consolidation of conforming lots
- Three-story residential structure(s)
- Affordable Housing Agreement

The applicant is requesting designation of four commercial buildings as contributors to a potential local landmark district and a parking variance to allow for less parking than required for adaptive reuse of commercial structures.

12. Other Public Agencies Whose Approval is Required

The City of Redondo Beach is the lead agency for the proposed project and approval of the remediation plan is required from the Los Angeles County Fire Department.

13. Have California Native American Tribes Traditionally and Culturally Affiliated with the Project Area Requested Consultation Pursuant to Public Resources Code Section 21080.3.1?

The City of Redondo Beach sent a Local Government Tribal Consultation List Request to the Native American Heritage Commission (NAHC) to obtain a list of Native American tribes with jurisdiction in the project area. The NAHC responded to the City’s request with a consultation list of eight tribes to contact for their traditional and cultural affiliation with the geographic area in which the project is located. Based on this list, and per Public Resources Code Section 21080.3.1., the City send out consultation letters to these eight listed tribes and have since received a response from the Gabrieleno Band of Mission Indians – Kizh Nation, requesting consultation to discuss the proposed project in further detail. Following the request from the Kizh Nation, a consultation phone call between Matthew Teutimez and Andrew Salas, representatives of the Kizh Nation, and City Staff occurred on June 24, 2020.

Environmental Factors Potentially Affected

This project would potentially affect the environmental factors checked below, involving at least one impact that is "Potentially Significant" as indicated by the checklist on the following pages.

☐ Aesthetics
■ Biological Resources
■ Geology/Soils
☐ Hydrology/Water Quality
■ Noise
☐ Recreation
☐ Utilities/Service Systems
☐ Agriculture and Forestry Resources
■ Cultural Resources
☐ Greenhouse Gas Emissions
☐ Land Use/Planning
☐ Population/Housing
■ Transportation
☐ Wildfire
■ Air Quality
☐ Energy
■ Hazards & Hazardous Materials
☐ Mineral Resources
☐ Public Services
■ Tribal Cultural Resources
■ Mandatory Findings of Significance

Determination

Based on this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions to the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

■ I find that the proposed project MAY have a "potentially significant impact" or "less than significant with mitigation incorporated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potential significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

Printed Name

Title

Environmental Checklist

1 Aesthetics

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Except as provided in Public Resources Code Section 21099, would the project:				
a. Have a substantial adverse effect on a scenic vista?	☐	☐	■	☐
b. Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	■	☐
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	■	☐
d. Create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?	☐	☐	■	☐

a. Would the project have a substantial adverse effect on a scenic vista?

Scenic vistas are panoramic public views that are found to be locally or regionally attractive. The city of Redondo Beach does not have any officially designated scenic vistas. However, the City considers its coastal recreation areas (e.g., beaches, public piers, bikeways, and regional and local parks) as providing important scenic views in the city (Redondo Beach 2004). The project site is not located on a scenic turnout or other visual access point and is not visible from the beach or harbor areas of Redondo Beach, which are located about 0.3-mile to the southwest and 0.2 mile to the west of the site, respectively, due to the existing multi-family and commercial development between three- and five-stories that block views from the coast to the project site. The closest parks within a 0.5-mile radius of the site include Czulegar Park, Vincent Park, and Veterans Park. While the project site is visible from Czulegar Park, the park's scenic views are facing west towards the Pacific Ocean; the project site is to the southeast of Czulegar Park and is already developed with existing commercial buildings that are surrounded by urbanized development and thus, does not constitute a scenic vista.

The proposed project involves demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue, and construction of 22 townhomes, eight apartments, and the rehabilitation and reuse of existing commercial buildings on a site that is currently zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). The proposed townhomes and apartment building would be of similar height (30 feet) to other single- and multi-family residences surrounding the site, which range from one- to five-stories tall. Although there are ocean views along Catalina Avenue, there are no views of scenic resources inside the project site, as shown in the photos of the site and surrounding uses in Figure 3 through Figure 6, and Figure 15 and Figure 16. Therefore, the proposed project would not significantly obstruct any scenic vistas or views of or from scenic resources in the city. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The project site is in an urban area consisting of residential and retail/commercial uses which does not contain any scenic resources such as natural habitats or rock outcroppings, nor is it in proximity to any such resources. The project site is not located on any National Register of Historic Places, California State Historical Landmarks, or California Historical Resources or Points of Interest (California State Parks 2017). The project site is located approximately 300 feet south of the Diamond Apartments, which are listed properties on the National Register of Historic Places. The project abuts the Oklahoma Apartments (c. 1908), located at 305 Emerald Street that is a locally designated Historic Landmark property that may be eligible for listing on the National Register of Historic Places. However, the proposed project would not obstruct any scenic resources visible from or in proximity to a state scenic highway designated by the City of Redondo Beach (California Department of Transportation [Caltrans] 2011; Redondo Beach 2017a). While Pacific Coast Highway (PCH) is designated as an eligible scenic highway in other areas, the portion of PCH nearest to the project site (0.1-mile east) is not an eligible or designated scenic highway. Therefore, the project would not substantially degrade views of mature trees, rock outcroppings, or any other scenic resources along or visible from a scenic highway. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c. Would the project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The project site is currently occupied by five existing buildings, four of which serve commercial retail/restaurant uses and one of which is vacant, and associated surface parking lots. Vegetation on the project site includes street trees and hedges, ruderal vegetation, and minimal ornamental landscaping including an approximately 15-foot-tall hedge on the eastern boundary of the project site. The project involves demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue, and construction of 22 townhomes and eight apartments, with rehabilitation and re-use of existing commercial buildings. The project is in an urban area of the City that is primarily developed with one- to five-story residential and commercial/retail buildings.

Implementation of the project would add residential uses and rehabilitate the site's existing commercial buildings for future commercial uses. While development of the project would change the appearance and use of the project site relative to existing conditions, it is not anticipated to degrade the existing visual character or quality of the site and its surroundings since it would be a compatible use with other existing residential uses in the project area and would upgrade the existing landscaping and visual quality of the site and, therefore, contribute to an aesthetically-enhanced project area.

The proposed project has applied for a local historic district to grandfather in the existing commercial buildings currently on site and for a concession to allow the adaptive reuse of the structures. The proposed project would also be subject to design review and compliance with the architectural standards in the Zoning Code for multi-unit residential projects per Section 10-2.2502 of the RBMC. In addition, the design of the project would be reviewed for approval by the Planning Commission. This regulatory procedure verifies that the design, colors, and finish materials of development projects comply with adopted design guidelines and achieve compatibility with the surrounding area. Although the project would not substantially degrade the visual character of the site and surroundings, this regulatory procedure provides the City with further assurances for aesthetic review and an opportunity to incorporate additional conditions to increase the aesthetic value of the project. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. *Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?*

The project is in an urban area of the City that is primarily developed with residential and commercial/retail buildings. Existing lighting and glare in the project area consist of streetlights and exterior lighting/glare associated with the on-site commercial structures, surrounding residential and commercial/retail structures, and associated vehicles. Implementation of the project would replace existing lighting with new outdoor on-site lighting for the rehabilitated commercial buildings, proposed townhomes and apartment building, internal walking paths, driveway/garage lights, landscaping, and other safety-related lighting. New residential lighting that is proposed as part of the project would represent an increase in daytime and nighttime lighting at the project site relative to existing lighting associated with commercial uses. However, the light sources would not substantially increase the overall levels of day or nighttime lighting in the area because they would be comparable to existing light levels from the surrounding residences. Furthermore, Catalina Avenue and Emerald Street are already illuminated by street lighting. For these reasons, the proposed project would not result in a substantial new source of light such that day or nighttime views in the area would be adversely affected. Rather, the proposed exterior lighting and building materials would be consistent with those of surrounding uses and would be an important aide to public safety.

In addition, as shown in Figure 13 and Figure 14, the project design does not propose any new highly reflective materials that would cause significant glare during the day, such as stainless-steel panels or expansive glass windows. The design of this project, including its finish, colors, and materials, would be reviewed for approval through the City's review process. This regulatory procedure provides the City with an additional layer of review for aesthetics including light and glare, and an opportunity to incorporate additional conditions to improve the project's building materials and lighting plans. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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2 Agriculture and Forestry Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	■
b. Conflict with existing zoning for agricultural use or a Williamson Act contract?	☐	☐	☐	■
c. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)); timberland (as defined by Public Resources Code Section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	☐	☐	☐	■
d. Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	■
e. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	■

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

The project site is in an urban area of the City and currently consists of commercial and parking uses. According to the City's Zoning and Land Use Maps, the project site is zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). According to the California Department of Conservation's (DOC) California Important Farmland Finder, the project site is in an area that does not consist of Farmland (California DOC 2016). Therefore, the project would not have an impact on designated Farmland.

NO IMPACT

b. *Would the project conflict with existing zoning for agricultural use or a Williamson Act contract?*

As discussed under impact discussion *a.* of this section, the project site consists of commercial and parking uses and is not zoned or designated for agricultural use. In addition, the project site is not under a Williamson Act contract (California DOC 2015). The project involves construction of 22 townhomes, eight apartments, and the rehabilitation and reuse of existing commercial buildings on a site that is currently zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). The project site would not convert farmland to non-agricultural uses; therefore, the proposed project would have no impact with respect to conflicting with agricultural zoning or a Williamson Act contract.

NO IMPACT

c. *Would the project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)); timberland (as defined by Public Resources Code Section 4526); or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?*

d. *Would the project result in the loss of forest land or conversion of forest land to non-forest use?*

As discussed under impact discussion *a.* of this section, the project site consists of commercial and parking uses and is not zoned or designated for forest land or timberland. Therefore, the project would not conflict with forest land or timberland zoning or result in the loss of forest land or conversion of forest land to non-forest use. No impact would occur.

NO IMPACT

e. *Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?*

The proposed project does not include the conversion of farmland to non-agricultural uses, forest land to non-forest uses, nor any other change in the existing environment that could result in impacts to Farmland or forest land. No impact would occur.

NO IMPACT

3 Air Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	■	☐
b. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?	■	☐	☐	☐
c. Expose sensitive receptors to substantial pollutant concentrations?	■	☐	☐	☐
d. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	■	☐

Air Quality Standards and Attainment

The project site is in the South Coast Air Basin (Basin), which includes the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, and all of Orange County. The Basin is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). As the local air quality management agency, the SCAQMD is required to monitor air pollutant levels to ensure that state and federal air quality standards are met and, if they are not met, to develop strategies to meet the standards.

Depending on whether the standards are met or exceeded, the Basin is classified as being in “attainment” or “nonattainment.” Under State law, air districts are required to prepare a plan for air quality improvement for pollutants for which the district is in non-compliance. The SCAQMD is in non-attainment for the federal standards for ozone and $PM_{2.5}$ (particulate matter up to 2.5 microns in size) and the State standards for ozone, PM_{10} (particulate matter up to 10 microns in size), and $PM_{2.5}$. The Los Angeles County portion of the Basin is also designated non-attainment for lead (SCAQMD 2016). The Basin is designated unclassifiable or in attainment for all other federal and State standards. The health effects associated with criteria pollutants for which the Basin is in non-attainment are described in Table 2.

Table 2 Health Effects Associated with Non-Attainment Criteria Pollutants

Pollutant	Adverse Effects
Ozone	(1) Short-term exposures: (a) pulmonary function decrements and localized lung edema in humans and animals and (b) risk to public health implied by alterations in pulmonary morphology and host defense in animals; (2) long-term exposures: risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (3) vegetation damage; and (4) property damage.
Suspended particulate matter (PM_{10} and $PM_{2.5}$)	(1) Excess deaths from short-term and long-term exposures; (2) excess seasonal declines in pulmonary function, especially in children; (3) asthma exacerbation and possibly induction; (4) adverse birth outcomes including low birth weight; (5) increased infant mortality; (6) increased respiratory symptoms in children such as cough and bronchitis; and (7) increased hospitalization for both cardiovascular and respiratory disease (including asthma).[a]
Lead	(1) Short-term overexposures: lead poisoning can cause (a) anemia, (b) weakness, (c) kidney damage, and (d) brain damage; and (2) long-term exposures: long-term exposure to lead increases risk for (a) high blood pressure, (b) heart disease, (c) kidney failure, and (d) reduced fertility.

[a] More detailed discussions on the health effects associated with exposure to suspended particulate matter can be found in the following documents: United States Environmental Protection Agency (USEPA), Air Quality Criteria for Particulate Matter, October 2004.

Sources: USEPA 2018a; Centers for Disease Control and Prevention (CDC) 2019

Air Quality Management

Under State law, the SCAQMD is required to prepare a plan for air quality improvement for pollutants for which the District is in non-compliance. The SCAQMD administers the Air Quality Management Plan (AQMP) for the Basin, which is a comprehensive document outlining an air pollution control program for attaining all California Ambient Air Quality Standards (CAAQS) and National Ambient Air Quality Standards (NAAQS). The most recently adopted AQMP is the 2016 AQMP (SCAQMD 2017), which was adopted by the SCAQMD Governing Board on March 3, 2017. The 2016 AQMP represents a new approach, focusing on available, proven, and cost-effective alternatives to traditional strategies while seeking to achieve multiple goals in partnership with other entities promoting reductions in greenhouse gases (GHGs) and toxic risk, as well as efficiencies in energy use, transportation, and goods movement (SCAQMD 2017). The 2016 AQMP incorporates new scientific data and notable regulatory actions that have occurred since adoption of the 2012 AQMP, including the approval of the new federal 8-hour ozone standard of 0.070 ppm that was finalized in 2015.

The 2016 AQMP addresses several State and federal planning requirements and incorporates new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and meteorological air quality models. The Southern California Association of Governments' (SCAG) projections for socio-economic data (e.g., population, housing, employment by industry) and transportation activities from the 2016 Regional Transportation Plan/Sustainable Communities Strategy (2016 RTP/SCS) are integrated into the 2016 AQMP. This Plan builds upon the approaches taken in the 2012 AQMP for the attainment of federal PM and ozone standards and highlights the significant amount of reductions to be achieved. It emphasizes the need for interagency planning to identify additional strategies to achieve reductions within the timeframes allowed under the federal Clean Air Act, especially in the area of mobile sources. The 2016 AQMP also includes a discussion of emerging issues and opportunities, such as fugitive toxic particulate emissions, zero-emission mobile source control strategies, and the interacting dynamics among climate, energy, and air pollution. The Plan also demonstrates strategies for attainment of the new federal eight-hour ozone standard and vehicle miles travelled (VMT) emissions offsets, pursuant to recent USEPA requirements (SCAQMD 2017).

Air Emission Thresholds

CEQA Guidelines Section 15064.7 provide that, when available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make determinations of significance. These thresholds are designed such that a project that would not exceed the adopted thresholds would not have an individually or cumulatively significant impact on the Basin's air quality. Therefore, a project that does not exceed these SCAQMD thresholds would have a less than significant impact. This Initial Study conforms to the methodologies recommended in the SCAQMD's *CEQA Air Quality Handbook* (1993) and supplemental guidance provided by the SCAQMD, including recommended thresholds for emissions associated with both construction and operation of the project (SCAQMD 2015).

Table 2 presents the significance thresholds for construction and operational-related criteria air pollutant and precursor emissions being used for the purposes of this analysis. These represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the Basin's existing air quality conditions. For the purposes of this analysis, the proposed project would result in a significant impact if construction or operational emissions would exceed any of the thresholds shown in Table 3.

Table 3 SCAQMD Regional Significance Thresholds

Construction Thresholds	Operational Thresholds
75 pounds per day of VOC	55 pounds per day of VOC
100 pounds per day of NO_X	55 pounds per day of NO_X
550 pounds per day of CO	550 pounds per day of CO
150 pounds per day of SO_X	150 pounds per day of SO_X
150 pounds per day of PM_{10}	150 pounds per day of PM_{10}
55 pounds per day of $PM_{2.5}$	55 pounds per day of $PM_{2.5}$

VOC = volatile organic compounds; NO_x = nitrogen oxides; CO = carbon monoxide; SO_x = sulfur oxides

Source: SCAQMD 2019

Localized Significance Thresholds

In addition to the above regional thresholds, the SCAQMD has developed Localized Significance Thresholds (LSTs) in response to the Governing Board's Environmental Justice Enhancement Initiative (1-4), which was prepared to update the *CEQA Air Quality Handbook* (1993). LSTs were devised in response to concern regarding exposure of individuals to criteria pollutants in local communities and have been developed for NO_X, CO, PM_{10}, and $PM_{2.5}$. LSTs represent the maximum emissions from a project that will not cause or contribute to an air quality exceedance of the most stringent applicable federal or state ambient air quality standard at the nearest sensitive receptor, taking into consideration ambient concentrations in each source receptor area (SRA), distance to the sensitive receptor, and project size. LSTs have been developed for emissions generated in construction areas up to five acres in size. However, LSTs only apply to emissions in a fixed stationary location and are not applicable to mobile sources, such as cars on a roadway (SCAQMD 2008a). As such, LSTs are typically applied only to construction emissions because most operational emissions are associated with project-generated vehicle trips.

The project site is in Source Receptor Area 3 (SRA-3, Southwest Coastal Los Angeles County) (SCAQMD 2008a). Sensitive receptors closest to the project site consist of multi-family residences and a church immediately to the north; multi-family residences immediately to the east and churches across North Broadway; multi-family residences to the south across Emerald Street; and multi-family residences to the west across North Catalina Avenue. The SCAQMD's publication *Final Localized Significant (LST) Thresholds Methodology* (2008) provides LSTs for receptors at a distance of 82 to 1,640 feet (25 to 500 meters) from the project site boundary. According to the SCAQMD, projects with boundaries located closer than 82 feet to the nearest receptor should use the LSTs for receptors located at 82 feet. Therefore, Table 4 summarizes the LSTs for a 1.26-acre site in SRA 3 with sensitive receptors located at a distance of 82 feet.

Table 4 SCAQMD LSTs for Construction Emissions

Pollutant	Allowable Emissions from a one-acre site in SRA-3 for a receptor 82 feet away
Gradual conversion of NO_X to NO_2	91
CO	664
PM_{10}	5
$PM_{2.5}$	3

NO_x = nitrogen oxides; NO2; CO = carbon monoxide; PM_{10} = particulate matter measuring 10 microns or less in diameter; $PM_{2.5}$ = particulate matter measuring 2.5 microns or less in diameter

Source: SCAQMD 2009

a. Would the project conflict with or obstruct implementation of the applicable air quality plan?

A project may be inconsistent with the AQMP if it would generate population, housing, or employment growth exceeding the forecasts used in the development of the AQMP. The 2016 AQMP relies on local general plans and the SCAG 2016 RTP/SCS forecasts of regional population, housing, and employment growth in its own projections for managing air quality in the Basin.

The growth projections used by the SCAQMD to develop the AQMP emissions budgets are based on the population, vehicle trends, and land use plans developed in general plans and used by SCAG in the development of the 2016 RTP/SCS. As such, projects that are consistent with the growth anticipated by SCAG's growth projections and/or the General Plan would not conflict with the AQMP. If a project is less dense than anticipated by the growth projections, the project would likewise be consistent with the AQMP.

The proposed project involves construction of 22 townhomes, eight apartments, and the rehabilitation and reuse of existing commercial buildings on a site that is currently zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). As discussed in Section 11, *Land Use and Planning*, the R-3A zone and land use designation permit low-density multi-family residential land uses, including townhomes and apartment buildings. Therefore, the proposed project would be consistent with the site's current zoning and General Plan designation.

As discussed in Section 14, *Population and Housing,* according to the California Department of Finance (DOF), the City has an estimated population of 66,994 with an average household size of 2.3 persons (California DOF 2020). SCAG estimates that the City's population will increase to 74,400 by 2040, an increase of approximately 11.1 percent or 7,406 persons (SCAG 2016). Demolition of an existing commercial building, rehabilitation and reusage of four existing commercial buildings, and construction of 22 townhomes and eight apartments would generate 130 bedrooms and increase the existing population by approximately 299 residents[1] (an approximately 0.5 percent increase from the existing population) to 67,293, which would be within SCAG's 2040 population forecast.

According to California DOF estimates, the City has an existing housing stock of 30,892 units, which SCAG forecasts will increase by 2,108 units (an approximately seven percent increase) to 33,000 units by 2040 (California DOF 2020; SCAG 2016). Construction of the proposed 22 new townhomes and eight apartment units would represent approximately 1.4 percent of this projected increase in housing units, which would not exceed SCAG's 2040 housing units forecast.

Therefore, the project would not conflict with the SCAQMD's AQMP and the potential population and housing increase generated by the proposed project would not substantially alter air quality conditions in the Basin and would not generate emissions that would adversely affect regional air quality. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard?*

c. *Would the project expose sensitive receptors to substantial pollutant concentrations?*

Air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development, and the SCAQMD develops and implements plans for future attainment of ambient air quality standards. Based on these considerations, project-level thresholds of significance for criteria pollutants are relevant in the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. If a project's emissions would exceed the SCAQMD significance thresholds, it is considered to have a cumulatively considerable contribution. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant.

As discussed under *Air Quality Standards and Attainment* of this section, the Basin has been designated as a federal nonattainment area for O_3 and $PM_{2.5}$ and a State nonattainment area for O_3, PM_{10}, and $PM_{2.5}$. The Los Angeles County portion of the Basin is designated in nonattainment for lead, as well. The Basin is designated unclassifiable or in attainment for all other federal and State standards. The proposed project does not include any stationary sources of lead emissions.

Construction activities such as the operation of construction vehicles and equipment over unpaved areas, grading, trenching, and disturbance of stockpiled soils have the potential to generate fugitive dust (PM_{10}) through the exposure of soil to wind erosion and dust entrainment. In addition, exhaust emissions associated with heavy construction equipment would potentially degrade air quality. Construction activities could also potentially expose nearby sensitive receptors to substantial pollutant concentrations.

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[1] This analysis conservatively applies the City's average household size of 2.3 persons to the project's bedroom count of 130 bedrooms rather than the project's unit count of 30 units.

Long-term emissions associated with operational impacts would include area sources, energy sources, and mobile emissions. Area sources include use of consumer products, use of gas-powered landscaping equipment, re-application of architectural coating (re-painting), and use of fireplaces/hearths. Energy sources include natural gas for uses such as heating/air conditioning, appliances, lighting, and water heating. Mobile emissions include vehicle trips (including residents, employees, deliveries, and visitors).

Impacts related to temporary construction-related air pollutant emissions, long-term operational emissions, and the exposure of sensitive receptors to pollutants may be potentially significant and will be analyzed further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

c. Would the project expose sensitive receptors to substantial pollutant concentrations?

d. Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of the receiving location, each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the project, which would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment and architectural coatings. Such odors would disperse rapidly from the project site, generally occur at magnitudes that would not affect substantial numbers of people and would be limited to the construction period. Impacts associated with odors during construction would be temporary and less than significant. With respect to operation, the SCAQMD's *CEQA Air Quality Handbook* (1993) identifies land uses associated with odor complaints as agricultural uses, wastewater treatment plants, chemical and food processing plants, composting, refineries, landfills, dairies, and fiberglass molding. Residential and commercial uses are not identified on this list and no odor-producing uses are in the project vicinity. In addition, solid waste generated by the proposed on-site uses would be collected by a contracted waste hauler, ensuring that odors resulting from on-site waste would be managed and collected in a manner to prevent the proliferation of odors. Therefore, the proposed project would not generate objectionable odors affecting a substantial number of people, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

4 Biological Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	■	☐	☐	☐
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	■
c. Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	■
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☐	■
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	■	☐
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	■

The analysis presented in this section is based on a review of available technical information regarding biological resources in the project vicinity. In order to obtain comprehensive information regarding the presence or potential presence of sensitive biological resources (including special status species, sensitive communities, and jurisdictional waters and wetlands) in the vicinity of the project site, queries of the United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS): Information, Planning and Conservation System (IPaC) (USFWS 2020a), USFWS Critical Habitat Portal (USFWS 2020b), USFWS National Wetland Inventory (NWI) (USFWS 2020c), California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) (CDFW 2020a), CDFW Biogeographic Information and Observation System (BIOS) (CDFW 2020b) and California Native Plant Society (CNPS) Online Inventory of Rare, Threatened and Endangered Plants of California (CNPS 2020) were conducted.

a. *Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

Special status species are those plants and wildlife listed, proposed for listing, or candidates for listing as Threatened or Endangered by the USFWS under the Federal Endangered Species Act (FESA); those considered “Species of Concern” by the USFWS; those listed or candidates for listing as Rare, Threatened, or Endangered by the CDFW under the California Endangered Species Act (CESA); animals designated as “Fully Protected” by the California Fish and Game Code (CFGC); wildlife listed as Species of Special Concern by the CDFW; and plants with CNPS California Rare Plant Ranks (CRPR) of 1B, 2, 3, and 4. The potential for special status plant and wildlife species to occur at the project site was assessed based on a review of a five-mile search of the CNDDB (CDFW 2020b) and nine-quadrangle search of the CNPS (CNPS 2020).

The project site is approximately one-quarter mile east of the Pacific Ocean, located in an urban area and is currently developed with commercial and parking uses. Vegetation on site is limited to ornamental trees, primarily including Mexican fan palm (*Washingtonia robusta*), and other landscaping contained in small areas within parking lots and store frontages. Given the developed nature of the project site in a predominantly urban area, the project site does not provide suitable habitat for special status species. As such, the project site is not expected to support any candidate, sensitive or special status species and none have a moderate or high potential to occur. Therefore, development of the proposed project would not have a substantial, adverse effect on such species.

While common birds are not designated as special status species, destruction of their eggs, nests, and nestlings is prohibited by federal and State law. The vegetation present on the project site could provide nesting habitat for common resident birds. Several large ornamental trees onsite could provide low-quality potential habitat for nesting raptors. Nesting birds are protected under the CFGC Sections 3503, 3503.5, and 3513 as well as the Migratory Bird Treaty Act (MBTA). Violation of these provisions would be considered a potentially significant impact. The project could directly (e.g., vegetation removal) and indirectly (e.g., construction noise and motion) affect nesting of these species. Therefore, because the proposed project could potentially affect nesting species, impacts are considered potentially significant and will be examined further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

b. *Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

Plant communities are considered sensitive biological resources if they have limited distributions, have high wildlife value, including sensitive species, or are particularly susceptible to disturbance. CDFW ranks sensitive communities as “threatened” or “very threatened” and keeps records of their occurrences in the CNDDB. The project is in a developed urban area and is not located within a vegetated or open space area. The only vegetation present on site is landscaping, consisting of sparse, ornamental shrubs and planted trees. These existing trees and shrubs do not constitute a sensitive natural community. Additionally, there is no riparian habitat on or near the project site (USFWS 2020c). Therefore, the proposed project would not have a substantial adverse effect on riparian habitat or other sensitive natural communities as none exist on the site or in nearby areas. No impact would occur.

NO IMPACT

c. *Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

As examined under impact discussions *a.* and *b.* of this section, the project site is in an urban area. No riparian habitats, wetlands, or other water features have been identified on or adjacent to the project site (USFWS 2020c). Further, the project site does not include any discernable drainage courses, inundated areas, wetland vegetation, or hydric soils (USDA 2020). As a result, no state or federally protected wetlands or other waters that may be considered jurisdictional by the CDFW, United State Army Corps of Engineers (USACE), or Regional Water Quality Control Board (RWQCB) occur on or adjacent to the project site. Therefore, the proposed project would not directly or indirectly have a substantial adverse effect on State or federally protected wetlands or other jurisdictional waters. No impact would occur.

NO IMPACT

d. *Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

Wildlife corridors are generally defined as connections between habitat areas that allow for physical and genetic exchange between otherwise isolated animal populations. Such linkages may serve a local purpose, such as between foraging and denning areas, or they may be regional in nature, allowing movement across the landscape. Some habitat linkages may serve as migration corridors, wherein animals periodically move away from an area and then subsequently return. Examples of barriers or impediments to movement include housing and other urban development, roads, fencing, unsuitable habitat, or open areas with little vegetative cover.

As examined under impact discussions *a.* through *c.* of this section, the project site is developed with commercial and parking uses in an urban area. The site is separated from any open space areas by existing development and roadways. The project site does not contain any natural communities or habitat areas that would be expected to support populations of native wildlife nurseries or movement. While the project site contains trees, these trees are ornamental and are not a part of larger habitat area; they are surrounded by development and do not form a natural community or constitute a habitat area.

Due to their fully developed nature as described above, the project site and surrounding area do not contain any natural or physical features that connect habitat areas, and impacts to the movement of native or resident species or on the use of native wildlife nursery sites resulting from the proposed project are not expected. Therefore, no impact would occur.

NO IMPACT

e. *Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

While the project site is located in the Coastal Zone, it is not located in or adjacent to areas with suitable habitat to support Environmental Sensitive Habitat Areas or special status species. Vegetation on-site is limited to trees and other ornamental landscaping, which would be removed during construction. According to Section 10-2.1900, Street Tree Requirements, of the RBMC, no existing street tree shall be removed without the approval of the City. In addition, street tree species, size, spacing, and planting standards will be subject to approval of the Superintendent of Parks. The Superintendent of Parks shall select street trees taking into consideration the following criteria: that the selected tree as proposed to be located will not harm public sidewalks, streets, and infrastructure; that the tree is consistent with water conservation objectives; that the tree requires low maintenance and no pesticides; that the tree will enhance the visual character and identity of City streets; and that the tree complements appropriate existing street trees. The City does not have any additional ordinances or polices protecting biological resources. Removal of street trees due to project implementation would be completed in accordance with RBMC Section 10-2.1900. Therefore, the proposed project would not conflict with any local policies or ordinances protecting biological resources, and the impact would be less than significant.

LESS THAN SIGNIFICANT IMPACT

f. *Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?*

There are no adopted Habitat Conservation or Natural Community Conservation Plans in the City of Redondo Beach. Further, there are also no approved local, regional, or state habitat conservation plans in the City. Therefore, no impacts would occur.

NO IMPACT

5 Cultural Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	■	☐	☐	☐
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	■	☐	☐	☐
c. Disturb any human remains, including those interred outside of formal cemeteries?	■	☐	☐	☐

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Public Resources Code [PRC], Section 21084.1) and tribal cultural resources (PRC Section 21074 [a][1][A]-[B]). Tribal cultural resources are discussed in Section 18, below.

A historical resource is a resource listed in, or determined to be eligible for listing in, the California Register of Historical Resources (CRHR); a resource included in a local register of historical resources; or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (CEQA Guidelines, Section 15064.5[a][1-3]).

A resource shall be considered historically significant if it:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage
2. Is associated with the lives of persons important in our past
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history

In addition, if it can be demonstrated that a project would cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that resources cannot be left undisturbed, mitigation measures are required (PRC, Section 21083.2[a], [b]).

PRC, Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

2. Has a special and particular quality such as being the oldest of its type or the best available example of its type; or
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person.

a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?

Kaplan Chen Kaplan completed a Historic Resource Evaluation in November 2020. None of the buildings at the project site (112 North Catalina Avenue, 116 North Catalina Avenue, 124 North Catalina Avenue, 126 North Catalina Avenue and 132 North Catalina Avenue) meet the criteria to be eligible for inclusion on the National Register of Historic Places or for the California Register of Historical Resources (Kaplan Chen Kaplan 2020). However, the report concluded that the properties at 112 North Catalina Avenue and 126 North Catalina Avenue appear eligible as City of Redondo Beach individual landmarks; and the buildings at 112 North Catalina Avenue, 124 North Catalina Avenue, 126 North Catalina Avenue and 132 North Catalina Avenue are eligible contributing buildings to a City of Redondo Beach Historic District. Therefore, the proposed project has the potential to impact historic resources and this issue will be further discussed in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

c. Would the project disturb any human remains, including those interred outside of formal cemeteries?

Although the project area has been developed for the last 70 years, there is potential for archeological resources and/or human remains to exist below the ground surface of the project area, which could be disturbed by grading and excavation activities associated with the proposed project. Therefore, the proposed project has the potential to impact archaeological resources or human remains and this issue will be further discussed in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

6 Energy

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	■	☐
b. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	■	☐

a. Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

The proposed project would use nonrenewable resources for construction and operation of the project. Natural resources that would be utilized by the project include petroleum-based fuels for vehicles and equipment, operational building energy usage, and operational water consumption. The anticipated use of these resources is detailed in the following subsections. As supported by the discussion below, the proposed project would not create energy demand that would result in a significant environmental impact.

Construction Energy Demand

During project construction, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel to and from the project site, and vehicles used to deliver materials to the site and export soil and demolition material from the site. Project construction would require demolition, site preparation, grading, pavement and asphalt installation, building construction, architectural coating, and landscaping and hardscaping. As shown in Table 5, project construction would require approximately 13,900 gallons of gasoline and approximately 82,800 gallons of diesel fuel. These construction energy estimates are conservative because they assume that the construction equipment used in each phase of construction is operating every day of construction.

Table 5 Estimated Fuel Consumption during Construction

	Fuel Consumption (gallons)	
Source	Gasoline	Diesel
Construction Equipment & Hauling Trips	–	82,770
Construction Worker Vehicle Trips	13,888	–

See Appendix IS-2 for energy calculation sheets.

Energy use during construction would be temporary in nature, and construction equipment used would be typical of similar-sized construction projects in the region. In addition, construction contractors would be required to comply with the provisions of California Code of Regulations Title 13 Sections 2449 and 2485, which prohibit diesel-fueled commercial motor vehicles and off-road diesel vehicles from idling for more than five minutes and would minimize unnecessary fuel consumption. Construction equipment would be subject to the USEPA Construction Equipment Fuel Efficiency Standard, which would also minimize inefficient, wasteful, or unnecessary fuel consumption. Furthermore, per applicable regulatory requirements such as California's Green Building Standards Code (CALGreen; California Code of Regulations, Title 24, Part 11), the project would comply with construction waste management practices to divert a minimum of 65 percent of construction and demolition debris. These practices would result in efficient use of energy necessary to construct the project. In the interest of cost-efficiency, construction contractors also would not utilize fuel in a manner that is wasteful or unnecessary. Therefore, the project would not involve the inefficient, wasteful, and unnecessary use of energy during construction, and the construction-phase impact related to energy consumption would be less than significant.

Operational Energy Demand

Operation of the project would primarily contribute to area energy demand by consuming gasoline and diesel fuel for vehicle trips to and from the site. Natural gas and electricity would be used for heating and cooling systems, lighting, appliances, water use, and the overall operation of the project. The estimated number of average daily trips associated with the project is used to determine the energy consumption associated with vehicle fuel use from operation of the project. CalEEMod was used to estimate the project's electricity and natural gas demand.

Table 6 summarizes estimated operational energy consumption for the proposed project and existing uses on the site. As shown therein, project operation would require approximately 140,200 gallons of gasoline and 36,200 gallons of diesel for transportation fuels. The project would require 0.12 gigawatt hour (GWh) of electricity per year and natural gas use for appliances and heating, ventilation, and air conditioning (HVAC) would require approximately 12,345 U.S. therms per year. Transportation of workers, customers, and deliveries would represent the greatest operational use of energy associated with the proposed project. As shown in Table 6, the proposed project would result in increased transportation fuel use due to the increased VMT associated with the proposed project. Existing operational uses on the project site are estimated to consume more electricity than the proposed project due to the energy efficiency components of the project. Natural gas consumption for the project would be higher than the existing uses on the site due to increased appliance and HVAC use associated with the proposed residential units. As illustrated in Table 6, the proposed project would result in a net increase of energy use on the project site due to the increased development intensity proposed.

Table 6 Estimated Project and Existing Annual Operational Energy Consumption

Source	Energy Consumption[1]	
Proposed Project		
Transportation Fuels[2]		
Gasoline	140,235 gallons	15,396 MMBtu
Diesel	36,173 gallons	4,611 MMBtu
Electricity	0.12 GWh	412 MMBtu
Natural Gas Usage	12,345 U.S. therms	1,148 MMBtu
Total Energy Consumption		**21,567 MMBtu**
Existing Uses		
Transportation Fuels[2]		
Gasoline	84,202 gallons	9,244 MMBtu
Diesel	20,876 gallons	2,661 MMBtu
Electricity	0.21 GWh	708 MMBtu
Natural Gas Usage	288 U.S. therms	27 MMBtu
Total Existing Energy Consumption		**12,640 MMBtu**
Net Energy Consumption (Proposed-Existing)[3]		
Transportation Fuels		
Gasoline	56,033 gallons	6,152 MMBtu
Diesel	15,297 gallons	1,950 MMBtu
Electricity	(0.09) GWh	(296) MMBtu
Natural Gas Usage	12,057 U.S. therms	1,121 MMBtu
Project Net Energy Consumption		**8,927 MMBtu**

MMBtu: million metric British thermal units; GWh: Gigawatt hours

[1] Energy consumption is converted to MMBtu for each source

[2] The estimated number of average daily trips associated with the project is used to determine the energy consumption associated with fuel use from operation of the project. According to CalEEMod calculations (see Appendix IS-1), the project would result in approximately 1,635,472 annual VMT, whereas existing uses result in approximately 979,023 annual VMT.

[3] Parentheses indicate negative values

See Appendix IS-2 for transportation energy calculation sheets and Appendix IS-1 for CalEEMod output results for electricity and natural gas usage.

Though the project would result in increased energy consumption compared to existing uses, the project would comply with all standards established in California Building Code (CBC) Title 24, which would minimize the wasteful, inefficient, or unnecessary consumption of energy resources during operation. California’s Green Building Standards Code (CALGreen; California Code of Regulations, Title 24, Part 11) requires implementation of energy efficient light fixtures and building materials into the design of new construction projects. Furthermore, the 2019 Building Energy Efficiency Standards (CBC Title 24, Part 6) requires newly constructed buildings to meet energy performance standards set by the Energy Commission. These standards are specifically crafted for new buildings to result in energy efficient performance so that the buildings do not result in wasteful, inefficient, or unnecessary consumption of energy. The standards are updated every three years and each iteration is more energy efficient than the previous standards. Furthermore, the project would continue to reduce its use of nonrenewable energy resources as the electricity generated by renewable resources provided by SCE continues to increase to comply with State requirements through Senate Bill (SB) 100, which requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.

To help achieve Title 24 reduction targets, the project applicant proposes to incorporate several energy efficient features into overall project design. Energy efficient design features include use of passive solar by including large windows, energy-efficient appliances and lighting, high-efficiency irrigation systems, water-efficient indoor fixtures throughout the project site, rooftop solar panels, and water-efficient landscaping irrigation. Approximately ten percent of the project's total parking would be equipped with EV charging outlets. In addition, the project would include 15 common and 22 private on-site bicycle parking spaces.

Operation of the project would consume fuel, natural gas, and electricity; however, the project would conform to the latest version of California's Green Building Standards Code and Building Energy Efficiency Standards and would therefore not lead to wasteful, inefficient, or unnecessary consumption of energy resources. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

The City of Redondo Beach has not adopted a renewable energy or energy efficiency plan. However, as discussed further in Section 8, *Greenhouse Gas Emissions*, the City has adopted a Climate Action Plan (CAP) which contains policies for the conservation of energy resources. The project would be designed to comply with the performance levels of the latest version of the California Green Building Standards Code, which would reduce energy consumption compared to standard building practices. The proposed project would be required to comply with the residential and nonresidential mandatory measures in the 2019 California Green Building Standards Code, Title 24, Part 11. The proposed project would also be required to comply with the energy standards in the California Energy Code, Part 6 of the California Building Standards Code (Title 24). Measures to meet these energy standards may include rooftop solar panels, low-flow plumbing fixtures, water-efficient irrigation systems, high-efficiency HVAC and hot water storage tank equipment, and lighting conservation features. As illustrated in Table 9, the project would not conflict with the policies and goals, including energy efficiency-related measures, of the CAP. Therefore, the project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

7 Geology and Soils

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
1. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?	☐	☐	■	☐
2. Strong seismic ground shaking?	☐	☐	■	☐
3. Seismic-related ground failure, including liquefaction?	☐	☐	■	☐
4. Landslides?	☐	☐	■	☐
b. Result in substantial soil erosion or the loss of topsoil?	☐	☐	■	☐
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	■	☐
d. Be located on expansive soil, as defined in Table 1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	■	☐	☐	☐
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	■
f. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	■	☐	☐	☐

A Geotechnical Engineering Investigation was prepared for the project site , which concluded that the proposed project is feasible from a geotechnical engineering standpoint, provided that the recommendations presented in the report are adhered to during planning and construction of the project, to the satisfaction of the Department of Building and Safety (Geotechnologies, Inc. 2019; see Appendix IS-3). The following is based on the information and analysis contained in the project specific Geotechnical Engineering Investigation.

a.1. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

The project site is located in a seismically active area of southern California; however, according to the California Geological Survey (CGS), the project site is not located in an Alquist-Priolo Fault Zone (CGS 2020). There are no faults present on the project site, and the nearest fault to the project site is the Palos Verdes Fault Zone, located less than two miles southwest of the site (CGS 1986; CGS 2020).

To reduce geologic and seismic impacts, the City's General Plan Environmental Hazards/Natural Hazards Element (1993) includes goals, objectives, and policies intended to reduce death, injuries, damage to property, and economic and social dislocation due to earthquakes and related geologic hazards. In addition, the project would comply with the CBC (Title 24), which establishes minimum standards to safeguard the public health, safety, and general welfare through structural strength, means of egress, and general stability by regulating and controlling the design, construction, quality of materials, use and occupancy, location, and maintenance of all building and structures within its jurisdiction. The impact to people, buildings, or structures from fault rupture would be reduced by the required conformance with applicable building codes and accepted engineering practices. Nonetheless, due to the project's location from an Alquist-Priolo mapped zone, the project would not directly or indirectly cause potential adverse effects related to rupture of a known earthquake fault. Potential impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.2. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

As discussed under impact discussion *a.1.* of this section, the project site is situated in the seismically active Southern California Region and is therefore susceptible to ground shaking during a seismic event. Although the nearest mapped fault (i.e., the Palos Verdes Fault Zone) is located less than two miles southwest of the site, strong ground shaking at the site may occur in the event of a sufficiently large earthquake on this or other nearby faults, such as the Newport-Inglewood Fault located approximately eight miles northeast of the site.

As discussed under impact discussion *a.1.,* the City's General Plan Environmental Hazards/Natural Hazards Element (1993) includes goals, objectives, and policies intended to reduce death, injuries, damage to property, and economic and social dislocation due to earthquakes and related geologic hazards. The City also regulates development through the requirements of the CBC. The earthquake design requirements of the CBC consider the occupancy category of the structure, site class, soil classifications, and various seismic coefficients. The CBC provides standards for various aspects of construction, including but not limited to excavation, grading, earthwork, construction, preparation of the site prior to fill placement, specification of fill materials, fill compaction and field testing, retaining wall design and construction, foundation design and construction, and seismic requirements. It includes provisions to address issues such as (but not limited to) construction on expansive soils and soil strength loss. In accordance with California law, project design and construction would be required to comply with provisions of the CBC. Because the project would comply with the CBC and because the project would not exacerbate existing ground shaking hazards, impacts related to seismically induced ground shaking would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.3. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

Liquefaction is a process whereby soil is temporarily transformed to fluid form during intense and prolonged ground shaking or because of a sudden shock or strain. Liquefaction typically occurs in areas where the groundwater is less than 30 feet from the surface and where the soils are composed of poorly consolidated fine to medium sand. According to the CGS, the project site is not located in a liquefaction zone (CGS 2020). Based on the findings in the geotechnical study, groundwater was not encountered during boring activities within the project site, which reached depths of up to 50 feet below ground surface (Geotechnologies, Inc. 2019; see Appendix IS-3). Design and construction of the proposed project would conform to the current seismic design provisions of the CBC. The 2019 CBC incorporates the latest seismic design standards for structural loads and materials, as well as provisions from the National Earthquake Hazards Reduction Program, to mitigate losses from an earthquake and provide for the latest in earthquake safety. While the project would be susceptible to seismic activity given its location within a seismically active area, the project would be required to minimize this risk, to the extent feasible, through the incorporation of applicable CBC standards. Therefore, the potential effects of differential settlement as a result of liquefaction would be reduced to a less than significant level.

LESS THAN SIGNIFICANT IMPACT

a.4. Would the project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

According to the CGS, the project site is not located in an area subject to landslides caused by earthquakes, nor is it downslope from an area subject to seismically induced landslides (CGS 2020). The project site and surrounding area are relatively flat. Implementation of the project would not exacerbate the existing risk of earthquake-induced landslides in the immediate vicinity because the project would not directly result in a seismic event or destabilize soils prone to landslide. Therefore, the risk of earthquake-induced landslides at the project site is low and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project result in substantial soil erosion or the loss of topsoil?

The project involves construction of 22 townhomes; a four-unit apartment building and adaptive reuse of an existing building for use as four apartment units; and the rehabilitation and re-use of existing commercial buildings on a site that is currently zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). Construction activities involving soil disturbance, such as excavation, stockpiling, and grading could result in increased erosion and sediment transport by stormwater to surface waters. Fugitive dust caused by strong wind and/or earth-moving operations during construction would be minimized through compliance with SCAQMD Rule 403, which prohibits visual particulate matter from crossing property lines. Standard practices to control fugitive dust emissions include watering of active grading sites, covering soil stockpiles with plastic sheeting, and covering soils in haul trucks with secured tarps. Furthermore, construction of the proposed project would be required to comply with a Construction General Permit, which is issued by the State Water Resources Control Board (SWRCB). The Construction General Permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP), which outlines best management practices (BMP) to reduce erosion and topsoil loss from stormwater runoff (also refer to the discussion in Section 10, *Hydrology and Water Quality*). Compliance with the Construction General Permit would ensure that BMPs are implemented during construction and minimize substantial soil erosion or the loss of topsoil. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

Lateral spreading is the horizontal movement or spreading of soil toward an open face. Lateral spreading may occur when soils liquefy during an earthquake event, and the liquefied soils with overlying soils move laterally to unconfined spaces. Subsidence is the sudden sinking or gradual downward settling of the earth's surface with little or no horizontal movement. Subsidence is caused by a variety of activities that include, but are not limited to, withdrawal of groundwater, pumping of oil and gas from underground, the collapse of underground mines, liquefaction, and hydrocompaction.

As examined under impact discussion *a.1.* of this section, although the proposed project is in a seismically active area, the project site is not located on unstable soils or a geologic unit at risk for liquefaction or landslides. The project site consists of compact, relatively flat land that is surrounded by developed land. According to the Geotechnical Engineering Investigation (Appendix IS-3), artificial fill underlying the project site consists of moist, medium dense, dark brown fine-grained silty sands to approximately three feet below ground surface. Artificial fill is underlain by native alluvial soils; consisting of moist to very moist, medium dense to very dense, yellowish-brown to dark brown, fine to medium-grained silty sands. Construction and operation of the proposed project would not involve activities known to cause or trigger subsidence and is not anticipated to adversely affect soil stability or increase the potential for local or regional landslides, subsidence, liquefaction, or collapse. Lastly, the project would comply with CBC requirements. Because the project would not create or exacerbate conditions related to unstable soils, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. Would the project be located on expansive soil, as defined in Table 1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Expansive soils are highly compressible, clay-based soils that tend to expand as they absorb water and shrink as water is drawn away. According to the Geotechnical Engineering Investigation (Appendix IS-3), artificial fill underlying the project site consists of moist, medium dense, dark brown fine-grained silty sands to approximately three feet below ground surface. Artificial fill is underlain by native alluvial soils; consisting of moist to very moist, medium dense to very dense, yellowish-brown to dark brown, fine to medium-grained silty sands. The presence of groundwater in the project site is reported to exceed 50 feet below ground surface (Geotechnologies, Inc. 2019). In addition, laboratory testing performed on representative samples of the near surface soils indicates that the soils possess a low expansion range. Because the project site contains moderately compressible soils, development could pose an indirect or direct risk to life or property and impacts could be potentially significant. Further analysis of this issue will be discussed in the EIR.

POTENTIALLY SIGNIFICANT IMPACT

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

The proposed project would be served by the City's existing sewer system and no septic tanks are proposed for the project. Therefore, there is no potential for adverse effects due to soil incompatibility with septic tanks. No impact would occur.

NO IMPACT

f. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Los Angeles County is situated within the Transverse Ranges Geologic Province and the City of Redondo Beach is situated within the area known as the Los Angeles Basin. The Los Angeles Basin is located within the Peninsular Ranges. There is the potential for paleontological resources to exist below the ground surface throughout the City. Such resources could be disturbed by grading and excavation activities associated with new housing development. Therefore, project development has the potential to impact paleontological resources and this issue will be discussed further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

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8 Greenhouse Gas Emissions

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	■	☐
b. Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	■	☐

Overview of Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period of time. Climate change is the result of numerous, cumulative sources of GHG emissions contributing to the "greenhouse effect," a natural occurrence which takes place in Earth's atmosphere and helps regulate the temperature of the planet. The majority of radiation from the sun hits Earth's surface and warms it. The surface, in turn, radiates heat back towards the atmosphere in the form of infrared radiation. Gases and clouds in the atmosphere trap and prevent some of this heat from escaping into space and re-radiate it in all directions.

GHG emissions occur both naturally and as a result of human activities, such as fossil fuel burning, decomposition of landfill wastes, raising livestock, deforestation, and some agricultural practices. GHGs produced by human activities include carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100 years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, methane has a GWP of 28, meaning its global warming effect is 28 times greater than CO_2 on a molecule per molecule basis (IPCC 2014).[2]

Anthropogenic activities since the beginning of the industrial revolution (approximately 250 years ago) are adding to the natural greenhouse effect by increasing the concentration of GHGs in the atmosphere that trap heat. Since the late 1700s, estimated concentrations of CO_2, methane, and

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[2] The IPCC's (2014) *Fifth Assessment Report* determined that methane has a GWP of 28. However, the 2017 Climate Change Scoping Plan published by the California Air Resources Board uses a GWP of 25 for methane, consistent with the IPCC's (2007) *Fourth Assessment Report*. Therefore, this analysis utilizes a GWP of 25.

nitrous oxide in the atmosphere have increased by over 43 percent, 156 percent, and 17 percent, respectively, primarily due to human activity (United States Environmental Protection Agency 2020). Emissions resulting from human activities are thereby contributing to an average increase in Earth's temperature. Potential climate change impacts in California may include loss of snowpack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (State of California 2018).

Regulatory Framework

In response to climate change, California implemented Assembly Bill (AB) 32, the "California Global Warming Solutions Act of 2006." AB 32 required the reduction of statewide GHG emissions to 1990 emissions levels (essentially a 15 percent reduction below 2005 emission levels) by 2020 and the adoption of rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions. On September 8, 2016, the Governor signed Senate Bill 32 into law, extending AB 32 by requiring the State to further reduce GHG emissions to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, the California Air Resources Board (CARB) adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program and the Low Carbon Fuel Standard, and implementation of recently adopted policies and legislation, such as SB 1383 (aimed at reducing short-lived climate pollutants including methane, hydrofluorocarbon gases, and anthropogenic black carbon) and SB 100 (discussed further below) . The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends local governments adopt policies and locally-appropriate quantitative thresholds consistent with a statewide per capita goal of six metric tons (MT) of carbon dioxide equivalents (CO_2e) by 2030 and two MT of CO_2e by 2050 (CARB 2017).

Other relevant state laws and regulations include:

- **SB 375:** The Sustainable Communities and Climate Protection Act of 2008 (SB 375), signed in August 2008, enhances the state's ability to reach AB 32 goals by directing the CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. Metropolitan Planning Organizations are required to adopt a Sustainable Communities Strategy (SCS), which allocates land uses in the Metropolitan Planning Organization's Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. The Southern California Association of Governments (SCAG) was assigned targets of an 8 percent reduction in per capita GHG emissions from passenger vehicles from 2005 levels by 2020 and a 19 percent reduction in per capita GHG emissions from passenger vehicles from 2005 levels by 2035. SCAG adopted the 2020-2045 RTP/SCS (titled Connect SoCal) in September 2020, which meets the requirements of SB 375.
- **SB 100:** Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's Renewables Portfolio Standard Program. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045.
- **California Building Standards Code (California Code of Regulations Title 24):** The California Building Standards Code consists of a compilation of several distinct standards and codes

related to building construction including plumbing, electrical, interior acoustics, energy efficiency, and handicap accessibility for persons with physical and sensory disabilities. The current iteration is the 2019 Title 24 standards. Part 6 is the Building Energy Efficiency Standards, which establishes energy-efficiency standards for residential and non-residential buildings in order to reduce California's energy demand. Part 12 is the California Green Building Standards Code (CALGreen), which includes mandatory minimum environmental performance standards for all ground-up new construction of residential and non-residential structures.

- **City of Redondo Beach Climate Action Plan:** The City of Redondo Beach, in cooperation with the South Bay Cities Council of Governments, has developed a CAP to reduce GHG emissions in the City. The City's CAP serves as a guide for action by setting GHG emission reduction goals and establishing strategies and policies to achieve desired outcomes over the next 20 years. It identifies community-wide strategies to lower GHG emissions from a range of sources within the jurisdiction, including transportation, land use, energy generation and consumption, water, and waste. The City's CAP is a voluntary plan and was not adopted through a public process.

Methodology

Construction and operational GHG emissions were estimated using the California Emissions Estimator Model (CalEEMod), version 2016.3.2. CalEEMod uses project-specific information, including the project's land uses, square footages for different uses (e.g., multi-family residential, townhomes, retail, and parking), and location, to estimate a project's construction and operational emissions of air pollutants and GHG. CalEEMod version 2016.3.2 was used to estimate emissions associated with development of the proposed project and with operation of the existing commercial/retail uses on the project site to determine net project operational emissions.

Construction Emissions

CalEEMod calculates GHG emissions of CO_2, CH_4, and N_2O generated by construction equipment used on-site and emissions generated by vehicle trips associated with construction, such as worker, hauling, and vendor trips. Construction of the proposed project would occur in a single development phase over a period of approximately 20 months, starting in September 2021. Construction activities for the proposed project would include demolition, grading, building construction, architectural coating, and paving. The anticipated construction schedule was provided by the project applicant and the construction equipment list was based on CalEEMod defaults. In addition, based on applicant-provided information, the proposed project would include demolition of approximately 8,929 sf of existing buildings on the project site. The project would also include import of 909 cy of soil material. In accordance with the SCAQMD guidance, this analysis relies on the recommendation of the SCAQMD to amortize construction emissions over a period of 30 years (the assumed life of the project), add amortized construction emissions to operational emissions, so that GHG reduction measures will address construction GHG emissions as part of the operational GHG reduction strategies (SCAQMD 2008).

Operational Emissions

CalEEMod calculates operational emissions of CO_2, CH_4, and N_2O associated with energy use, area sources, waste generation, water use and conveyance as well as CO_2 and CH_4 emissions associated with mobile sources. Because the project would be operational post-2020, the project's emissions were modeled for 2030 in order to provide a more accurate comparison to 2030 targets per SB 32.

The default electricity consumption values in CalEEMod include the CEC-sponsored California Commercial End Use Survey and Residential Appliance Saturation Survey studies. CalEEMod currently incorporates California's 2016 Title 24 building energy efficiency standards; however, the proposed project be constructed in accordance with the 2019 Title 24 building energy requirements. In accordance with Section 150.1(b)14 of the 2019 Building Energy Efficiency Standards, all new residential uses under three stories must install photovoltaic solar panels that generate an amount of electricity equal to expected electricity usage. Therefore, residential energy use was set to zero in CalEEMod to account for the inclusion of solar panels. The residential units would also be equipped with EnergyStar appliances, which was included in CalEEMod. In addition, according to the CEC, nonresidential buildings built to the 2019 standards will use about 30 percent less energy than those built to the 2016 standards due to energy efficiency measures, particularly lighting upgrades (CEC 2018). As a result, a 30 percent reduction was included in the model for the project's Title 24 energy use for the retail components of the project.

The project would be served by SCE. Therefore, SCE's energy intensity factors (i.e., the amount of CO_2, CH_4, and N_2O per kilowatt-hour) were used to calculate GHG emissions. The default SCE energy intensity factors included in CalEEMod are based on data from 2012. As of 2012, SCE procured 20.6 percent of its electricity from renewable sources (SCE 2012); however, per SB 100, the statewide RPS Program requires electricity providers to increase procurement from eligible renewable energy sources to 33 percent by 2020, 44 percent by 2024, and 60 percent by 2030. To account for the continuing effects of the RPS, the energy intensity factors included in CalEEMod were reduced based on the percentage of renewables reported by SCE. Energy intensity factors that include this reduction are shown in Table 7.

Table 7 SCE Energy Intensity Factors

	2012 (lbs/MWh)	2030 (lbs/MWh)
Percent procurement	20.6	60[1]
Carbon dioxide (CO_2)	702.4	353.87
Methane (CH_4)	0.029	0.015
Nitrous oxide (N_2O)	0.006	0.003

[1] RPS goal established by SB 100

Source: SCE 2012

GHG emissions from water and wastewater usage calculated in CalEEMod were based on the default electricity intensity from the CEC's 2006 Refining Estimates of Water-Related Energy Use in California using the average values for northern and southern California. A 20 percent reduction in indoor potable water use was incorporated in the model in accordance with CALGreen standards. In addition, pursuant to CALGreen standards, the project would utilize a water efficient landscape irrigation system, which was included in the model.

Mobile source emissions are generated by vehicle trips to and from the project site associated with operation of on-site development. The estimated trip generation rates used in CalEEMod were based on the Traffic Impact Analysis prepared for the proposed project (Fehr & Peers 2021; Appendix IS-4). The "Increase Density" and "Integrate Below Market Rate Housing" options in CalEEMod were used to account for project design features that would reduce VMT associated with the proposed project including increased residential and employment density and the allocation of 13.3 percent of the residential apartment units as affordable housing (CARB 2020). CalEEMod calculates emissions of CO_2 and CH_4 generated by project-generated vehicle trips (i.e., mobile sources). However, CalEEMod does not calculate N_2O emissions from mobile sources; therefore, N_2O emissions were quantified separately using guidance from CARB (see Appendix IS-1 for CalEEMod worksheets).

Existing on-site development anticipated to be replaced by the proposed project includes approximately 12,675 sf of operational retail uses, including custom framing, stone and tile, dry cleaners, carpentry, and party rental businesses. Some of the existing development would be demolished while the remainder would be renovated. Because existing uses on the project site would be removed, existing operational emissions were subtracted from the proposed project's emissions to account for the net change in GHG emissions associated with the project. Existing emissions were calculated using CalEEMod defaults for the year 2030.

Significance Thresholds

The majority of individual projects do not generate sufficient GHG emissions to create significant project-specific environmental effects. However, the environmental effects of a project's GHG emissions can contribute incrementally to cumulative environmental effects that are significant, such as climate change, even if an individual project's environmental effects are limited (*CEQA Guidelines* Section 15064[h][1]). The issue of a project's environmental effects and contribution towards climate change typically involves an analysis of whether or not a project's contribution towards climate change is cumulatively considerable. Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (*CEQA Guidelines* Section 15064[h][1]).

Section 15064.4 of the *CEQA Guidelines* recommends that lead agencies quantify GHG emissions of projects and consider several other factors that may be used in the determination of significance of GHG emissions from a project, including the extent to which the project may increase or reduce GHG emissions; whether a project exceeds an applicable significance threshold; and the extent to which the project complies with regulations or requirements adopted to implement a plan for the reduction or mitigation of GHG emissions.

CEQA Guidelines Section 15064.4 does not establish a threshold of significance. Lead agencies have the discretion to establish significance thresholds for their respective jurisdictions, and in establishing those thresholds, a lead agency may appropriately look to thresholds developed by other public agencies, or suggested by other experts, as long as any threshold chosen is supported by substantial evidence (*CEQA Guidelines* Section 15064.7[c]).

According to *CEQA Guidelines* Section 15183.5, projects can tier off of a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. However, the City has not adopted a qualified GHG reduction plan; therefore, it is not appropriate to use this approach for evaluating the proposed project. Accordingly, this analysis utilizes three thresholds to evaluate the significance of the project's GHG emissions, which are discussed in the following subsections.

Per *CEQA Guidelines* Section 15064(h)(3), a project's incremental contribution to a cumulative impact can be found not cumulatively considerable if the project would comply with an approved plan or mitigation program that provides specific requirements that would avoid or substantially lessen the cumulative problem in the geographic area of the project. To qualify, such plans or programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. Examples of such programs include a "water quality control plan, air quality attainment or maintenance plan, integrated waste management plan, habitat conservation plan, natural community conservation plans [and] plans or regulations for the reduction of GHG emissions." Therefore, a lead agency can make a finding of less than significant for GHG emissions if a project complies with adopted programs, plans, policies and/or other regulatory strategies to reduce GHG emissions. The proposed project's consistency with applicable plans, policies, and regulations adopted for the purpose of reducing GHG emissions is evaluated qualitatively. A project is considered consistent with the provisions of these documents if it meets the general intent in reducing GHG emissions in order to facilitate the achievement of local- and state-adopted goals and does not impede attainment of those goals.

The City has not formally adopted a numerical significance threshold for assessing impacts related to GHG emissions and does not have a qualified GHG reduction plan under CEQA Guidelines Section 15183.5 that is applicable to the proposed project. Neither the SCAQMD, the California Office of Planning and Research, CARB, the California Air Pollution Control Officers Association (CAPCOA), or any other state or applicable regional agency has adopted a numerical significance threshold for assessing GHG emissions that is applicable to the project. In the absence of any adopted numeric threshold, the significance of the project's GHG emissions is evaluated consistent with CEQA Guidelines Section 15064.4(b) by considering whether the project complies with applicable plans, policies, regulations and requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions. For this project, the most directly applicable adopted regulatory plans to reduce GHG emissions are the 2017 Scoping Plan, the 2020-2045 RTP/SCS, and the City's CAP. Calculations of the project's GHG emissions are provided for informational purposes only and are not used herein to evaluate the significance of the project's impacts.

a. *Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?*

b. *Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

Project Consistency with Plans, Policies, and Regulations

As discussed under *Regulatory Setting* of this section, plans and policies have been adopted to reduce GHG emissions in the Southern California region, including the State's 2017 Scoping Plan, SCAG's 2020-2045 RTP/SCS, and the City of Redondo Beach's CAP. The project's consistency with these plans is discussed in the following subsections. As discussed therein, the proposed project would not conflict with plans and policies aimed at reducing GHG emissions.

2017 Scoping Plan

The principal State plan and policy addressing GHG emissions is AB 32, the California Global Warming Solutions Act of 2006, and the follow up, SB 32. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020 and the goal of SB 32 is to reduce GHG emissions to 40 percent below 1990 levels by 2030. Pursuant to the SB 32 goal, the 2017 Scoping Plan was created to outline goals and measures for the state to achieve these reductions. The 2017 Scoping Plan's goals include reducing fossil fuel use and energy demand and maximizing recycling and diversion from landfills. The project would be consistent with these goals through project design, which includes complying with the latest Title 24 Green Building Code and Building Efficiency Energy Standards and installing energy-efficient LED lighting, water-efficient faucets and toilets, and water efficient landscaping and irrigation. Therefore, the project would be consistent with the 2017 Scoping Plan.

SCAG 2020-2045 RTP/SCS

SCAG's 2020-2045 RTP/SCS is forecast to help California reach its GHG reduction goals by reducing per capita GHG emissions from passenger cars by eight percent below 2005 levels by 2020 and 19 percent by 2035 in accordance with the most recent CARB targets adopted in March 2018. The 2016-2040 RTP/SCS includes ten goals with corresponding implementation strategies for focusing growth near destinations and mobility options, promoting diverse housing choices, leveraging technology innovations, and supporting implementation of sustainability policies. The project's consistency with the 2020-2045 RTP/SCS is discussed in Table 8. As shown therein, the proposed project would be consistent with the GHG emission reduction strategies contained in the 2020-2045 RTP/SCS.

Table 8 Project Consistency with Applicable SCAG 2020-2045 RTP/SCS Strategies

Reduction Strategy	Project Consistency
Focus Growth Near Destinations & Mobility Options ▪ Emphasize land use patterns that facilitate multimodal access to work, educational and other destinations ▪ Focus on a regional jobs/housing balance to reduce commute times and distances and expand job opportunities near transit and along center-focused main streets ▪ Plan for growth near transit investments and support implementation of first/last mile strategies. ▪ Promote the redevelopment of underperforming retail developments and other outmoded nonresidential uses ▪ Prioritize infill and redevelopment of underutilized land to accommodate new growth, increase amenities and connectivity in existing neighborhoods ▪ Encourage design and transportation options that reduce the reliance on and number of solo car trips (this could include mixed uses or locating and orienting close to existing destinations) ▪ Identify ways to "right size" parking requirements and promote alternative parking strategies (e.g., shared parking or smart parking)	**Consistent.** The proposed project is an infill redevelopment that would replace the existing underutilized retail uses on the project site with new mixed-use residential and commercial uses in an urbanized area with good access to existing regional-serving commercial retail development, jobs, and services. Existing public transit facilities are located within walking distance of the project site, including bus stops operated by Beach Cities Transit (BCT), LADOT Transit, and Metro transit, which run along Catalina Boulevard. Bus stops for BCT Lines 102 and 109 are located adjacent to the project site at the North Catalina Avenue/Emerald Street intersection. Additional bus stops for LADOT Transit Line 438A and Metro transit Line 130 are located within an 800-foot radius of the project site. The proposed project would also be within walking and biking distance of existing residential, commercial, and recreational uses and would provide bicycle parking options on the site. Therefore, the proposed project would focus growth near existing destinations and mobility options.
Leverage Technology Innovations ▪ Promote low emission technologies such as neighborhood electric vehicles, shared rides hailing, car sharing, bike sharing and scooters by providing supportive and safe infrastructure such as dedicated lanes, charging and parking/drop-off space ▪ Improve access to services through technology—such as telework and telemedicine as well as other incentives such as a "mobility wallet," an app-based system for storing transit and other multi-modal payments ▪ Identify ways to incorporate "micro-power grids" in communities, for example solar energy, hydrogen fuel cell power storage and power generation	**Consistent.** Approximately ten percent of the project's total parking would be equipped with EV charging outlets, and common and private bicycle parking spaces would also be provided. In addition, solar panels would be provided on the rooftops that would meet the energy requirements of the residential components of the project.

Reduction Strategy	Project Consistency
Support Implementation of Sustainability Policies ▪ Pursue funding opportunities to support local sustainable development implementation projects that reduce GHG emissions ▪ Support statewide legislation that reduces barriers to new construction and that incentivizes development near transit corridors and stations ▪ Support local jurisdictions in the establishment of Enhanced Infrastructure Financing Districts (EIFDs), Community Revitalization and Investment Authorities (CRIAs), or other tax increment or value capture tools to finance sustainable infrastructure and development projects, including parks and open space ▪ Work with local jurisdictions/communities to identify opportunities and assess barriers to implement sustainability strategies ▪ Enhance partnerships with other planning organizations to promote resources and best practices in the SCAG region ▪ Continue to support long range planning efforts by local jurisdictions ▪ Provide educational opportunities to local decision makers and staff on new tools, best practices and policies related to implementing the Sustainable Communities Strategy	**Consistent.** The project would be consistent with the City's CAP (refer to Table 9, below), Title 24, and the latest CALGreen requirements. Therefore, the project would support implementation of sustainability policies.
Promote a Green Region ▪ Support development of local climate adaptation and hazard mitigation plans, as well as project implementation that improves community resiliency to climate change and natural hazards ▪ Support local policies for renewable energy production, reduction of urban heat islands and carbon sequestration ▪ Integrate local food production into the regional landscape ▪ Promote more resource efficient development focused on conservation, recycling and reclamation ▪ Preserve, enhance and restore regional wildlife connectivity ▪ Reduce consumption of resource areas, including agricultural land ▪ Identify ways to improve access to public park space	**Consistent.** The project is an infill redevelopment that would involve construction of residential and commercial uses in an urban area, and therefore, would not interfere with regional wildlife connectivity or convert agricultural land. The project would comply with the applicable sustainability policies in the City's CAP (refer to Table 9, below), Title 24, and CALGreen, including the use of rooftop solar panels to meet residential energy requirements. Therefore, the project would support development of a green region.

Source: SCAG 2020

Local Regulations

The adopted CAP contains goals, measures, and specific sub strategies to help achieve its ongoing commitment to sustainability, energy efficiency, and reducing GHG emissions reductions. Most of the goals, measures, and sub strategies are directed towards City initiated projects and not specific individual development projects. However, the project would result in a net decrease of GHG emissions compared to the existing developments on-site. As such, the project would not conflict with the City's CAP, which is intended to reduce citywide emissions. Furthermore, as shown in

Table 9, the project would be consistent with applicable goals and measures to reduce GHG emissions contained within the City's CAP.

Table 9 Consistency with Applicable CAP Goals and Measures

Land Use and Transportation (LUT)	Project Consistency
Goal LUT: G – Land Use Strategies	
Measure LUT: G1 – Increase Density This measure seeks to increase destination accessibility by encouraging combined uses such as office, commercial, institutional, and residential within areas and developments.	**Consistent.** The proposed project would increase housing density near existing transit stops and commercial and residential uses. The project site is within walking distance of bus stops operated by Beach Cities Transit (BCT), LADOT Transit, and Metro transit, which run along Catalina Boulevard. Bus stops for BCT Lines 102 and 109 are located adjacent to the project site at the North Catalina Avenue/Emerald Street intersection. Additional bus stops for LADOT Transit Line 438A and Metro transit Line 130 are located within an 800-foot radius of the project site.
Energy Efficiency (EE)	**Project Consistency**
Goal EE: E – Increase Energy Efficiency Through Water Efficiency	
Measure EE: E1 – Promote or Require Water Efficiency through SB X7-7 The Water Conservation Act of 2009 (SB X7-7), requires all water suppliers to increase water use efficiency. The legislation set an overall goal of reducing per capita urban water consumption by 20 percent from a baseline level by 2020. The goal of the Water Conservation Act can be met by taking a variety of actions, including targeted public outreach and promoting water efficiency measures such as low-irrigation landscaping. Additional water conservation information, resource materials, education, and incentives are available through the West Basin Water District (WBMWD).	**Consistent.** The proposed project would be required to comply with the energy standards in the California Energy Code, Part 6 of the CBC (Title 24). Measures to meet these energy standards may include low-flow plumbing fixtures and water-efficient irrigation systems. Energy efficient design features associated with the project include energy-efficient appliances and lighting, high-efficiency irrigation systems, and water-efficient indoor fixtures throughout the project site.
Goal EE: F – Decrease Energy Demand Through Reducing Urban Heat Island Effect	
Measure EE: F1 – Promote Tree Planting for Shading and Energy Efficiency Trees and plants naturally help cool an environment by providing shade and evapotranspiration (the movement of water from the soil and plants to the air), making vegetation a simple and effective way to reduce urban heat islands. Urban heat islands are urban areas that are significantly warmer than their surrounding rural areas due to human activities. Shaded surfaces may be 20–45°F cooler than the peak temperatures of un-shaded materials. In addition, evapotranspiration, alone or in combination with shading, can help reduce peak summer temperatures by 2–9°F. Furthermore, trees and plants that directly shade buildings can reduce energy use by decreasing demand for air conditioning.	**Consistent.** The project site is developed with retail/commercial buildings and is almost entirely paved with impermeable surfaces. As discussed in Section 4, *Biological Resources*, given the developed nature of the project site in a predominantly urban area, the project site does not provide suitable habitat for special status species. Though construction of the proposed project would involve removal of a few ornamental trees, the project would include new planting, trees, and open space at the project site's frontages along North Catalina Avenue and Emerald Street and would add a pedestrian path along a private residential corridor on the eastern boundary of the project site.

Source: City of Redondo Beach 2017b

Project Greenhouse Gas Emissions

Project construction and operational emissions quantified with CalEEMod are presented below for informational purposes. Project construction is assumed to occur over a period of approximately two years and would become operational in 2024. Based on CalEEMod modeling results, construction activities for the project would generate an estimated 826 MT of CO_2e (Table 10). Amortized over a 30-year period (the assumed life of the project per SCAQMD guidance), project construction would generate about 28 MT of CO_2e per year.

Table 10 Estimated Construction GHG Emissions

Construction Year	Project Emissions (MT of CO_2e per year)
2021	113
2022	432
2023	281
Total	**826**
Total Amortized over 30 Years	**28**

See Appendix IS-1 for CalEEMod worksheets.

Table 11 summarizes the project's operational GHG emissions, including the amortized construction emissions. Because these sources of operational emissions would be removed under the proposed project, these emissions were subtracted from the proposed project's, to obtain the overall net change in operational GHG emissions. Existing operational GHG emissions are included in Table 11. As shown in Table 11, implementation of the proposed project would result in a net increase of 336 MT of CO_2e per year on the project site compared to existing uses.

Table 11 Combined Annual Emissions of Greenhouse Gases

Emission Source	Annual Emissions (MT of CO_2e)
Proposed Construction	28
Proposed Operation	
Area	1
Energy	81
Solid Waste	25
Water	8
Mobile	
CO_2 and CH_4	601
N_2O	14
Proposed Project Subtotal	**758**
Existing Emissions (Retail Uses)	422
Net Total	**336**

See Appendix IS-1 for CalEEMod worksheets.

Because the proposed project would not conflict with plans and policies aimed at reducing GHG emissions or generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment, impacts would be less significant.

LESS THAN SIGNIFICANT IMPACT

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9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	■	☐
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	■	☐	☐	☐
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?	☐	☐	■	☐
d. Be located on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	■	☐	☐	☐
e. For a project located in an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	■
f. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	■
g. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☐	■

a. *Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

Project construction would involve the use of potentially hazardous materials such as construction equipment and vehicles which use fuels and fluids that could be released should an accidental leak or spill occur. However, standard construction BMPs for the use and handling of such materials would be implemented to avoid or reduce the potential for such conditions to occur. Any use of potentially hazardous materials utilized during construction of the proposed project would be subject to all local, State, and federal regulations regarding the handling of potentially hazardous materials. In addition, arsenic was historically use on the project site to prevent pest infestation and control weeds along railroad tracks. Consequently, soil treatment or removal during construction of the project are proposed to eliminate the potential risk of arsenic leaching to groundwater beneath the site; and the project would include barriers to avoid dermal contact during construction and dust generation would be implemented to minimize potential exposure to construction workers. The applicant would also be required to obtain a waste discharge requirement (WDR) permit from the Cal-EPA Los Angeles RWQCB for the proposed treatment and reuse of onsite arsenic-affected soil. Therefore, the primary method of remediation of the arsenic would be on-site treatment, so any transport during construction of the project would be minimal and would not create a significant hazard to the public. Additional details regarding the remediation measures for the existing on-site potentially hazardous materials will be further analyzed in an EIR.

Operation and maintenance of the proposed project would likely involve the use of common household materials such as cleaning and degreasing solvents, fertilizers, and pesticides. These and other materials used in the regular maintenance of the building and landscaping would also be utilized in the secondary activities associated with residential uses. Use of these materials would be subject to compliance with existing regulations, standards, and guidelines established by the federal, State, and local agencies related to storage, use, and disposal of hazardous materials. The transport, use, and storage of hazardous materials during construction of the project would be subject to all applicable State and federal laws, such as the Hazardous Materials Transportation Act, Resource Conservation and Recovery Act, the California Hazardous Material Management Act, and the California Code of Regulations, Title 22. Upon compliance with all applicable regulations and standards, potential impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. *Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

As described under *Impact a.,* above, the transport, use and storage of hazards materials during the construction of the proposed project would be conducted in accordance with all applicable local, State, and federal laws. However, there is the potential for construction to involve the demolition of structures that may contain asbestos and/or lead-based paint (LBP), which could pose hazards to receptors at adjacent land uses. In addition, there is potential for the project site to be located in an area where hazardous materials were once used or stored and have the potential to contain contaminated soils, the disturbance of which could pose hazards to receptors at adjacent land uses. Therefore, impacts related to the release of hazardous materials would be potentially significant and will be studied further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school?

The nearest school is Redondo Union High School, located approximately 0.4-mile southwest of the project site. During construction of the proposed project, hazardous and potentially hazardous materials would be utilized for the transport and operation of vehicles and machinery. As discussed under impact discussion *a.* of this section, the transport, use, and storage of hazardous materials during the construction of the project would be conducted in accordance with all applicable State and federal laws, such as the Hazardous Materials Transportation Act, Resource Conservation and Recovery Act, the California Hazardous Material Management Act, and the California Code of Regulations, Title 22. As discussed under impact discussion *a.*, the construction of the project, and associated air pollutant emissions, would be temporary and less than significant. Furthermore, operation and maintenance of the proposed project would likely involve the use of common household materials comparable to those materials already in use in the project site vicinity. Therefore, emissions or hazardous materials releases near Redondo Union High School would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. Would the project be located on a site that is included on a list of hazardous material sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Development under the proposed project could occur on a hazardous material site. The proposed residential construction could lead to a significant hazard to the public or environment by exposing future residents to potential contamination if not properly identified. Therefore, this impact will be discussed further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

The project site is not located within two miles of a public airport. The airports nearest to the project site are Zamperini Field located 3.9 miles southeast of the site and Los Angeles International Airport located approximately 6.5 miles north-northwest of the site. According to the Los Angeles Airport Land Use Commission (ALUC) Airport Land Use Plan, the site is not located in either of the airports' hazard areas (Los Angeles County ALUC 2004). Furthermore, there are no private airstrips in the vicinity of the project site. Therefore, the project would not result in safety hazards related to airports for people residing or working at the project site and its vicinity. No impact would occur.

NO IMPACT

f. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The proposed project would involve rehabilitation and reuse of five existing commercial buildings, and construction of 22 townhomes and eight apartments in an urban area of the City of Redondo Beach. During construction, temporary and occasional lane closures may be required, however two-way traffic would still be maintained at construction entry points. Although the project would result in an increase in density of land use at the project site, it would not modify existing roadways in the vicinity. Vehicles would be able to access the project site via Emerald Street for the southernmost residential building and North Catalina Avenue for the remaining residential and commercial buildings. Implementation of the proposed project would not create new obstructions to an emergency response plan or evacuation plan. In addition, the project would not result in inadequate emergency access because it would be subject to Fire Department review of site plans, site construction, and the actual structures prior to occupancy to ensure that required fire protection safety features, including building sprinklers and emergency access, are implemented. Therefore, the proposed project would not impair implementation of or physically interfere with an adopted emergency response or evacuation plan. No impact would occur.

NO IMPACT

g. Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

The project site is in an urban area of the City of Redondo Beach. Undeveloped wildland areas are not located in proximity to the project site. The project site is not located in a “Fire Hazard Severity Zone” or “Very High Hazard Severity Zone” for wildland fires (CalFire 2007). Therefore, the project would not expose people or structures to a significant risk of loss injury or death involving wildland fires. No impact would occur.

NO IMPACT

10 Hydrology and Water Quality

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	■	☐
b. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	■	☐
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
(i) Result in substantial erosion or siltation on- or off-site;	☐	☐	■	☐
(ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;	☐	☐	■	☐
(iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	■	☐
(iv) Impede or redirect flood flows?	☐	☐	■	☐
d. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	■
e. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	■	☐

a. *Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?*

The existing site is almost entirely developed with commercial uses and is surrounded by residential and commercial uses in an urban area. Drainage is collected in existing paved parking lots and at downspouts on existing structures. Stormwater is then directed to the City's existing stormwater system via curb gutters near the intersection of North Catalina Avenue and Emerald Street. Construction of the proposed project would involve removal of a few ornamental trees. However, as shown in Figure 7, the project would incorporate landscaping at the eastern and southwestern areas of the project site, which increase permeable surface area on-site. Therefore, upon completion, the proposed project would not increase existing stormwater flows off the site and would not affect water quality. In addition, the proposed project would be required to comply with all established regulations under the National Pollution Discharge Elimination System (NPDES) permitting program to control both construction and operation stormwater discharges. Under the permit, the project applicant would be required to eliminate or reduce non-stormwater discharges to waters of the nation, develop and implement a SWPPP for project construction activities (as discussed in Section 7, *Geology and Soils*), and perform inspections of the stormwater pollution prevention measures and control practices to ensure conformance with the SWPPP. Further, the applicant would be required to implement all applicable source control BMPs to reduce water-quality impacts as listed under the NPDES permit.

The project would also be required to comply with various sections of the RBMC that regulate water quality. Title 5, Chapter 7, Stormwater Management and Discharge Control, includes the following requirements:

- **Section 5-7.107, Storm Drain Impact Fees.** The project would be required to pay storm drain impact fees.
- **Section 5-7.113, Standard Urban Stormwater Mitigation Plan (SUSMP) and Low Impact Development (LID) Requirements for New Development and Redevelopment Projects**. The provisions of this section establish requirements for construction activities and facility operations of development and redevelopment projects to comply with the current Municipal NPDES Permit to lessen the water quality impacts of development by using smart growth practices and integrate LID practices and standards for stormwater pollution mitigation through means of infiltration, evapotranspiration, biofiltration, and rainfall harvest and use. Except as otherwise provided herein, the City shall administer, implement, and enforce the provisions of this section.

As required by the RBMC and NPDES permit, construction activities on the project site would use a series of BMPs to reduce erosion and sedimentation and the construction contractor would be required to operate and maintain these controls throughout the duration of construction. Because the proposed project includes additional permeable surface area that would improve infiltration and stormwater quality and would comply with all applicable local and federal stormwater drainage requirements, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

The City receives its water service from the California Water Service Company (Cal Water), which has provided water service to the community since 1927. The project site is in the Hermosa-Redondo Subdistrict of the Dominguez District of Cal Water. Cal Water provided a Will Serve letter for the proposed project (see Appendix IS-5). Part of Cal Water's water supply comes from groundwater, which comes from two adjudicated basins, the West Coast Basin, and the Central Basin. The adjudicated basins limit groundwater pumping to safe yield amounts. Safe yield is based upon a calculation of the rate of groundwater replenishment, as explained in Cal Water's 2015 Urban Water Management Plan (UWMP) for the Rancho Dominguez District. The existing site currently has a few ornamental trees that would be removed to accommodate construction of 22 townhomes and eight apartments. However, as shown in the Low-Impact Development (LID) Plan, the project would increase permeable surfaces on-site and include landscaping at the eastern and southwestern areas of the project site (see Figure 7). Compared to existing conditions, the increase of landscaped area under the proposed project would increase infiltration and groundwater recharge and reduce the amount of surface runoff. In addition, according to the 2015 UWMP, the Cal Water would be able to provide reliable water supplies for an average year, single dry year, and multiple dry years for its existing and planned supplies (Cal Water 2016). Therefore, the proposed project would be served by existing water supplies and would not result in an exceedance of safe yield or a significant depletion of groundwater supplies. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c.(i) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would result in substantial erosion or siltation on- or off-site?

The project site is generally flat, with minimal elevation change across the site. The project site does not contain any streams, rivers, or other drainage features. The project site is developed with commercial buildings and surface parking lots and is almost entirely paved with impermeable surfaces. As shown in the LID Plan, the project would increase permeable surfaces on-site and include landscaping at the eastern and southwestern areas of the project site (see Figure 7). Therefore, runoff leaving the project site would be reduced when compared to existing conditions. Furthermore, as listed under the impact discussion *a.* of this section, the proposed project would comply with the City's urban runoff requirements as stated in the RBMC, the applicant would be required to comply with the site-specific LID Plan, which would reduce the quantity and level of pollutants from runoff leaving the project site. Therefore, impacts related to erosion and siltation would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c.(ii) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

c.(iv) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows?

The project site is developed with commercial buildings and surface parking lots and is almost entirely paved with impermeable surfaces. Under the proposed project, the project site would be redeveloped from its current condition by rehabilitating and repurposing four of the five existing commercial buildings and constructing 22 new townhomes and eight apartments. As shown on the LID Plan, the project would include landscaping at the eastern and southwestern areas of the project site (see Figure 7) and would, therefore increase pervious surfaces, reducing the volume of runoff from the site when compared to existing conditions. In addition, any runoff from the site would be conveyed into the existing drainage system and the project would not substantially change the site's drainage patterns and would not alter a stream, river or other drainage course in a manner that would result in flooding or redirect flood flows. Furthermore, the proposed project would comply with the City's urban runoff and drainage requirements as stated in the RBMC and would be required to comply with the site-specific LID, which would reduce the amount of runoff leaving the site. The proposed project would not increase runoff such that flooding would occur, and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

c.(iii) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

The project site is generally flat, with minimal elevation changes across the site. The project site does not contain any streams, rivers, or other drainage features. The project site is developed with commercial buildings and is almost entirely paved with impermeable surfaces. As previously discussed, the project would increase permeable surfaces on-site and include landscaping at the eastern and southwestern areas of the project site (see Figure 7). Therefore, as the proposed project would be required to comply with the site-specific LID and the City's urban runoff requirements as stated in the RBMC, runoff leaving the project site would be reduced when compared to existing conditions.

As discussed under impact discussion *a.* of this section, the proposed project would comply with the City's urban runoff requirements as stated in the RBMC, which would reduce the quantity and level of pollutants in runoff leaving the project site. Therefore, the proposed project would not create runoff that would exceed the capacity of the storm drain system and would not provide a substantial additional source of polluted runoff. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

The project site is not located near any dams, levees, or other major bodies of water that could produce seiche impacts at the project site. The project site is located approximately 900 feet from the Pacific Ocean and, according to the California DOC is not inside the boundaries of any regional tsunami impact areas (2009). No impact would occur.

NO IMPACT

e. Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The project would be served by Cal Water, which maintains a UWMP (Cal Water 2016). Cal Water utilizes water treatment facilities to ensure water quality standards and goals are met. Both the proposed residential and commercial uses on the project site are not considered point source generators of water pollutants and would not interfere with the ability of Cal Water to maintain water quality standards per the UWMP. Section 19, *Utilities and Service Systems* provides additional details about project water demand. The project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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11 Land Use and Planning

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Physically divide an established community?	☐	☐	☐	■
b. Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	■	☐

a. Would the project physically divide an established community?

The proposed project involves the demolition of approximately 8,929 square feet of the existing buildings on properties located between 112 and 132 North Catalina Avenue, the rehabilitation and re-use of four of the existing commercial buildings, and construction of 22 townhomes and eight apartments in an urban area. Vehicular access to the proposed townhome buildings and associated at-grade parking would be provided via North Catalina Avenue and the proposed interior alleyway. Vehicular access to the at-grade parking associated with the proposed residential apartment building would be provided via Emerald Street and North Catalina Avenue. The project does not include any new roads, development or infrastructure that has the potential to divide any established communities. No impact would occur.

NO IMPACT

b. Would the project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The proposed site is zoned and designated R-3A (Low-Density Multi-Family Residential) (Redondo Beach 2008; 2011). The R-3A zone and land use designation permit low-density multi-family residential land uses, including townhomes and apartment buildings. In addition, the proposed project has applied for a Density Bonus concession/incentive to adaptively reuse the existing commercial buildings currently on-site. Furthermore, the proposed project only involves residential and commercial uses. Therefore, the project is consistent with the existing land use designation and impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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12 Mineral Resources

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	■
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	■

a. *Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?*

b. *Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?*

The California Surface Mining and Reclamation Act of 1975 (SMARA) was enacted to promote conservation and protection of significant mineral deposits. According to the California Department of Conservation Mineral Land Classification Maps, the project site is in an area with MRZ-3 designation, indicating that the area may contain mineral deposits; however, the significance cannot be evaluated using available data (DOC 2010). The proposed project involves demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue, rehabilitation and re-use of four of the existing commercial buildings, and construction of 22 townhomes and eight apartments in an urban area. Given the existing conditions of the site and the nature of the project, extensive excavations, which may impact mineral resources at moderate depths, are not proposed and is thus unlikely to result in an impact related to the loss of availability of a known mineral resource.

NO IMPACT

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13 Noise

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project result in:				
a. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	■	☐	☐	☐
b. Generation of excessive groundborne vibration or groundborne noise levels?	■	☐	☐	☐
c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	■	☐

a. *Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

The project involves the demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue; the rehabilitation and re-use of the buildings at 126 and 132 North Catalina Avenue for commercial uses (i.e., coffee shop and tasting room); adaptive re-use of the building at 112 North Catalina Avenue for residential use; and the demolition of the shed located at the rear end of 116 North Catalina Avenue. The project also involves the construction of 22 three-story townhomes, four units in the former Masonic Lodge building and four units in a new three-story apartment building, for a combined total of 30 residential units on the project site.

The immediate surrounding area, consisting of multi-family residences, a church, and commercial uses, may be subject to both temporary construction noise and long-term operational noise. The primary on-site noise sources associated with operation of the proposed project would include noise from delivery trucks, trash hauling trucks, and persons associated with the project outdoors such as conversation or light recreation activities. Potential noise impacts related to substantial temporary or permanent increases in noise, in excess of City standards, could occur and will be further analyzed in the EIR.

POTENTIALLY SIGNIFICANT IMPACT

b. Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Operation of the project would not include stationary sources of significant vibration, such as heavy equipment operations. Rather, construction activities have the greatest potential to generate groundborne vibration affecting nearby receivers. Certain types of construction equipment can generate high levels of groundborne vibration. Construction of the project would potentially utilize loaded trucks, jackhammers, and/or bulldozers during most construction phases. Construction under the proposed project may result in excessive short-term ground borne vibration or noise levels and will be evaluated further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

c. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

As discussed in Section 9, *Hazards and Hazardous Materials*, the project site is not located within two miles of a public airport. The airports nearest to the project site are Zamperini Field located 3.3 miles southeast of the site and Hawthorne Municipal Airport located approximately six miles northeast of the site. According to the Los Angeles Airport Land Use Commission (ALUC) Airport Land Use Plan, the site is not located in either of the airports' noise contours (Los Angeles County ALUC 2004). Furthermore, there are no private airstrips in the vicinity of the project site. Therefore, the proposed project would not expose people working in the project area to excessive noise levels associated with airports or airstrips and the project would not exacerbate existing noise conditions related to airports or airstrips. No impact would occur.

NO IMPACT

14 Population and Housing

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Induce substantial unplanned population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	■	☐
b. Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	■

a. Would the project induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

According to the California DOF, the City of Redondo Beach has an estimated population of 66,994 with an average household size of 2.3 persons (California DOF 2020). SCAG estimates that the City's population will increase to 72,900 by 2045, an increase of approximately 8.8 percent or 5,906 persons (SCAG 2020). Demolition of an existing commercial building, rehabilitation and reuse of four existing commercial buildings, and construction of 22 townhomes and eight apartments would generate 130 bedrooms and increase the existing population by up to approximately 299 residents[3] (an approximately 0.5 percent increase from the existing population) to 67,293, which would be within SCAG's 2045 population forecast. In addition, according to California DOF estimates, the City has an existing housing stock of 30,892 units, which SCAG forecasts will increase by 208 units (an approximately one percent increase) to 31,100 units by 2045 (California DOF 2020; SCAG 2020). The project would generate 30 housing units, which would represent approximately 14 percent of the projected increase in housing units. The proposed commercial use would not generate an increase in project residents. Given that the proposed project would not exceed SCAG's 2045 population or housing forecast, the project would not cause a substantial increase in population or induce unplanned population growth. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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[3] This analysis conservatively applies the City's average household size of 2.3 persons to the project's bedroom count of 130 bedrooms rather than the project's unit count of 30 units.

b. *Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

As described above in Section 11, *Land Use and Planning*, the proposed project involves demolition, rehabilitation and re-use of the existing commercial buildings, and construction of 22 townhomes and eight apartments at the project site. Because no existing housing is located on the project site, the proposed project would not displace existing housing or people and would not necessitate the construction of replacement housing elsewhere. No impact would occur.

NO IMPACT

15 Public Services

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
1 Fire protection?	☐	☐	■	☐
2 Police protection?	☐	☐	■	☐
3 Schools?	☐	☐	■	☐
4 Parks?	☐	☐	■	☐
5 Other public facilities?	☐	☐	■	☐

a.1. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered fire protection facilities, or the need for new or physically altered fire protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

The City of Redondo Beach Fire Department provides fire protection services in the City and maintains a Mutual Aid Agreement with other fire departments in the region. The Fire Department has three facilities in the City, including two fire stations and a fire boat. The site would be served by Fire Station Fire Station #1, located at 401 South Broadway, approximately 0.4-mile south of the site (Redondo Beach Fire Department 2017). Other stations would respond to emergencies at the project site as needed. The target response time for the Fire Department is five minutes or less for approximately 90 percent of calls (Redondo Beach 2017c).

With implementation of the proposed project, demand for fire protection would remain similar to existing conditions since the site has been operating with commercial uses that have relied on the availability of fire protection services. Furthermore, the Fire Department would review site plans, site construction, and the actual structures prior to occupancy to ensure that required fire protection safety features, including building sprinklers and emergency access, are implemented. In addition, the proposed project would comply with applicable policies and ordinances for fire prevention, protection, and safety as required by the RBMC, which include development with modern materials and in accordance with current standards, inclusive of fire-resistant materials, and provision of fire alarms and detection systems, and automatic fire sprinklers. With these provisions and because the project site is in an area already served by the Fire Department, the proposed project would not require the construction of new or expanded firefighting facilities. Therefore, the project's potential impacts to fire services and facilities would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.2. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered police protection facilities, or the need for new or physically altered police protection facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

The City of Redondo Beach Police Department provides police protection services in the City and maintains mutual assistance programs with the Los Angeles County Sheriff's Department. The Police Department is located at 401 Diamond Street, approximately 900 feet north of the project site. The Police Department already serves the existing commercial development on the site. Therefore, current estimated response time for priority police emergency calls for service is approximately four minutes from the time that the call is made (Redondo Beach Police Department 2017).

During operation of the proposed project, potential impacts could be generated from an increased need for police protection services associated with routine patrols and responding to calls possibly related to graffiti, vandalism, and robbery. However, as discussed in Section 14, *Population and Housing*, the project would generate a population increase of approximately 299 residents and, therefore, any increase in police protection services would be nominal. The project would also be designed, constructed, and operated per all applicable standards required by the City for new development with respect to public safety. Therefore, the proposed project would not result in the need for new or physically altered police protection facilities that could have an environmental impact. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.3. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered schools, or the need for new or physically altered schools, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?

The Redondo Beach Unified School District (RBUSD) provides primary and secondary public education services to students living in the local area. In the RBUSD, there are currently eight elementary schools, two middle schools, two high schools, one alternative education school, and one adult school (RBUSD 2017). The project site is located 0.4-mile southwest from Redondo Union High School, approximately 0.6-mile west of Parras Middle School, and approximately 0.7-mile south from Beryl Heights Elementary. According to the RBUSD, there were approximately 9,500 students enrolled in district schools for the 2018-2019 school year (RBUSD 2019).

The need for new school facilities is typically associated with a population increase that generates an increase in enrollment large enough to cause new schools to be constructed. The proposed project would involve demolition of an existing commercial building, rehabilitation, and reuse of four existing commercial buildings, and construction of 22 townhomes and eight apartments, which would increase the number of residential units in the City. Using a Student Yield Factor of 0.7

students per dwelling unit for Unified School Districts and conservatively applying this factor to the project's bedroom count, the proposed project would generate approximately 91 new students in the RBUSD (Office of Public School Construction 2008). Compared to the 9,500 students enrolled in RBUSD schools for the 2018-2019 school year, the project would incrementally increase existing student enrollment by approximately one percent. Furthermore, the project applicant would be required to pay the state-mandated school impact fees that would contribute to the funds available for development of new school facilities. Pursuant to Section 65995 (3)(h) of the California Government Code (Senate Bill 50, chaptered August 27, 1998), the payment of statutory fees "...is deemed to be full and complete mitigation of the impacts of any legislative or adjudicative act, or both, involving, but not limited to, the planning, use, or development of real property, or any change in governmental organization or reorganization." Therefore, the project would not substantially increase the number of students at local public school or lead to the need for new or physically altered school facilities. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.4. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered parks, or the need for new or physically altered parks, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios or other performance objectives?

The City currently owns and operates a total of 35 public parks, open space areas, and recreation sites, occupying approximately 155 acres of land (Redondo Beach 2004). These areas are all part of the city recreation and parks system. The closest public park to the project site is Czulegar Park, located approximately 350 feet northwest of the project site. The park is approximately 2.1 acres and contains a walkway for joggers and pedestrians that connects to Redondo Beach's International Boardwalk and Pier.

The City's current estimated population is 66,994 (California DOF 2020). Using the standard of three acres per 1,000 residents, as given in the Recreation and Parks Element of the General Plan, the City's parkland goal is approximately 201 acres. Consequently, the existing 155 acres of parkland in the City, which equates to 2.3 acres per 1,000 residents, do not achieve the Recreation and Parks Element goal (Redondo Beach 2004). The proposed project would involve demolition of an existing commercial building, rehabilitation, and reuse of four existing commercial buildings, and construction of 22 townhomes and eight apartments, which would generate 30 housing units and approximately 299 residents. As discussed under Section 16, *Recreation*, the addition of 299 residents would increase the City's population to 67,293. Therefore, the project would not change the City's ratio of parkland to residents, which would remain at approximately 2.3 acres per 1,000 residents. The proposed project would therefore not create the need for new or expanded park facilities and Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

a.5. Would the project result in substantial adverse physical impacts associated with the provision of other new or physically altered public facilities, or the need for other new or physically altered public facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives?

Development of the proposed project would result in incremental impacts to the City's public services and facilities such as storm drain usage, solid-waste disposal, water usage, and wastewater disposal. Refer to the impact analysis in Section 10, *Hydrology and Water Quality*, and Section 19, *Utilities and Service Systems*.

The proposed project would introduce new residential uses to the project site, but these uses would be similar to existing residential uses surrounding the project site and use similar levels of public services. In addition, the proposed commercial uses would use similar levels of public services to the existing commercial developments on the project site. The project site is in an urban area already served by other commonly used public facilities such as public libraries and medical facilities. As discussed under Section 14, *Population and Housing*, the proposed project would not induce substantial growth and would therefore not adversely affect existing governmental facilities or require the need for new or altered governmental facilities and would generally follow the same use patterns of similar existing residential uses in terms of demand for public services. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

16 Recreation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	■	☐
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	■	☐

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

The City currently owns and operates a total of 35 public parks, open space areas, and recreation sites, occupying approximately 155 acres of land (Redondo Beach 2004). These areas are all part of the City's recreation and parks system. The closest public park to the project site is Czulegar Park, located approximately 330 feet northwest of the project site. The approximately two-acre park offers an extensive walkway for joggers and pedestrians, as well as oceanside views. Additionally, Veterans Park, located approximately 0.3 mile south of the project site, contains shuffleboard courts, a large playground area, and a senior activity center. The City's current estimated population is 68,473 (California DOF 2020). Using the standard of three acres per 1,000 residents, as given in the Recreation and Parks Element of the General Plan, the City's parkland goal is approximately 205 acres. Therefore, the existing 155 acres of parkland in the City, which equates to 2.3 acres per 1,000 residents, do not achieve the Recreation and Parks Element goal (Redondo Beach 2004).

The proposed project involves demolition of approximately 8,929 square feet of existing buildings on the properties located between 112 and 132 North Catalina Avenue, rehabilitation and re-use of four of the existing commercial buildings, and construction of 22 townhomes and eight apartments, which would generate 30 housing units and increase the existing population by approximately 299 residents. As discussed under Section 14, *Population and Housing,* the addition of 299 residents would increase the City's population to 67,293. Therefore, implementation of the project would not change the City's ratio of parkland to residents, which would remain at approximately 2.3 acres per 1,000 residents. Further, the project applicant would be required to dedicate land, pay a fee in lieu thereof, or a combination of both, for neighborhood and community park or recreational purposes according to the standards and formula contained in RBMC Section 10-1.1408. As such, the proposed project would not increase the demand for parks nor cause substantial deterioration of existing parks such that new park facilities would be needed. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

17 Transportation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	■	☐	☐	☐
b. Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)?	■	☐	☐	☐
c. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?	■	☐	☐	☐
d. Result in inadequate emergency access?	■	☐	☐	☐

a. Would the project conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

b. Would the project conflict or be inconsistent with CEQA Guidelines Section 15064.3(b)?

c. Would the project substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible use (e.g., farm equipment)?

d. Would the project result in inadequate emergency access?

The proposed project would involve rehabilitation and reuse of five existing commercial buildings, and construction of 22 townhomes and eight apartments in an urban area of the City of Redondo Beach. This could result in increased traffic compared to existing conditions. Trips generated as a result of increased density or new development have the potential to impact intersection and roadway segments near the project site and contribute to cumulative traffic increases. Potential impacts related to CEQA Guidelines Section 15064 pertaining to VMT and compliance with plans and policies that establish measures of effective performance of the circulation system will be discussed in an EIR, as well as other transportation related issues, such as traffic hazards, incompatible uses, and emergency uses.

POTENTIALLY SIGNIFICANT IMPACT

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18 Tribal Cultural Resources

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in a Public Resources Code Section 21074 as either a site, feature, place, or cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or	■	☐	☐	☐
b. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	■	☐	☐	☐

As of July 1, 2015, California Assembly Bill 52 of 2014 (AB 52) was enacted and expands CEQA by defining a new resource category, “tribal cultural resources.” AB 52 establishes that “A project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment” (PRC Section 21084.2). It further states that the lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource, when feasible (PRC Section 21084.3).

PRC Section 21074 (a)(1)(A) and (B) defines tribal cultural resources as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe” and is:

1. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or
2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process for California tribes regarding those resources. The consultation process must be completed before a CEQA document can be certified. Under AB 52, lead agencies are required to “begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project.” Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

a. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074 that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k)?*

b. *Would the project cause a substantial adverse change in the significance of a tribal cultural resource as defined in Public Resources Code Section 21074 that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1?As discussed in Section 5,* Cultural Resources*, the project site is currently developed with commercial uses and is surrounded by residential and commercial uses. The developed site has been disturbed, has been previously graded, and is almost entirely paved. Due to this previous ground disturbance, there is low probability of encountering on-site tribal cultural resources throughout project construction.*

The City of Redondo Beach sent a Local Government Tribal Consultation List Request to the Native American Heritage Commission (NAHC) to obtain a list of Native American tribes with jurisdiction in the project area. The NAHC responded to the City’s request with a consultation list of eight tribes to contact for their traditional and cultural affiliation with the geographic area in which the project is located. Based on this list, and per Public Resources Code Section 21080.3.1., the City sent out consultation letters on April 16, 2020 to these eight listed tribes and have since received a response from the Gabrieleno Band of Mission Indians – Kizh Nation, requesting consultation to discuss the proposed project in further detail. Following the request from the Kizh Nation, a consultation phone call between Matthew Teutimez and Andrew Salas, representatives of the Kizh Nation, and City Staff occurred on June 24, 2020. During the phone call and in a follow up email, tribal representatives stated concern about ground disturbance associated with construction of the project due to the site being located within and around a sacred village, adjacent to sacred water courses and salt ponds and major traditional trade routes. Materials related to this consultation process are included in will be included in EIR.

Given the developed nature of the site, excavation and grading activities required for project construction are not expected to uncover tribal cultural resources. However, it is possible that intact and previously undiscovered tribal cultural resources are present at subsurface levels and could be uncovered during ground-disturbing activities. In the event such previously unknown tribal cultural resources are found, significant effects may occur to that resource if the resource is disturbed, destroyed, or otherwise improperly treated. Therefore, impacts related to tribal cultural resources could be potentially significant and will be discussed further in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

19 Utilities and Service Systems

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Would the project:				
a. Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	■	☐
b. Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	■	☐
c. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	■	☐
d. Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	■	☐
e. Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	■	☐

a. Would the project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

c. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

As discussed in Section 10, *Hydrology and Water Quality*, the City of Redondo Beach receives its water service from the Cal Water, which has provided water service to the community since 1927. The project site is in the Hermosa-Redondo Subdistrict of the Dominguez District of Cal Water, and the applicant received a Will Serve letter for the proposed project from Cal Water (see Appendix IS-5). According to the 2015 UWMP, Cal Water would be able to provide reliable water supplies for an average year, single dry year, and multiple dry years for its existing and planned supplies (Cal Water 2016). Therefore, the project would not result in the need for new or expanded water facilities.

The local wastewater collection system is owned by the City of Redondo Beach and is managed, operated, and maintained by the City's Public Works Department. The City maintains 113 miles of sewer line and 15 pump stations (Redondo Beach 2020). The system connects all buildings throughout the city with Los Angeles County Sanitation District (LACSD) interceptors, which carry the sewage to a regional treatment facility for disposal. Wastewater in the City is conveyed to the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson. This wastewater treatment plant provides both primary and secondary treatment for approximately 3.5 million people throughout Los Angeles County. The JWPCP has a capacity of 400 million gallons per day and currently average daily flows are approximately 260 million gallons per day (LACSD 2020). Therefore, the plant has a remaining daily capacity of approximately 140 million gallons per day.

CalEEMod is a statewide emissions computer model and comprehensive tool for quantifying emissions associated with both construction and operations from a variety of land use projects, including project water demand. Conservatively assuming that wastewater generation would be approximately 100 percent of water demand, which is based on the CalEEMod result (Appendix IS-1), the proposed project would generate approximately 3,520,000 gallons of wastewater per year, or 9644 gallons of wastewater per day. By comparison, existing uses on the site demand approximately 1,515,000 gallons of wastewater per year, or 4,151 gallons of wastewater per day. Therefore, the project would result in a net increase of approximately 5,493 gallons of wastewater per day. The project's estimated daily wastewater generation accounts for less than 0.01 percent of the JWPCP's remaining daily capacity of approximately 140 million gallons. Therefore, the JWPCP has sufficient capacity to accommodate additional wastewater flows generated by the proposed project, the proposed project would not require the construction of new or expanded treatment facilities, and impacts would be less than significant.

The project site would continue to connect to the existing storm drain system operated and maintained by the City. As discussed in Section 10, *Hydrology and Water Quality*, project implementation would result in similar drainage patterns as existing conditions. Furthermore, the project would increase permeable surfaces on-site compared to existing conditions because the site is currently almost entirely composed of impermeable surfaces, but the proposed project would include landscaping at the eastern and southwestern areas of the project site (see Figure 7). Therefore, runoff leaving the project site would be reduced compared to existing conditions and the project would not necessitate the construction of new stormwater drainage facilities or expansion of existing facilities.

As discussed in Section 6, *Energy*, the project would not result in the wasteful, inefficient or unnecessary consumption of energy. Project operation would consume approximately 0.12 GWh of electricity per year (Appendix IS-1). The project's electricity demand would be served by Southern California Edison (SCE), which supplied 80,913 GWh of electricity to its service area in 2019 (California Energy Commission [CEC] 2019a). The project's electricity demand would represent less than 0.01 percent of electricity provided by SCE. Therefore, SCE would have sufficient supplies for the project. Estimated natural gas consumption for the project would be 0.01 MMthm per year (Appendix IS-1). The project's natural gas demand would be serviced by the Sothern California Gas Company (SoCal Gas), which provided 5,425 MMthm per year in 2019 (CEC 2019b). The project's natural gas consumption would represent less than 0.01 percent of natural gas provided by SoCal

Gas, which would therefore have adequate supply to serve the project. Therefore, the project would not require the construction of new electric power or natural gas facilities. Likewise, the project site is an infill project served by existing telecommunications facilities within the City and would not require the expansion or construction of new telecommunications infrastructure. The project would not result in significant environmental impacts due to the construction of new utility facilities and the project would be served by a wastewater treatment plant with adequate capacity. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. *Would the project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?*

The Dominguez District of Cal Water is the local supplier of domestic water and would provide potable water to the proposed project. The applicant received a Will Serve letter for the proposed project from Cal Water (see Appendix IS-5). The District uses local groundwater pumped from the West Coast Groundwater Basin's Silverado aquifer and from the Central Basin (approximately 10 percent to 25 percent of total supply) and purchased imported surface water and recycled water from the West Basin Municipal Water District (approximately 75 percent to 90 percent of supply). Cal Water's recent 2015 UWMP identifies anticipated water supplies and demands for the years 2020 through 2040. The UWMP states that, with its existing and planned supplies, Cal Water can provide reliable water supplies for an average year, single dry year, and multiple dry years. Though Cal Water has adjudicated rights to groundwater, it is assumed that purchased water from West Basin Municipal Water District and Metropolitan Water District will be sufficient to serve all demand not served by groundwater or recycled water supplies through 2040 under all hydrologic conditions (Cal Water 2016). Table 12 shows projected water supply and demand in the District through 2040 according to the 2015 UWMP.

Table 12 Normal Year Water Supply and Demand Comparison

	2015	2020	2025	2030	2035	2040
Water Supply Totals	37,372	42,746	43,501	44,516	45,671	46,971
Water Demand Totals	28,003	42,746	43,501	44,516	45,671	46,971
5-year Increase	–	14,743	755	1,015	1,155	1,300

[1] Water supply and demand totals are reported in acre-feet per year (AFY).

Source: California Water Service 2015 Urban Water Management Plan: Dominguez District

According to the UWMP, the population in the UWMP service area is expected to increase from 142,227 in 2015 to 152,372 in 2040, based on Cal Water estimates. As discussed in Section 14, *Population and Housing*, the project would generate a population increase of approximately 299 residents, which would account for approximately three percent of the service area population increase between the years 2015 and 2040. In addition, according to CalEEMod results, the project would demand a net increase of an estimated 5,493 gallons of water per day, or approximately 6.2 acre-feet per year (AFY) of water. This increase is within the forecasted increase in water demand for Cal Water shown in Table 12. Impacts related to water supply would therefore be less than significant.

LESS THAN SIGNIFICANT IMPACT

d. *Would the project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?*

e. *Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?*

Athens Services is the City's exclusive franchise waste hauler that services all residential and commercial waste and recycling programs. Solid waste from Redondo Beach is collected by Athens Services and taken to their recycling facilities, which currently consist of the City of Industry Materials Recovery Facility (MRF) and the Sun Valley MRF (Athens Services 2017a). Food waste is processed and delivered to their compost facility, American Organics, in Victorville (Athens Services 2017b). Unrecyclable solid waste collected by Athens Service is delivered to the Sunshine Canyon Landfill, Chiquita Canyon Landfill, or the El Sobrante Landfill, or various San Bernardino County landfills that accept waste from Los Angeles County, including Mid-Valley Landfill and San Timoteo Landfill. The current facility specifics are provided in Table 13.

Table 13 Solid Waste Disposal Facilities

Facility	Permitted Daily Throughput (tons/day)	Average Daily Waste Quantities Disposed (tons/day)	Estimated Remaining Daily Capacity (tons/day)	Estimated Closure Date
Sunshine Canyon Landfill	12,100	6,765	5,335	2037
Chiquita Canyon Landfill	12,000	4,904	7,096	2047
El Sobrante Landfill	16,054	12,050	4,004	2051
Mid-Valley Landfill	7,500	3,616	3,884	2033
San Timoteo Landfill	2,000	906	1,094	2039
Total	**55,354**	**28,241**	**27,113**	**–**

N/A = not available

Sources: California Department of Resources Recycling and Recovery, Solid Waste Information System Facility/Site Search, 2019; Los Angeles County Department of Public Works, Countywide Integrated Waste Management Plan, 2018 Annual Report, 2019.

Construction of the proposed project would generate solid waste, including construction debris. This construction debris would include wood, concrete, and plaster material from the existing commercial buildings on the site. Construction debris would be removed and disposed of at California Waste Services in a timely manner and in accordance with all applicable laws and regulations, including the diversion of a minimum of 65 percent of construction and demolition debris pursuant to CALGreen. California Waste Services is a local recycling facility equipped to handle construction debris located approximately 6.5 miles northeast of the project site in the City of Gardena. The removal of demolition materials would only occur during the construction period. In addition, the project would be required to submit a Waste Management Plan for demolition activities in accordance with RBMC Section 5-2.704. However, because demolition activities would be temporary, construction of the proposed project would not exceed the permitted capacity of any local landfill.

According to the CalEEMod results (Appendix IS-1) existing uses on the project site generate approximately 13.3 tons of solid waste per year while operation of the proposed project would generate approximately 49.5 tons of solid waste per year. Therefore, the project would generate a net increase of an estimated 36.2 tons of solid waste per year, which would not exceed the current estimated remaining daily capacity of the landfills identified in Table 13. The proposed project would comply with federal, State, and local statues and regulations related to solid waste, such as AB 939 and the City's recycling programs for residences. Furthermore, the proposed project would be served by landfills with sufficient capacity. Therefore, impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

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20 Wildfire

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
a. Substantially impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	■	☐
b. Due to slope, prevailing winds, and other factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☐	■
c. Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☐	■
d. Expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	■

a. If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project substantially impair an adopted emergency response plan or emergency evacuation plan?

The project site is in an urban area of the city of Redondo Beach. Undeveloped wildland areas are not located near the project site. According to CalFire, the project site is not located in a “Fire Hazard Severity Zone” or “Very High Hazard Severity Zone” for wildland fires (CalFire 2007, 2011). Therefore, the project site is not located near a state responsibility area or classified as having a high fire hazard.

As discussed in Section 15, *Public Services*, the RBFD would provide fire prevention, fire protection, and emergency response for the proposed project. The Fire Department has reviewed a fire safety site plan. The Fire Department will review construction plans, and perform site inspection of the new and adaptively reused structures prior to issuance of certificates of occupancy to ensure that required fire protection safety features, including building sprinklers and emergency access, are implemented. In addition, the proposed project would comply with applicable policies and ordinances for fire prevention, protection, and safety as required by the RBMC, which include development with modern materials and in accordance with current standards, inclusive of fire-resistant materials, and provision of fire alarms and detection systems, and automatic fire sprinklers. Construction of the proposed project would be required to maintain emergency access to the site and on area roadways and would not interfere with an emergency response plan or evacuation route. Impacts would be less than significant.

LESS THAN SIGNIFICANT IMPACT

b. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?*

d. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project expose people or structures to significant risks, including downslopes or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?*

There are no streams or rivers located on or adjacent to the project site, and the project site and surrounding areas are not at high risk of downslope or downstream flooding or landslides. The project site is in an urban area and is not located in or near a high fire hazard severity zone (CalFire 2007). Therefore, the project would not exacerbate wildfire risks, and risks to people or structures due to runoff, post-fire slope instability, or drainage changes would not occur. Residents and visitors of the project site would not be exposed to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire. No impact would occur.

NO IMPACT

c. *If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*

The project site is in an urban area and is not located in or near a state responsibility area or land classified as a very high fire hazard severity zone (CalFire 2007). The proposed project involves demolition of approximately 8,929 square feet of existing buildings on properties located between 112 and 132 North Catalina Avenue, rehabilitation and re-use of four of the existing commercial buildings, and construction of 22 townhomes and eight apartments; however, it would not require the installation or maintenance of associated infrastructure that may exacerbate fire risk. The project site would be adequately served by existing facilities and utilities. Therefore, the proposed project would not require additional roads, fuel breaks, emergency water sources, power lines or other utilities that would exacerbate fire risk and no temporary or ongoing impacts to the environment would occur.

NO IMPACT

21 Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Does the project:				
a. Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	■	☐	☐	☐
b. Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	■	☐	☐	☐
c. Have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	■	☐	☐	☐

a. Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

As discussed in Section 4, *Biological Resources*, there are no mapped essential habitat connectivity areas in the immediate vicinity of the project site. In addition, regional wildlife movement is restricted given the built-out nature of the project area, and no native resident or migratory fish or wildlife species, established native resident or migratory wildlife corridors, or native wildlife nursery sites exist on or immediately around the project site. However, the site currently contains mature trees which may provide nesting habitat for birds. Therefore, the project could have the potential to have a substantial adverse effect on nesting bird species. As discussed in Section 5, *Cultural*

Resources, Section 7, *Geology and Soils*, and Section 18, *Tribal Cultural Resources,* the proposed project could have the potential to impact historical, archaeological, paleontological, and tribal cultural resources. Since the proposed project has potential to degrade the quality of the environment, including animals and potential cultural and historical resources, this impact is potentially significant and will be further analyzed in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

b. *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

As concluded in Sections 1 through 20, the project could result in significant impacts to air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, noise, transportation, and tribal cultural resources. Potential cumulative impacts in these issue areas including air quality, noise, and transportation will be further analyzed in an EIR. Some of the other resource areas (agricultural and mineral) were determined to have no impact in comparison to existing conditions. Therefore, the project would not contribute to cumulative impacts related to these issues. Other issues (e.g., biological resources, cultural resources, geology, hazards, hazardous materials, and tribal cultural resources) are by their nature project specific and impacts at one location do not add to impacts at other locations or create additive impacts.

The proposed project would include construction of 22 townhomes; eight apartments; and the rehabilitation and reuse of existing commercial buildings. The project site is currently occupied by five existing, non-residential buildings, four of which serve commercial retail/restaurant uses and one of which is vacant, and associated surface parking lots. While development of the project would change the appearance and use of the project site relative to existing conditions, it is not anticipated to degrade the existing visual character or quality of the site and its surroundings. The project site will be considered for designation as an historic district and thereby a Certificate of Appropriateness would be necessary to ensure compatibility of the new structures with the existing buildings that would be contributors to the district and existing surrounding historic structures. Since it would be a compatible use with other existing residential uses in the project area and would upgrade the existing landscaping and visual quality of the site and, therefore, contribute to an aesthetically-enhanced project area. The proposed project would therefore not generate cumulatively considerable impacts associated with aesthetics.

POTENTIALLY SIGNIFICANT IMPACT

c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*

In general, impacts to human beings are associated with air quality, hazards and hazardous materials, and noise impacts. As discussed in Section 3, *Air Quality,* the proposed project could potentially generate criteria pollutant emissions exceeding the SCAQMD regional thresholds for operation and construction activities and may expose sensitive receptors adjacent to the project site to substantial pollutant concentrations. As discussed in Section 9, *Hazards and Hazardous Materials,* there is the potential for structures being demolished on the project site to contain asbestos and/or LBP, and the construction could lead to significant hazard to the public or environment by exposing future residents to potential on-site contamination if not properly identified. As discussed in Section 13, *Noise,* construction of the proposed project could generate temporary noise levels in excess of allowable City standards. Therefore, since the proposed project could potentially have harmful environmental effects that could affect humans either directly or indirectly, impacts would be potentially significant and these issues will be discussed in an EIR.

POTENTIALLY SIGNIFICANT IMPACT

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List of Preparers

Rincon Consultants, Inc. prepared this Initial Study under contract to the City of Redondo Beach. Persons involved in data gathering analysis, project management, and quality control are listed below.

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Appendix IS-1

Air Quality/Greenhouse Gas Modeling Results

100-132 North Catalina Avenue Proposed Project- Air Quality Modeling

South Coast AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.38	Acre	0.38	16,552.80	0
Parking Lot	11.00	Space	0.10	4,400.00	0
Unenclosed Parking Structure	22.00	Space	0.00	8,800.00	0
Fast Food Restaurant w/o Drive Thru	1.78	1000sqft	0.04	1,784.00	0
High Turnover (Sit Down Restaurant)	1.28	1000sqft	0.03	1,279.00	0
Apartments Low Rise	8.00	Dwelling Unit	0.20	9,025.00	23
Condo/Townhouse High Rise	22.00	Dwelling Unit	0.51	40,286.00	63

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2030
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	353.87	**CH4 Intensity (lb/MWhr)**	0.015	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Updated per 2030 RPS

Land Use - Based on project plans/data and google earth estimations

Construction Phase - Schedule per applicant-provided info

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Off-road Equipment -

Trips and VMT -

Demolition - Based on project plans

Grading - Per applicant provided info

Architectural Coating - Per SCAQMD Rule 1113

Vehicle Trips - Trip gen from traffic study

Vehicle Emission Factors -

Vehicle Emission Factors -

Vehicle Emission Factors -

Woodstoves - None per applicant-provided information

Area Coating - Per SCAQMD Rule 1113

Energy Use - Title 24 30% reduction for non-residential land uses; solar panels per 2019 Title 24

Water And Wastewater - CalGreen req's 20% reduction indoor water use

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Mobile Land Use Mitigation - Mixed use development, 13.3% of units affordable housing

Area Mitigation - Per SCAQMD Rule 1113

Energy Mitigation - EnergyStar appliances in residential units per applicant provided info

Water Mitigation - Project complies with 2019 CALGreen

Fleet Mix -

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	22.00
tblConstructionPhase	NumDays	2.00	21.00
tblConstructionPhase	NumDays	4.00	43.00
tblConstructionPhase	NumDays	200.00	577.00
tblConstructionPhase	NumDays	10.00	181.00
tblConstructionPhase	NumDays	10.00	61.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblEnergyUse	LightingElect	810.36	0.00
tblEnergyUse	LightingElect	1,001.10	0.00
tblEnergyUse	NT24E	3,172.76	0.00
tblEnergyUse	NT24E	3,054.10	0.00
tblEnergyUse	T24E	177.01	0.00
tblEnergyUse	T24E	179.76	0.00
tblEnergyUse	T24E	8.71	6.10
tblEnergyUse	T24E	8.71	6.10

tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	6.80	0.00
tblFireplaces	NumberGas	18.70	0.00
tblFireplaces	NumberNoFireplace	0.80	0.00
tblFireplaces	NumberNoFireplace	2.20	0.00
tblFireplaces	NumberWood	0.40	0.00
tblFireplaces	NumberWood	1.10	0.00
tblGrading	MaterialImported	0.00	909.00
tblLandUse	LandUseSquareFeet	1,780.00	1,784.00
tblLandUse	LandUseSquareFeet	1,280.00	1,279.00
tblLandUse	LandUseSquareFeet	8,000.00	9,025.00
tblLandUse	LandUseSquareFeet	22,000.00	40,286.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.50	0.20
tblLandUse	LotAcreage	0.34	0.51
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.015
tblProjectCharacteristics	CO2IntensityFactor	702.44	353.87
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblVehicleTrips	WD_TR	6.59	7.32
tblVehicleTrips	WD_TR	4.18	7.32
tblVehicleTrips	WD_TR	716.00	225.33
tblVehicleTrips	WD_TR	127.15	96.17

tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	IndoorWaterUseRate	521,232.20	416,985.76
tblWater	IndoorWaterUseRate	1,433,388.56	1,146,710.85
tblWater	IndoorWaterUseRate	540,290.01	432,232.01
tblWater	IndoorWaterUseRate	388,523.15	310,818.52
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	0.40	0.00
tblWoodstoves	NumberCatalytic	1.10	0.00

tblWoodstoves	NumberNoncatalytic	0.40	0.00
tblWoodstoves	NumberNoncatalytic	1.10	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0989	0.9556	0.6153	1.2800e-003	0.1835	0.0440	0.2275	0.0894	0.0411	0.1305	0.0000	112.0078	112.0078	0.0256	0.0000	112.6466
2022	0.3303	2.4503	2.5654	5.0900e-003	0.0804	0.1083	0.1887	0.0216	0.1046	0.1262	0.0000	429.9801	429.9801	0.0616	0.0000	431.5210
2023	0.3581	1.4347	1.7147	3.2900e-003	0.0512	0.0628	0.1140	0.0137	0.0604	0.0741	0.0000	279.7098	279.7098	0.0426	0.0000	280.7748
Maximum	**0.3581**	**2.4503**	**2.5654**	**5.0900e-003**	**0.1835**	**0.1083**	**0.2275**	**0.0894**	**0.1046**	**0.1305**	**0.0000**	**429.9801**	**429.9801**	**0.0616**	**0.0000**	**431.5210**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021	0.0989	0.9556	0.6153	1.2800e-003	0.0895	0.0440	0.1335	0.0421	0.0411	0.0832	0.0000	112.0077	112.0077	0.0256	0.0000	112.6464
2022	0.3303	2.4503	2.5653	5.0900e-003	0.0804	0.1083	0.1887	0.0216	0.1046	0.1262	0.0000	429.9797	429.9797	0.0616	0.0000	431.5206
2023	0.3581	1.4347	1.7147	3.2900e-003	0.0512	0.0628	0.1140	0.0137	0.0604	0.0741	0.0000	279.7096	279.7096	0.0426	0.0000	280.7746
Maximum	**0.3581**	**2.4503**	**2.5653**	**5.0900e-003**	**0.0895**	**0.1083**	**0.1887**	**0.0421**	**0.1046**	**0.1262**	**0.0000**	**429.9797**	**429.9797**	**0.0616**	**0.0000**	**431.5206**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**29.84**	**0.00**	**17.74**	**37.94**	**0.00**	**14.30**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**9-1-2021**	**11-30-2021**	0.6905	0.6905
2	**12-1-2021**	**2-28-2022**	0.8131	0.8131
3	**3-1-2022**	**5-31-2022**	0.7002	0.7002
4	**6-1-2022**	**8-31-2022**	0.6999	0.6999
5	**9-1-2022**	**11-30-2022**	0.6929	0.6929
6	**12-1-2022**	**2-28-2023**	0.7513	0.7513
7	**3-1-2023**	**5-31-2023**	0.9108	0.9108
8	**6-1-2023**	**8-31-2023**	0.3663	0.3663
		Highest	0.9108	0.9108

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2170	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184
Energy	6.1900e-003	0.0552	0.0396	3.4000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	80.6211	80.6211	2.0000e-003	1.2900e-003	81.0545
Mobile	0.1482	0.8580	1.6285	7.4700e-003	0.7341	4.6100e-003	0.7387	0.1966	4.2800e-003	0.2009	0.0000	696.0445	696.0445	0.0296	0.0000	696.7851
Waste						0.0000	0.0000		0.0000	0.0000	10.0541	0.0000	10.0541	0.5942	0.0000	24.9087
Water						0.0000	0.0000		0.0000	0.0000	0.8161	7.1244	7.9405	3.1100e-003	1.8400e-003	8.5652
Total	**0.3714**	**0.9167**	**1.9772**	**7.8300e-003**	**0.7341**	**0.0106**	**0.7447**	**0.1966**	**0.0103**	**0.2069**	**10.8703**	**784.2963**	**795.1666**	**0.6294**	**3.1300e-003**	**811.8319**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2170	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184
Energy	6.1900e-003	0.0552	0.0396	3.4000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	80.6211	80.6211	2.0000e-003	1.2900e-003	81.0545
Mobile	0.1402	0.8162	1.4382	6.4400e-003	0.6212	4.0100e-003	0.6253	0.1664	3.7200e-003	0.1701	0.0000	600.4247	600.4247	0.0263	0.0000	601.0825
Waste						0.0000	0.0000		0.0000	0.0000	10.0541	0.0000	10.0541	0.5942	0.0000	24.9087
Water						0.0000	0.0000		0.0000	0.0000	0.8161	6.9839	7.8000	3.1100e-003	1.8300e-003	8.4242
Total	**0.3634**	**0.8750**	**1.7869**	**6.8000e-003**	**0.6212**	**0.0100**	**0.6313**	**0.1664**	**9.7200e-003**	**0.1761**	**10.8703**	**688.5359**	**699.4062**	**0.6261**	**3.1200e-003**	**715.9883**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**2.14**	**4.56**	**9.62**	**13.15**	**15.37**	**5.66**	**15.24**	**15.37**	**5.45**	**14.88**	**0.00**	**12.21**	**12.04**	**0.53**	**0.32**	**11.81**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2021	9/22/2021	7	22	
2	Site Preparation	Site Preparation	10/1/2021	10/21/2021	7	21	
3	Grading	Grading	11/1/2021	12/13/2021	7	43	
4	Building Construction	Building Construction	12/1/2021	6/30/2023	7	577	
5	Architectural Coating	Architectural Coating	1/1/2023	6/30/2023	7	181	
6	Paving	Paving	5/1/2023	6/30/2023	7	61	

Acres of Grading (Site Preparation Phase): 10.5

Acres of Grading (Grading Phase): 16.13

Acres of Paving: 0.48

Residential Indoor: 99,855; Residential Outdoor: 33,285; Non-Residential Indoor: 4,595; Non-Residential Outdoor: 1,532; Striped Parking Area: 1,785 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	41.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	114.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	35.00	9.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	7.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.3900e-003	0.0000	4.3900e-003	6.7000e-004	0.0000	6.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0219	0.2167	0.1594	2.7000e-004		0.0115	0.0115		0.0107	0.0107	0.0000	23.1785	23.1785	5.9300e-003	0.0000	23.3266
Total	**0.0219**	**0.2167**	**0.1594**	**2.7000e-004**	**4.3900e-003**	**0.0115**	**0.0158**	**6.7000e-004**	**0.0107**	**0.0114**	**0.0000**	**23.1785**	**23.1785**	**5.9300e-003**	**0.0000**	**23.3266**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5000e-004	5.3400e-003	1.1300e-003	2.0000e-005	3.5000e-004	2.0000e-005	3.7000e-004	1.0000e-004	2.0000e-005	1.1000e-004	0.0000	1.5307	1.5307	1.0000e-004	0.0000	1.5334
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.4000e-004	4.9800e-003	2.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3666	1.3666	4.0000e-005	0.0000	1.3675
Total	**7.5000e-004**	**5.7800e-003**	**6.1100e-003**	**4.0000e-005**	**1.9200e-003**	**3.0000e-005**	**1.9500e-003**	**5.2000e-004**	**3.0000e-005**	**5.4000e-004**	**0.0000**	**2.8973**	**2.8973**	**1.4000e-004**	**0.0000**	**2.9009**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.9800e-003	0.0000	1.9800e-003	3.0000e-004	0.0000	3.0000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0219	0.2167	0.1594	2.7000e-004		0.0115	0.0115		0.0107	0.0107	0.0000	23.1784	23.1784	5.9300e-003	0.0000	23.3266
Total	**0.0219**	**0.2167**	**0.1594**	**2.7000e-004**	**1.9800e-003**	**0.0115**	**0.0134**	**3.0000e-004**	**0.0107**	**0.0110**	**0.0000**	**23.1784**	**23.1784**	**5.9300e-003**	**0.0000**	**23.3266**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.5000e-004	5.3400e-003	1.1300e-003	2.0000e-005	3.5000e-004	2.0000e-005	3.7000e-004	1.0000e-004	2.0000e-005	1.1000e-004	0.0000	1.5307	1.5307	1.0000e-004	0.0000	1.5334
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.0000e-004	4.4000e-004	4.9800e-003	2.0000e-005	1.5700e-003	1.0000e-005	1.5800e-003	4.2000e-004	1.0000e-005	4.3000e-004	0.0000	1.3666	1.3666	4.0000e-005	0.0000	1.3675
Total	**7.5000e-004**	**5.7800e-003**	**6.1100e-003**	**4.0000e-005**	**1.9200e-003**	**3.0000e-005**	**1.9500e-003**	**5.2000e-004**	**3.0000e-005**	**5.4000e-004**	**0.0000**	**2.8973**	**2.8973**	**1.4000e-004**	**0.0000**	**2.9009**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0609	0.0000	0.0609	0.0310	0.0000	0.0310	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.1829	0.0794	1.8000e-004		8.0400e-003	8.0400e-003		7.3900e-003	7.3900e-003	0.0000	15.8743	15.8743	5.1300e-003	0.0000	16.0027
Total	**0.0163**	**0.1829**	**0.0794**	**1.8000e-004**	**0.0609**	**8.0400e-003**	**0.0689**	**0.0310**	**7.3900e-003**	**0.0384**	**0.0000**	**15.8743**	**15.8743**	**5.1300e-003**	**0.0000**	**16.0027**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.6000e-004	2.9300e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.8028	0.8028	2.0000e-005	0.0000	0.8033
Total	**3.5000e-004**	**2.6000e-004**	**2.9300e-003**	**1.0000e-005**	**9.2000e-004**	**1.0000e-005**	**9.3000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.8028**	**0.8028**	**2.0000e-005**	**0.0000**	**0.8033**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0274	0.0000	0.0274	0.0140	0.0000	0.0140	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0163	0.1829	0.0794	1.8000e-004		8.0400e-003	8.0400e-003		7.3900e-003	7.3900e-003	0.0000	15.8743	15.8743	5.1300e-003	0.0000	16.0026
Total	**0.0163**	**0.1829**	**0.0794**	**1.8000e-004**	**0.0274**	**8.0400e-003**	**0.0354**	**0.0140**	**7.3900e-003**	**0.0214**	**0.0000**	**15.8743**	**15.8743**	**5.1300e-003**	**0.0000**	**16.0026**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.5000e-004	2.6000e-004	2.9300e-003	1.0000e-005	9.2000e-004	1.0000e-005	9.3000e-004	2.4000e-004	1.0000e-005	2.5000e-004	0.0000	0.8028	0.8028	2.0000e-005	0.0000	0.8033
Total	**3.5000e-004**	**2.6000e-004**	**2.9300e-003**	**1.0000e-005**	**9.2000e-004**	**1.0000e-005**	**9.3000e-004**	**2.4000e-004**	**1.0000e-005**	**2.5000e-004**	**0.0000**	**0.8028**	**0.8028**	**2.0000e-005**	**0.0000**	**0.8033**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1057	0.0000	0.1057	0.0543	0.0000	0.0543	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0277	0.3081	0.1361	3.0000e-004		0.0137	0.0137		0.0126	0.0126	0.0000	26.6249	26.6249	8.6100e-003	0.0000	26.8401
Total	**0.0277**	**0.3081**	**0.1361**	**3.0000e-004**	**0.1057**	**0.0137**	**0.1194**	**0.0543**	**0.0126**	**0.0669**	**0.0000**	**26.6249**	**26.6249**	**8.6100e-003**	**0.0000**	**26.8401**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.2000e-004	0.0149	3.1500e-003	4.0000e-005	9.8000e-004	4.0000e-005	1.0200e-003	2.7000e-004	4.0000e-005	3.1000e-004	0.0000	4.2562	4.2562	2.9000e-004	0.0000	4.2635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.3000e-004	5.9900e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.6437	1.6437	4.0000e-005	0.0000	1.6448
Total	**1.1400e-003**	**0.0154**	**9.1400e-003**	**6.0000e-005**	**2.8700e-003**	**5.0000e-005**	**2.9200e-003**	**7.7000e-004**	**5.0000e-005**	**8.2000e-004**	**0.0000**	**5.8999**	**5.8999**	**3.3000e-004**	**0.0000**	**5.9083**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0476	0.0000	0.0476	0.0244	0.0000	0.0244	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0277	0.3081	0.1361	3.0000e-004		0.0137	0.0137		0.0126	0.0126	0.0000	26.6248	26.6248	8.6100e-003	0.0000	26.8401
Total	**0.0277**	**0.3081**	**0.1361**	**3.0000e-004**	**0.0476**	**0.0137**	**0.0613**	**0.0244**	**0.0126**	**0.0371**	**0.0000**	**26.6248**	**26.6248**	**8.6100e-003**	**0.0000**	**26.8401**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.2000e-004	0.0149	3.1500e-003	4.0000e-005	9.8000e-004	4.0000e-005	1.0200e-003	2.7000e-004	4.0000e-005	3.1000e-004	0.0000	4.2562	4.2562	2.9000e-004	0.0000	4.2635
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.2000e-004	5.3000e-004	5.9900e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.1000e-004	0.0000	1.6437	1.6437	4.0000e-005	0.0000	1.6448
Total	**1.1400e-003**	**0.0154**	**9.1400e-003**	**6.0000e-005**	**2.8700e-003**	**5.0000e-005**	**2.9200e-003**	**7.7000e-004**	**5.0000e-005**	**8.2000e-004**	**0.0000**	**5.8999**	**5.8999**	**3.3000e-004**	**0.0000**	**5.9083**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0281	0.2114	0.1999	3.4000e-004		0.0106	0.0106		0.0102	0.0102	0.0000	28.1399	28.1399	5.0200e-003	0.0000	28.2655
Total	**0.0281**	**0.2114**	**0.1999**	**3.4000e-004**		**0.0106**	**0.0106**		**0.0102**	**0.0102**	**0.0000**	**28.1399**	**28.1399**	**5.0200e-003**	**0.0000**	**28.2655**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-004	0.0135	3.3500e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.1000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4058	3.4058	2.2000e-004	0.0000	3.4112
Worker	2.2600e-003	1.6700e-003	0.0189	6.0000e-005	5.9500e-003	4.0000e-005	6.0000e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.1845	5.1845	1.4000e-004	0.0000	5.1879
Total	**2.6600e-003**	**0.0152**	**0.0223**	**1.0000e-004**	**6.8300e-003**	**7.0000e-005**	**6.9100e-003**	**1.8300e-003**	**7.0000e-005**	**1.9000e-003**	**0.0000**	**8.5903**	**8.5903**	**3.6000e-004**	**0.0000**	**8.5992**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0281	0.2114	0.1999	3.4000e-004		0.0106	0.0106		0.0102	0.0102	0.0000	28.1399	28.1399	5.0200e-003	0.0000	28.2654
Total	**0.0281**	**0.2114**	**0.1999**	**3.4000e-004**		**0.0106**	**0.0106**		**0.0102**	**0.0102**	**0.0000**	**28.1399**	**28.1399**	**5.0200e-003**	**0.0000**	**28.2654**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.0000e-004	0.0135	3.3500e-003	4.0000e-005	8.8000e-004	3.0000e-005	9.1000e-004	2.5000e-004	3.0000e-005	2.8000e-004	0.0000	3.4058	3.4058	2.2000e-004	0.0000	3.4112
Worker	2.2600e-003	1.6700e-003	0.0189	6.0000e-005	5.9500e-003	4.0000e-005	6.0000e-003	1.5800e-003	4.0000e-005	1.6200e-003	0.0000	5.1845	5.1845	1.4000e-004	0.0000	5.1879
Total	**2.6600e-003**	**0.0152**	**0.0223**	**1.0000e-004**	**6.8300e-003**	**7.0000e-005**	**6.9100e-003**	**1.8300e-003**	**7.0000e-005**	**1.9000e-003**	**0.0000**	**8.5903**	**8.5903**	**3.6000e-004**	**0.0000**	**8.5992**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3009	2.2818	2.3226	4.0200e-003		0.1075	0.1075		0.1038	0.1038	0.0000	331.3779	331.3779	0.0577	0.0000	332.8208
Total	**0.3009**	**2.2818**	**2.3226**	**4.0200e-003**		**0.1075**	**0.1075**		**0.1038**	**0.1038**	**0.0000**	**331.3779**	**331.3779**	**0.0577**	**0.0000**	**332.8208**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3800e-003	0.1507	0.0372	4.1000e-004	0.0104	2.8000e-004	0.0106	2.9900e-003	2.7000e-004	3.2500e-003	0.0000	39.7480	39.7480	2.4400e-003	0.0000	39.8090
Worker	0.0250	0.0178	0.2055	6.5000e-004	0.0701	5.1000e-004	0.0706	0.0186	4.7000e-004	0.0191	0.0000	58.8542	58.8542	1.4800e-003	0.0000	58.8912
Total	**0.0294**	**0.1685**	**0.2428**	**1.0600e-003**	**0.0804**	**7.9000e-004**	**0.0812**	**0.0216**	**7.4000e-004**	**0.0223**	**0.0000**	**98.6022**	**98.6022**	**3.9200e-003**	**0.0000**	**98.7002**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3009	2.2818	2.3226	4.0200e-003		0.1075	0.1075		0.1038	0.1038	0.0000	331.3775	331.3775	0.0577	0.0000	332.8204
Total	**0.3009**	**2.2818**	**2.3226**	**4.0200e-003**		**0.1075**	**0.1075**		**0.1038**	**0.1038**	**0.0000**	**331.3775**	**331.3775**	**0.0577**	**0.0000**	**332.8204**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.3800e-003	0.1507	0.0372	4.1000e-004	0.0104	2.8000e-004	0.0106	2.9900e-003	2.7000e-004	3.2500e-003	0.0000	39.7480	39.7480	2.4400e-003	0.0000	39.8090
Worker	0.0250	0.0178	0.2055	6.5000e-004	0.0701	5.1000e-004	0.0706	0.0186	4.7000e-004	0.0191	0.0000	58.8542	58.8542	1.4800e-003	0.0000	58.8912
Total	**0.0294**	**0.1685**	**0.2428**	**1.0600e-003**	**0.0804**	**7.9000e-004**	**0.0812**	**0.0216**	**7.4000e-004**	**0.0223**	**0.0000**	**98.6022**	**98.6022**	**3.9200e-003**	**0.0000**	**98.7002**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1379	1.0598	1.1413	2.0000e-003		0.0466	0.0466		0.0450	0.0450	0.0000	164.3472	164.3472	0.0279	0.0000	165.0449
Total	**0.1379**	**1.0598**	**1.1413**	**2.0000e-003**		**0.0466**	**0.0466**		**0.0450**	**0.0450**	**0.0000**	**164.3472**	**164.3472**	**0.0279**	**0.0000**	**165.0449**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6200e-003	0.0562	0.0165	2.0000e-004	5.1300e-003	6.0000e-005	5.2000e-003	1.4800e-003	6.0000e-005	1.5400e-003	0.0000	19.1165	19.1165	1.0500e-003	0.0000	19.1428
Worker	0.0117	7.9700e-003	0.0940	3.1000e-004	0.0348	2.5000e-004	0.0350	9.2300e-003	2.3000e-004	9.4600e-003	0.0000	28.0968	28.0968	6.6000e-004	0.0000	28.1133
Total	**0.0133**	**0.0642**	**0.1105**	**5.1000e-004**	**0.0399**	**3.1000e-004**	**0.0402**	**0.0107**	**2.9000e-004**	**0.0110**	**0.0000**	**47.2133**	**47.2133**	**1.7100e-003**	**0.0000**	**47.2561**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1379	1.0598	1.1413	2.0000e-003		0.0466	0.0466		0.0450	0.0450	0.0000	164.3470	164.3470	0.0279	0.0000	165.0447
Total	**0.1379**	**1.0598**	**1.1413**	**2.0000e-003**		**0.0466**	**0.0466**		**0.0450**	**0.0450**	**0.0000**	**164.3470**	**164.3470**	**0.0279**	**0.0000**	**165.0447**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.6200e-003	0.0562	0.0165	2.0000e-004	5.1300e-003	6.0000e-005	5.2000e-003	1.4800e-003	6.0000e-005	1.5400e-003	0.0000	19.1165	19.1165	1.0500e-003	0.0000	19.1428
Worker	0.0117	7.9700e-003	0.0940	3.1000e-004	0.0348	2.5000e-004	0.0350	9.2300e-003	2.3000e-004	9.4600e-003	0.0000	28.0968	28.0968	6.6000e-004	0.0000	28.1133
Total	**0.0133**	**0.0642**	**0.1105**	**5.1000e-004**	**0.0399**	**3.1000e-004**	**0.0402**	**0.0107**	**2.9000e-004**	**0.0110**	**0.0000**	**47.2133**	**47.2133**	**1.7100e-003**	**0.0000**	**47.2561**

3.6 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1655					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0174	0.1179	0.1639	2.7000e-004		6.4100e-003	6.4100e-003		6.4100e-003	6.4100e-003	0.0000	23.1070	23.1070	1.3800e-003	0.0000	23.1415
Total	**0.1829**	**0.1179**	**0.1639**	**2.7000e-004**		**6.4100e-003**	**6.4100e-003**		**6.4100e-003**	**6.4100e-003**	**0.0000**	**23.1070**	**23.1070**	**1.3800e-003**	**0.0000**	**23.1415**

3.6 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3300e-003	1.5900e-003	0.0188	6.0000e-005	6.9500e-003	5.0000e-005	7.0000e-003	1.8500e-003	5.0000e-005	1.8900e-003	0.0000	5.6194	5.6194	1.3000e-004	0.0000	5.6227
Total	**2.3300e-003**	**1.5900e-003**	**0.0188**	**6.0000e-005**	**6.9500e-003**	**5.0000e-005**	**7.0000e-003**	**1.8500e-003**	**5.0000e-005**	**1.8900e-003**	**0.0000**	**5.6194**	**5.6194**	**1.3000e-004**	**0.0000**	**5.6227**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1655					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0174	0.1179	0.1639	2.7000e-004		6.4100e-003	6.4100e-003		6.4100e-003	6.4100e-003	0.0000	23.1069	23.1069	1.3800e-003	0.0000	23.1415
Total	**0.1829**	**0.1179**	**0.1639**	**2.7000e-004**		**6.4100e-003**	**6.4100e-003**		**6.4100e-003**	**6.4100e-003**	**0.0000**	**23.1069**	**23.1069**	**1.3800e-003**	**0.0000**	**23.1415**

3.6 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.3300e-003	1.5900e-003	0.0188	6.0000e-005	6.9500e-003	5.0000e-005	7.0000e-003	1.8500e-003	5.0000e-005	1.8900e-003	0.0000	5.6194	5.6194	1.3000e-004	0.0000	5.6227
Total	**2.3300e-003**	**1.5900e-003**	**0.0188**	**6.0000e-005**	**6.9500e-003**	**5.0000e-005**	**7.0000e-003**	**1.8500e-003**	**5.0000e-005**	**1.8900e-003**	**0.0000**	**5.6194**	**5.6194**	**1.3000e-004**	**0.0000**	**5.6227**

3.7 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0197	0.1902	0.2685	4.1000e-004		9.4100e-003	9.4100e-003		8.6800e-003	8.6800e-003	0.0000	35.9059	35.9059	0.0114	0.0000	36.1905
Paving	6.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0203**	**0.1902**	**0.2685**	**4.1000e-004**		**9.4100e-003**	**9.4100e-003**		**8.6800e-003**	**8.6800e-003**	**0.0000**	**35.9059**	**35.9059**	**0.0114**	**0.0000**	**36.1905**

3.7 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0000e-003	0.0118	4.0000e-005	4.3500e-003	3.0000e-005	4.3800e-003	1.1600e-003	3.0000e-005	1.1800e-003	0.0000	3.5171	3.5171	8.0000e-005	0.0000	3.5192
Total	**1.4600e-003**	**1.0000e-003**	**0.0118**	**4.0000e-005**	**4.3500e-003**	**3.0000e-005**	**4.3800e-003**	**1.1600e-003**	**3.0000e-005**	**1.1800e-003**	**0.0000**	**3.5171**	**3.5171**	**8.0000e-005**	**0.0000**	**3.5192**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0197	0.1902	0.2685	4.1000e-004		9.4100e-003	9.4100e-003		8.6800e-003	8.6800e-003	0.0000	35.9059	35.9059	0.0114	0.0000	36.1904
Paving	6.3000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0203**	**0.1902**	**0.2685**	**4.1000e-004**		**9.4100e-003**	**9.4100e-003**		**8.6800e-003**	**8.6800e-003**	**0.0000**	**35.9059**	**35.9059**	**0.0114**	**0.0000**	**36.1904**

3.7 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.4600e-003	1.0000e-003	0.0118	4.0000e-005	4.3500e-003	3.0000e-005	4.3800e-003	1.1600e-003	3.0000e-005	1.1800e-003	0.0000	3.5171	3.5171	8.0000e-005	0.0000	3.5192
Total	**1.4600e-003**	**1.0000e-003**	**0.0118**	**4.0000e-005**	**4.3500e-003**	**3.0000e-005**	**4.3800e-003**	**1.1600e-003**	**3.0000e-005**	**1.1800e-003**	**0.0000**	**3.5171**	**3.5171**	**8.0000e-005**	**0.0000**	**3.5192**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.1402	0.8162	1.4382	6.4400e-003	0.6212	4.0100e-003	0.6253	0.1664	3.7200e-003	0.1701	0.0000	600.4247	600.4247	0.0263	0.0000	601.0825
Unmitigated	0.1482	0.8580	1.6285	7.4700e-003	0.7341	4.6100e-003	0.7387	0.1966	4.2800e-003	0.2009	0.0000	696.0445	696.0445	0.0296	0.0000	696.7851

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	58.56	57.28	48.56	194,602	164,684
Condo/Townhouse High Rise	161.04	94.82	75.46	476,195	402,986
Fast Food Restaurant w/o Drive Thru	401.09	1,238.88	890.00	1,069,633	905,191
High Turnover (Sit Down Restaurant)	123.10	202.71	168.76	192,151	162,610
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	743.79	1,593.69	1,182.78	1,932,580	1,635,472

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Fast Food Restaurant w/o Drive	16.60	8.40	6.90	1.50	79.50	19.00	51	37	12
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
Condo/Townhouse High Rise	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
Fast Food Restaurant w/o Drive Thru	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
High Turnover (Sit Down Restaurant)	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
Other Asphalt Surfaces	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
Parking Lot	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757
Unenclosed Parking Structure	0.552035	0.041482	0.206421	0.111285	0.012766	0.005738	0.022315	0.037879	0.002185	0.001506	0.004914	0.000717	0.000757

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	19.3713	19.3713	8.2000e-004	1.6000e-004	19.4408
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	19.3713	19.3713	8.2000e-004	1.6000e-004	19.4408
NaturalGas Mitigated	6.1900e-003	0.0552	0.0396	3.4000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	61.2498	61.2498	1.1700e-003	1.1200e-003	61.6138
NaturalGas Unmitigated	6.1900e-003	0.0552	0.0396	3.4000e-004		4.2800e-003	4.2800e-003		4.2800e-003	4.2800e-003	0.0000	61.2498	61.2498	1.1700e-003	1.1200e-003	61.6138

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	102077	5.5000e-004	4.7000e-003	2.0000e-003	3.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	5.4472	5.4472	1.0000e-004	1.0000e-004	5.4796
Condo/Townhouse High Rise	251404	1.3600e-003	0.0116	4.9300e-003	7.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	13.4159	13.4159	2.6000e-004	2.5000e-004	13.4956
Fast Food Restaurant w/o Drive Thru	462627	2.4900e-003	0.0227	0.0191	1.4000e-004		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	24.6875	24.6875	4.7000e-004	4.5000e-004	24.8342
High Turnover (Sit Down Restaurant)	331670	1.7900e-003	0.0163	0.0137	1.0000e-004		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	17.6992	17.6992	3.4000e-004	3.2000e-004	17.8044
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**6.1900e-003**	**0.0552**	**0.0396**	**3.4000e-004**		**4.2800e-003**	**4.2800e-003**		**4.2800e-003**	**4.2800e-003**	**0.0000**	**61.2498**	**61.2498**	**1.1700e-003**	**1.1200e-003**	**61.6138**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Apartments Low Rise	102077	5.5000e-004	4.7000e-003	2.0000e-003	3.0000e-005		3.8000e-004	3.8000e-004		3.8000e-004	3.8000e-004	0.0000	5.4472	5.4472	1.0000e-004	1.0000e-004	5.4796
Condo/Townhouse High Rise	251404	1.3600e-003	0.0116	4.9300e-003	7.0000e-005		9.4000e-004	9.4000e-004		9.4000e-004	9.4000e-004	0.0000	13.4159	13.4159	2.6000e-004	2.5000e-004	13.4956
Fast Food Restaurant w/o Drive Thru	462627	2.4900e-003	0.0227	0.0191	1.4000e-004		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	24.6875	24.6875	4.7000e-004	4.5000e-004	24.8342
High Turnover (Sit Down Restaurant)	331670	1.7900e-003	0.0163	0.0137	1.0000e-004		1.2400e-003	1.2400e-003		1.2400e-003	1.2400e-003	0.0000	17.6992	17.6992	3.4000e-004	3.2000e-004	17.8044
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**6.1900e-003**	**0.0552**	**0.0396**	**3.4000e-004**		**4.2800e-003**	**4.2800e-003**		**4.2800e-003**	**4.2800e-003**	**0.0000**	**61.2498**	**61.2498**	**1.1700e-003**	**1.1200e-003**	**61.6138**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse High Rise	0	0.0000	0.0000	0.0000	0.0000
Fast Food Restaurant w/o Drive Thru	60424.1	9.6988	4.1000e-004	8.0000e-005	9.7336
High Turnover (Sit Down Restaurant)	43319.7	6.9534	2.9000e-004	6.0000e-005	6.9783
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	1540	0.2472	1.0000e-005	0.0000	0.2481
Unenclosed Parking Structure	15400	2.4719	1.0000e-004	2.0000e-005	2.4808
Total		**19.3713**	**8.1000e-004**	**1.6000e-004**	**19.4408**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Apartments Low Rise	0	0.0000	0.0000	0.0000	0.0000
Condo/Townhouse High Rise	0	0.0000	0.0000	0.0000	0.0000
Fast Food Restaurant w/o Drive Thru	60424.1	9.6988	4.1000e-004	8.0000e-005	9.7336
High Turnover (Sit Down Restaurant)	43319.7	6.9534	2.9000e-004	6.0000e-005	6.9783
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	1540	0.2472	1.0000e-005	0.0000	0.2481
Unenclosed Parking Structure	15400	2.4719	1.0000e-004	2.0000e-005	2.4808
Total		**19.3713**	**8.1000e-004**	**1.6000e-004**	**19.4408**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

No Hearths Installed

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2170	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184
Unmitigated	0.2170	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0166					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1912					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.2700e-003	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184
Total	**0.2170**	**3.5600e-003**	**0.3090**	**2.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**0.5063**	**0.5063**	**4.8000e-004**	**0.0000**	**0.5184**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0166					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1912					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	9.2700e-003	3.5600e-003	0.3090	2.0000e-005		1.7200e-003	1.7200e-003		1.7200e-003	1.7200e-003	0.0000	0.5063	0.5063	4.8000e-004	0.0000	0.5184
Total	**0.2170**	**3.5600e-003**	**0.3090**	**2.0000e-005**		**1.7200e-003**	**1.7200e-003**		**1.7200e-003**	**1.7200e-003**	**0.0000**	**0.5063**	**0.5063**	**4.8000e-004**	**0.0000**	**0.5184**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	7.8000	3.1100e-003	1.8300e-003	8.4242
Unmitigated	7.9405	3.1100e-003	1.8400e-003	8.5652

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	0.416986 / 0.328603	1.6050	5.7000e-004	3.3000e-004	1.7186
Condo/Townhouse High Rise	1.14671 / 0.903658	4.4139	1.5700e-003	9.2000e-004	4.7261
Fast Food Restaurant w/o Drive Thru	0.432232 / 0.0344866	1.1178	5.7000e-004	3.4000e-004	1.2335
High Turnover (Sit Down Restaurant)	0.310819 / 0.0247993	0.8038	4.1000e-004	2.5000e-004	0.8870
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**7.9405**	**3.1200e-003**	**1.8400e-003**	**8.5652**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Apartments Low Rise	0.416986 / 0.308558	1.5693	5.7000e-004	3.3000e-004	1.6827
Condo/Townhouse High Rise	1.14671 / 0.848535	4.3156	1.5600e-003	9.2000e-004	4.6274
Fast Food Restaurant w/o Drive Thru	0.432232 / 0.0323829	1.1141	5.7000e-004	3.4000e-004	1.2298
High Turnover (Sit Down Restaurant)	0.310819 / 0.0232866	0.8011	4.1000e-004	2.5000e-004	0.8843
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**7.8000**	**3.1100e-003**	**1.8400e-003**	**8.4242**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	10.0541	0.5942	0.0000	24.9087
Unmitigated	10.0541	0.5942	0.0000	24.9087

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	3.68	0.7470	0.0442	0.0000	1.8507
Condo/Townhouse High Rise	10.12	2.0543	0.1214	0.0000	5.0894
Fast Food Restaurant w/o Drive Thru	20.5	4.1613	0.2459	0.0000	10.3095
High Turnover (Sit Down Restaurant)	15.23	3.0916	0.1827	0.0000	7.6592
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Total		**10.0541**	**0.5942**	**0.0000**	**24.9087**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Apartments Low Rise	3.68	0.7470	0.0442	0.0000	1.8507
Condo/Townhouse High Rise	10.12	2.0543	0.1214	0.0000	5.0894
Fast Food Restaurant w/o Drive Thru	20.5	4.1613	0.2459	0.0000	10.3095
High Turnover (Sit Down Restaurant)	15.23	3.0916	0.1827	0.0000	7.6592
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000
Total		**10.0541**	**0.5942**	**0.0000**	**24.9087**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

100-132 North Catalina Avenue Existing Uses GHG Modeling

South Coast Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.97	Acre	0.97	42,253.20	0
Strip Mall	12.68	1000sqft	0.29	12,675.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2030
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	535.87	**CH4 Intensity (lb/MWhr)**	0.015	**N2O Intensity (lb/MWhr)**	0.003

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Updated per 2030 RPS

Land Use - Per site demolition plan and Assessor's Portal

Construction Phase - No construction, existing uses

Off-road Equipment -

Area Coating - SCAQMD Rule 1113

Energy Use -

Area Mitigation - SCAQMD Rule 1113

Water And Wastewater - Anaerobic only

Solid Waste -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstructionPhase	NumDays	20.00	0.00
tblLandUse	LandUseSquareFeet	12,680.00	12,675.00
tblProjectCharacteristics	CH4IntensityFactor	0.029	0.015
tblProjectCharacteristics	CO2IntensityFactor	702.44	535.87
tblProjectCharacteristics	N2OIntensityFactor	0.006	0.003
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2021					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum					**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
		Highest		

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0521	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004
Energy	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	51.8720	51.8720	1.4400e-003	3.1000e-004	51.9999
Mobile	0.0788	0.4367	0.8415	3.7500e-003	0.3717	2.3700e-003	0.3741	0.0996	2.2000e-003	0.1018	0.0000	349.0102	349.0102	0.0151	0.0000	349.3867
Waste						0.0000	0.0000		0.0000	0.0000	2.7018	0.0000	2.7018	0.1597	0.0000	6.6936
Water						0.0000	0.0000		0.0000	0.0000	0.3323	4.5272	4.8595	1.2700e-003	7.5000e-004	5.1142
Total	**0.1310**	**0.4380**	**0.8427**	**3.7600e-003**	**0.3717**	**2.4700e-003**	**0.3742**	**0.0996**	**2.3000e-003**	**0.1019**	**3.0341**	**405.4097**	**408.4438**	**0.1774**	**1.0600e-003**	**413.1948**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0521	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004
Energy	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	51.8720	51.8720	1.4400e-003	3.1000e-004	51.9999
Mobile	0.0788	0.4367	0.8415	3.7500e-003	0.3717	2.3700e-003	0.3741	0.0996	2.2000e-003	0.1018	0.0000	349.0102	349.0102	0.0151	0.0000	349.3867
Waste						0.0000	0.0000		0.0000	0.0000	2.7018	0.0000	2.7018	0.1597	0.0000	6.6936
Water						0.0000	0.0000		0.0000	0.0000	0.3323	4.5272	4.8595	1.2700e-003	7.5000e-004	5.1142
Total	**0.1310**	**0.4380**	**0.8427**	**3.7600e-003**	**0.3717**	**2.4700e-003**	**0.3742**	**0.0996**	**2.3000e-003**	**0.1019**	**3.0341**	**405.4097**	**408.4438**	**0.1774**	**1.0600e-003**	**413.1948**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	No construction	Demolition	1/21/2021	1/20/2021	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.97

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
No construction			0.00	0.00	14.70	6.90				

3.1 Mitigation Measures Construction

3.2 No construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0788	0.4367	0.8415	3.7500e-003	0.3717	2.3700e-003	0.3741	0.0996	2.2000e-003	0.1018	0.0000	349.0102	349.0102	0.0151	0.0000	349.3867
Unmitigated	0.0788	0.4367	0.8415	3.7500e-003	0.3717	2.3700e-003	0.3741	0.0996	2.2000e-003	0.1018	0.0000	349.0102	349.0102	0.0151	0.0000	349.3867

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Strip Mall	561.98	533.07	259.05	979,023	979,023
Total	561.98	533.07	259.05	979,023	979,023

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.554588	0.041680	0.206638	0.111313	0.012826	0.005773	0.022313	0.034878	0.002168	0.001490	0.004854	0.000717	0.000760
Strip Mall	0.554588	0.041680	0.206638	0.111313	0.012826	0.005773	0.022313	0.034878	0.002168	0.001490	0.004854	0.000717	0.000760

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	50.4448	50.4448	1.4100e-003	2.8000e-004	50.5642
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	50.4448	50.4448	1.4100e-003	2.8000e-004	50.5642
NaturalGas Mitigated	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4272	1.4272	3.0000e-005	3.0000e-005	1.4357
NaturalGas Unmitigated	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4272	1.4272	3.0000e-005	3.0000e-005	1.4357

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	26744.3	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4272	1.4272	3.0000e-005	3.0000e-005	1.4357
Total		**1.4000e-004**	**1.3100e-003**	**1.1000e-003**	**1.0000e-005**		**1.0000e-004**	**1.0000e-004**		**1.0000e-004**	**1.0000e-004**	**0.0000**	**1.4272**	**1.4272**	**3.0000e-005**	**3.0000e-005**	**1.4357**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	26744.3	1.4000e-004	1.3100e-003	1.1000e-003	1.0000e-005		1.0000e-004	1.0000e-004		1.0000e-004	1.0000e-004	0.0000	1.4272	1.4272	3.0000e-005	3.0000e-005	1.4357
Total		**1.4000e-004**	**1.3100e-003**	**1.1000e-003**	**1.0000e-005**		**1.0000e-004**	**1.0000e-004**		**1.0000e-004**	**1.0000e-004**	**0.0000**	**1.4272**	**1.4272**	**3.0000e-005**	**3.0000e-005**	**1.4357**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	37182.8	9.0379	2.5000e-004	5.0000e-005	9.0593
Strip Mall	170352	41.4069	1.1600e-003	2.3000e-004	41.5049
Total		**50.4448**	**1.4100e-003**	**2.8000e-004**	**50.5642**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Parking Lot	37182.8	9.0379	2.5000e-004	5.0000e-005	9.0593
Strip Mall	170352	41.4069	1.1600e-003	2.3000e-004	41.5049
Total		**50.4448**	**1.4100e-003**	**2.8000e-004**	**50.5642**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0521	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004
Unmitigated	0.0521	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.5300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0485					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004
Total	**0.0521**	**0.0000**	**1.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.6000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	3.5300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0485					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.0000e-005	0.0000	1.7000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	3.4000e-004	3.4000e-004	0.0000	0.0000	3.6000e-004
Total	**0.0521**	**0.0000**	**1.7000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**3.4000e-004**	**3.4000e-004**	**0.0000**	**0.0000**	**3.6000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	4.8595	1.2700e-003	7.5000e-004	5.1142
Unmitigated	4.8595	1.2700e-003	7.5000e-004	5.1142

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.93924 / 0.575663	4.8595	1.2700e-003	7.5000e-004	5.1142
Total		**4.8595**	**1.2700e-003**	**7.5000e-004**	**5.1142**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.93924 / 0.575663	4.8595	1.2700e-003	7.5000e-004	5.1142
Total		**4.8595**	**1.2700e-003**	**7.5000e-004**	**5.1142**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	2.7018	0.1597	0.0000	6.6936
Unmitigated	2.7018	0.1597	0.0000	6.6936

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	13.31	2.7018	0.1597	0.0000	6.6936
Total		**2.7018**	**0.1597**	**0.0000**	**6.6936**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Strip Mall	13.31	2.7018	0.1597	0.0000	6.6936
Total		**2.7018**	**0.1597**	**0.0000**	**6.6936**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

N2O Operational GHG Emission Mobile Calculations

Project Code & Title: 19-07402, 100-132 N Catalina Avenue Proposed Project

Vehicle Population Breakdown*	
10751499	Gasoline vehicles
476006	Diesel vehicles
95.8%	Gasoline vehicle %
4.2%	Diesel vehicle %

VMT per Vehicle Type	
1635472	Project VMT (CalEEMod output)
1566134	Gasoline vehicle VMT
69338	Diesel vehicle VMT

Gasoline Vehicles	
95.8%	Gasoline vehicle %
0.8162	Tons per year mobile NOX emissions (annual output in CalEEMod)
0.78	Gasoline vehicle tons per year NOX emissions
0.0515	Tons per year N2O emissions for gasoline vehicles**
0.0468	Metric tons per year N2O emissions for gasoline vehicles

Diesel Vehicles	
1.60	grams N2O per gallon of fuel for diesel vehicles**
131673.95	Diesel average miles per gallon*
0.00001	grams per mile N2O for diesel vehicles
0.8	grams per year N2O for diesel vehicles
0.0000008	Metric tons per year N2O emissions for diesel vehicles

CO2e Emissions from N2O	
0.0468	Metric tons per year from gasoline + diesel vehicles
298	GWP of N2O***
13.9	**CO2e emissions per year from N2O emissions from gasoline + diesel vehicles**

Sources

***Vehicle population source:**

Source: EMFAC2021 (v1.0.0) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2030
Season: Annual
Vehicle Classification: EMFAC202x Categories

****Methodology source:**

EMFAC2017 Volume III - Technical Documentation
https://www.arb.ca.gov/msei/emfac2011-faq.htm

*****GWP source:**

Intergovernmental Panel on Climate Change (IPCC). 2007.
AR4 Climate Change 2007: The Physical Science Basis.
Contrbution of Working Group I to the Fourth Assessment Report of the
Intergovernmental Panel on Climate Change.

N2O Operational GHG Emission Mobile Calculations

Project Code & Title: 19-07402, 100-132 N Catalina Avenue Existing Uses

Vehicle Population Breakdown*	
10751499	Gasoline vehicles
476006	Diesel vehicles
95.8%	Gasoline vehicle %
4.2%	Diesel vehicle %

VMT per Vehicle Type	
979023	Project VMT (CalEEMod output)
937516	Gasoline vehicle VMT
41507	Diesel vehicle VMT

Gasoline Vehicles	
95.8%	Gasoline vehicle %
0.4367	Tons per year mobile NOX emissions (annual output in CalEEMod)
0.42	Gasoline vehicle tons per year NOX emissions
0.0333	Tons per year N2O emissions for gasoline vehicles**
0.0302	Metric tons per year N2O emissions for gasoline vehicles

Diesel Vehicles	
1.60	grams N2O per gallon of fuel for diesel vehicles**
131673.95	Diesel average miles per gallon*
0.00001	grams per mile N2O for diesel vehicles
0.5	grams per year N2O for diesel vehicles
0.0000005	Metric tons per year N2O emissions for diesel vehicles

CO2e Emissions from N2O	
0.0302	Metric tons per year from gasoline + diesel vehicles
298	GWP of N2O***
9.0	**CO2e emissions per year from N2O emissions from gasoline + diesel vehicles**

Sources

***Vehicle population source:**
Source: EMFAC2021 (v1.0.0) Emissions Inventory
Region Type: Air District
Region: South Coast AQMD
Calendar Year: 2030
Season: Annual
Vehicle Classification: EMFAC202x Categories

****Methodology source:**
EMFAC2017 Volume III - Technical Documentation
https://www.arb.ca.gov/msei/emfac2011-faq.htm

*****GWP source:**
Intergovernmental Panel on Climate Change (IPCC). 2007.
AR4 Climate Change 2007: The Physical Science Basis.
Contrbution of Working Group I to the Fourth Assessment Report of the
Intergovernmental Panel on Climate Change.

Appendix IS-2

Energy Calculations

100-132 N Catalina Avenue Project Construction Energy Demand

Last Updated: 2/2/2021

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT

Construction Equipment	#	Hours per Day	Horsepower	Load Factor	Construction Phase	Fuel Used (gallons)
Tractors/Loaders/Backhoes	3	8	97	0.37	Demolition Phase	1,113.58
Rubber Tired Dozers	1	8	247	0.4	Demolition Phase	919.15
Concrete/Industrial Saws	1	8	81	0.73	Demolition Phase	611.55
Tractors/Loaders/Backhoes	1	8	97	0.37	Site Preparation Phase	354.32
Graders	1	8	187	0.41	Site Preparation Phase	680.85
Rubber Tired Dozers	1	7	247	0.4	Site Preparation Phase	767.70
Graders	1	6	187	0.41	Grading Phase	1,045.60
Rubber Tired Dozers	1	6	247	0.4	Grading Phase	1,347.40
Tractors/Loaders/Backhoes	1	7	97	0.37	Grading Phase	634.82
Cranes	1	6	231	0.29	Building Construction Phase	12,259.03
Forklifts	1	6	89	0.2	Building Construction Phase	3,621.26
Generator Sets	1	8	84	0.74	Building Construction Phase	16,861.25
Tractors/Loaders/Backhoes	1	6	97	0.37	Building Construction Phase	7,301.52
Welders	3	8	46	0.45	Building Construction Phase	16,844.98
Air Compressors	1	6	78	0.48	Architectural Coating Phase	805.25
Pavers	1	6	130	0.42	Paving Phase	3,134.31
Cement and Mortar Mixers	1	6	9	0.56	Paving Phase	321.64
Paving Equipment	1	8	132	0.36	Paving Phase	3,637.17
Tractors/Loaders/Backhoes	1	8	97	0.37	Paving Phase	3,053.90
Rollers	1	7	80	0.38	Paving Phase	2,263.41
					Total Fuel Used	**77,578.70** **(Gallons)**

Construction Phase	Days of Construction
Demolition Phase	22
Site Preparation Phase	21
Grading Phase	43
Building Construction Phase	577
Paving Phase	181
Architectural Coating Phase	61
Total Days	905

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition Phase	24.4	13	14.7	172.30
Site Preparation Phase	24.4	8	14.7	101.21
Grading Phase	24.4	8	14.7	207.25
Building Construction Phase	24.4	35	14.7	12166.66
Paving Phase	24.4	7	14.7	763.32
Architectural Coating Phase	24.4	13	14.7	477.75
			Total	**13,888.49**

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
HAULING TRIPS				
Demolition Phase	7.5	41	20.0	109.33
Site Preparation Phase	7.5	0	20.0	0.00
Grading Phase	7.5	114	20.0	304.00
Building Construction Phase	7.5	0	20.0	0.00
Paving Phase	7.5	0	20.0	0.00
Architectural Coating Phase	7.5	0	20.0	0.00
			Total	**413.33**
VENDOR TRIPS				
Demolition Phase	7.5	0	6.9	0.00
Site Preparation Phase	7.5	0	6.9	0.00
Grading Phase	7.5	0	6.9	0.00
Building Construction Phase	7.5	9	6.9	4777.56
Paving Phase	7.5	0	6.9	0.00
Architectural Coating Phase	7.5	0	6.9	0.00
			Total	**4,777.56**

Total Gasoline Consumption (gallons)	**13,888.49**
Total Diesel Consumption (gallons)	**82,769.59**

Sources:

[1] United States Environmental Protection Agency. 2018. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES2014b* . July 2018. Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100UXEN.pdf.

[2] United States Department of Transportation, Bureau of Transportation Statistics. 2019. *National Transportation Statistics 2019* . Available at: https://www.bts.gov/topics/national-transportation-statistics.

100-132 N Catalina Avenue Project Proposed Uses
Transportation Energy Demand

Last Updated: 2/2/2021

Populate one of the following tables (Leave the other blank):

Annual VMT	
Annual VMT:	1,635,472

OR

Daily Vehicle Trips	
Daily Vehicle Trips:	
Average Trip Distance:	

Fleet Class	Fleet Mix
Light Duty Auto (LDA)	0.550809
Light Duty Truck 1 (LDT1)	0.042355
Light Duty Truck 2 (LDT2)	0.203399
Medium Duty Vehicle (MDV)	0.115606
Light Heavy Duty 1 (LHD1)	0.014562
Light Heavy Duty 2 (LHD2)	0.005806
Medium Heavy Duty (MHD)	0.02181
Heavy Heavy Duty (HHD)	0.035336
Other Bus (OBUS)	0.002134
Urban Bus (UBUS)	0.001736
Motorcycle (MCY)	0.004891
School Bus (SBUS)	0.000712
Motorhome (MH)	0.000845

Fuel Economy (MPG) [1]	
Passenger Vehicles	24.4
Light-Med Duty Trucks	17.9
Heavy Trucks/Other	7.5
Motorcycles	44

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	*55.08%*	*Gasoline*	900833	900832.70	73838.75
Light-Medium Duty Trucks	*36.14%*	*Gasoline*	590994	590994.16	66032.87
Heavy Trucks/Other	*8.29%*	*Diesel*	135648	135647.68	36172.72
Motorcycle	*0.49%*	*Gasoline*	7999	7999.09	363.60

Total Gasoline Consumption (gallons)	**140235.21**
Total Diesel Consumption (gallons)	**36172.72**

Sources:

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2019. National Transportation Statistics 2019. Available at: https://www.bts.gov/topics/national-transportation-statistics.

100-132 N Catalina Avenue Project Existing Uses
Transportation Energy Demand

Last Updated: 2/2/2021

Populate one of the following tables (Leave the other blank):

Annual VMT	
Annual VMT:	979,023

OR

Daily Vehicle Trips	
Daily Vehicle Trips:	
Average Trip Distance:	

Fleet Class	**Fleet Mix**
Light Duty Auto (LDA)	0.553363
Light Duty Truck 1 (LDT1)	0.04254
Light Duty Truck 2 (LDT2)	0.203692
Medium Duty Vehicle (MDV)	0.115607
Light Heavy Duty 1 (LHD1)	0.014606
Light Heavy Duty 2 (LHD2)	0.00583
Medium Heavy Duty (MHD)	0.0218
Heavy Heavy Duty (HHD)	0.032323
Other Bus (OBUS)	0.00212
Urban Bus (UBUS)	0.001725
Motorcycle (MCY)	0.004837
School Bus (SBUS)	0.000711
Motorhome (MH)	0.000846

Fuel Economy (MPG) [1]	
Passenger Vehicles	24.4
Light-Med Duty Trucks	17.9
Heavy Trucks/Other	7.5
Motorcycles	44

Fleet Mix

Vehicle Type	**Percent**	**Fuel Type**	**Annual VMT: VMT**	**Vehicle Trips: VMT**	**Fuel Consumption (Gallons)**
Passenger Vehicles	*55.34%*	*Gasoline*	541755	541755.10	44406.16
Light-Medium Duty Trucks	*36.18%*	*Gasoline*	354249	354248.70	39580.86
Heavy Trucks/Other	*8.00%*	*Diesel*	78284	78283.66	20875.64
Motorcycle	*0.48%*	*Gasoline*	4736	4735.53	215.25

Total Gasoline Consumption (gallons)	**84202.27**
Total Diesel Consumption (gallons)	**20875.64**

Sources:

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2019. National Transportation Statistics 2019. Available at: https://www.bts.gov/topics/national-transportation-statistics.

Appendix IS-3

Geotechnical Engineering Investigation

Geotechnologies, Inc.
Consulting Geotechnical Engineers

439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

April 22, 2019
File No. 21759

Catalina Fund, LLC
1240 Rosecrans Avenue
Manhattan Beach, California 90266

Attention: Lindsey Mills

<u>Subject</u>: Geotechnical Engineering Investigation
Proposed Mixed-Use Development
100 - 132 North Catalina Avenue, Redondo Beach, California

Ladies and Gentlemen:

This letter transmits the Geotechnical Engineering Investigation for the subject site prepared by Geotechnologies, Inc. This report provides geotechnical recommendations for the development of the site, including earthwork, seismic design, temporary excavations, foundations, and floor slabs. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

The validity of the recommendations presented herein is dependent upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

ANDRES E. LOZANO
Staff Engineer

STANLEY S. TANG
R.C.E. 56178

REGISTERED PROFESSIONAL ENGINEER
STANLEY S'U KEI TANG
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TABLE OF CONTENTS

SECTION **PAGE**

INTRODUCTION 1
PROPOSED DEVELOPMENT 1
SITE CONDITIONS 2
GEOTECHNICAL EXPLORATION 2
  FIELD EXPLORATION 2
    Geologic Materials 3
    Groundwater 3
    Caving 4
  OIL WELLS 5
  METHANE 5
SEISMIC EVALUATION 5
  REGIONAL GEOLOGIC SETTING 5
  REGIONAL FAULTING 6
  SEISMIC HAZARDS AND DESIGN CONSIDERATIONS 7
    Surface Rupture 7
    Liquefaction 8
    Dynamic Dry Settlement 9
    Tsunamis, Seiches and Flooding 10
    Landsliding 10
CONCLUSIONS AND RECOMMENDATIONS 10
  SEISMIC DESIGN CONSIDERATIONS 12
    2016 CBC Seismic Parameters 12
  FILL SOILS 13
  EXPANSIVE SOILS 13
  WATER-SOLUBLE SULFATES 13
  GRADING GUIDELINES 14
    Site Preparation 14
    Recommended Overexcavation 14
    Compaction 15
    Acceptable Materials 15
    Utility Trench Backfill 16
    Shrinkage 16
    Weather Related Grading Considerations 16
    Abandoned Seepage Pits 17
    LEED Considerations 18
    Geotechnical Observations and Testing During Grading 19
  FOUNDATION DESIGN 19
    Conventional Foundation Design 19
    Miscellaneous Foundations 20
    Conventional Foundations General 20
    Lateral Design 21
    Foundation Settlement 21
    Foundation Observations 21

TABLE OF CONTENTS

SECTION **PAGE**

RETAINING WALL DESIGN 22
  Cantilever Retaining Walls 22
  Dynamic (Seismic) Earth Pressure 22
  Waterproofing 23
  Retaining Wall Drainage 23
  Retaining Wall Backfill 24
  Sump Pump Design 24
TEMPORARY EXCAVATIONS 25
  Excavation Adjacent to Buildings or Property Lines 25
  Excavation Observations 26
SLABS ON GRADE 26
  Concrete Slabs-on-Grade 26
  Design Of Slabs That Receive Moisture-Sensitive Floor Coverings 27
  Concrete Crack Control 27
  Slab Reinforcing 28
PAVEMENTS 28
SITE DRAINAGE 30
STORMWATER DISPOSAL 30
  Introduction 30
  Percolation Testing 31
    Shallow Percolation Testing 31
    Deep Percolation Testing 32
  Recommendations 33
DESIGN REVIEW 35
CONSTRUCTION MONITORING 36
EXCAVATION CHARACTERISTICS 36
CLOSURE AND LIMITATIONS 37
GEOTECHNICAL TESTING 37
  Classification and Sampling 37
  Moisture and Density Relationships 38
  Direct Shear Testing 38
  Consolidation Testing 39
  Expansion Index Testing 39
  Laboratory Compaction Characteristics 40

ENCLOSURES

- References
- Vicinity Map
- Plot Plan
- Local Geologic Map - Dibblee
- Historically Highest Groundwater Levels Map
- Water Well Location Map
- Oil Well Location Map

TABLE OF CONTENTS

SECTION **PAGE**

ENCLOSURES - continued

Seismic Hazard Zone Map
Plates A-1 through A-6
Plates B-1 and B-2
Plates C-1 through C-3
Plate D
Calculation Sheets (3 pages)
Monitoring Well Measurement Logs (6 pages)

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
100 – 132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical engineering investigation performed on the subject site. The purpose of this investigation was to identify the distribution and engineering properties of the geologic materials underlying the site, and to provide geotechnical recommendations for the design of the proposed development.

This investigation included six exploratory excavations, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information and the preparation of this report. The site location is shown on the enclosed Vicinity Map, and the boring locations are shown on the enclosed Plot Plan. The results of the exploration and laboratory tests are provided in the Appendix of this report.

PROPOSED DEVELOPMENT

Information concerning the proposed project was furnished by the client. The proposed project consists of a new mixed-use development. The plan proposed 13,500 square feet of commercial space located in three existing structures to be renovated. The residential portion of the development consists of 22, three-story townhomes, and a three-story, 8-unit apartment building. The structures will be constructed at, or near, current grade, with surface parking. Grading will consist of removal and recompaction of existing unsuitable soils.

Any changes in the design or location of the relocated structure, as outlined in this report, should be reviewed by this office. The recommendations contained herein should not be considered valid until reviewed and modified or reaffirmed subsequent to such review.

SITE CONDITIONS

The property is located at 100 – 132 North Catalina Avenue, in the City of Redondo Beach, California. The site is bounded by Emerald Street to the south, by a 1-story commercial structure to the north, by North Catalina Avenue to the west, and by 1 to 2-story near grade residential and commercial structures to the east.

At the time of exploration, the site was occupied by 1 to 2-story near-grade commercial structures. The existing commercial structures will be renovated as part of the proposed development. The site is relatively level, with no pronounced highs or lows.

The neighboring developments consist of multi-story commercial and residential structures. Vegetation at the site consists of a few mature trees and shrubs, contained in planter areas. Drainage appears to be by sheetflow to the city streets.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on February 25 and 26, 2019, by excavating four exploratory borings and two test pits. The borings varied in depth from 20 and 50 feet below the existing grade, and Borings B1, B2 and B3 were excavated with the aid of a truck mounted drilling machine using 8-inch diameter hollow stem augers and B4 was excavated using 4-inch hand auger. The test pits were excavated to a depths ranging from 6 to 20 feet with the aid of hand tools and hand labor.

The exploration locations are shown on the enclosed Plot Plan, and the geologic materials encountered are logged on Plates A-1 through A-6.

The location of the exploratory excavations was determined from hardscaped features shown on the attached Plot Plan. The location of the exploratory excavations should be considered accurate only to the degree implied by the method used.

Geologic Materials

Fill materials underlying the subject site predominantly consists of silty sands, which are dark brown in color, moist, medium dense, and fine grained. The observed fill materials extend to a depth of 1½ to 3 feet below existing grade.

The fill is underlain by native alluvial soils, consisting predominantly of silty sands and sands. The native alluvial soils range from yellowish brown to dark brown in color, and are slightly moist to very moist, medium dense to very dense, and fine to medium grained. More detailed descriptions of the earth materials encountered may be obtained from individual logs of the subsurface excavations.

Groundwater

Groundwater was not encountered during exploration which was conducted to a maximum depth of 50 feet below the existing ground surface at Boring B2. According to the Redondo Beach 7½ Minute Quadrangle Seismic Hazard Evaluation Report, Plate 1.2, Historically Highest Ground Water Contours (CDMG, 1998, Revised 2006), the historic-high groundwater level at the site is not well defined in this area. The 10-foot contour is over 0.25 miles to the west and no contour shows for over a mile to the east of the site. It is the opinion of this firm that this closest groundwater level contour is not representative of the site's historically highest groundwater level. A copy of this plate is included in the Appendix as Historically Highest Groundwater Levels Map.

The Los Angeles Department of Public Works lists a water monitoring well less than 100 feet east of the subject site. This monitoring well is numbered 715B, and its location is shown relative to the subject site in the enclosed Water Well Location Map. Groundwater levels were measured in this well at least annually from 1958 through 2008. According to water-well logs obtained from the Los Angeles Department of Public Works Website (enclosed in the Appendix), the highest groundwater level for Well 715B was approximately 46.3 feet below ground surface (or approximate elevation 18.7 feet) in 1989. The deepest groundwater level measured on this well is reported to be 85.2 feet (or approximate elevation -20.2 feet), which was measured in 1958. Based on the nearby groundwater well data, it is recommended that a historically highest groundwater elevation of 20.0 feet above Mean Sea Level (MSL), which corresponds to approximately 45 feet below the existing site grade.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving

Caving could not be directly observed during drilling because the boreholes were cased during drilling, and caving was not possible. Caving was not experienced during excavation of the test pits. However, based on the general experience of this firm, large diameter excavations, excavations that encounter granular, cohesionless soils will most likely experience caving.

OIL WELLS

Based on review of the California State Division of Oil, Gas and Geothermal Resources (DOGGR) Online Mapping System, the site is located within the limits of the Torrance Oil Field. Review of the DOGGR On-line Mapping System also indicates that the closest oil and gas wells are located approximately 2,000 feet to the northwest and 3,700 feet to the east. No oil wells are reported to be located at the subject site. The enclosed Oil Well Location Map shows the reported location of nearby wells.

METHANE

Since the site is located within the limits of an oil field, and the nearest oil and gas well is approximately 2,000 feet to the northwest, this firm recommends that a qualified environmental consultant is contacted to determine if methane mitigation would be required for the project.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject site is located within the Los Angeles Basin and Peninsular Ranges Geomorphic Province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-west trending reverse faults that form the southern margin of the Transverse Ranges.

The Los Angeles Basin is located at the northern end of the Peninsular Ranges Geomorphic Province. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, and to the northwest by the Santa Monica Mountains. Over 22 million years ago, the Los Angeles Basin was a deep marine basin formed by tectonic forces between the North

American and Pacific plates. Since that time, over 5 miles of marine and non-marine sedimentary rock as well as, intrusive and extrusive igneous rocks have filled the basin. During the last 2 million years, defined by the Pleistocene and Holocene epochs, the Los Angeles Basin and surrounding mountain ranges have been uplifted to form the present day landscape. Erosion of the surrounding mountains has resulted in deposition of unconsolidated sediments in low-lying areas by rivers such as the Los Angeles River. Areas that have experienced subtle uplift have been eroded with gullies.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

SEISMIC HAZARDS AND DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

Surface Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines "active" and "potentially active" faults utilizing the same aging criterial as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as characteristic for faults that have a relatively high potential for ground rupture in the future.

The CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Surface rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature, no known active faults or potentially active faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these consideration, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The Seismic Hazards Map of the Redondo Beach Quadrangle by the State of California (CDMG, 1999) does not classify the site as part of a "Liquefiable" area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map has been included in the Appendix.

A site-specific liquefaction analysis was performed following the Recommended Procedures for Implementation of the California Geologic Survey Special Publication 117A, Guidelines for Analyzing and Mitigating Seismic Hazards in California (CGS, 2008), and the EERI Monograph (MNO-12) by Idriss and Boulanger (2008). The semi-empirical method is based on a correlation between measured values of Standard Penetration Test (SPT) resistance and field performance data.

Groundwater was not encountered during exploration, conducted to a maximum depth of 50 feet below the existing grade. According to the Seismic Hazard Zone Report of Redondo Beach 7½-Minute Quadrangle (CDMG, 1998, Revised 2006), the historic-high groundwater level for the site is not well defined in this area. The 10-foot contour is over 0.25 miles to the west and no contour shows for over a mile to the east of the site. However, review of the logs from a Los Angeles Department of Public Works groundwater monitoring well, located less than 100 feet east of the subject site, indicate that between 1958 and 2008 the highest groundwater level measured in this well was approximately 46.3 feet below existing grade (or approximate elevation 18.7 feet).

For the purpose of the enclosed liquefaction analysis, the historic highest groundwater level of 10 feet below the existing site grade was conservatively utilized.

The peak ground acceleration (PGA_M) and modal magnitude were obtained from the USGS websites, using the U.S. Seismic Design Maps tool (USGS, 2018) and the Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). A Site Class "D" (Stiff Soil Profile) and a published shear wave velocity of 259 meters per second were utilized for V_S30 (Tinsley and Fumal, 1985) in the USGS seismic programs. A modal magnitude (M_W) of 6.95 was obtained using the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). A peak ground acceleration of 0.643g, which corresponds to the site's PGA_M, was obtained using the U.S. Seismic Design Maps tool. These parameters are used in the enclosed liquefaction analyses.

The enclosed "Liquefaction Evaluation" calculation sheet is based on Boring 2. Standard Penetration Test (SPT) data were collected at 5-foot intervals. Samples of the collected materials were conveyed to the laboratory for testing and analysis. Utilizing the adjusted blow count data, and the results of laboratory testing, the enclosed liquefaction analysis indicated that the underlying soils would not be prone to liquefaction.

Dynamic Dry Settlement

Seismically-induced settlement of compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Some seismically-induced settlement of the proposed structures should be expected as a result of strong ground-shaking, however, due to the uniform nature of the underlying geologic materials, excessive differential settlements are not expected to occur.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. Review of the County of Los Angeles Flood and Inundation Hazards Map, (Leighton, 1990), indicates the site does not lie within mapped tsunami inundation boundaries. The site is far and/or high enough from the ocean or lakes such that it would not be prone to hazards of a tsunami or seiche.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the County of Los Angeles Flood and Inundation Hazards Map (Leighton, 1990), indicates the site does not lie within the inundation boundaries due to a seiche or a breached upgradient reservoir.

Landsliding

The probability of seismically-induced landslides affecting the subject development is considered to be low, due to the lack of elevation difference across of adjacent to the site.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of this firm that the proposed project is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

Fill materials were encountered during exploration to a maximum depth of 3 feet below the existing site grade. The existing fill materials are considered to be unsuitable for support of the proposed foundations, floor slabs, or additional fill, but may be reused for the preparation of a uniform compacted fill pad. Groundwater was not encountered during exploration, conducted to a depth of 50 feet below existing grade.

The proposed new structures may be supported by conventional foundations bearing in a uniform compacted fill pad. For the construction of a uniform compacted fill pad, all existing fill materials and upper native soils shall be removed and recompacted to a minimum depth of 5 feet below the proposed grade, or 3 feet below the bottom of the proposed foundations, whichever is deeper. In addition, the compacted fill should extend horizontally a minimum of 3 feet beyond the edge of foundations, or for a distance equal to the depth of fill below the foundation, whichever is greater.

New footings may be necessary as part of the proposed renovation of the existing structures. Where new footings are needed, as determined by the project structural engineer, new footings may be deepened to bear into the underlying native soils. Where existing slab-on-grade will need to be replaced, the existing fill materials shall be properly removed and recompacted for slab support.

Foundations for small outlying structures, such as property line walls, which will not be tied-in to the proposed structures, may be supported on conventional foundations bearing in native geologic materials and/or certified compacted fill.

The validity of the conclusions and design recommendations presented herein is dependent upon review of the geotechnical aspects of the proposed construction by this firm. The subsurface conditions described herein have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations which may occur between these excavations or which may result from changed in subsurface conditions. Any changes in the design, as outlined in this report, should be reviewed by this office. The recommendations contained herein should not be considered valid until reviewed and modified or reaffirmed subsequent to such review.

SEISMIC DESIGN CONSIDERATIONS

2016 CBC Seismic Parameters

Based on information derived from the subsurface investigation, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile, according to Table 1613.5.2 of the California Building Code (CBC). This information and the site coordinates were input into the USGS U.S. Seismic Design Maps tool to calculate the seismic ground motion parameters for the site. Ground motion parameters for the 2016 CBC are presented below.

2016 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	1.802g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	1.802g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.201g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.676g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.014g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.676g

FILL SOILS

The maximum depth of fill encountered on the site was 3 feet. The existing fill soils are not suitable for support of newly proposed foundations, floor slabs or additional fill buy may be reused as compacted fill. All existing fill materials shall be properly removed and recompacted for foundation and slab support.

EXPANSIVE SOILS

The onsite geologic materials are in the very low expansion range. The Expansion Index was found to be 2 and 3 for representative remolded bulk samples. Recommended reinforcing is provided in the "Foundation Design" and "Slabs-on-grade" sections of this report.

WATER-SOLUBLE SULFATES

The Portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually the two most common sources of exposure are from soil and marine environments.

The sources of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite geologic materials was tested by California Test 417. The water-soluble sulfate content was determined to be less than 0.1% percentage by weight for the soils tested. Based on American Concrete Institute (ACI) Standard 318-08, the sulfate exposure is considered to be negligible for geologic materials with less than 0.1%, and therefore, there are no restrictions on cement types for concrete foundations in contact with the site soils.

GRADING GUIDELINES

The following guidelines are provided for the preparation of the compacted fill pad recommended for support of the proposed structures, and for any other miscellaneous compaction that may be required, such as retaining wall or footing backfill, or subgrade preparation.

Site Preparation

- A thorough search should be made for possible underground utilities and/or structures. Any existing or abandoned utilities or structures located within the footprint of the proposed grading should be removed or relocated as appropriate.
- All vegetation, existing fill, and soft or disturbed geologic materials should be removed from the areas to receive controlled fill. All existing fill materials and any disturbed geologic materials resulting from grading operations shall be completely removed and properly recompacted prior to foundation excavation.
- Any vegetation or associated root system located within the footprint of the proposed structures should be removed during grading.
- Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.
- The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Recommended Overexcavation

All existing fill materials shall be properly removed and recompacted within the proposed building area. The proposed fill pad shall extend to a minimum depth of 5 feet below the bottom of the proposed grade, or 3 feet below bottom of the proposed foundations, whichever is greater. In addition, the excavation shall extend horizontally at least 3 feet beyond the edge of foundations, or for a distance equal to the depth of fill below the foundations, whichever is greater. It is very important that the position of the proposed structure is accurately located so that the limits of the graded area are accurate and the grading operation proceeds efficiently.

Compaction

All fill should be mechanically compacted in layers not more than 8 inches thick. The materials placed should be moisture conditioned to within 3 percent of the optimum moisture content of the particular material placed. All fill should be compacted to at least 90 percent of the maximum laboratory density for the materials used. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using the test method described in the most recent revision of ASTM D 1557.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until minimum of 90 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed. Materials larger than 6 inches in maximum dimension shall not be used in the fill. Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of geologic materials with an expansion index of less than 50. The water-soluble sulfate content of the import materials should be less than 0.1% percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 90 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with the most recent revision of ASTM D-1557.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between 2 and 10 percent should be anticipated when excavating and recompacting the existing fill and underlying native geologic materials on the site to an average comparative compaction of 92 percent.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Abandoned Seepage Pits

No abandoned seepage pits were encountered during exploration and none are known to exist on the site. However, should such a structure be encountered during grading, options to permanently abandon seepage pits include complete removal and backfill of the excavation with compacted fill, or drilling out the loose materials and backfilling to within a few feet of grade with slurry, followed by a compacted fill cap.

If the subsurface structures are to be removed by grading, the entire structure should be demolished. The resulting void may be refilled with compacted soil. Concrete and brick generated during the seepage pit removal may be reused in the fill as long as all fragments are less than 6 inches in longest dimension and the debris comprises less than 15 percent of the fill by volume. All grading should comply with the recommendations of this report.

Where the seepage pit structure is to be left in place, the seepage pits should cleaned of all soil and debris. This may be accomplished by drilling. The pits should be filled with minimum 1-1/2 sack concrete slurry to within 5 feet of the bottom of the proposed foundations. In order to provide a more uniform foundation condition, the remainder of the void should be filled with controlled fill.

LEED Considerations

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System encouraged adoption of sustainable green building and development practices. Credit for LEED Certification can be assigned for reuse of construction waste and diversion of materials from landfills in new construction.

In an effort to provide the design team with a viable option in this regard, demolition debris could be crushed onsite in order to use it in the ongoing grading operations. The environmental ramifications of this option, if any, should be considered by the team.

The demolition debris should be limited to concrete, asphalt and other non-deleterious material. All deleterious materials should be removed including, but not limited to, paper, garbage, ceramic materials and wood.

For structural fill applications, the materials should be crushed to 2 inches in maximum dimension or smaller. The crushed materials should be thoroughly blended and mixed with onsite soils prior to placement as compacted fill. The amount of crushed material should not exceed 20 percent. The blended and mixed materials should be tested by this office prior to placement to insure it is suitable for compaction purposes. The blended and mixed materials should be tested by Geotechnologies, Inc. during placement to insure that it has been compacted in a suitable manner.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

FOUNDATION DESIGN

Conventional Foundation Design

The proposed structures may be supported on conventional foundations bearing in the newly placed compacted fill blanket. In addition, new footings may be necessary as part of the proposed renovation of the existing structures. Where new footings are needed, as determined by the project structural engineer, new footings may be deepened to bear into the underlying native soils. The deepened portions of the footings may be backfilled with a minimum of 3 sack slurry to the bottom of the proposed footing. The slurry is denser than the surrounding soils and will transfer the structural loads into the underlying native soils.

Continuous foundations may be designed for a bearing capacity of 2,000 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

Column foundations may be designed for a bearing capacity of 2,500 pounded per square foot, and should be a minimum of 24 inches in width, 18 inches in depth below the lowest adjacent grade, and 18 inches into the recommended bearing material.

The bearing capacity increase for each additional foot of width is 200 pounds per square foot. The bearing capacity increase for each additional foot of depth is 400 pounds per square foot. The maximum recommended bearing capacity is 5,000 pounds per square foot.

Miscellaneous Foundations

Foundations for small outlying structures, such as property line walls and trash enclosures, which will not be tied-in to the proposed building may be supported on conventional foundations bearing in native soils, and/or properly placed compacted fill. These footings may be designed for a bearing value of 1,500 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material. No bearing value increases are recommended.

Conventional Foundations General

A minimum factor of safety of 3 was utilized in determining the allowable bearing capacities. The bearing values indicated above are for the total of dead and frequently applied live loads, and may be increased by one third for short duration loading, which included the effects of wind or seismic forces.

Since the recommended bearing value is a net value, the weight of concrete in the foundations may be taken as 50 pounds per cubic foot and the weight of the soil backfill may be neglected when determining the downward load on the foundations.

All continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundations, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of the foundations and by passive earth pressure. An allowable coefficient of friction of 0.35 may be used with the dead load forces.

Passive earth pressure for the sides of foundations poured against undisturbed or recompacted soil may be computed as an equivalent fluid having a density of 200 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot. The passive and friction components may be combined for lateral resistance without reduction. A one-third increase in the passive value may be used for short duration loading such as wind or seismic forces.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. The maximum settlement is not expected to exceed 1 inch and would occur below the heaviest loaded elements. Differential settlement is not expected to exceed ½ inch.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory earth materials, if necessary. Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Miscellaneous site retaining walls up to 6 feet may be required as part of the proposed development. Retaining walls supporting a level backslope may be designed utilizing a triangular distribution of pressure. Cantilever retaining walls may be designed for 30 pounds per cubic foot for walls retaining up to 6 feet of earth.

For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made. Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.

In addition to the recommended earth pressure, the upper ten feet of the retaining wall adjacent to street, driveways or parking areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal street traffic. If the traffic is kept back at least ten feet from the retaining walls, the traffic surcharge may be neglected.

The lateral earth pressures recommended above for retaining walls assume that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. Also, where necessary, the retaining walls should be designed to accommodate any surcharge pressures that may be imposed by any adjacent buildings.

Dynamic (Seismic) Earth Pressure

Based on the 2016 California Building Code, retaining walls exceeding 6 feet in height shall be designed to resist the additional earth pressure caused by seismic ground shaking. Miscellaneous retaining walls anticipated for the proposed project are not expected to exceed 6 feet in height. Therefore the dynamic earth pressure may be omitted.

Waterproofing

Moisture effecting retaining walls is one of the most common post construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water inside the building. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Drainage

Retaining walls should be provided with a subdrain covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. The onsite earth materials are acceptable for use as retaining wall backfill as long as they are compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557.

Certain types of subdrain pipe are not acceptable to the various municipal agencies. It is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Where retaining walls are to be constructed adjacent to property lines there is usually not enough space for emplacement of a standard pipe and gravel drainage system. Under these circumstances, the use of a flat-drainage product is acceptable.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 percent of the maximum density obtainable by the most recent revision of ASTM D 1557 method of compaction. Flooding should not be permitted. Compaction within 5 feet, measured horizontally, behind a retaining structure should be achieved by use of light weight, hand operated compaction equipment.

Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to the structure.

Sump Pump Design

The purpose of the recommended retaining wall backdrainage system is to relieve hydrostatic pressure. Groundwater was not encountered during exploration, conducted to a depth of 50 feet below existing grade. Based on the anticipated development to be constructed at/or near grade, it is the opinion of the firm that the groundwater level would not be expected to rise to the anticipated finished grade of the proposed structures level during the life of the structures. Therefore the only water which could affect the proposed retaining walls would be irrigation water and precipitation.

Based on these considerations the retaining wall backdrainage system is not expected to experience an appreciable flow of water, and in particular, no groundwater will affect it. However, for the purposes of design, a flow of 5 gallons per minute may be assumed.

TEMPORARY EXCAVATIONS

Excavations on the order of 5 feet in vertical height are anticipated for the recommended recompaction. The excavations are expected to expose fill and medium dense native soils, which are suitable for vertical excavation up to 5 feet where not surcharged by adjacent traffic of structures. Excavations which will be surcharged by adjacent traffic or structures should be shored or slot-cut.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 (h:v) slope gradient in their entirety, up to a maximum height of 10 feet. A uniform sloped excavation does not have a vertical component. Sloped excavations with vertical cuts at the toe of the slope are not recommended.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Excavation Adjacent to Buildings or Property Lines

Where foundation excavations will leave an adjacent foundation of property line unsupported the proposed foundations may be slot cut a maximum vertical height of 6 feet. The slot cutting method employs the earth as a buttress and allows the earth excavation to proceed in phases. The "A-B-C" slot-cutting procedure should be utilized. The initial excavation consists of excavating the "A" slots. Alternate "A" slots of 8 feet may be worked. The remaining earth buttresses ("B" and "C" slots) should each be 8 feet in width for a combined intervening length of 16 feet. The backfill shall be properly placed or the foundation should be poured in the "A" slots before the

"B" slots are excavated. After completing the grading and/or foundation in the "B" slots, finally the "C" slots may be excavated.

The client and contractor should be aware that where slot cuts are utilized for construction of new foundations, continuous construction of the proposed foundations will not be possible.

Excavation Observations

It is critical that the soils exposed in the cut slopes are observed by a representative of this office during excavation so that modifications of the slopes can be made if variations in the earth material conditions occur. Many building officials require that temporary excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

SLABS ON GRADE

Concrete Slabs-on-Grade

Concrete floor slabs should be a minimum of 4 inches of thickness. Slabs-on-grade should be cast over properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent relative compaction.

Outdoor concrete flatwork should be a minimum of 4 inches in thickness. Outdoor concrete flatwork should be cast over undisturbed native alluvial soils or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent relative compaction.

Design Of Slabs That Receive Moisture-Sensitive Floor Coverings

Geotechnologies, Inc. does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure.

Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection from unwanted moisture.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder should comply with ASTM E 1745 Class A requirements.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be covered with a layer of trimable, compactible, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

For standard crack control maximum expansion joint spacing 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork (such as walkways or patio areas) and concrete pavement, is not required. However, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to at least 90 percent relative compaction.

Slab Reinforcing

Concrete slabs-on-grade and outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

PAVEMENTS

Prior to placing paving, the exposed grade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 95 percent of the maximum density as determined by the most recent revision of ASTM D 1557. The client should be aware that removal of all existing fill in the area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. The following pavement section are recommended:

Service	**Asphalt Pavement Thickness Inches**	**Base Course Inches**
Passenger Car Traffic	3	4
Medium Truck Traffic	4	6
Heavy Truck Traffic	5	8

Concrete paving may also be utilized for the project. For concrete paving, the following sections are recommended:

Service	**Concrete Pavement Thickness Inches**	**Base Course Inches**
Passenger Car Traffic	6	4
Medium Truck Traffic	6	4
Heavy Truck Traffic	7.5	6

Aggregate base should be compacted to a minimum of 95 percent of the most recent revision of ASTM D 1557 laboratory maximum dry density. Base materials should conform to Sections 200-2.2 or 200-2.4 of the "Standard Specifications for Public Works Construction", (Green Book), latest edition.

For standard control of concrete cracking, a maximum crack control joint spacing of 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer. Concrete paving should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. If planter islands are planned, the perimeter curb should extend a minimum of 12 inches below the bottom of the aggregate base.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage, with the exception of any required to dispose of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices. The proposed structures should be provided with roof drainage. Discharge from downspouts, roof drains and scupper should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

STORMWATER DISPOSAL

Introduction

Regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. This requirement is not prudent engineering practice. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

Percolation Testing

In order to establish an infiltration rate for the site soils, shallow percolation testing was conducted in Test Pit 1, and deep percolation testing was conducted in Boring 4. The location of these excavations are shown on the enclosed Plot Plan.

Shallow Percolation Testing

Test Pit 1 was initially excavated to a depth of 5 feet, and then a one cubic foot of soil was removed from the bottom of the test pit for percolation testing. Percolation testing was conducted following the excavation percolation test procedure provided in the Guidelines for Design, Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.2), dated June 30, 2017, presented in the Administrative Manual for the County of Los Angeles, Department of Public Works, Geotechnical and Material Engineering Division.

The test pit was presoaked for a minimum of 4 hours prior to the test. After the presoak, the test pit was refilled with water and the absorption of the soils was measured. The percolation test readings were recorded a minimum of 8 times, or until a stabilized rate of drop was obtained, whichever occurred first.

After a representative percolation rate was obtained from the testing, the Reduction Factor (R_f) required by the County of Los Angeles procedure to account for non-vertical flow was applied to obtain an infiltration rate. Based on the percolation testing and analysis, an infiltration rate of 1.1

inches per hour may be utilized for the design of shallow infiltration systems. No other factors of safety or correction factors have been applied to this rate. The Civil Engineer must determine and apply any additional factors of safety, or correction factors, required for the design.

Deep Percolation Testing

Boring 4 was drilled to a depth of 20 feet below the existing grade, and was utilized to conduct deep percolation testing. At the completion of drilling of the boring, a 2-inch diameter casing was placed within the center of the borehole for the purpose of conducting percolation testing. The casing consisted of a slotted PVC pipe within the lower 10 feet of the borehole, and solid PVC pipe to the top of the borehole. A sand pack consisting of #3 Monterey Sand was poured into the annular space around the slotted portion of the casing. A 1-foot thick, hydrated bentonite seal was placed over the sand and drill cuttings were placed to the ground surface.

Percolation testing was conducted following the test procedure for boring percolation provided in the Guidelines for Design, Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.2), dated June 30, 2017, presented in the Administrative Manual for the County of Los Angeles, Department of Public Works, Geotechnical and Material Engineering Division.

Prior to testing, the borehole was filled with water for the purpose of pre-soaking for 4 hours. After presoaking, the borehole was refilled with water, and the rate of drop in the water level was measured. The percolation test readings were recorded a minimum of 8 times or until a stabilized rate of drop was obtained, whichever occurred first.

The table below summarized the results of the infiltration rate derived from the testing. The infiltration rate provided below included a Reduction Factor (R_f), as required by the County of Los Angeles procedure to account for non-vertical flow. No other factors of safety or correction factors have been applied to these rates. The Civil Engineer must determine and apply any additional factors of safety, or correction factors, required for the design.

Percolation Testing Boring No.	**Depth of Boring Below Existing Ground Surface (ft.)**	**Percolation Testing Conducted Between Depths:**	**Infiltration Rate (in./hr.)**
B4	20	10' and 20'	0.58

At the completion of the percolation testing, the PVC casing was completely removed from the testing well, and the resulting hole was backfilled with on-site soils to the ground surface.

Recommendations

This site soils are considered suitable for stormwater infiltration. Stormwater infiltration shall only occur on undisturbed native soils, and shall not be allowed within the fill materials.

The design and location of the proposed infiltration systems has not been finalized. It is anticipated that it will consist of a combination of shallow infiltration systems and deep drywells. The final location and design of the proposed infiltration systems shall be reviewed and approved by this office prior to construction.

Any proposed infiltration system shall be located outside the proposed structures. The edge of any proposed infiltration system shall maintain a minimum horizontal setback distance of 10 feet away from any at-grade structure and private property line, and a minimum horizontal setback of 20 feet away from any new or existing below-grade retaining wall.

For any proposed infiltration drywell systems, stormwater infiltration should only occur at or deeper than 10 feet below the grade observed at the drywell location. It is anticipated that a settling chamber would be installed in the upper portion of the drywell. The seams and bottom of the settling chamber should be adequately sealed to prevent infiltration within 10 feet from the existing grade.

Stormwater infiltration is not allowed within 10 feet (vertically) from the groundwater level. Groundwater was not encountered during exploration, conducted to a maximum depth of 50 feet below the existing grade. As explained in the "Groundwater" Section of this report, the historically highest groundwater levels published by the State of California are not well defined in the vicinity of the site. However, review of the logs from a Los Angeles Department of Public Works groundwater monitoring well, located less than 100 feet to the east of the subject site, indicates that between 1958 and 2008 the highest groundwater level measure in this well was approximately 46.3 feet below existing grade (or approximate elevation 18.7 feet). Based on these considerations, it is the recommendation of this firm that the bottom of any proposed infiltration drywell does not extend below a depth of 35 feet below the existing site grade.

The proposed infiltration systems should be provided with overflow protection. Once the device is full of water, additional water flowing to the device should be diverted to another acceptable disposal area, or disposed offsite in an acceptable manner.

Based on the granular nature of the underlying native soils, the stormwater should percolate in a generally vertical manner. The potential for creating a perched water condition is considered to be remote. It is the opinion of this firm that, if the recommendations provided herein are followed, the proposed stormwater infiltration systems should not cause any damage, settlement, or adversely affect any buildings located on or off-site.

The proposed stormwater infiltration systems will not be located in a hillside area. The onsite soils are in the very low expansion range, and are not susceptible to significant hydroconsolidation.

The design and construction of stormwater infiltration facilities is not the responsibility of the geotechnical engineer. However, based on the experience of this firm, it is recommended that several aspects of the use of such facilities should be considered by the design and construction team:

- Open infiltration basins have many negative associated issues. Such a design must consider attractive nuisance, impacts to growing vegetation, impacts to air quality and vector control.

- All infiltration devices should be provided with overflow protection. Once the device is full of water, additional water flowing to the device should be diverted to another acceptable disposal area, or disposed offsite in an acceptable manner.

- All connections associated with stormwater infiltration devices should be sealed and water-tight. Water leaking into the subgrade soils can lead to loss of strength, piping, erosion, settlement and/or expansion of the effected earth materials.

- Excavations proposed for the installation of stormwater facilities should comply with the "Temporary Excavations" section of this report, as well as CalOSHA Regulations where applicable.

- Caving should be expected during drilling of the drywells. Where caving occurs, it will be necessary to utilized casing to maintain an open shaft.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein are satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. Therefore, it is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify this office immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The scope of the geotechnical services provided did not include any environmental site assessment for the presence or absence of organic substances, hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification System. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System.

Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the boring log.

Samples of the earth materials encountered in the borings were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Unless noted on the boring logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound automatic trip hammer. The soil is retained in brass rings of 2.50 inches inside diameter and 1.00 inches in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples noted on the boring logs as SPT samples are obtained in accordance with ASTM D 1586 utilizing an automatic hammer. Samples are retained for 30 days after the date of the geotechnical report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the "Excavation Logs", A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by ASTM D 3080 with a strain controlled, direct shear machine manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagram," B-Plates.

The most recent revision of ASTM 3080 limits the particle size to 10 percent of the diameter of the direct shear test specimen. The sheared sample is inspected by the laboratory technician running the test. The inspection is performed by splitting the sample along the sheared plane and observing the soils exposed on both sides. Where oversize particles are observed in the shear plane, the results are discarded and the test run again with a fresh sample.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests using the most recent revision of ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the most recent revision of ASTM D4829. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hours or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height, and multiplied by 1,000. Results are presented in Plate D of this report.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined by use of the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into a mold of given dimensions, with each layer compacted by 25 blows of a 10 pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted represent a curvilinear relationship known as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve. Results are presented in Plate D of this report.

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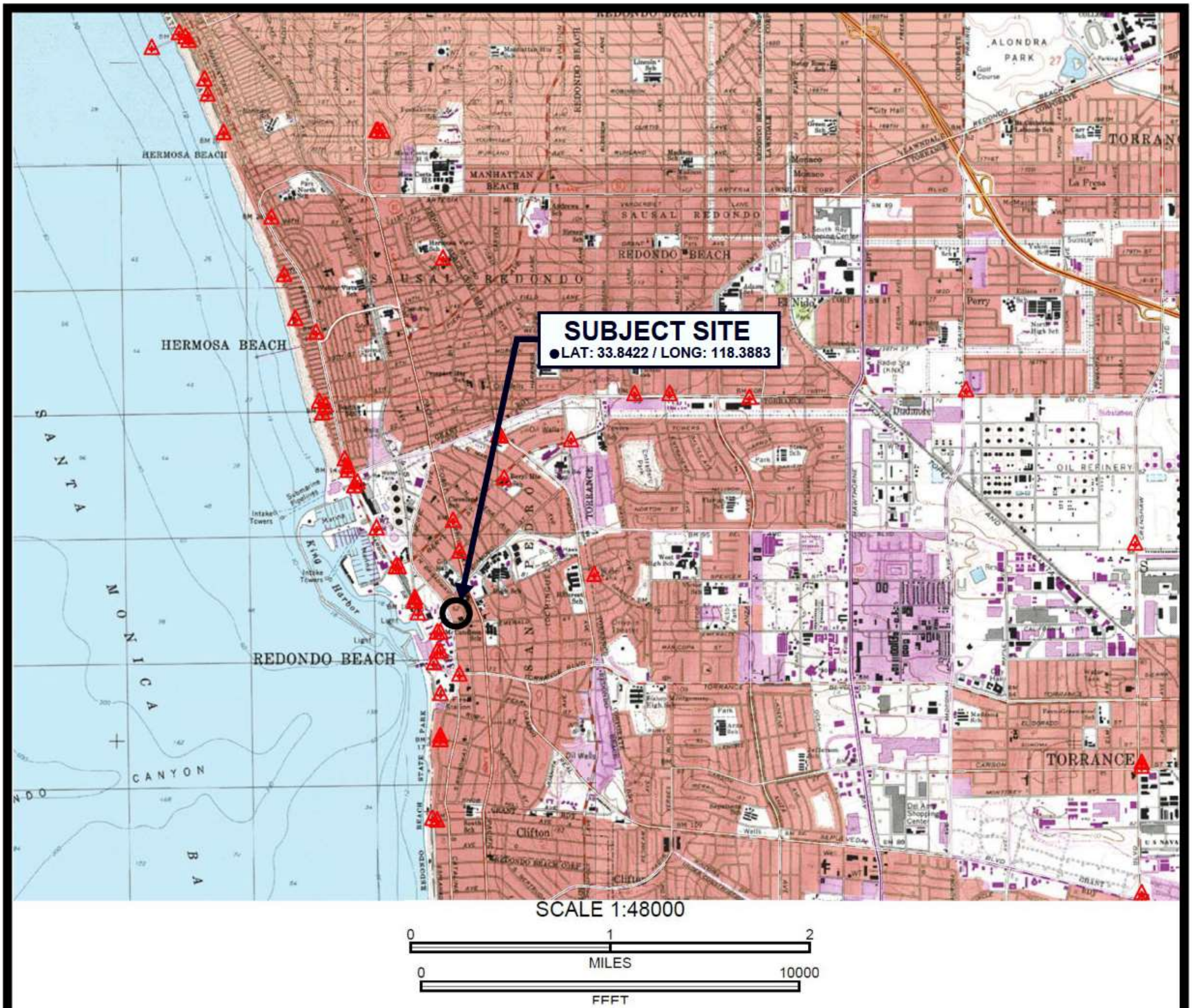


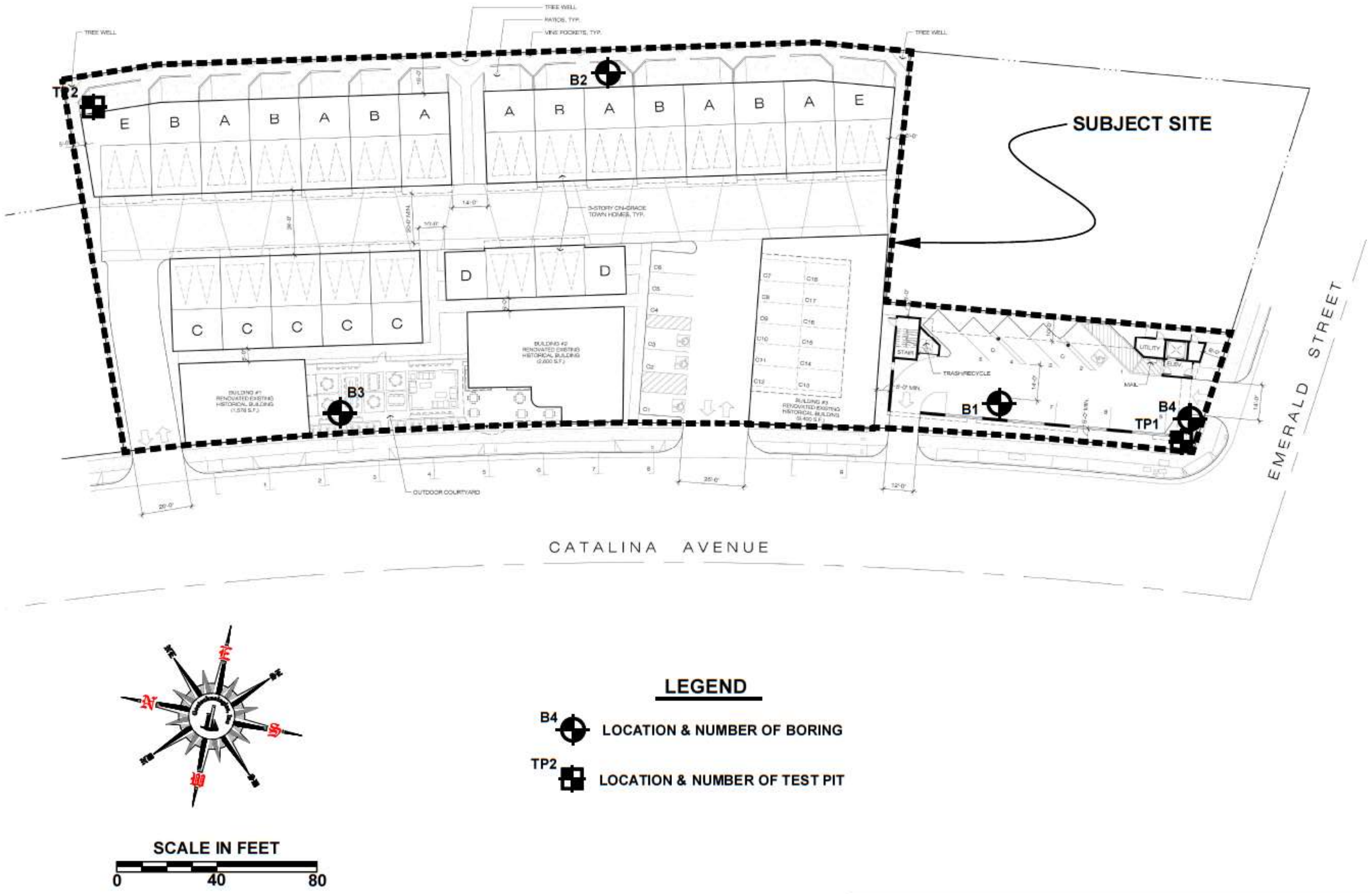
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES,
TORRANCE, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759

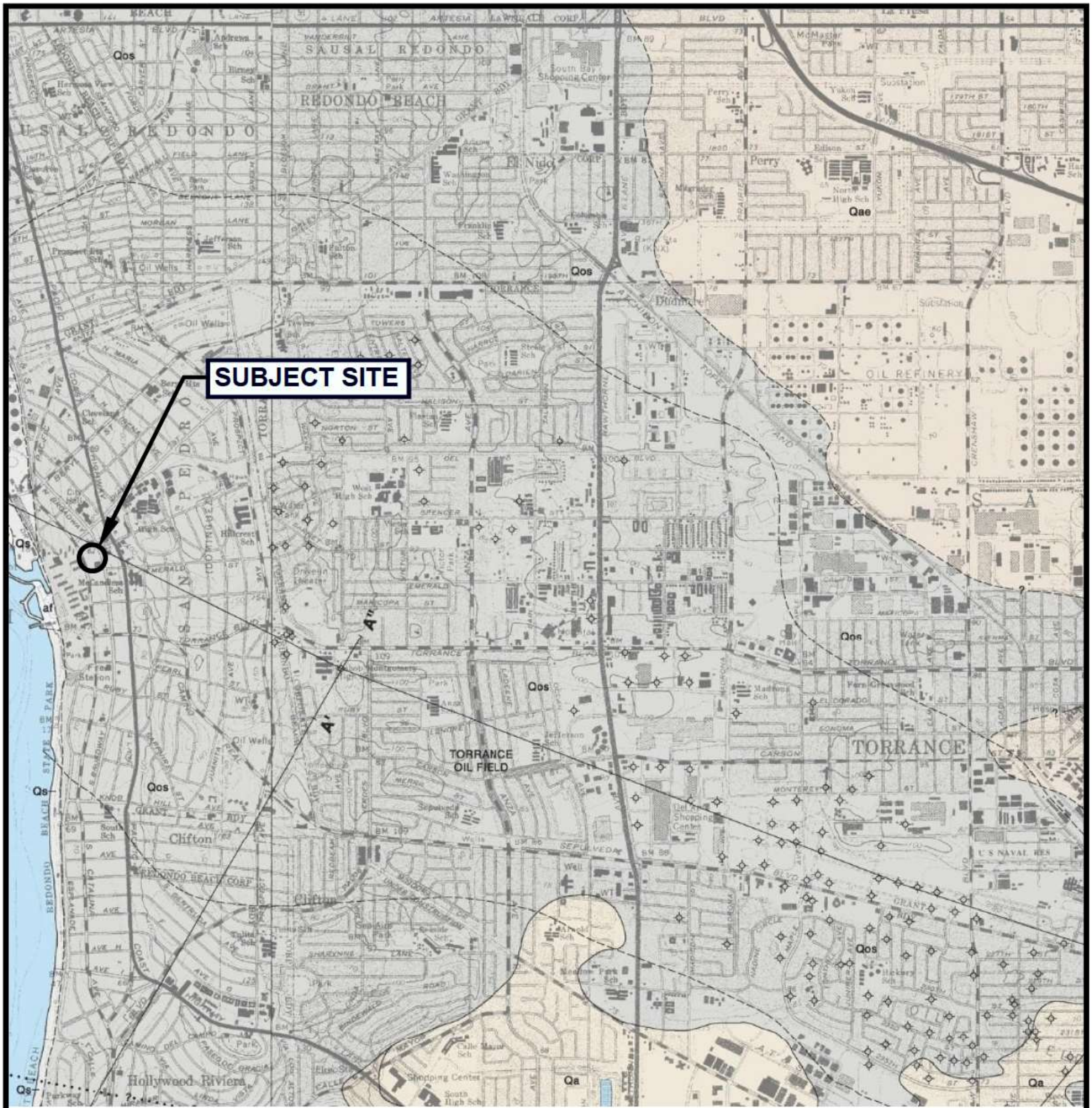


REFERENCE: BUILDING PLAN PROVIDED BY WITHEE ARCHITECTS
DATED: 12/19/2018

Geotechnologies, Inc.
Consulting Geotechnical Engineers

PLOT PLAN

CATALINA FUND, LLC.
File No.: 21759
Date: March '19



LEGEND

SCALE IN FEET
0 500 1000 2000

af: Artificial fill or cut and fill
Qa: Alluvium - gravel, sand and clay
Qae: Alluvium - similar to Qa but slightly elevated and locally dissected
Qos: Older, stabilized dune and drift sand
Qs: Beach sediments, ranging from sand to cobble-boulder gravel

REFERENCE: DIBBLEE, T.W., (1992) GEOLOGIC MAP OF THE REDONDO BEACH, TORRANCE, AND SAN PEDRO QUADRANGLES (#DF-70)

LOCAL GEOLOGIC MAP - DIBBLEE

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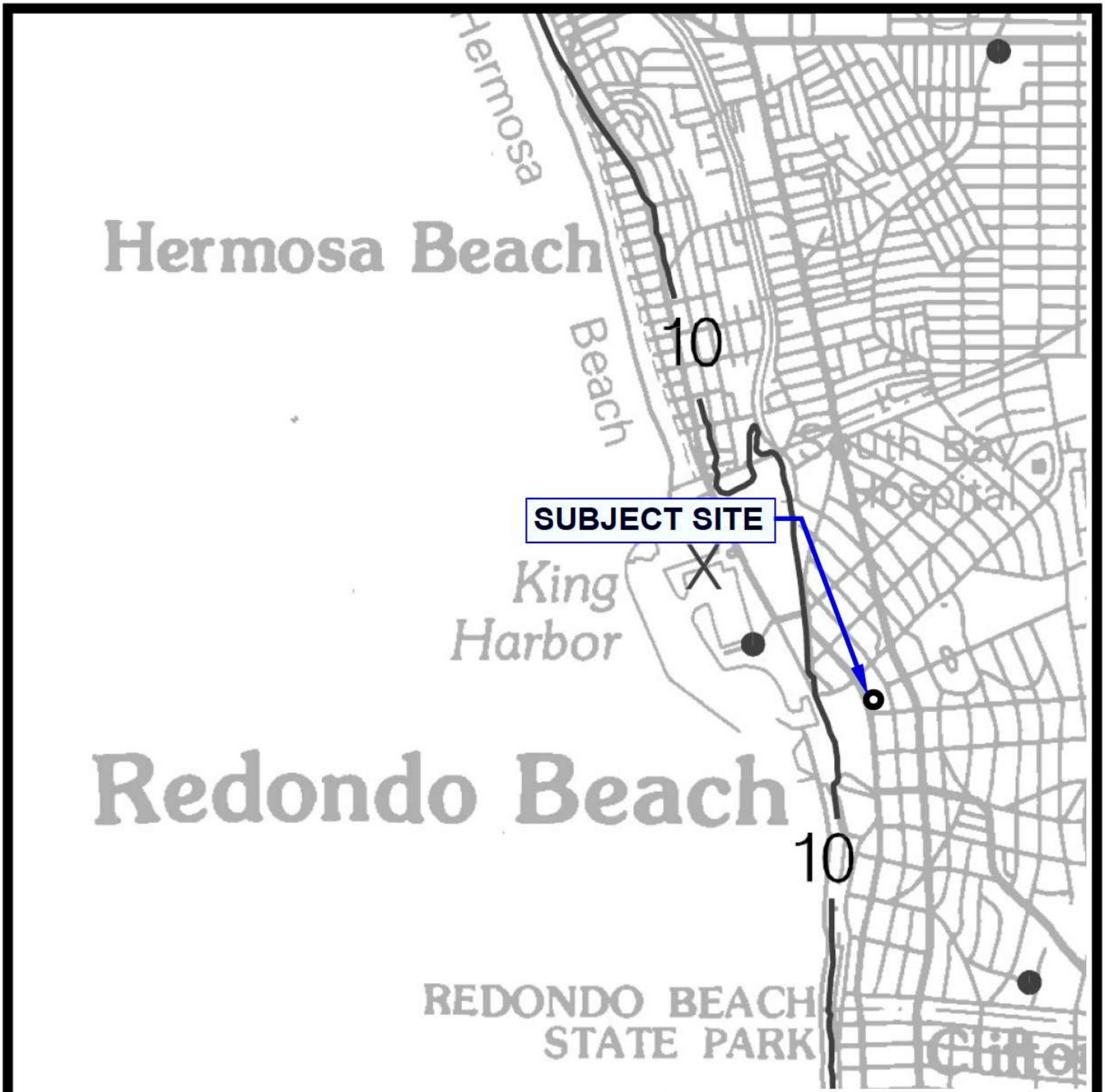
CATALINA FUND, LLC.

FILE NO. 21759



20 Depth to groundwater in feet

ONE MILE
SCALE

REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 031
REDONDO BEACH 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA (1998, REVISED 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS

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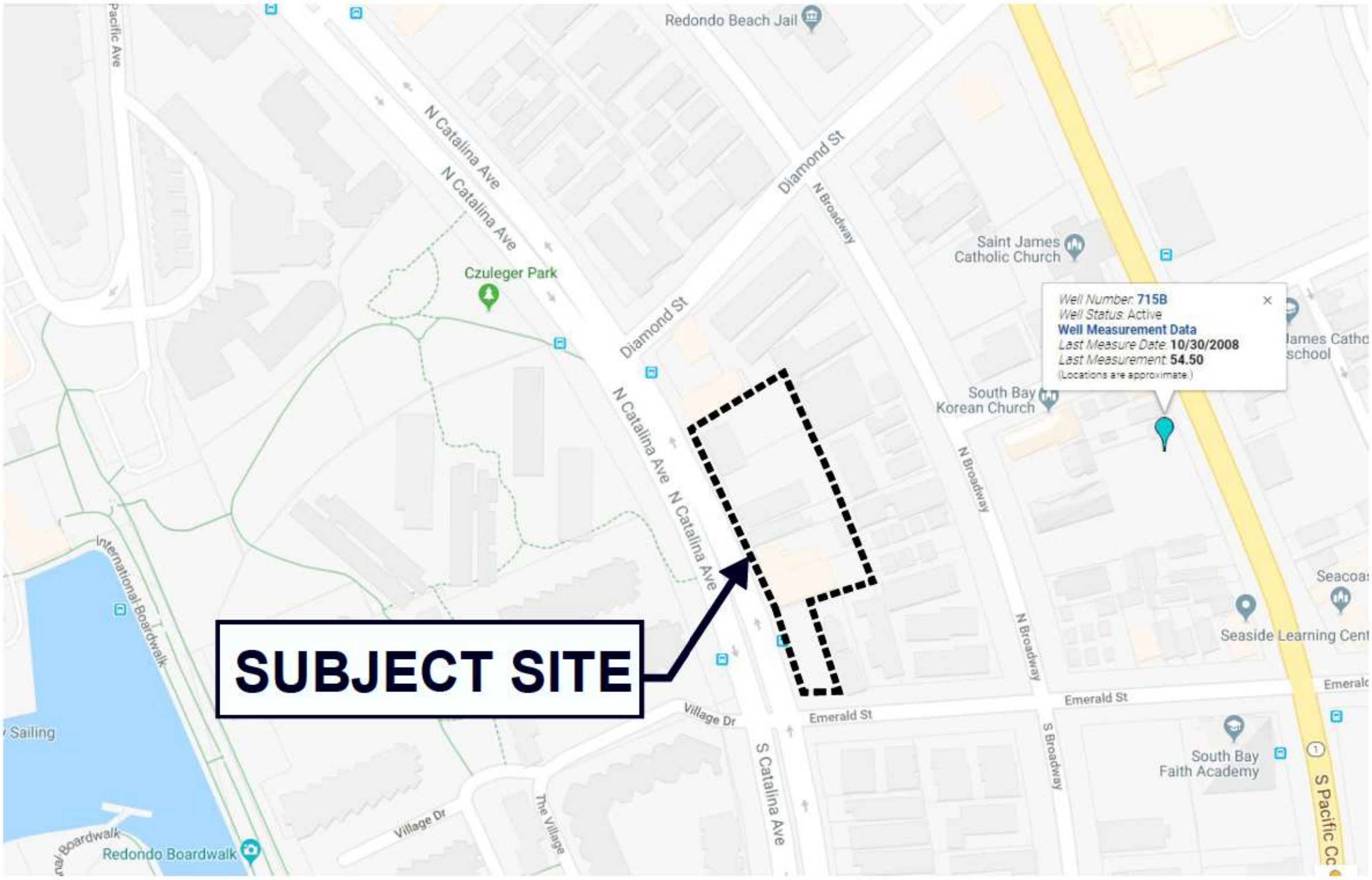
FILE No. 21759



APPROX. SCALE (FEET)

0 100 200

N

REFERENCE: LOS ANGELES DEPARTMENT OF PUBLIC WORKS WEBSITE
http://www.ladpw.org/wrd/wellinfo/well.cfm

WATER WELL LOCATION MAP

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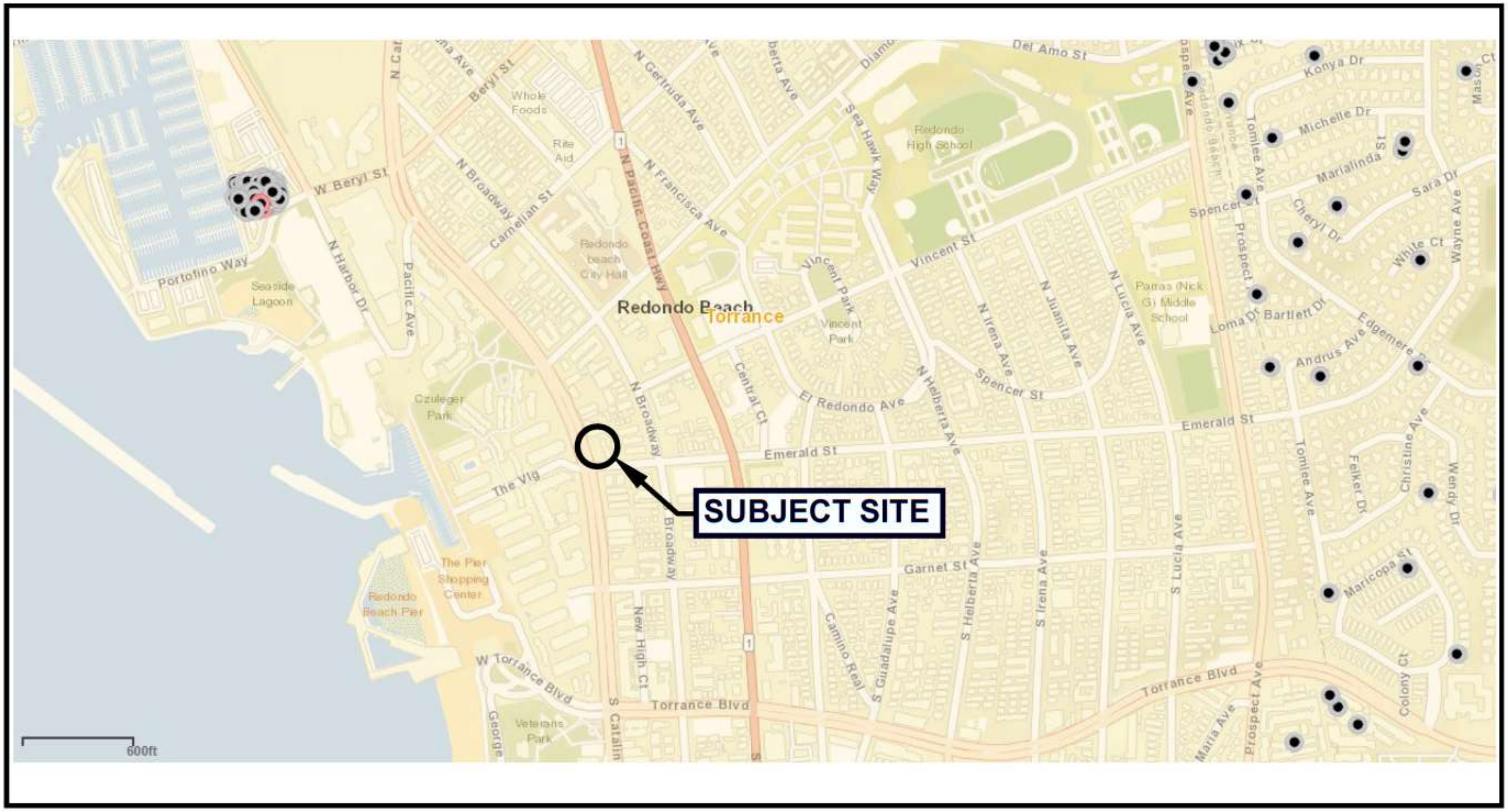
FILE NO. 21759



REFERENCE: DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES WELL FINDER, STATE OF CALIFORNIA, 2018

OIL WELL LOCATION MAP

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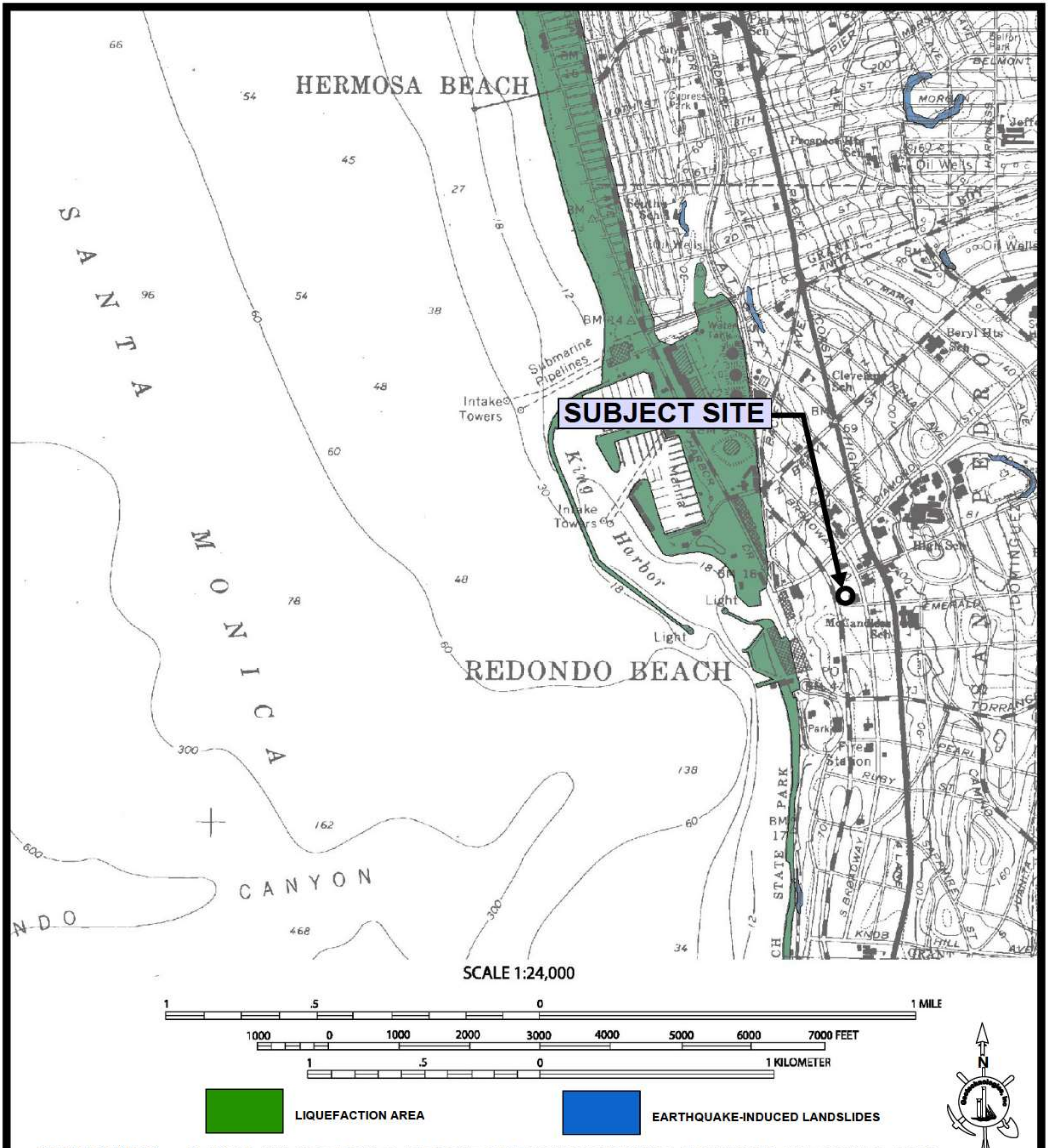
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759



REFERENCE: SEISMIC HAZARD ZONES, REDONDO BEACH QUADRANGLE OFFICIAL MAP (CDMG, 1999)

SEISMIC HAZARD ZONE MAP

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Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759

BORING LOG NUMBER 1

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
				0		3-inch Asphalt over 2-inch Base
				1		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				2		
2.5	29	4.6	121.5	-		
				3	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, slightly moist, medium dense, fine grained
				4		
5	70	3.7	126.9	5		dense
				6		
				7		
7.5	59	2.4	116.9	-		
				8	SP	Sand, dark brown, slightly moist, dense, fine grained
				9		
10	50	2.6	111.5	10		
				11		
				12		
				13		
				14		
15	67	3.5	108.9	15		dark and yellowish brown, fine to medium grained
				16		
				17		
				18		
				19		fine grained
20	72	3.0	105.9	20		Total Depth 20 feet No Water Fill to 3 feet
				21		
				22		
				23		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				24		
				25		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted

BORING LOG NUMBER 2

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		3-inch Asphalt, No Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	7	8.7	116.9	-		
				3 --		
				-	SM/SP	NATIVE SOILS: Silty Sand, dark brown, moist, medium dense, fine grained
				4 --		
				-		
5	10	8.3	SPT	5 --		
				-	SP	Sand, dark brown, moist, medium dense, fine grained
				6 --		
				-		
				7 --		
7.5	18	12.6	117.0	-		
				8 --		very moist
				-		
				9 --		
				-		
10	18	6.7	SPT	10 --		
				-		moist
				11 --		
				-		
				12 --		
12.5	59	6.6	117.3	-		
				13 --		fine to medium grained
				-		
				14 --		
				-		
15	28	6.3	SPT	15 --		
				-		fine grained
				16 --		
				-		
				17 --		
17.5	84	6.3	115.0	-		
				18 --		dense to very dense
				-		
				19 --		
				-		
20	38	4.2	SPT	20 --		
				-		slightly moist, medium dense to dense, fine to medium grained
				21 --		
				-		
				22 --		
22.5	25 50/5"	4.7	111.6	-		
				23 --		very dense
				-		
				24 --		
				-		
25	37	4.3	SPT	25 --		
				-		medium dense to dense

BORING LOG NUMBER 2

Catalina Fund, LLC

File No. 21759

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	37 50/4"	4.4	110.3			
				28		Sand, dark and yellowish brown, slightly moist, very dense, fine grained
				29		
30	54 50/4"	7.5	SPT	30		moist, fine to medium grained
				31		
				32		
32.5	100/9"	4.8	110.5			slightly moist, fine grained
				33		
				34		
35	93	4.5	SPT	35		
				36		
				37		
37.5	45 50/3"	3.1	107.2			fine to medium grained
				38		
				39		
40	70	4.2	SPT	40		
				41		
				42		
42.5	46 50/3"	4.9	106.4			
				43		
				44		
45	73	10.4	SPT	45		moist
				46		
				47		
47.5	49 50/4"	5.2	106.4			slightly moist
				48		
				49		
50	85	3.5	SPT	50		Total Depth 50 feet No Water Fill to 3 feet

NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.

Used 8-inch diameter Hollow-Stem Auger
140-lb. Automatic Hammer, 30-inch drop
Modified California Sampler used unless otherwise noted
SPT=Standard Penetration Test

BORING LOG NUMBER 3

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		8-inch Asphalt, No Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	27	7.6	128.9	-		
				3 --		
				-	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				4 --		
				-		
5	24	7.8	115.7	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	37	3.0	107.3	-		
				8 --	SP	Sand, dark and yellowish brown, slightly moist, medium dense, fine grained
				-		
				9 --		
				-		
10	47	2.8	109.0	10 --		
				-		medium dense to dense
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	71	2.9	110.3	15 --		
				-		dark brown, dense, fine to medium grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	83	3.2	109.3	20 --		
				-		Total Depth 20 feet
				21 --		No Water
				-		Fill to 3 feet
				22 --		
				-		
				23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				24 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				25 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted

BORING LOG NUMBER 4

Catalina Fund, LLC | **Date: 02/26/19**

File No. 21759 | **Method: 4-inch diameter Hand Auger**

km

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
1	6.0	122.1	1		
			2	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
3	6.5	118.6	3		
			4		
5	5.6	118.1	5	SP	Sand, dark and yellowish brown, slightly moist, medium dense, fine grained
			6		
7	3.6	114.5	7		
			8		
			9		
10	2.2	114.3	10		yellowish brown
			11		
			12		
			13		
			14		
15	2.0	108.6	15		dark and yellowish brown, dense, fine to medium grained
			16		
			17		
			18		
			19		
20	1.9	109.3	20		Total Depth 20 feet No Water Fill to 2 feet
			21		
			22		
			23		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			24		Used 4-inch diameter Hand Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
			25		

LOG OF TEST PIT NUMBER 1

Catalina Fund, LLC **Drilling Date: 02/26/19**

File No. 21759 **Method: Hand Dug Test Pit**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			-		
			1 --		
			-		
			2 --		
			-	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
			3 --		
			-		
			4 --		
			-		
			5 --		
			-		dark and medium brown
			6 --		
			-		Total Depth 6 feet
			7 --		No Water
			-		Fill to 2 feet
			8 --		
			-		
			9 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			10 --		
			-		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 2

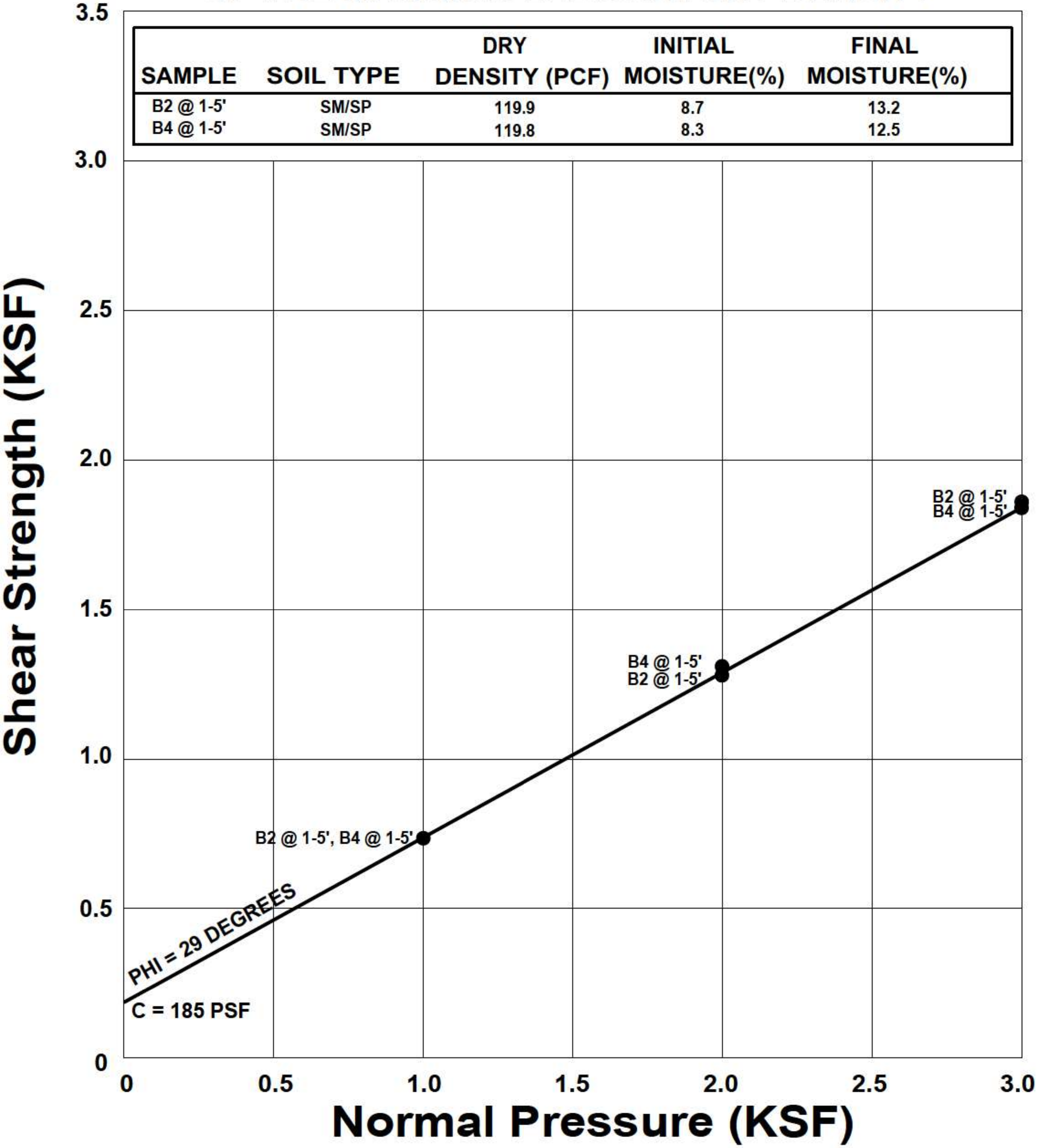
Catalina Fund, LLC **Drilling Date: 02/26/19**

File No. 21759 **Method: Hand Dug Test Pit**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			1		
2	7.9	120.4	2	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
			3		
4	8.3	118.3	4		
			-	SP	Sand, dark and medium brown, moist, medium dense, fine grained
			5		
			6		
7	9.1	121.2	7		
			-		dark brown
			8		
			9		
10	7.8	88.2	10		
			-		yellowish brown, medium dense to dense
			11		
			12		
			13		
			14		
15	3.9	110.9	15		
			-		slightly moist, fine to medium grained
			16		
			17		
			18		
			19		
20	3.5	102.4	20		
			-		Total Depth 20 feet No Water Fill to 1½ feet
			21		
			22		
			23		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			24		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			25		

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 1-5'	SM/SP	119.9	8.7	13.2
B4 @ 1-5'	SM/SP	119.8	8.3	12.5

● Direct Shear, Saturated

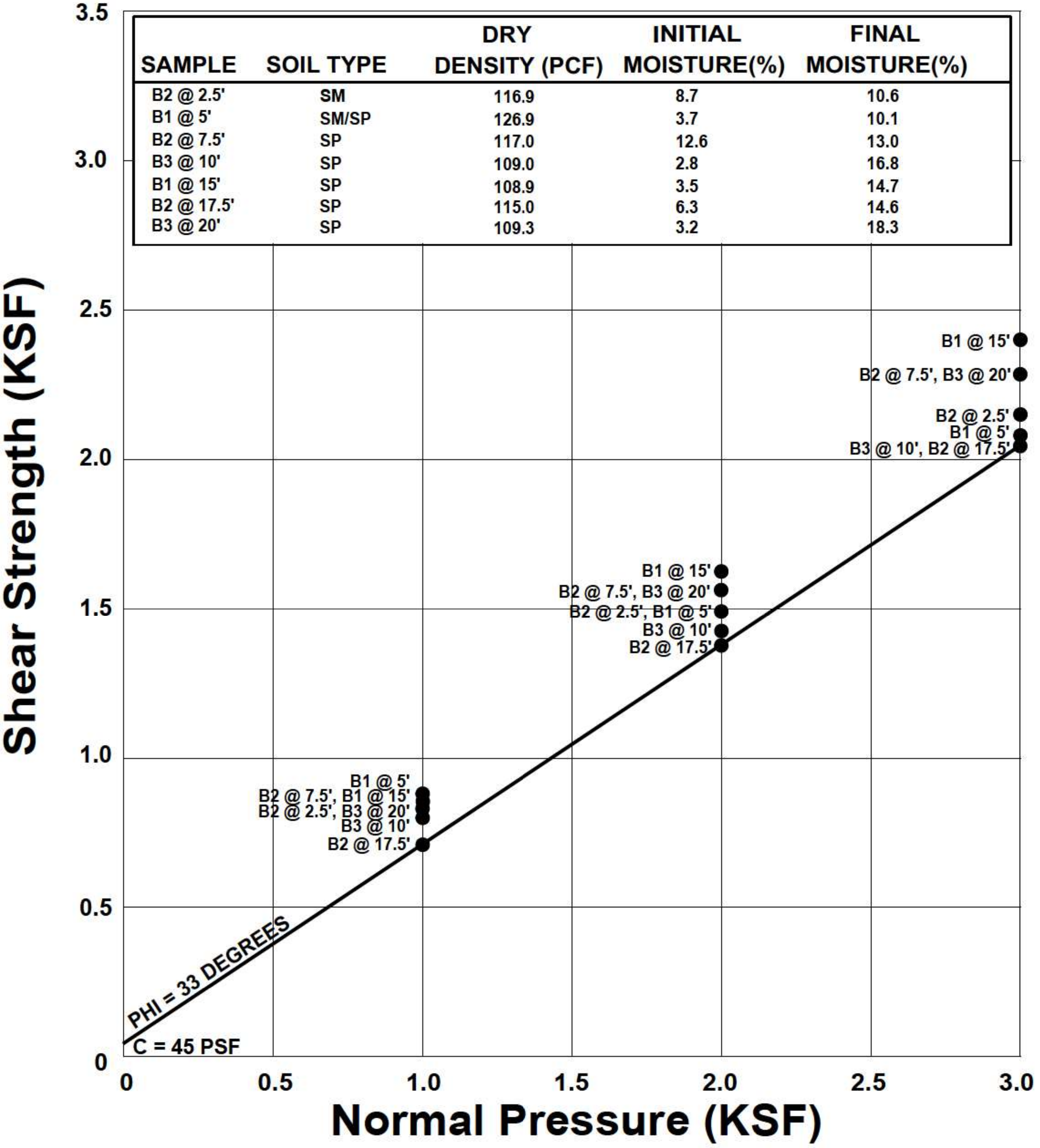
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: B-1



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 2.5'	SM	116.9	8.7	10.6
B1 @ 5'	SM/SP	126.9	3.7	10.1
B2 @ 7.5'	SP	117.0	12.6	13.0
B3 @ 10'	SP	109.0	2.8	16.8
B1 @ 15'	SP	108.9	3.5	14.7
B2 @ 17.5'	SP	115.0	6.3	14.6
B3 @ 20'	SP	109.3	3.2	18.3

● **Direct Shear, Saturated**

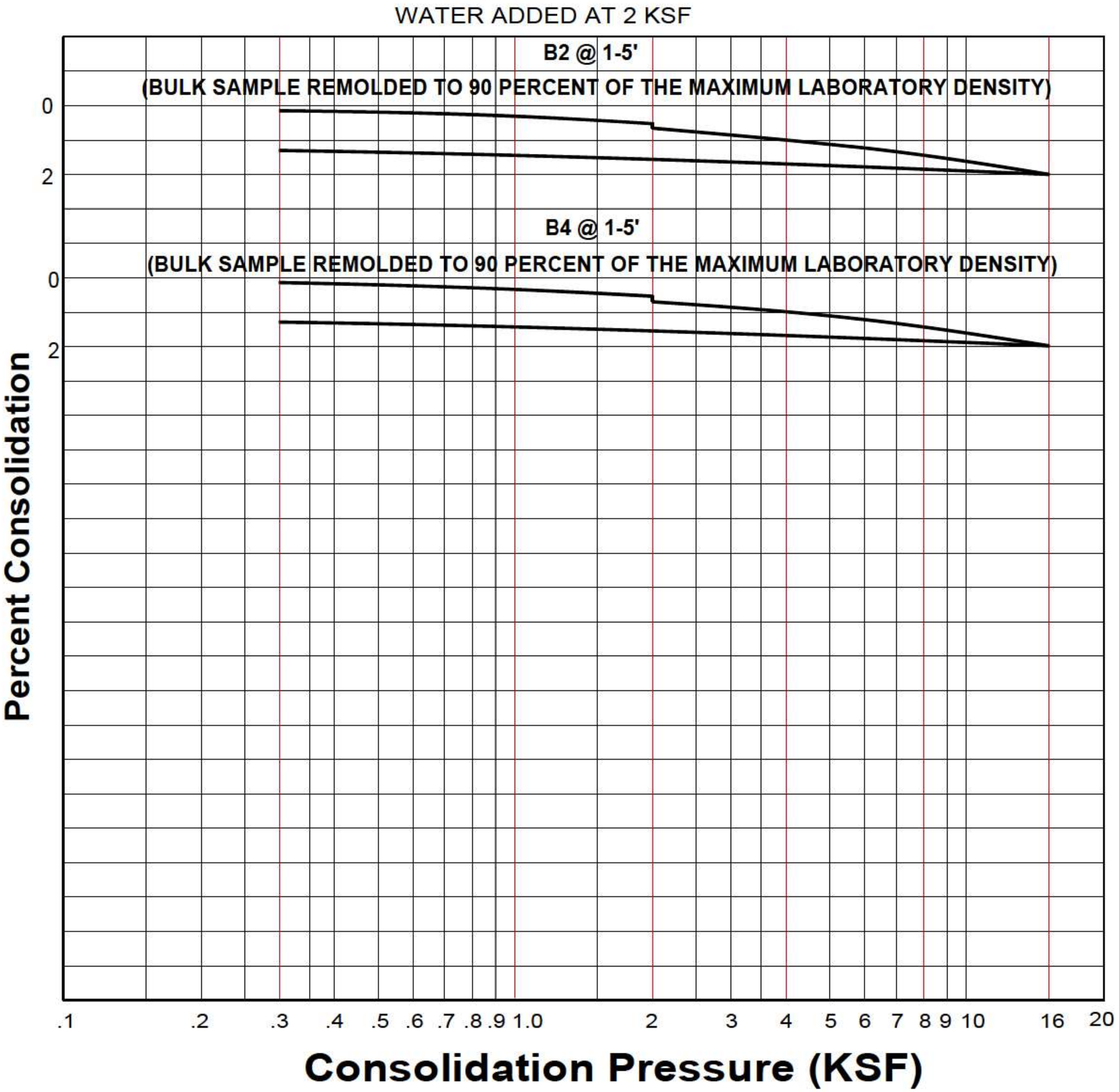
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: B-2



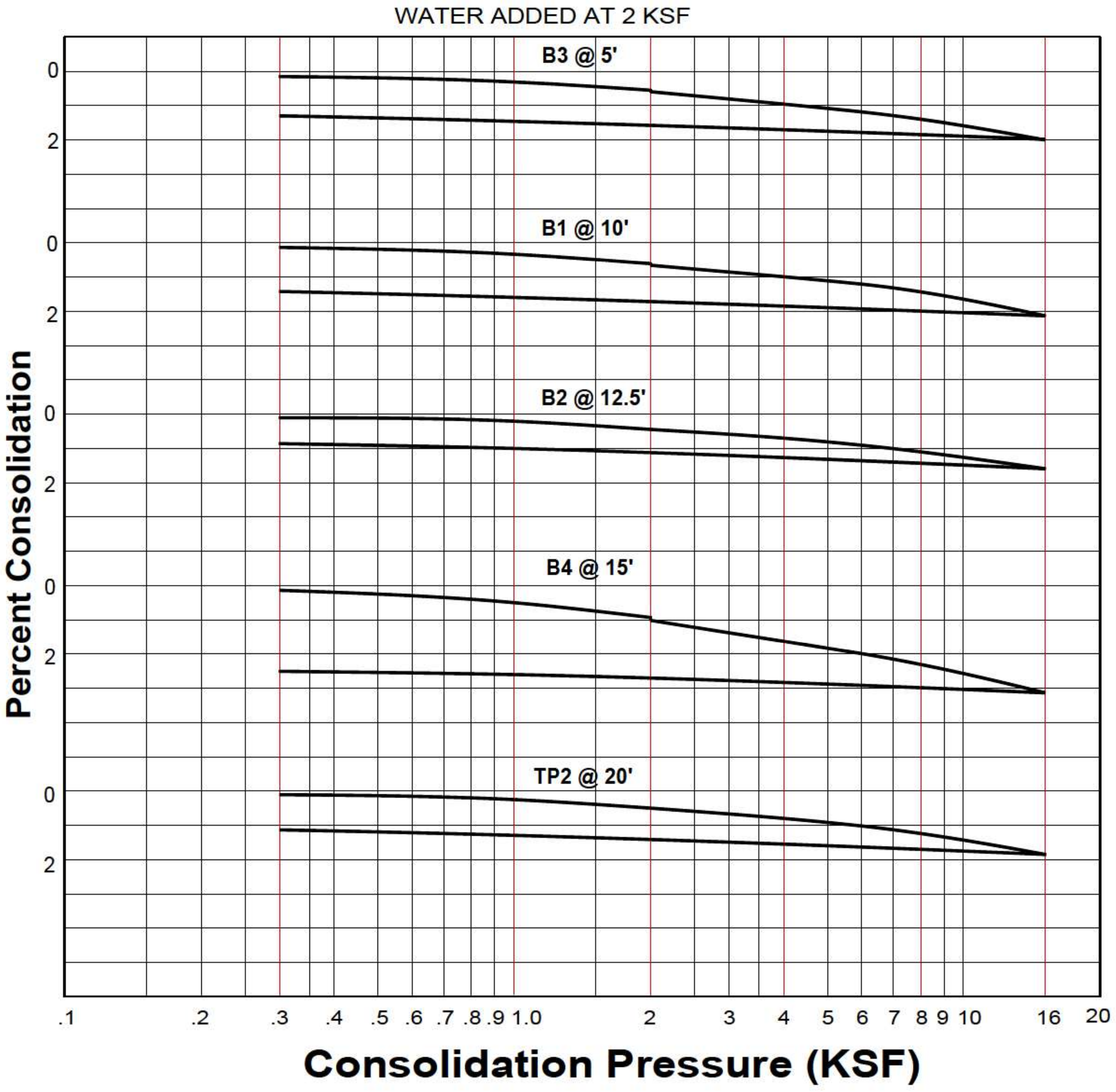
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: C-1



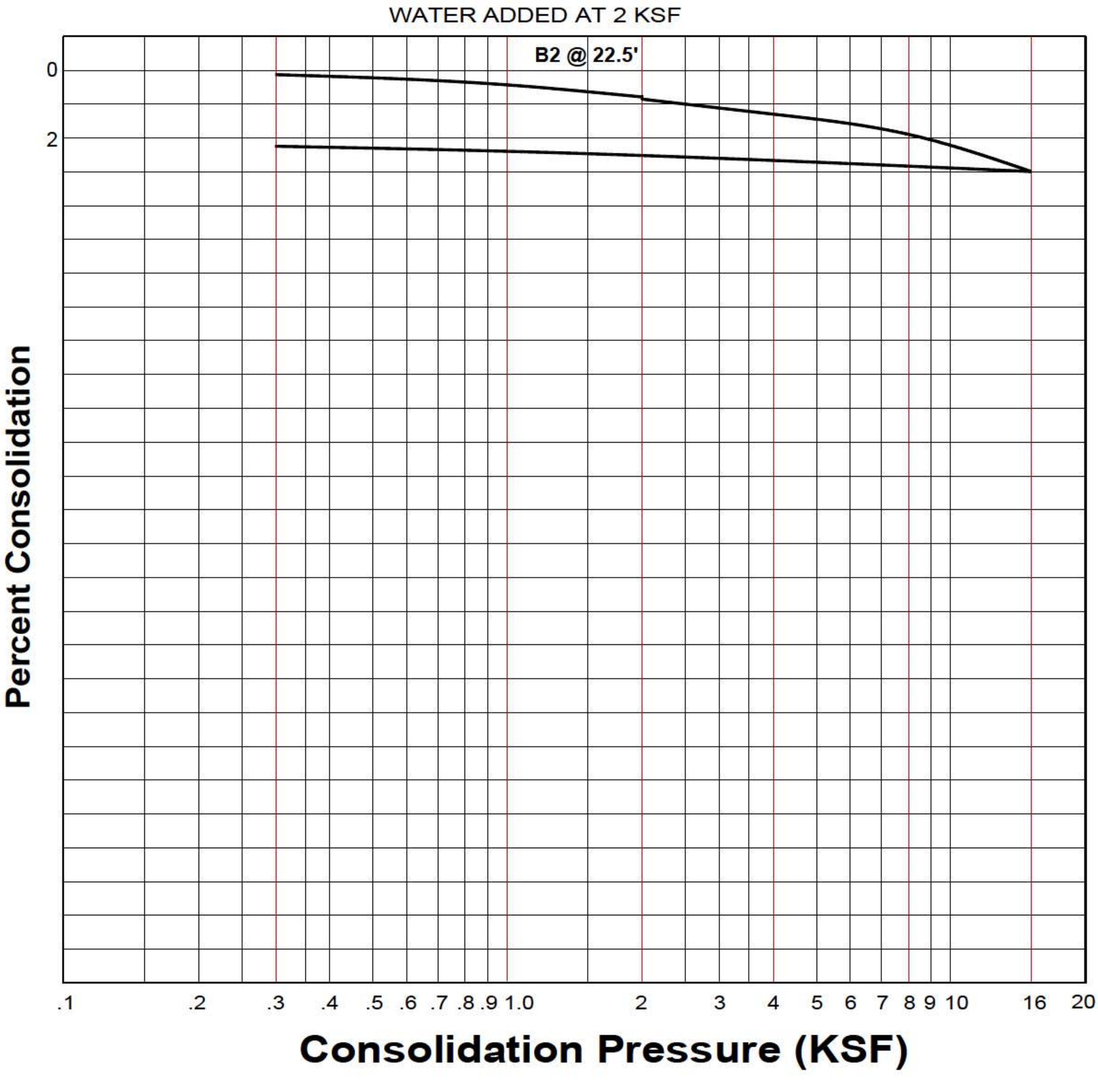
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: C-2



CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: C-3

ASTM D-1557

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SOIL TYPE:	SM/SP	SM/SP
MAXIMUM DENSITY pcf.	133.2	133.1
OPTIMUM MOISTURE %	8.7	8.3

ASTM D 4829

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SOIL TYPE:	SM/SP	SM/SP
EXPANSION INDEX UBC STANDARD 18-2	2	3
EXPANSION CHARACTER	VERY LOW	VERY LOW

SULFATE CONTENT

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: D

Geotechnologies, Inc.

Project: Catalina Fund, LLC
File No.: 21759
Description: Liquefaction Analysis
Boring Numbe 2

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:	
Earthquake Magnitude (M):	7.0
Peak Ground Horizontal Acceleration, PGA (g):	0.64
Calculated Mag.Wtg.Factor:	1.156
GROUNDWATER INFORMATION:	
Current Groundwater Level (ft):	51.0
Historically Highest Groundwater Level* (ft):	10.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:	
Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y
LIQUEFACTION BOUNDARY:	
Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc} (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	127.0	Unsaturated	Unsaturated	10	5	0.0	0	127.0	127.0	21.7	1.00	0.420	0.290	Non-Liq.	0.00
2	127.0	Unsaturated	Unsaturated	10	5	0.0	0	254.0	254.0	21.7	1.00	0.418	0.290	Non-Liq.	0.00
3	127.0	Unsaturated	Unsaturated	10	5	0.0	0	381.0	381.0	21.7	1.00	0.417	0.290	Non-Liq.	0.00
4	127.0	Unsaturated	Unsaturated	10	5	0.0	0	508.0	508.0	21.7	0.99	0.416	0.290	Non-Liq.	0.00
5	127.0	Unsaturated	Unsaturated	10	5	0.0	0	635.0	635.0	23.4	0.99	0.414	0.326	Non-Liq.	0.00
6	127.0	Unsaturated	Unsaturated	10	5	0.0	0	762.0	762.0	22.9	0.99	0.413	0.314	Non-Liq.	0.00
7	127.0	Unsaturated	Unsaturated	10	5	0.0	0	889.0	889.0	21.0	0.98	0.411	0.278	Non-Liq.	0.00
8	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1020.7	1020.7	35.3	0.98	0.410	1.513	Non-Liq.	0.00
9	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1152.4	1152.4	35.6	0.98	0.408	1.600	Non-Liq.	0.00
10	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1284.1	1284.1	33.8	0.97	0.407	1.123	Non-Liq.	0.00
11	131.7	Unsaturated	Saturated	18	10	0.0	0	1415.8	1353.4	33.0	0.97	0.424	0.969	2.3	0.00
12	131.7	Unsaturated	Saturated	18	10	0.0	0	1547.5	1422.7	32.3	0.96	0.439	0.846	1.9	0.00
13	125.0	Unsaturated	Saturated	18	10	0.0	0	1672.5	1485.3	31.6	0.96	0.452	0.757	1.7	0.00
14	125.0	Unsaturated	Saturated	18	10	0.0	0	1797.5	1547.9	31.0	0.96	0.464	0.686	1.5	0.00
15	125.0	Unsaturated	Saturated	28	15	0.0	0	1922.5	1610.5	53.4	0.95	0.475	2.000	4.2	0.00
16	125.0	Unsaturated	Saturated	28	15	0.0	0	2047.5	1673.1	52.8	0.95	0.484	2.000	4.1	0.00
17	125.0	Unsaturated	Saturated	28	15	0.0	0	2172.5	1735.7	52.3	0.94	0.493	2.000	4.1	0.00
18	122.2	Unsaturated	Saturated	28	15	0.0	0	2294.7	1795.5	51.9	0.94	0.501	2.000	4.0	0.00
19	122.2	Unsaturated	Saturated	28	15	0.0	0	2416.9	1855.3	51.4	0.93	0.508	2.000	3.9	0.00
20	122.2	Unsaturated	Saturated	38	20	0.0	0	2539.1	1915.1	69.2	0.93	0.514	2.000	3.9	0.00
21	122.2	Unsaturated	Saturated	38	20	0.0	0	2661.3	1974.9	68.6	0.92	0.520	2.000	3.8	0.00
22	122.2	Unsaturated	Saturated	38	20	0.0	0	2783.5	2034.7	68.1	0.92	0.525	2.000	3.8	0.00
23	116.8	Unsaturated	Saturated	38	20	0.0	0	2900.3	2089.1	67.6	0.91	0.529	2.000	3.8	0.00
24	116.8	Unsaturated	Saturated	38	20	0.0	0	3017.1	2143.5	67.2	0.91	0.534	2.000	3.7	0.00
25	116.8	Unsaturated	Saturated	37	25	0.0	0	3133.9	2197.9	65.0	0.90	0.538	2.000	3.7	0.00
26	116.8	Unsaturated	Saturated	37	25	0.0	0	3250.7	2252.3	64.6	0.90	0.541	2.000	3.7	0.00
27	116.8	Unsaturated	Saturated	37	25	0.0	0	3367.5	2306.7	64.2	0.89	0.544	2.000	3.7	0.00
28	115.2	Unsaturated	Saturated	37	25	0.0	0	3482.7	2359.5	67.1	0.89	0.547	2.000	3.7	0.00
29	115.2	Unsaturated	Saturated	37	25	0.0	0	3597.9	2412.3	66.7	0.88	0.549	2.000	3.6	0.00
30	115.2	Unsaturated	Saturated	50	30	0.0	0	3713.1	2465.1	89.7	0.87	0.551	2.000	3.6	0.00
31	115.2	Unsaturated	Saturated	50	30	0.0	0	3828.3	2517.9	89.2	0.87	0.552	2.000	3.6	0.00
32	115.2	Unsaturated	Saturated	50	30	0.0	0	3943.5	2570.7	88.7	0.86	0.554	2.000	3.6	0.00
33	115.8	Unsaturated	Saturated	50	30	0.0	0	4059.3	2624.1	88.2	0.86	0.555	2.000	3.6	0.00
34	115.8	Unsaturated	Saturated	50	30	0.0	0	4175.1	2677.5	87.8	0.85	0.556	2.000	3.6	0.00
35	115.8	Unsaturated	Saturated	93	35	0.0	0	4290.9	2730.9	162.4	0.85	0.556	2.000	3.6	0.00
36	115.8	Unsaturated	Saturated	93	35	0.0	0	4406.7	2784.3	161.6	0.84	0.556	2.000	3.6	0.00
37	115.8	Unsaturated	Saturated	93	35	0.0	0	4522.5	2837.7	160.7	0.84	0.557	2.000	3.6	0.00
38	110.5	Unsaturated	Saturated	93	35	0.0	0	4633.0	2885.8	160.0	0.83	0.557	2.000	3.6	0.00
39	110.5	Unsaturated	Saturated	93	35	0.0	0	4743.5	2933.9	159.3	0.82	0.557	2.000	3.6	0.00
40	110.5	Unsaturated	Saturated	70	40	0.0	0	4854.0	2982.0	119.4	0.82	0.557	2.000	3.6	0.00
41	110.5	Unsaturated	Saturated	70	40	0.0	0	4964.5	3030.1	118.9	0.81	0.557	2.000	3.6	0.00
42	110.5	Unsaturated	Saturated	70	40	0.0	0	5075.0	3078.2	118.4	0.81	0.556	2.000	3.6	0.00
43	111.6	Unsaturated	Saturated	70	40	0.0	0	5186.6	3127.4	117.9	0.80	0.556	2.000	3.6	0.00
44	111.6	Unsaturated	Saturated	70	40	0.0	0	5298.2	3176.6	117.5	0.80	0.555	2.000	3.6	0.00
45	111.6	Unsaturated	Saturated	73	45	0.0	0	5409.8	3225.8	122.0	0.79	0.554	2.000	3.6	0.00
46	111.6	Unsaturated	Saturated	73	45	0.0	0	5521.4	3275.0	121.5	0.78	0.553	2.000	3.6	0.00
47	111.6	Unsaturated	Saturated	73	45	0.0	0	5633.0	3324.2	121.0	0.78	0.552	2.000	3.6	0.00
48	111.9	Unsaturated	Saturated	73	45	0.0	0	5744.9	3373.7	120.6	0.77	0.550	1.992	3.6	0.00
49	111.9	Unsaturated	Saturated	85	50	0.0	0	5856.8	3423.2	139.8	0.77	0.549	1.982	3.6	0.00
50	111.9	Unsaturated	Saturated	85	50	0.0	0	5968.7	3472.7	139.3	0.76	0.547	1.972	3.6	0.00
											Total Liquefaction Settlement, S =			**0.00 inches**	

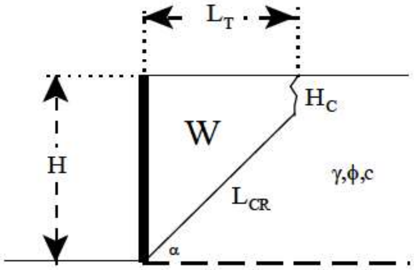
Geotechnologies, Inc.

Project: Catalina Fund, LLC
File No.: 21759
Description: Retaining Walls up to 6 feet

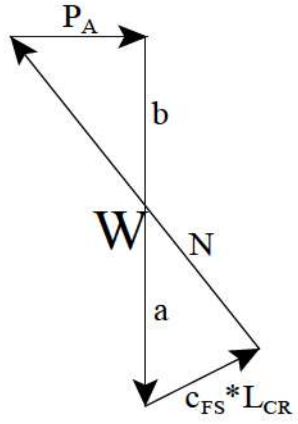
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	6.00 feet
Unit Weight of Retained Soils	(γ)	120.0 pcf
Friction Angle of Retained Soils	(ϕ)	29.0 degrees
Cohesion of Retained Soils	(c)	185.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	20.3 degrees
	(c_{FS})	123.3 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	13	1522.2	3.9	1071.9	450.3	207.3
46	3.2	12	1493.3	3.9	1038.4	454.9	219.1
47	3.1	12	1461.2	3.9	1004.8	456.4	229.7
48	3.1	12	1426.5	3.9	971.4	455.1	239.1
49	3.1	12	1389.9	3.9	938.5	451.4	247.3
50	3.0	11	1351.6	3.9	906.2	445.5	254.3
51	3.0	11	1312.2	3.9	874.6	437.6	260.0
52	3.0	11	1271.7	3.8	843.7	428.0	264.5
53	3.0	10	1230.5	3.8	813.7	416.8	267.8
54	3.0	10	1188.8	3.8	784.5	404.3	269.8
55	3.0	10	1146.6	3.7	756.0	390.5	270.6
56	3.0	9	1104.0	3.7	728.3	375.7	270.2
57	3.0	9	1061.2	3.6	701.2	360.0	268.5
58	3.0	8	1018.2	3.6	674.8	343.4	265.6
59	3.0	8	975.0	3.5	648.9	326.1	261.4
60	3.0	8	931.7	3.4	623.5	308.2	256.0
61	3.0	7	888.3	3.4	598.5	289.8	249.4
62	3.1	7	844.7	3.3	573.8	270.9	241.6
63	3.1	7	801.0	3.2	549.3	251.8	232.5
64	3.2	6	757.2	3.1	524.8	232.4	222.2
65	3.2	6	713.2	3.0	500.3	212.8	210.7
66	3.3	6	668.9	2.9	475.7	193.2	198.1
67	3.4	5	624.3	2.8	450.7	173.6	184.3
68	3.5	5	579.4	2.7	425.3	154.1	169.5
69	3.6	4	534.0	2.6	399.1	134.9	153.7
70	3.7	4	488.0	2.5	372.0	116.0	136.9



Design Equations (Vector Analysis):

$a = c_{FS} * L_{CR} * \sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$
$b = W-a$
$P_A = b * \tan(\alpha-\phi_{FS})$
$EFP = 2 * P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\,max}$ 270.61 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2 * P_A/H^2$

EFP 15.0 pcf

Design Wall for an Equivalent Fluid Pressure: 30 pcf

Date: 26-Feb-19
File No. 21759
File Name : Catalina Fund, LLC

Percolation Rate Calculation for Test Pit

Testing Pit Number	1	
Total Depth of Test Pit (Including Test Hole)	72	inches
Volume of Test Hole Excavated at Bottom	1	cubic foot
Ground surface elevation	0	feet
Bottom Elevation of Prop. Infiltration Unit	N.A.	feet
Elevation Bottom of Test Pit	-6	feet
Pre-soak Time	4	hours
Measured By		H.C.

Terms

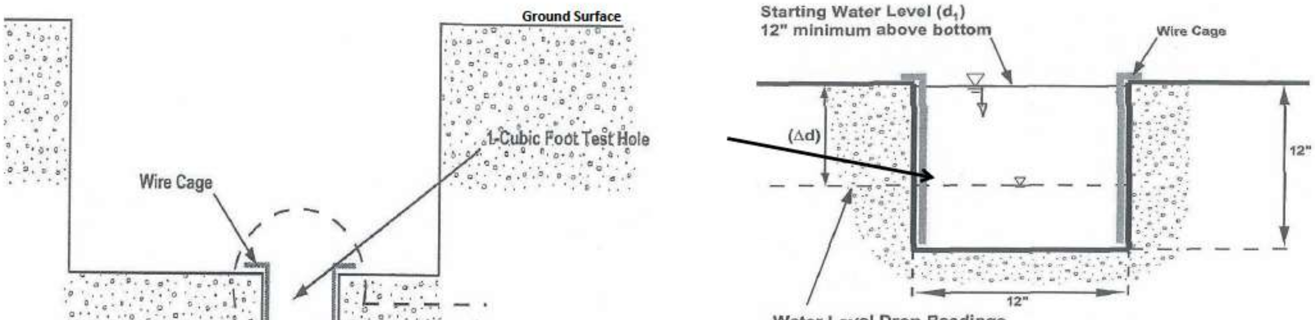
Initial water depth (d1) =dc-di
Water level drop (Δd) = di-df

di and df are taken from ground surface

Reading Number	Clock Time	Elapsed Time	Water Measurement (d_i) and (d_f)	Measured Percolation Rate	Measured Percolation Rate	Starting Water Level	Water level Drop (Δd)	Reduction Factor (Rf)	Infiltration Rate	Infiltration Rate Variation
						d_1	$\Delta d = d_1 - d_f$	$Rf = (2d_1 - \Delta d/13.5)+1$	measured perc rate/Rf	
		Min	in	in/min	in/hour	in	in	Unitless	in/hour	Percent
1	11:55		59.75			12.25				
	12:25	30	61.25	0.05	3.00		1.50	2.7	1.1	
2										
	12:26		59.75			12.25				
	12:56	30	61.25	0.05	3.00		1.5	2.7	1.1	0.0
3										
	12:58		59.50			12.5				
	13:28	30	61.00	0.05	3.00		1.5	2.7	1.1	-1.4
4										
	13:33		59.50			12.5				
	14:03	30	61.00	0.05	3.00		1.5	2.7	1.1	0.0
5										
	14:05		59.00			13				
	14:35	30	60.50	0.05	3.00		1.5	2.8	1.1	-2.7
6										
	14:36		59.00			13				
	15:06	30	60.50	0.05	3.00		1.5	2.8	1.1	0.0
7										
8										

Final Percolation Rate = **1.1 in/hr**

Note: *Calculation based on County of Los Angeles, Administrative Manual, Low Impact Development Best Management Practice Guidelines for Design, Investigation, and Reporting (Dated 6/30/17)
**LA County Minimum Design Infiltration 0.3 Inches per hour



Infiltration Rate = Pre-adjusted Percolation Rate divided by Reduction Factor

Where reduction factor (Rf) is given by:

$$R_f = \left(\frac{2d_1 - \Delta d}{DIA}\right) + 1$$

With:
d1 = Initial Water Depth (in.)
Δd = Water Level Drop of Final Period or Stablized Level (in.)
DIA = 13.5 (Equivalent Diameter of the Boring)(in.)

LOS ANGELES DEPARTMENT OF PUBLIC WORKS

MONITORING WELL No. 715B

MEASUREMENT LOGS

(6 Pages)

WELL_ID	ACTIVE	STATE_WELL_ID	MEASURE_DATE	RP_TO_WS	GS_ELEV	RP_ELEV	GS_TO_WS	WATER_SURFACE_ELEVATION
715B	1	4S14W07F01	10/30/2008	54.5	65	64.8	54.7	10.3
715B	1	4S14W07F01	4/17/2008	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	10/29/2007	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/17/2007	56.8	65	64.8	57	8
715B	1	4S14W07F01	10/13/2006	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/25/2006	56.3	65	64.8	56.5	8.5
715B	1	4S14W07F01	4/29/2005	57.7	65	64.8	57.9	7.1
715B	1	4S14W07F01	4/22/1999	54.4	65	64.8	54.6	10.4
715B	1	4S14W07F01	10/26/1998	54.7	65	64.8	54.9	10.1
715B	1	4S14W07F01	4/28/1998	54.8	65	64.8	55	10
715B	1	4S14W07F01	10/20/1997	54.7	65	64.8	54.9	10.1
715B	1	4S14W07F01	4/1/1997	54.6	65	64.8	54.8	10.2
715B	1	4S14W07F01	10/31/1996	52.3	65	64.8	52.5	12.5
715B	1	4S14W07F01	4/26/1996	55	65	64.8	55.2	9.8
715B	1	4S14W07F01	10/31/1995	58.1	65	64.8	58.3	6.7
715B	1	4S14W07F01	10/25/1994	56.3	65	64.8	56.5	8.5
715B	1	4S14W07F01	4/29/1994	57.9	65	64.8	58.1	6.9
715B	1	4S14W07F01	10/20/1993	53.2	65	64.8	53.4	11.6
715B	1	4S14W07F01	5/11/1993	53.2	65	64.8	53.4	11.6
715B	1	4S14W07F01	11/5/1992	53.9	65	64.8	54.1	10.9
715B	1	4S14W07F01	4/9/1992	54.5	65	64.8	54.7	10.3
715B	1	4S14W07F01	10/29/1991	53.4	65	64.8	53.6	11.4
715B	1	4S14W07F01	4/9/1991	51.7	65	64.8	51.9	13.1
715B	1	4S14W07F01	12/11/1990	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	10/17/1990	55.1	65	64.8	55.3	9.7
715B	1	4S14W07F01	10/11/1989	46.1	65	64.8	46.3	18.7
715B	1	4S14W07F01	4/25/1989	54	65	64.8	54.2	10.8
715B	1	4S14W07F01	10/27/1988	60.5	65	64.8	60.7	4.3
715B	1	4S14W07F01	7/19/1988	57.5	65	64.8	57.7	7.3
715B	1	4S14W07F01	4/15/1988	59.5	65	64.8	59.7	5.3
715B	1	4S14W07F01	10/13/1987	58.3	65	64.8	58.5	6.5
715B	1	4S14W07F01	8/25/1987	59.4	65	64.8	59.6	5.4
715B	1	4S14W07F01	4/17/1987	58.8	65	64.8	59	6
715B	1	4S14W07F01	10/24/1986	60.3	65	64.8	60.5	4.5
715B	1	4S14W07F01	5/12/1986	63.1	65	64.8	63.3	1.7
715B	1	4S14W07F01	10/31/1985	64.3	65	64.8	64.5	0.5
715B	1	4S14W07F01	4/8/1985	54.8	65	64.8	55	10
715B	1	4S14W07F01	12/6/1984	58.2	65	64.8	58.4	6.6
715B	1	4S14W07F01	7/20/1984	57.9	65	64.8	58.1	6.9
715B	1	4S14W07F01	4/10/1984	56.2	65	64.8	56.4	8.6
715B	1	4S14W07F01	10/28/1983	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	5/11/1983	54	65	64.8	54.2	10.8

715B	1	4S14W07F01	10/26/1982	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	4/19/1982	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	10/23/1981	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	4/13/1981	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	10/14/1980	56.1	65	64.8	56.3	8.7
715B	1	4S14W07F01	4/11/1980	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	10/23/1979	58.9	65	64.8	59.1	5.9
715B	1	4S14W07F01	6/6/1979	60.1	65	64.8	60.3	4.7
715B	1	4S14W07F01	4/10/1979	58.4	65	64.8	58.6	6.4
715B	1	4S14W07F01	11/15/1978	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	10/18/1978	58.3	65	64.8	58.5	6.5
715B	1	4S14W07F01	4/21/1978	55.7	65	64.8	55.9	9.1
715B	1	4S14W07F01	4/18/1978	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	10/24/1977	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	7/11/1977	55.6	65	64.8	55.8	9.2
715B	1	4S14W07F01	4/13/1977	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	2/22/1977	55.1	65	64.8	55.3	9.7
715B	1	4S14W07F01	11/2/1976	55.6	65	64.8	55.8	9.2
715B	1	4S14W07F01	5/10/1976	57.5	65	64.8	57.7	7.3
715B	1	4S14W07F01	4/19/1976	57.6	65	64.8	57.8	7.2
715B	1	4S14W07F01	10/16/1975	62.5	65	64.8	62.5	2.3
715B	1	4S14W07F01	4/8/1975	65.2	65	64.8	65.2	-0.4
715B	1	4S14W07F01	10/21/1974	63.9	65	64.8	64.1	0.9
715B	1	4S14W07F01	4/4/1974	59	65	64.8	59.2	5.8
715B	1	4S14W07F01	11/1/1973	60.2	65	64.8	60.2	4.6
715B	1	4S14W07F01	4/2/1973	62.1	65	64.8	62.1	2.7
715B	1	4S14W07F01	10/25/1972	63.7	65	64.8	63.7	1.1
715B	1	4S14W07F01	4/10/1972	63.7	65	64.8	63.7	1.1
715B	1	4S14W07F01	10/26/1971	62.2	65	64.8	62.2	2.6
715B	1	4S14W07F01	3/30/1971	61.2	65	64.8	61.2	3.6
715B	1	4S14W07F01	11/10/1970	59.9	65	64.8	59.9	4.9
715B	1	4S14W07F01	11/1/1970	61.2	65	64.8	61.2	3.6
715B	1	4S14W07F01	4/29/1970	62.8	65	64.8	63	2
715B	1	4S14W07F01	3/31/1970	63	65	64.8	63	1.8
715B	1	4S14W07F01	3/26/1970	62.5	65	64.8	62.7	2.3
715B	1	4S14W07F01	2/26/1970	64.3	65	64.8	64.5	0.5
715B	1	4S14W07F01	1/27/1970	61.4	65	64.8	61.6	3.4
715B	1	4S14W07F01	12/2/1969	60	65	64.8	60.2	4.8
715B	1	4S14W07F01	10/22/1969	60.3	65	64.8	60.3	4.5
715B	1	4S14W07F01	9/30/1969	59.2	65	64.8	59.4	5.6
715B	1	4S14W07F01	8/26/1969	59.3	65	64.8	59.5	5.5
715B	1	4S14W07F01	7/29/1969	59.3	65	64.8	59.5	5.5

715B	1	4S14W07F01	6/30/1969	59.5	65	64.8	59.5	5.3
715B	1	4S14W07F01	5/28/1969	59.1	65	64.8	59.1	5.7
715B	1	4S14W07F01	4/16/1969	58.3	65	64.8	58.3	6.5
715B	1	4S14W07F01	3/27/1969	58.5	65	64.8	58.5	6.3
715B	1	4S14W07F01	2/27/1969	58.4	65	64.8	58.4	6.4
715B	1	4S14W07F01	1/29/1969	59	65	64.8	59	5.8
715B	1	4S14W07F01	12/23/1968	59.1	65	64.8	59.1	5.7
715B	1	4S14W07F01	11/29/1968	59.6	65	64.8	59.6	5.2
715B	1	4S14W07F01	10/31/1968	60.1	65	64.8	60.1	4.7
715B	1	4S14W07F01	10/21/1968	60.5	65	64.8	60.5	4.3
715B	1	4S14W07F01	9/25/1968	59.3	65	64.8	59.3	5.5
715B	1	4S14W07F01	8/29/1968	57.2	65	64.8	57.2	7.6
715B	1	4S14W07F01	7/30/1968	57.1	65	64.8	57.1	7.7
715B	1	4S14W07F01	6/27/1968	56.9	65	64.8	57.1	7.9
715B	1	4S14W07F01	5/29/1968	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/18/1968	57.1	65	64.8	57.3	7.7
715B	1	4S14W07F01	4/3/1968	57.5	65	64.8	57.5	7.3
715B	1	4S14W07F01	3/29/1968	56.7	65	64.8	56.9	8.1
715B	1	4S14W07F01	2/29/1968	56.2	65	64.8	56.4	8.6
715B	1	4S14W07F01	1/26/1968	57.6	65	64.8	57.8	7.2
715B	1	4S14W07F01	12/28/1967	56.9	65	64.8	57.1	7.9
715B	1	4S14W07F01	11/13/1967	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	10/27/1967	57.8	65	64.8	58	7
715B	1	4S14W07F01	10/23/1967	58	65	64.8	58.2	6.8
715B	1	4S14W07F01	9/29/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	8/25/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	7/26/1967	59.7	65	64.8	59.9	5.1
715B	1	4S14W07F01	6/28/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	5/26/1967	58.9	65	64.8	59.1	5.9
715B	1	4S14W07F01	4/17/1967	59	65	64.8	59.2	5.8
715B	1	4S14W07F01	4/10/1967	58.8	65	64.8	59	6
715B	1	4S14W07F01	4/3/1967	58.6	65	64.8	58.8	6.2
715B	1	4S14W07F01	2/28/1967	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	1/26/1967	56.5	65	64.8	56.7	8.3
715B	1	4S14W07F01	1/3/1967	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	12/8/1966	60	65	64.8	60.2	4.8
715B	1	4S14W07F01	11/28/1966	59.5	65	64.8	59.7	5.3
715B	1	4S14W07F01	11/1/1966	60.9	65	64.8	61.1	3.9
715B	1	4S14W07F01	10/28/1966	61	65	64.8	61.2	3.8
715B	1	4S14W07F01	9/29/1966	60.2	65	64.8	60.4	4.6
715B	1	4S14W07F01	8/31/1966	60.1	65	64.8	60.3	4.7
715B	1	4S14W07F01	7/29/1966	60.7	65	64.8	60.9	4.1
715B	1	4S14W07F01	6/21/1966	60.4	65	64.8	60.6	4.4
715B	1	4S14W07F01	5/25/1966	61.3	65	64.8	61.5	3.5
715B	1	4S14W07F01	4/19/1966	60.7	65	64.8	60.9	4.1
715B	1	4S14W07F01	3/30/1966	62.2	65	64.8	62.4	2.6
715B	1	4S14W07F01	2/25/1966	62.5	65	64.8	62.7	2.3

715B	1	4S14W07F01	1/27/1966	63.1	65	64.8	63.3	1.7
715B	1	4S14W07F01	12/30/1965	64	65	64.8	64.2	0.8
715B	1	4S14W07F01	12/1/1965	64.7	65	64.8	64.9	0.1
715B	1	4S14W07F01	11/29/1965	64.7	65	64.8	64.9	0.1
715B	1	4S14W07F01	10/29/1965	64.6	65	64.8	64.8	0.2
715B	1	4S14W07F01	9/30/1965	64.1	65	64.8	64.3	0.7
715B	1	4S14W07F01	8/30/1965	63.4	65	64.8	63.6	1.4
715B	1	4S14W07F01	8/5/1965	64.6	65	64.8	64.8	0.2
715B	1	4S14W07F01	7/29/1965	64.2	65	64.8	64.4	0.6
715B	1	4S14W07F01	5/26/1965	66.8	65	64.8	67	-2
715B	1	4S14W07F01	5/5/1965	68.1	65	64.8	68.3	-3.3
715B	1	4S14W07F01	4/14/1965	69.8	65	64.8	70	-5
715B	1	4S14W07F01	4/1/1965	70.6	65	64.8	70.8	-5.8
715B	1	4S14W07F01	3/1/1965	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	2/24/1965	74.6	65	64.8	74.8	-9.8
715B	1	4S14W07F01	2/1/1965	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	1/28/1965	76.2	65	64.8	76.4	-11.4
715B	1	4S14W07F01	1/11/1965	76.8	65	64.8	77	-12
715B	1	4S14W07F01	12/29/1964	77.6	65	64.8	77.8	-12.8
715B	1	4S14W07F01	12/21/1964	77.6	65	64.8	77.8	-12.8
715B	1	4S14W07F01	11/30/1964	75.3	65	64.8	75.5	-10.5
715B	1	4S14W07F01	11/17/1964	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	11/6/1964	76.2	65	64.8	76.4	-11.4
715B	1	4S14W07F01	10/26/1964	76.4	65	64.8	76.6	-11.6
715B	1	4S14W07F01	10/22/1964	76.5	65	64.8	76.7	-11.7
715B	1	4S14W07F01	10/5/1964	76.8	65	64.8	77	-12
715B	1	4S14W07F01	9/28/1964	77.1	65	64.8	77.3	-12.3
715B	1	4S14W07F01	9/1/1964	77.7	65	64.8	77.9	-12.9
715B	1	4S14W07F01	8/26/1964	77.5	65	64.8	77.7	-12.7
715B	1	4S14W07F01	8/4/1964	77.8	65	64.8	78	-13
715B	1	4S14W07F01	7/30/1964	78.2	65	64.8	78.4	-13.4
715B	1	4S14W07F01	7/6/1964	78.6	65	64.8	78.8	-13.8
715B	1	4S14W07F01	7/1/1964	78.4	65	64.8	78.6	-13.6
715B	1	4S14W07F01	6/9/1964	79.2	65	64.8	79.4	-14.4
715B	1	4S14W07F01	5/4/1964	80.1	65	64.8	80.3	-15.3
715B	1	4S14W07F01	4/6/1964	81.4	65	64.8	81.6	-16.6
715B	1	4S14W07F01	3/3/1964	83	65	64.8	83.2	-18.2
715B	1	4S14W07F01	2/3/1964	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	1/6/1964	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	12/9/1963	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	11/19/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	10/2/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	9/3/1963	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	8/5/1963	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	7/8/1963	83.8	65	64.8	84	-19
715B	1	4S14W07F01	6/4/1963	82.8	65	64.8	83	-18
715B	1	4S14W07F01	6/3/1963	83.8	65	64.8	84	-19

715B	1	4S14W07F01	5/6/1963	83.7	65	64.8	83.9	-18.9
715B	1	4S14W07F01	4/3/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	3/4/1963	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	2/5/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	1/7/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	12/6/1962	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	12/5/1962	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	11/6/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	10/1/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	9/4/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	8/6/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	7/10/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	6/4/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	5/7/1962	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	4/4/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	3/7/1962	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	2/5/1962	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	1/9/1962	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	12/11/1961	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	11/15/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	10/9/1961	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	9/5/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	8/7/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	7/11/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/5/1961	84.8	65	64.8	85	-20
715B	1	4S14W07F01	5/9/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	4/12/1961	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	4/4/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	3/6/1961	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	2/7/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	1/3/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	12/13/1960	84.6	65	64.8	84.8	-19.8
715B	1	4S14W07F01	11/16/1960	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	11/2/1960	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	10/10/1960	84.9	65	64.8	85.1	-20.1
715B	1	4S14W07F01	9/13/1960	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	8/9/1960	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	7/5/1960	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/6/1960	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	5/16/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	4/11/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	3/7/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	2/3/1960	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	1/11/1960	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	12/15/1959	84.7	65	64.8	84.9	-19.9
715B	1	4S14W07F01	11/16/1959	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	10/5/1959	83.7	65	64.8	83.9	-18.9

715B	1	4S14W07F01	9/1/1959	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	8/11/1959	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	7/7/1959	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	6/10/1959	83.7	65	64.8	83.9	-18.9
715B	1	4S14W07F01	5/11/1959	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	4/15/1959	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	4/7/1959	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	3/3/1959	82.7	65	64.8	82.9	-17.9
715B	1	4S14W07F01	2/3/1959	82.3	65	64.8	82.5	-17.5
715B	1	4S14W07F01	1/12/1959	82.9	65	64.8	83.1	-18.1
715B	1	4S14W07F01	12/15/1958	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	11/12/1958	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	10/14/1958	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	9/10/1958	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	8/4/1958	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	7/8/1958	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/11/1958	85	65	64.8	85.2	-20.2
715B	1	4S14W07F01	5/26/1958	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	4/16/1958	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	3/10/1958	84.6	65	64.8	84.8	-19.8
715B	1	4S14W07F01	2/10/1958	84.9	65	64.8	85.1	-20.1

Appendix IS-4

Trip Generation

TABLE 6
CATALINA VILLAGE PROJECT
VEHICLE TRIP GENERATION ESTIMATES

			Trip Generation Rates [a]							Estimated Trip Generation						
				AM Peak Hour			PM Peak Hour				AM Peak Hour Trips			PM Peak Hour Trips		
Land Use	ITE Land Use Code	Size	Daily	Rate	In%	Out%	Rate	In%	Out%	Daily	In	Out	Total	In	Out	Total
PROPOSED PROJECT																
Multifamily Residential (Low-Rise)	220	30 DU	7.32	0.46	23%	77%	0.56	63%	37%	220	3	11	14	11	6	17
Coffee Shop [b]	936	1.784 ksf	364.35	101.14	51%	49%	36.31	50%	50%	650	92	88	180	33	32	65
Internal Capture [c]			*1%*		*3%*	*3%*		*6%*	*6%*	(6)	(3)	(3)	(6)	(2)	(2)	(4)
Walk/Bike [d]			*37%*		*40%*	*40%*		*29%*	*29%*	(242)	(37)	(36)	(73)	(10)	(9)	(19)
Net External Coffee Shop										402	52	49	101	21	21	42
Tasting Room [e]	925	1.279 ksf	155.30	-	-	-	11.36	66%	34%	199	0	0	0	10	5	15
Internal Capture [c]			*1%*		-	-		*6%*	*6%*	(2)	0	0	0	(1)	0	(1)
Walk/Bike [d]			*37%*		-	-		*29%*	*29%*	(74)	0	0	0	(3)	(1)	(4)
Net External Tasting Room										123	0	0	0	6	4	10
NET EXTERNAL VEHICLE TRIPS										744	55	60	115	38	31	69

Notes:

[a] Source: Institute of Transportation Engineers (ITE), *Trip Generation, 10th Edition* , 2017. Unless otherwise notes, all rates are Peak Hour of Adjacent Street Traffic.

[b] The number of daily trips was estimated to be 10 times greater than the total PM peak hour trips.

[c] Internal capture represents the percentage of trips between land uses that occur within the site. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[d] The Walk/Bike credit includes non-auto trips from the surrounding neighborhood. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[e] The number of daily trips was estimated to be 10 times greater than the total PM Peak Hour trips based on the PM Peak Hour of the Generator rate (15.53 trips/ksf).

Appendix IS-5

Will Serve Letter

CALIFORNIA WATER SERVICE
Rancho Dominguez District 2632 West 237th Street, Torrance, CA 90505
Tel: (310) 257-1400

September 18, 2020

Beach City Capital
1221 Hermosa Avenue, Suite 101
Hermosa Beach, CA 90254
Attn: Ben O'Neal

Will Serve Letter
112 – 132 North Catalina Avenue, Redondo Beach, CA
Developer: Beach City Capital

Dear Mr. O'Neal:

As a regulated utility, California Water Service Company Rancho Dominguez district ("Cal Water") has an obligation to provide water service in accordance with the rules and regulations of the California Public Utility Commission (CPUC). Assuming you receive all required permits from the City of Redondo Beach or Los Angeles County, Cal Water will provide water service to the above referenced project. Cal Water agrees to operate the water system and provide service in accordance with the rules and regulations of the California Public Utilities Commission (CPUC) and the company's approved tariffs on file with the CPUC. This will serve letter shall remain valid for **two years** from the date of this letter. If construction of the project has not commenced within this **two year** time frame, Cal Water will be under no further obligation to serve the project unless the developer receives an updated letter from Cal Water reconfirming our commitment to serve the above mentioned project. Additionally, Cal Water reserves the right to rescind this letter at any time in the event its water supply is severely reduced by legislative, regulatory or environmental actions.

Cal Water will provide such potable water at such pressure as may be available from time to time as a result of its normal operations per the company's tariffs on file with the CPUC. Installation of facilities through developer funding shall be made in accordance with the current rules and regulations of the CPUC including, among others, Tariff Rules 15 and 16 and General Order 103-A. In order for us to provide adequate water for domestic use as well as fire service protection, it may be necessary for the developer to fund the cost of special facilities, such as, but not limited to, booster pumps, storage tanks and/or water wells, in addition to the cost of mains and services. Cal Water will provide more specific information regarding special facilities and fees after you provide us with your improvement plans, fire department requirements, and engineering fees for this project.

This letter shall at all times be subject to such changes or modifications by the CPUC as said Commission may, from time to time, require in the exercise of its jurisdiction.

If you have any questions regarding the above, please call me at (310) 257-1400.

Sincerely,

Daniel Armendariz
District Manager

cc: Ting He – Cal Water Engineering Dept
Robert Thompson – Operations Manager
Renzo Ayala / Cardinal Fernandezees – Superintendent
File

Appendix C

Transportation Assessments

Draft CEQA Transportation Impact Assessment

Catalina Village Project

Prepared for:
Rincon Consultants

August 2021

LB20-0012

FEHR & PEERS

Table of Contents

1. Introduction **1**

1.1 Project Description 1

1.2 Study Scope 1

1.3 Organization of the Report 3

2. Environmental Setting **4**

2.1 Existing Roadway Facilities 4

2.2 Existing Pedestrian and Bicycle Facilities 5

2.3 Existing Public Transit Facilities 6

2.4 Existing Roadway Safety Conditions 9

3. Methodologies & Thresholds of Significance **10**

3.1 Impact Criteria 10

3.2 Analysis Methodologies 10

3.2.1 Criterion 1: Program, Plan, Ordinance, or Policy (PPOP) 10

3.2.2 Criterion 2: Conflict or be Inconsistent with CEQA Guidelines § 15064.3, Subdivision (b). 10

3.2.3 Criterion 3: Geometric Hazards 12

3.2.4 Criterion 4: Emergency Response 12

4. CEQA Transportation Impact Analysis **13**

4.1 Criterion 1: Programs, Plans, Ordinances, and Policies Consistency Review 13

4.2 Criterion 2: CEQA Guidelines § 15064.3, Subdivision (b) Conflict Review (VMT Analysis) 16

4.2.1 VMT Screening 16

4.3 Vehicle Miles Traveled Impact Analysis 21

4.3.1 Mitigation Options 24

4.4 Project Alternatives - Vehicle Miles Traveled Analysis 27

4.4.1 Alternative 1 – No Build 27

4.4.2 Alternative 2 – By-Right Density 27

4.4.3 Alternative 3 – Increased Affordable Housing 28

4.5 Criterion 3: Geometric Design Hazards Impact Review 29

4.6 Criterion 4: Emergency Access Impact Review 29

5. Summary **30**

Appendices

Appendix A – MXD Model Documentation

Appendix B – LADOT Infill & Complete Streets Strategy

List of Figures

Figure 1 – Project Site Plan 2
Figure 2 – Existing and Planned Bicycle Facilities 7
Figure 3 – Study Area Transit Routes 8

List of Tables

Table 1 – Total Collisions at Primary Site Access Intersections 9
Table 2 – City of Redondo Beach Draft VMT Impact Thresholds of Significance 12
Table 3 – Programs , Plans, Ordinances, and Policies Consistency Review 14
Table 4 – VMT Screening Guidance for Land Use Projects 17
Table 5 – Project Trip Generation Estimates 20
Table 6 – Low VMT Screening Analysis Results 21
Table 7 – Home-Based VMT per Capita Calculation 24
Table 8 – Project Home-Based Work VMT per Employee 24
Table 9 – Residential VMT Mitigation Measures 26
Table 10 – Home-Based VMT per Capita Calculation for Alternative 2 27
Table 11 – Home-Based VMT per Capita Calculation for Alternative 3 28

1. Introduction

This report documents the assumptions, methodologies, and findings of a study conducted by Fehr & Peers to evaluate the potential transportation impacts of the proposed Catalina Village Project ("Project"), in the City of Redondo Beach, California.

1.1 Project Description

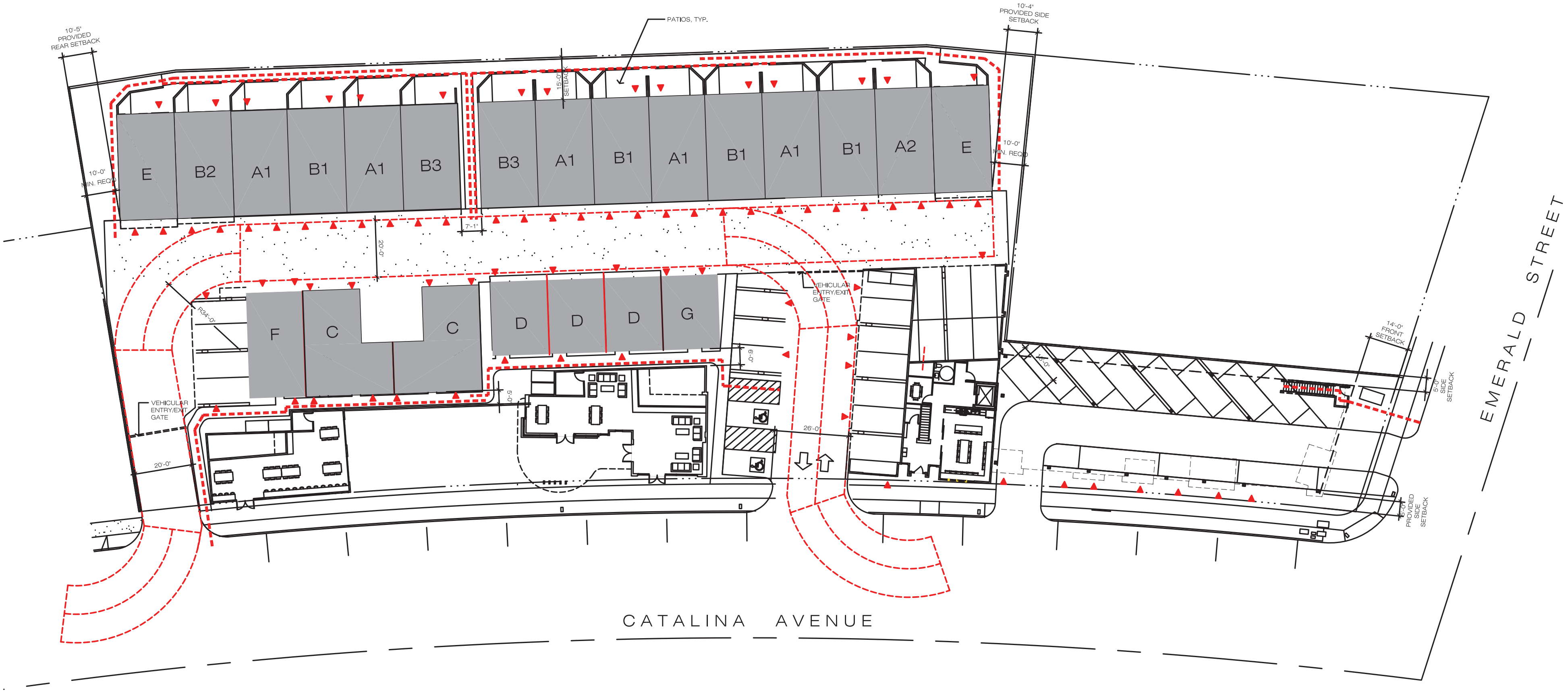
The proposed project (the Project) spans fourteen adjacent parcels across six addresses, including 100, 112, 116, 124, 126, and 132 N Catalina Avenue, and occupies almost the entire southwest quadrant of the block bounded by Diamond Street to the North, Emerald Street to the South, Catalina Avenue to the West, and North Broadway to the East. All of the Project parcels are currently zoned for Low-Density Multifamily Residential (R3-A).

Existing uses on the site include an office, a frame store, a cabinet shop, a tile and granite sales store, and a clothing store, as well as a vacant dry cleaner and coffee shop and a former Masonic Temple and United States Post Office. The Project involves the construction of 30 three-story mixed income apartment units and would preserve and retrofit approximately 3,000 square feet of commercial retail buildings, replacing the existing commercial uses with a 1,784 square foot coffee shop and a 1,279 square foot beer tasting room. Site access would be provided via two driveways on Catalina Avenue, and the Project would provide 72 parking stalls, with an additional 7 parking spaces available on-street in front of the commercial retail uses. **Figure 1** illustrates the ground level site plan for the Project.

1.2 Study Scope

Signed into law in 2013, SB 743 eliminates level of service (LOS) as a basis for determining significant transportation impacts under CEQA and provides a new performance metric – vehicle miles of travel (VMT). The City of Redondo Beach is currently updating its transportation analysis guidelines to reflect this change and will soon adopt new thresholds of significance for transportation impacts based on VMT. Consistent with CEQA, the potential for significant transportation impacts as a result of the proposed Project has been evaluated based on the transportation impact criteria of Appendix G to the California CEQA Guidelines, which is described in Chapter 3 of this report. This transportation impact study will be incorporated into the environmental impact report (EIR) being prepared for the proposed Project.

While SB 743 prohibits the use of LOS as a basis for determining significant transportation impacts under CEQA, the legislation does not preclude the application of local general plan policies, zoning codes, conditions of approval, or any other planning requirements. Localized transportation assessments may continue to utilize LOS as a basis for assessing the effects of development projects on traffic operations. Although level of service (LOS) analysis is not permitted as part of the CEQA process, the City of Redondo Beach intends to retain the methodology for use outside of the CEQA process to measure access, safety, and circulation functionality in the vicinity of the project site. The results of the LOS analysis conducted for the Project are presented in a supplemental report.



▲ Access to Bedroom*

---- 150' Fire Hose

*All Bedrooms are located at 1st and 2nd Levels

N

scale: 1/16" = 1'-0"
0 16 32 48 64

Figure 1

Site Plan

1.3 Organization of the Report

This report is divided into five chapters, including this introduction. Chapter 2 presents the environmental setting in which the Project is located. Chapter 3 presents the methodologies and thresholds of significance that are used in the analysis presented in Chapter 4. Chapter 5 summarizes the results of the study.

2. Environmental Setting

This chapter describes the existing environmental setting for transportation, including a discussion of existing roadways, bicycle and pedestrian facilities, transit service, and roadway safety conditions. The transportation system serving this area is a complex, built-out, multimodal network designed to carry both people and goods, consisting of roadways, bicycle facilities, sidewalks, and public transit. However, while the roadway and sidewalk network in the vicinity of the Project site is generally well developed and complete, the area lacks proximate connectivity to rail transit. Rail transit is served by connecting bus service.

2.1 Existing Roadway Facilities

The street network in the City of Redondo Beach is primarily gridded with good connectivity. A few large land uses, including the AES Power Plant, Sea Hawk Stadium, and Redondo Union High School contribute to a “super-block” roadway network. Arterial streets in the study area generally provide two to three vehicle travel lanes in each direction, with left-turn pockets at most intersections and right-turn pockets at some intersections. Posted travel speeds in the study area range from 35 to 50 miles per hour (mph), with the majority of streets allowing travel up to 35 mph. As described in detail below, regional access to the Project site is provided by PCH and a network of arterial and collector streets. The arterial street network that serves the proposed project area includes Anita Street, Beryl Street, Catalina Avenue, Herondo Street, and Torrance Boulevard. The local streets include Diamond Street, Emerald Street, and Garnet Street. The following describes the key roadway facilities that serve the project site:

The following details the key roadway facilities that serve the Project site:

- <u>Pacific Coast Highway (State Route 1)</u> - PCH is a 4-lane north/south major arterial. Left-turn lanes are provided at major intersections. A raised median is provided south of Avenue H. On-street parking is prohibited along sections of PCH at Torrance Boulevard, Catalina Avenue and Diamond Street, and generally permitted elsewhere. As a state route, PCH is under the jurisdiction of Caltrans.
- <u>Anita Street</u> - Anita Street is an east/west major arterial that runs east of Pacific Coast Highway (PCH) with two lanes in each direction. Between Maria and Prospect Avenue, it has a center turning lane. East of Prospect, there are left-turn pockets at most intersections, with a raised median. On-street parking is generally permitted on both sides of Anita Street.
- <u>Beryl Street</u> - Beryl Street is an east-west secondary arterial that runs from Harbor Drive to 190th Street. Between Prospect Street and Catalina Avenue, Beryl Street has one lane in each direction with a center turning lane. Beryl Street narrows to two lanes east of Flagler Lane. On- street parking is permitted between Catalina Avenue and Flagler Lane.
- <u>Catalina Avenue</u> - Catalina Avenue is a 4-lane north/south secondary arterial that runs from PCH near the northern City boundary to Palos Verdes Boulevard at the southern City boundary. On-street parking is metered on the west side from Carnelian Street to Torrance Boulevard and on the

east side from Emerald Street to Pearl Street. On-street parking is metered on both the west and east side from Avenue I to Palos Verdes Boulevard. It has a raised median between Beryl Street and Torrance Boulevard.

- Herondo Street - Herondo Street is an east/west secondary arterial that runs from PCH to Harbor Drive with one lane in each direction. It has a raised median, and left-turn pockets are provided at most intersections. Diagonal on-street parking is generally provided on both sides of Herondo Street. On-street striped bike lanes are also provided.
- Torrance Boulevard - Torrance Boulevard is a 4-lane east/west major arterial that ends in a cul- de-sac west of Catalina Avenue. On-street parking is permitted along most of its length in the study area.
- Diamond Street – Diamond Street is a 2-lane east/west collector with a shared left-turn lane that runs from Catalina Avenue to Prospect Avenue. On-street parking is provided on both sides of the street.
- Emerald Street – Emerald Street is a 2-lane east/west local street that runs from Catalina Avenue to Edgemere Drive. East of Edgemere Drive, it continues on as Wayne Avenue. On-street parking is provided on both sides of the street.
- Garnet Street – Garnet Street is a 4-lane east/west collector between Catalina Avenue and PCH. East of PCH, it continues as local street with one lane in each direction, ending at Prospect Avenue. On-street parking is provided on both sides of the street in the study area.

2.2 Existing Pedestrian and Bicycle Facilities

Sidewalks are generally present throughout the study area and Project site, and marked crosswalks are provided at all major arterial intersections. Most signalized intersections of major arterials and collector streets in the study area provide marked crossings on all four legs of the intersection, while some do not provide crossing facilities on all four legs of the intersection. Pedestrian access to the Project site is provided via a sidewalk on Catalina Avenue, with marked crosswalks provided at the intersection of Catalina Avenue and Emerald Street and Catalina Avenue and Diamond Street.

Class I bicycle facilities in the study area include the bicycle path/cycle track connecting the Hermosa Beach Strand to the Redondo Beach Pier. Class II bicycle lanes are located on Herondo Street west of the PCH, Catalina Avenue north of Torrance Boulevard and south of Pacific Avenue, and Diamond Street. A Class III bicycle route is located on Catalina Avenue south of Torrance Boulevard. The South Bay Bicycle Master Plan indicates that additional Class I, II, and III facilities are planned throughout the study area. Existing and planned bicycle facilities are presented in **Figure 2**. Bicycle access to the Project site is provided via a Class II bicycle lane on the east side of Catalina Avenue.

2.3 Existing Public Transit Facilities

The study area is served by several bus routes operated by four transit operators, including the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation Commuter Express (CE), Beach Cities Transit (BCT), and Torrance Transit (TT). **Figure 3** illustrates transit routes in the study area. The following details each individual line that serves the study area. Importantly, the information presented regarding weekday peak period headways is reflective of COVID-19 conditions.

- Metro Line 130 - Metro Line 130 provides local service between the Los Cerritos Center in Cerritos and Redondo Beach. In the study area, Line 130 travels north and south along Harbor Boulevard and Catalina Avenue. Service is provided seven days per week, with weekday peak period headways of approximately 20 to 30 minutes.
- Metro Line 232 - Metro Line 232 provides local service between the LAX bus center and Downtown Long Beach. In the study area, Line 232 travels north and south along PCH. Service is provided seven days per week with weekday peak period headways of approximately 10 to 20 minutes.
- CE Line 438 - Commuter Express (CE) Line 438 (operated by LADOT) provides express service between Downtown Los Angeles and the City of Redondo Beach. In the study area, Line 438 travels north and south along Harbor Drive and Catalina Avenue. Service is provided Monday through Friday, with peak period headways of approximately 15 minutes.
- BCT Line 102 - Beach Cities Transit (BCT) Line 102 provides local service between the Metro Green Line, the South Bay Galleria, and the Redondo Beach Pier. In the study area, Line 102 travels north and south along Catalina Avenue and northeast and southwest along Diamond Street. Service is provided seven days per week, with weekday peak period headways of approximately 30 to 45 minutes.
- BCT Line 109 - BCT Line 109 provides local service between the LAX Bus Center, Redondo Beach Pier, and Riviera Village. In the study area, Line 109 travels north and south along Catalina Avenue. Service is provided seven days per week, with weekday peak period headways of approximately 40 to 50 minutes.
- TT Line 3 - Torrance Transit (TT) Line 3 provides local service between Downtown Long Beach and the Redondo Beach Pier. In the study area, Line 3 travels east and west along Torrance Boulevard. Service is provided seven days per week, with weekday peak period headways of approximately 10 to 15 minutes.
- TT Line 7 - Line 7 provides local service between Carson and the Redondo Beach Pier. In the study area, Line 7 travels east and west along Torrance Boulevard. Service is provided Monday through Saturday, with weekday peak period headways of approximately 15 minutes.

N:\Projects\Active\2020\0012_100-132 N Catalina Ave\Graphics\GIS\MXD\CatalinaRedondo_Bikeways.mxd

	Existing	Proposed
Bike Route	▬	▪▪▪▪
Bike Lane	▬	▪▪▪▪
Bike Path	▬	
Cycle Track	▬	

Figure 2

Existing and Proposed Bikeways

N:\Projects\Active\2020\0012_100-132 N Catalina Ave\Graphics\GIS\MXD\CatalinaRedondo_Transit.mxd

Figure 3

Transit Routes

2.4 Existing Roadway Safety Conditions

A collision analysis, using data collected from the Statewide Integrated Traffic Records System (SWITRS), was conducted for the intersections Catalina Avenue & Emerald Street and Catalina Avenue & Diamond Street, which are the primary intersections used for site access. Based on the most recently available 5-year collision data set, reported collisions that occurred between 2014 and 2018 were analyzed. The 2019 collision data set is still provisional. **Table 1** summarizes the number, type, and severity of collisions within the study area.

Table 1 – Total Collisions at Primary Site Access Intersections

Collision Type	Total	Fatal + Significant Injury Collisions
Vehicle-Vehicle	3	0
Vehicle-Pedestrian	1	0
Vehicle-Bicyclist	0	0
Total	4	0

Over the 5-year period of collision data evaluated, 4 collisions occurred within the immediate vicinity of the Project site on streets used to access the Project site, including people driving and walking. Of the total number of collisions, none resulted in serious injury or fatality. All 4 collisions occurred at an intersection, with no reported collisions occurring outside of an intersection. The primary collision factors associated with collisions near the Project site were vehicle right of way violation (50%), improper turning (25%), and pedestrian violation (25%).

3. Methodologies & Thresholds of Significance

Consistent with CEQA, the potential for significant transportation impacts as a result of the proposed Project has been evaluated based on the transportation impact criteria of Appendix G to the California CEQA Guidelines.

3.1 Impact Criteria

Pursuant to Appendix G, impacts to transportation would be considered significant if the proposed Project were found to:

- Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.
- Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b). CEQA Guidelines Section 15064.3, subdivision (b) includes the criteria for analyzing transportation impacts for land use projects, as follows: Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact.
- Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
- Result in inadequate emergency access.

3.2 Analysis Methodologies

3.2.1 Criterion 1: Program, Plan, Ordinance, or Policy (PPOP)

The proposed Project will be qualitatively evaluated to determine if it is expected to conflict with a relevant PPOP related to the circulation system. A conflict could occur if the proposed Project would preclude the ability of a local jurisdiction to implement goals or policies.

3.2.2 Criterion 2: Conflict or be Inconsistent with CEQA Guidelines § 15064.3, Subdivision (b).

The City of Redondo Beach (the City) updated its transportation analysis guidelines based primarily on the recommendations detailed in the Governor's Office of Planning and Research (OPR) *Technical Advisory*.

The OPR *Technical Advisory* describes the four components of a VMT analysis necessary to comply with the new CEQA guidelines:

1. **VMT Screening & Qualitative Review**. The first step is to determine when a VMT analysis is required. OPR recommends that projects be screened from a VMT analysis based on their size, location, and/or accessibility to transit. If a project meets the screening criteria requiring a VMT analysis, it can be presumed to have a less than significant impact under this impact criterion.

2. **VMT Analysis Methodology**. If a project is not screened from requiring a VMT analysis, a regional travel demand model is typically used to estimate a project's VMT. OPR recommends that VMT be reported as "Home-Based VMT" per capita for residential projects and "Home-Based Work VMT" per employee for the employees of a project site. Home-Based VMT includes all vehicle roundtrips originating from the residence of the trip-maker. Home-Based Work VMT includes only vehicle roundtrips between the residence of the trip-maker and their place of work.

3. **VMT Impact Thresholds**. Lead agencies, such as the City of Redondo Beach, have the discretion to develop and adopt their own VMT thresholds, or rely on thresholds recommended by other agencies, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence. See also CEQA Guidelines Section 15064.3(c). OPR recommends that projects should have VMT that is at least 15 percent below existing VMT per capita or per employee when compared to a regional or citywide average of these metrics to avoid a significant impact.

3.2.2.1 City of Redondo Beach VMT Methodologies & Thresholds of Significance

The City of Redondo Beach has developed new transportation analysis guidelines to comply with SB 743. The VMT methodology employed in this study is consistent with the screening methodologies and impact criteria adopted by the Redondo Beach City Council on July 13, 2021. The adopted transportation analysis guidelines indicate the following:

- The South Bay Cities Council of Governments (SBCCOG) area is the geographic baseline used to compare project related VMT performance in the determination of the potential for a significant VMT impact.

- The threshold of significance is 16.8% below the baseline. The California Air Resources Board (CARB) developed a scenario-based modeling system (called Vision) that was used to identify foreseeable emission reductions associated with existing mobile-source regulations and to explore different combinations of further advancements in technologies, fuels, and transportation system efficiencies. The results of CARB's modeling show that a 16.8% reduction from existing levels in VMT per capita for light-duty vehicles is needed in order to achieve the state required target of 80% reduction in GHGs by 2050.

- If a project meets the adopted screening criteria, it would not be required to conduct a VMT impact analysis. The screening options adopted by Council include:

    - Project size screening (less than 110 net daily trips)

    - Locally serving retail (10,000 square feet or less)

- Low VMT area (based on data from the Southern California Association of Governments [SCAG] travel demand forecasting model). The City of Redondo Beach has defined a Low VMT area in accordance with CARB's recommendation of 16.8% below the SBCCOG Baseline VMT.

Using the 2016 SCAG RTP model (the most recently available model, as the 2020 SCAG RTP model has not yet been released), Fehr & Peers estimated average VMT per capita and per employee for the SBCCOG region as detailed in **Table 2**. Consistent with the City's adopted transportation analysis guidelines, a significant project-related VMT impact would occur if a project's home-based VMT per capita is greater than 11.1, or a project's home-based work VMT per employee is greater than 15.3. These same thresholds are used to determine areas in the City which would be considered to have low VMT and could be screened out from requiring VMT analysis and could be presumed to have a less than significant transportation impact.

Table 2 – City of Redondo Beach Draft VMT Impact Thresholds of Significance

VMT Metrics	SBCCOG Average VMT
	2016 Baseline
Home-Based VMT per Capita	13.3
Threshold of Significance (16.8% below)	*11.1*
Home-Based Work VMT per Employee	18.4
Threshold of Significance (16.8% below)	*15.3*

Source: Fehr & Peers, 2020; SCAG, 2016

3.2.3 Criterion 3: Geometric Hazards

The proposed Project will be evaluated to determine if it is expected to conflict with relevant design standards or introduce new or significantly worsen any existing geometric hazards, particularly related to the design of driveways.

3.2.4 Criterion 4: Emergency Response

The proposed Project will be evaluated to determine if it is expected to worsen emergency response times to the Project site or to the surrounding community.

4. CEQA Transportation Impact Analysis

This chapter assesses the impacts of the proposed Project in accordance with the methodologies and thresholds of significance detailed in Chapter 3.

4.1 Criterion 1: Programs, Plans, Ordinances, and Policies Consistency Review

The table below discusses local plans and policies that could have the potential to be inconsistent with the Project. Relevant plans, goals, policies and/or objectives that affect transportation and mobility in the City of Redondo Beach were evaluated and, as summarized in **Table 3**, no conflicts were identified. Therefore, no significant transportation impact is anticipated based on this criterion and no mitigation would be required.

Table 3 – Programs , Plans, Ordinances, and Policies Consistency Review

Plans	Description	Relevant Goals, Policies and/or Objectives	Consistency
Southern California Association of Governments Regional Transportation Plan	Every 4 years, SCAG updates its RTP for the 191-city SCAG region. Beginning with the 2012 RTP, SB 375 required the inclusion of a SCS in RTPs prepared by MPOs such as SCAG. The key goal of the SCS is to achieve GHG emission reduction targets through integrated land use and transportation strategies. A key objective is for planners and developers to consider how land use patterns influence travel demand. As part of the transportation modeling and analysis for the RTP/SCS, SCAG prepares population and employment growth projections by Transportation Analysis Zone (TAZ) and creates a future transportation network that represents the changes to the existing network based on the regional project list. TAZs are geographic polygons representing communities and neighborhoods at a sub-city level of detail.	1) Goal 2: Improve mobility, accessibility, reliability, and travel safety for people and goods. 2) Goal 3: Enhance the preservation, security, and resilience of the regional transportation system. 3) Goal 4: Increase person and goods movement and travel choices within the transportation system. 4) Goal 7: Adapt to a changing climate and support an integrated regional development pattern and transportation network.	As part of the transportation modeling and analysis for the RTP/SCS, SCAG prepares population and employment growth projections by Transportation Analysis Zone (TAZ) and creates a future transportation network that represents the changes to the existing network based on the regional project list. TAZs are geographic polygons representing communities and neighborhoods at a sub-city level of detail. The proposed Project was compared against the RTP/SCS forecasts and network changes included in the 2016 SCAG RTP model. Given that the proposed Project would not result in any changes to the existing transportation network, it is consistent with the RTP/SCS.
South Bay Bicycle Master Plan	The SBBMP is a multi-city bicycle master plan developed in 2011 by the LACBC and the SBBC with the common goal of improving the safety and convenience of bicycling in the South Bay Region. Seven member cities of the SBCCOG were involved in the development of the SBBMP, including the City of Redondo Beach.	1) Policy 1.1.4 – Review and encourage implementation of policies and facilities proposed in the SBBMP whenever planning new bicycle facilities or capital improvement projects that may be related to bicycle improvements.	The proposed Project is consistent with the SBBMP because the project would not make any changes to the existing bicycle infrastructure surrounding the Project site. It would not preclude the installation of any planned bicycle facilities in the SBBMP. Appropriate striping and/or signage would be installed at driveway approaches to meet MUTCD and City design standards and in accordance with roadway safety best practices. In addition, the proposed Project supports this policy by providing bicycle amenities and parking on-site for residents, visitors, and employees.

Plans	Description	Relevant Goals, Policies and/or Objectives	Consistency
City of Redondo Beach General Plan Circulation Element	The Redondo Beach General Plan Circulation Element was adopted in 2009 and provides goals and policies for the circulation system.	1) Goal G1 – Address the root causes of trip generation rather than simply reacting to the consequences. 2) Goal G4 – Allow for same and convenient walking, biking, or taking transit. 3) Goal G5 – Expand TDM programs that decrease the number of single-occupant vehicles on the road. 4) Goal G11 – Maintain the existing supply of public parking. 5) Goal G12 – Encourage all employers to pursue successful TDM measures. 6) Goal G14 – Increase the provision of bike lockers, bike racks, and lighting for bicycle facilities.	The proposed Project's increased land use intensity compared to existing conditions will result in a net increase of 744 daily vehicle trips per day. However, the Project's mix of uses and location immediately adjacent to and within walking or bicycling distance of existing residential uses reduce the Project's trip generation compared to a comparable project in another location. Because of this, the Project is consistent with the Circulation Element goal to address the root causes of trip generation. The proposed Project's location near the waterfront, where existing bicycle and pedestrian volumes are high, will expand recreational and retail opportunities for bicyclists and pedestrians, particularly for residents at adjacent residential developments surrounding the Project site. Bicycle access to the proposed Project will be available on Catalina Avenue to the north and south, with connections to additional bicycle facilities provided from Catalina Avenue. Additionally, a robust sidewalk network is available throughout the study area, providing ease of access to the Project site for pedestrians from the surrounding neighborhood and nearby destinations at the waterfront. Thus, the proposed Project is consistent with all Circulation Element goals related to active transportation.

Plans	Description	Relevant Goals, Policies and/or Objectives	Consistency
City of Redondo Beach Harbor/Civic Center Specific Plan	The Redondo Beach Harbor/Civic Center Specific Plan was adopted in 2008 and provides goals and policies for the Harbor/Civic Center area, in which the Project is located.	Goals for the Catalina Avenue Corridor Sub-Area include: 1) Establish a distinctive district of the City which accommodates a mix of light industrial, automobile related, coastal/harbor related and supporting commercial uses. 2) Ensure that the scale and mix of the various land uses, building densities, and design styles permitted and encouraged within the corridor are appropriate and compatible, both internally (i.e., within the corridor itself) and externally (i.e., to other areas in the Specific Plan area which are adjacent to the corridor), and promote effective use and patronage. 3) Ensure that the physical and environmental (relative to noise, light and glare, and traffic) integrity of the larger, intact, and established lower-density residential areas along the corridor (particularly on the eastern side of the Avenue between Beryl Street and Garnet Street) are respected, maintained, and protected. Parcels on the east side of Catalina Avenue between Diamond Street and Garnet Street currently occupied by a mix of commercial and residential structures will be encouraged to redevelop to medium-density multi-family residential units.	The proposed Project is consistent with the Redondo Beach Harbor/Civic Center Specific Plan because the Project would provide employment generating commercial uses that are supportive of the establishment of a distinctive coastal/harbor district, would maintain consistency, both internally and externally, with the scale and mix of existing land uses in the area, and would contribute to the redevelopment of parcels on the east side of Catalina Avenue between Diamond Street and Garnet Street into medium-density multi-family residential units.

4.2 Criterion 2: CEQA Guidelines § 15064.3, Subdivision (b) Conflict Review (VMT Analysis)

4.2.1 VMT Screening

As discussed in Chapter 3, the first step of a VMT impact analysis is to complete a project screening to determine whether a full VMT impact analysis needs to be conducted. Based on OPR's *Technical* Advisory and the City of Redondo Beach's adopted VMT methodologies, the following screening methods have been analyzed below for the Project: project size screening, locally serving retail screening, and Low VMT Area screening. If the full Project (both the residential and commercial components) fully meets at least one of the screening criteria, it is exempt from further VMT analysis. However, if either component of the Project does not meet at least one of the screening criteria, a full VMT analysis is required. **Table 4** provides additional details regarding the City's screening criteria.

Table 4 – VMT Screening Guidance for Land Use Projects

Screening Categories	Project Requirements to Meet Screening Criteria
Project Size	A project that generates 110 or fewer daily trips.
Locally Serving Retail	A project that has locally serving retail uses that are 10,000 square feet or less, including specialty retail, shopping center, grocery store, pharmacy, financial services/banks, fitness center or health club, restaurant, and café. If the project contains other land uses, those uses need to be considered under other applicable screening criteria.
Project Located in a Low VMT Area	A residential or office project that is located in an area that is already 16.8% below the SBCCOG Baseline VMT. For mixed-use projects that include both residential and office/commercial land uses, if either component of the project fails to meet the Low VMT screening criteria, all project components must complete a VMT analysis.

4.2.1.1 Project Size

To determine whether the Project meets the screening criteria shown in **Table 4** above, it was necessary to estimate the number of daily trips that would be generated by the Project. Standard trip generation methodologies typically use the Institute of Transportation (ITE) Engineers Trip Generation Manual (10th Edition) to establish trip rates for each individual land use in isolation. However, most of the empirical data used to develop ITE trip generation rates were collected in isolated, suburban settings, and do not accurately predict trip generation for mixed use and urban infill sites with transit proximity and a density, scale, and design that can facilitate walking and biking. Research indicates that the ITE manuals overestimate peak traffic generation for mixed-use development (MXD) by an average of 35%.[1] To overcome this shortcoming of the conventional ITE trip generation procedure, researchers have developed a mixed-use trip generation model. **Appendix A** includes *Getting Trip Generation Right - Eliminating the Bias Against Mixed Use Development* (Walters, Bochner, Ewiing 2013), a summary of the MXD model development, calibration and validation process published by the American Planning Association for their Planning Advisory Service. It

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[1] Ewing, Reid, Michael Greenwald, Ming Zhang, Jerry Walters, Robert Cervero, Lawrence Frank, and John Thomas. 2011. "Traffic Generated by Mixed-Use Developments — Six-Region Study Using Consistent Built Environmental Measures." ASCE Journal of Urban Planning and Development 137(3): 248–61. https://ascelibrary.org/doi/10.1061/%28ASCE%29UP.1943-5444.0000068

includes references to several additional research papers documenting the MXD model development and process.

Reflecting the mixed-use nature of the Project, Fehr & Peers used the mixed-use trip generation model (MXD+). MXD+ represents a substantial improvement over conventional traffic estimation methods. It improves accuracy, virtually eliminates overestimation, and is supported by substantial evidence. The established MXD method developed by Fehr & Peers for the US EPA, and continuously refined through consulting for other state, regional and local clients, is based on:

- Pooled household survey data for 239 MXDs in six diverse US regions.
- Equations on internal trip capture and mode share that were developed using regression statistical analysis of MXD variables that affect trip generation, such as population and employment density, number of bus stops, and other factors to determine a statistically significant model. Additional detail on the variables included in the MXD+ model are summarized in Getting Trip Generation Right.
- Validation at 27 existing MXD sites across the US, including mixed-use developments in California, Georgia, Florida, Texas, and Georgia. The mixed-use sites ranged from transit-oriented developments, to suburban mixed-use retail centers.
- Peer reviews.

MXD+ 2.0 accounts for 97% of the statistical variation in trip generation among the 27 validation sites, compared to 65% for the ITE Handbook. It also all but eliminates the Handbook's systematic overestimation of traffic, found to be 35% for the validation sites. MXD+ 2.0 reduces the overestimation to 4%, meaning that the MXD model still slightly overestimates trip generation relative to the actual counted trip generation of the validation sites so still represents a conservative assessment of potential traffic generated by the project.

The model starts with ITE trip generation rates for each individual land use, but through the statistical processes of the model, calibrates the ITE rates to reflect the site specific and area contexts of the Project, including its mixture of uses, site and area demographics, accessibility to other land uses, such as adjacent residential development, availability of transit service, pedestrian connectivity, and other factors. The model calibrates ITE rates based on these factors to provide a much more accurate estimate of external project trip generation than the application of ITE trip rates alone. Project trip generation estimates are included in **Table 5**. As shown in **Table 5**, the Project would generate more than 110 net new daily trips, meaning it cannot be screened from requiring a VMT analysis based on the ‘Project Size’ screening criterion. Importantly, ITE trip generation rates for the Project land uses are used only for the VMT screening analysis per the City’s requirements and are not used for the analysis of VMT generated by the Project. This is because the methodology employed by the City to estimate VMT Citywide and per TAZ relies on the SCAG RTP model, so the trip generation rates for the VMT analysis should use the model rates for internal consistency. Using ITE trip generation estimates to calculate the VMT generated by the Project would significantly overestimate the Project’s VMT.

TABLE 5
CATALINA VILLAGE PROJECT
VEHICLE TRIP GENERATION ESTIMATES

			Trip Generation Rates [a]							Estimated Trip Generation						
				AM Peak Hour			PM Peak Hour				AM Peak Hour Trips			PM Peak Hour Trips		
Land Use	ITE Land Use Code	Size	Daily	Rate	In%	Out%	Rate	In%	Out%	Daily	In	Out	Total	In	Out	Total
PROPOSED PROJECT																
Multifamily Residential (Low-Rise)	220	26 DU	7.32	0.46	23%	77%	0.56	63%	37%	190	3	9	12	9	6	15
Multifamfily Residential (Affordable)	[b]	4 DU	4.16	0.52	38%	62%	0.38	55%	45%	17	1	1	2	1	1	2
Coffee Shop [c]	936	1.784 ksf	364.35	101.14	51%	49%	36.31	50%	50%	650	92	88	180	33	32	65
Internal Capture [d]			*1%*		*3%*	*3%*		*6%*	*6%*	(6)	(3)	(3)	(6)	(2)	(2)	(4)
Walk/Bike [e]			*37%*		*40%*	*40%*		*29%*	*29%*	(242)	(37)	(36)	(73)	(10)	(9)	(19)
Net External Coffee Shop										402	52	49	101	21	21	42
Tasting Room [f]	925	1.279 ksf	155.30	-	-	-	11.36	66%	34%	199	0	0	0	10	5	15
Internal Capture [d]			*1%*					*6%*	*6%*	(2)	0	0	0	(1)	0	(1)
Walk/Bike [d]			*37%*					*29%*	*29%*	(74)	0	0	0	(3)	(1)	(4)
Net External Tasting Room										123	0	0	0	6	4	10
Total External Vehicle Trips										*732*	*56*	*59*	*115*	*38*	*32*	*69*
EXISTING USE CREDIT																
General Office	710	1.3 ksf	9.74	1.16	86%	14%	1.15	16%	84%	(13)	(2)	0	(2)	0	(1)	(1)
Commercial Retail	820	8.3 ksf	37.75	0.94	62%	38%	3.81	48%	52%	(313)	(5)	(3)	(8)	(15)	(17)	(32)
Internal Capture [d]			*1%*		*3%*	*3%*		*6%*	*6%*	3	0	0	0	1	1	2
Walk/Bike [e]			*37%*		*40%*	*40%*		*29%*	*29%*	116	2	1	3	4	5	9
Net Commercial Retail										(194)	(3)	(2)	(5)	(10)	(11)	(21)
Total Existing Use Credit										*(207)*	*(5)*	*(2)*	*(7)*	*(10)*	*(12)*	*(22)*
NET EXTERNAL VEHICLE TRIPS										525	51	57	108	27	20	47

Notes:

[a] Source: Institute of Transportation Engineers (ITE), *Trip Generation, 10th Edition* , 2017. Unless otherwise notes, all rates are Peak Hour of Adjacent Street Traffic.

[b] Source: City of Los Angeles' Local Affordable Housing Trip Generation Study (see Appendix B).

[c] The number of daily trips was estimated to be 10 times greater than the total PM peak hour trips.

[d] Internal capture represents the percentage of trips between land uses that occur within the site. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[e] The Walk/Bike credit includes non-auto trips from the surrounding neighborhood. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[f] The number of daily trips was estimated to be 10 times greater than the total PM Peak Hour trips based on the PM Peak Hour of the Generator rate (15.53 trips/ksf).

4.2.1.2 Locally Serving Retail & Low VMT Area

With regard to the 'Locally Serving Retail' criterion, the Project's commercial uses meet the definition of locally serving retail and total less than 10,000 square feet, meaning the commercial component of the Project may potentially be screened from VMT analysis. However, based on Fehr & Peers' estimation of existing VMT for the SBCCOG, the City of Redondo Beach, and the TAZ in which the Project is located (as described above), the results indicate that the Project TAZ's Home-Based VMT per Capita and Home-Based Work VMT per Employee are not 16.8% or more below the SBCCOG baseline VMT, as shown in **Table 6** below, meaning the 'Low VMT Area' screening criterion is not met. Because the residential component of the Project does not meet any of the screening criteria listed in **Table 4**, the full Project is required to complete a VMT analysis.

Table 6 – Low VMT Screening Analysis Results

Efficiency Metric	Project TAZ (2016)	SBCCOG (2016)	Percent Difference	Screened?
Home-Based VMT per Capita	11.5	13.3	-13.5%	**No**
Home-Based Work VMT per Employee	15.5	18.4	-15.7%	**No**

4.3 Vehicle Miles Traveled Impact Analysis

Because the Project does not meet the City's screening criteria, a full VMT analysis is required for both the residential and commercial components of the Project. The sections below describe the analysis that was conducted for each component and present the results. The residential component of the Project was analyzed using the metric of Home-based VMT per Capita, and the commercial components of the Project were analyzed using the metric of Home-based Work VMT per Employee.

Project VMT Analysis – Residential

This section presents the methodology for calculating Home-Based VMT per Capita for the Project. The 2016 SCAG RTP model was used as the basis for the information and analysis, with supplemental data derived from the 2010 California Household Travel Survey (CHTS) and the U.S. Census Bureau's 2014-2018 American Community Survey Five Year Estimates.

The following steps were undertaken to develop the Project-generated Home-Based VMT per Capita.

Step 1 – Develop a Bedrooms Per Dwelling Unit Equivalency Factor

According to data from the U.S. Census Bureau, 3 bedrooms per dwelling unit is the average for all multifamily developments in Redondo Beach. However, the Project would provide a total of 124 bedrooms spread across 30 dwelling units, yielding an average of 4.1 bedrooms per dwelling unit. Considering this, analyzing the Project as proposed could underestimate the total VMT generated by the Project if each unit ultimately has more residents than is typical due to the number of bedrooms in each unit. While the number of bedrooms may not ultimately lead to more residents, as extra bedrooms could be used as home offices, guest bedrooms, or other uses, a bedrooms per dwelling unit equivalency factor was developed to ensure that the VMT estimates do not underestimate the potential for a significant VMT impact.

The equivalency factor was developed by dividing the total number of bedrooms provided by the Project (n=124) by the average number of bedrooms per dwelling unit in Redondo Beach (n=3) and rounding to the nearest whole number, yielding a total of 42 dwelling units. This adjusted total of 42 dwelling units was used to analyze the Project's Home-Based VMT per Capita.

Step 2 – Determine Average Person Trip Rates from the SCAG Model

To be consistent with the methodology used for developing the City's residential VMT threshold, Fehr & Peers used the 2016 SCAG RTP model average person trip rate for multifamily residential land uses. The TAZ that contains the Project is an outlier for residential trip rate compared with the rest of the City. Fehr & Peers determined that relying solely on the existing person trip rate for the TAZ in which the Project is located may underestimate the Project's VMT. To account for this and provide a conservative analysis, Fehr & Peers identified the person trip rate for 23 TAZs in the City of Redondo Beach whose land use characteristics are primarily multifamily residential in nature. The person trip rates for these TAZs were averaged to yield a home-based production person trip rate of 2.6 daily trips per capita, which is the rate that was used to analyze the market rate dwelling units proposed by the Project. As mentioned previously, the methodology used by the City to calculate existing VMT Citywide and per TAZ does not rely on ITE trip generation rates, and as such, applying ITE rates in the analysis of the Project's VMT would significantly overestimate the Project's VMT. Because of this, the 2016 SCAG RTP model was used to estimate the person trip rate.

It should be noted that 4 of the Project's proposed 30 dwelling units, or 13%, will be provided at below-market-rate. The affordable portion of the project will generate new VMT. However, affordable units tend to have lower VMT generation rates than market rate units in the Project, and for that reason, 100% affordable housing projects are a use that OPR's *Technical Advisory* indicates can defensibly be screened and presumed to be less than significant for the purposes of VMT impact analysis. However, since the Project is not 100% affordable, this portion cannot be screened, but the reduction in VMT that can be found with affordable units can be accounted for in the VMT impact analysis if there is substantial evidence supporting the difference.

While the City of Redondo Beach has not conducted any local trip generation studies that could substantiate a difference in trip generation and VMT for affordable housing, Fehr & Peers conducted such a study in the City of Los Angeles in 2016 and found that affordable housing developments that predominantly serve families generated an average of 4.16 trips per dwelling unit per day, compared to the ITE rate of 7.32 trips per dwelling unit per day that is used for comparable market rate developments (ITE 220). Table 2 of **Appendix B** presents the results of the trip generation study conducted in the City of Los Angeles.

Based on the empirical data from the City of Los Angeles, the home-based production person trip rate for the Project's affordable units was estimated to be 1.48 daily trips per capita. Considering that 13% of the Project's dwelling units would be provided at below-market-rate, this percentage was applied to the bedroom equivalency adjusted total of 42 dwelling units to yield 5 affordable units.

To estimate the number of residents that would occupy the proposed Project, Fehr & Peers multiplied the bedroom equivalency adjusted number of dwelling units (37 market rate units and 5 affordable units) by the Redondo Beach average household size of 2.4, which was obtained from the U.S. Census Bureau. This yields a total Project population of 101 residents.

The land use and trip generation characteristics where the empirical data described in **Appendix B** were collected may be different than the land use and trip generation characteristics in the vicinity of the Project. While ITE has recently published trip generation rates for affordable housing, only peak hour rates are currently available, and all of the analysis presented in this report relies on daily rates. As such, the data provided in **Appendix B** is the best data currently available for estimating the VMT generated by affordable housing units.

Step 3 – Average Person Trip Rate to Vehicle Trips Conversion

Before conducting the VMT calculations, person trips need to be converted into vehicle trips. Average mode splits for the City of Redondo Beach were obtained from the 2016 SCAG RTP model, and average vehicle occupancy (AVO) for all home-based trips in Redondo Beach was obtained from the 2010 CHTS[2] because AVO estimates are not available directly from the SCAG model and the CHTS data are statistically significant survey data for the City of Redondo Beach. For home-based (residential) trips, 43% of trips were assumed to occur in vehicles occupied by one person and 40% in vehicles occupied by an average of 2.5 people. The remaining 17% of trips would take place using alternative modes such as walking, biking, or transit, and are not expected to generate VMT.[3]

Step 4 – Estimate Trip Length

Trip length was estimated using data from the 2016 SCAG RTP model. The travel model has the ability to produce average trip lengths for each TAZ in the City of Redondo Beach. To maintain consistency with the methodology that was used to estimate the person trip rate described above in Step 2, the average trip lengths for home-based productions for the 23 Redondo Beach TAZs that were used in Step 2 were averaged to yield a home-based production trip length of 10.0, which is the trip length that was used to analyze all of the dwelling units proposed by the Project.

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[2] The 2010 CHTS is the most recent statewide household travel survey available.

[3] The OPR *Technical Advisory* only recommends analyzing the VMT generated by private automobiles. As such, this analysis does not account for VMT generated from other sources including transit vehicles, delivery vehicles, or others.

Step 5 – VMT Calculation

The final step to calculate VMT is to multiply the number of vehicle trips by the average trip length of those trips. The results are presented in **Table 7** below and are compared against the SBCCOG significance threshold for Home-Based VMT per Capita of 11.1 shown in **Table 2**.

Table 7 – Home-Based VMT per Capita Calculation

Dwelling Unit Type	Population	Mode Split (SOV)	Mode Split (HOV)	Average Vehicle Occupancy (HOV)	Trip Length (Miles)	Person Trip Rate	VMT per Capita	Impact Threshold	Impact?
Market Rate	89	43%	40%	2.5	10.0	2.60	-	-	-
Affordable	12					1.48			
Total	101					-	**14.6**	***11.1***	**YES**

Project VMT Analysis – Commercial

The Project's commercial uses total approximately 3,000 square feet in size, and the Project applicant expects that a total of 3 full-time employees will be employed by the Project's commercial uses. Considering this, Fehr & Peers determined that Home-Based Work VMT per Employee for the Project's commercial uses is not likely to differ significantly from the average Home-Based Work VMT per Employee for the TAZ in which the Project is located. As such, the Project's Home-Based Work VMT per Employee was estimated to be equivalent to Work VMT for the Project TAZ. **Table 8** compares the average Home-Based Work VMT per Employee for the Project TAZ to the City's significance threshold.

Table 8 – Project Home-Based Work VMT per Employee

Efficiency Metric	Project TAZ (2016)	Impact Threshold	Impact?
Home-Based Work VMT per Employee	**15.5**	***15.3***	**Yes**

4.3.1 Mitigation Options

As shown in **Tables 7 & 8** above, the Project would exceed the City's VMT/Capita and VMT/Employee thresholds of 11.1 and 15.3, respectively. These are considered to be significant impacts under CEQA.

Mitigations for VMT impacts take the form of transportation demand management (TDM) measures that result in shorter average trip lengths and/or reduce the demand for automobile trips altogether. In order to mitigate the Project's residential VMT impact, Home-Based VMT per Capita would need to be reduced by approximately 24%. To mitigate the Project's work VMT impact, Home-Based Work VMT per Employee would need to be reduced by approximately 1.3%. In order to achieve these reductions, a range of TDM measures were considered for the Project, including the following:

- Transit subsidies for Project residents
- Pedestrian-oriented Project design (affects residential & commercial VMT)
- Commuter Incentives for Project employees valued at $150 per month
- Commute marketing program (affects residential & commercial VMT)
- Bikeshare System and subsidies (affects residential & commercial VMT)
- Local hire considerations

The effect of combining these TDM measures would result in a reduction of VMT for both the residential and commercial components of the Project. However, no combination of the aforementioned measures would be sufficient to mitigate the Project's Home-Based VMT per Capita impact, meaning this impact is significant and unavoidable. With respect to the Project's Home-Based Work VMT per Employee impact, the inclusion of local hire considerations coupled with incentives, monitoring, and enforcement for the hiring of individuals living within approximately 10 miles of the Project site would be sufficient to mitigate the work VMT impact, which means that commuter incentives would not be required if local hire considerations are implemented. While the details and structure of this approach are to be finalized, the underlying approach would include developing a framework for determining the site's average home-based work VMT per employee. Through a combination of incentives for local hiring and conditions of approval requiring regular monitoring of the site's average home-based work VMT per employee based on employee residential location and commute distance. By monitoring the residential location of residents to understand the length of employee commutes and the proportion of employees residing within certain distances from the project, it is possible to calculate the average employee commute trip length and determine whether it is within the identified employee VMT trip threshold of 15.3 VMT per employee trip.

In addition to the TDM strategies listed above, Fehr & Peers also evaluated strategies pertaining to parking, including reducing the Project's residential parking supply, and unbundling the residential parking and charging residents a separate fee to utilize the off-street parking provided by the Project. Reducing the Project's residential parking supply could result in up to an 11% reduction in residential VMT if the Project were to provide no parking. Unbundling the residential parking and charging residents a separate fee for its use could reduce residential VMT by up to 5.5%. While the combination of these strategies with the others that were evaluated would still not fully mitigate the Project's residential VMT impact, it should be noted that the City of Redondo Beach has concerns about the potential secondary effects of these strategies on neighborhood quality of life, as disincentivizing parking on-site may increase demand for scarce on-street parking, which may increase neighborhood traffic congestion. Additionally, the City has determined that reducing the Project's residential parking supply is infeasible as it may compromise the Project's financial viability. **Table 9** summarizes the combined effect of the TDM measures that were evaluated for the residential component of the Project.

Table 9 – Residential VMT Mitigation Measures

TDM Measure	VMT Reduction
Unbundled Parking	-5.5%
Transit Subsidy (100%)	-0.4%
Commute Marketing Program	-3.2%
Pedestrian-Oriented Design	-0.1%
Bikeshare System & Subsidies[a]	0.0%
Total VMT Reduction	**-9.0%**
Residential VMT Reduction[b]	**-7.2%**
Required Residential VMT Reduction	**-24%**

[a] Although bikeshare was evaluated as a potential mitigation strategy, the available research literature does not support the application of bikeshare for the mitigation of residential VMT impacts under CEQA.

[b] It is assumed for the purposes of calculating the residential VMT reduction that residents generate 80% of the VMT attributable to the residential component of the project and visitors generate 20% of the VMT. Because of this, the residential VMT reduction is 80% of the total VMT reduction.

4.4 Project Alternatives - Vehicle Miles Traveled Analysis

Three alternatives to the proposed Project were identified by the City of Redondo Beach for VMT analysis. The following sections describe each alternative and present the results of the VMT analyses that were conducted. Because the alternatives described below do not differ meaningfully from the proposed Project in terms of their design characteristics, they would not be expected to have significant impacts pursuant to Appendix G Criterion 1 (PPOP), Criterion 3 (Geometric Hazards), or Criterion 4 (Emergency Access) as described in Chapter 3.

4.4.1 Alternative 1 – No Build

Under Alternative 1, the proposed Project would not be constructed. As such, the existing residential and work VMT in the TAZ in which the Project would be located would not change. This alternative would not have any significant impacts under CEQA.

4.4.2 Alternative 2 – By-Right Density

Under Alternative 2, the Project's commercial square footage would remain unchanged, but only 22 residential units would be constructed, which is what is allowed by right per the City of Redondo Beach Municipal Code. To analyze this alternative, Fehr & Peers assumed that the same percentage of the total dwelling units would be offered at below-market rate (13%) as in the proposed Project. Additionally, Fehr & Peers carried forward the same assumptions that were applied to the analysis of Home-Based VMT per Capita for the proposed Project regarding the person trip rates for market rate and affordable housing, average household size, mode split, average vehicle occupancy, and trip length. **Table 10** shows the calculation of Home-Based VMT per Capita for Alternative 2.

Table 10 – Home-Based VMT per Capita Calculation for Alternative 2

Dwelling Unit Type	Population	Mode Split (SOV)	Mode Split (HOV)	Average Vehicle Occupancy	Trip Length (Miles)	Person Trip Rate	VMT per Capita	Impact Threshold	Impact?
Market Rate	65	43%	40%	2.5	10.0	2.60	-	-	-
Affordable	10					1.48			
Total	75					-	**14.5**	***11.1***	**YES**

Because Alternative 2 provides fewer dwelling units than the proposed Project, it would also generate less total VMT in comparison. However, the ratio of Home-Based VMT per Capita for Alternative 2 is effectively the same as that of the Project, meaning that Alternative 2 would have a significant residential VMT impact requiring a reduction of approximately 24%. As described previously, no combination of the TDM measures that were identified for the proposed Project would be sufficient to mitigate the Home-Based VMT per Capita impact for Alternative 2, meaning this impact is significant and unavoidable. Like the mitigation analysis for the proposed Project, parking strategies were not included in the mitigation analysis for Alternative 2, although their inclusion would still not fully mitigate the residential VMT impact.

Because Alternative 2 would not alter the proposed Project's commercial square footage, the Home-Based Work VMT per Employee for Alternative 2 would be the same as that of the proposed Project shown in **Table 8**. As such, the inclusion of local hire considerations coupled with incentives, monitoring, and enforcement for the hiring of individuals living within approximately 10 miles of the Project site would be sufficient to mitigate the work VMT impact under Alternative 2.

4.4.3 Alternative 3 – Increased Affordable Housing

Under Alternative 3, the Project's commercial square footage would remain unchanged, and, like the proposed Project, 30 dwelling units would be constructed. However, in contrast to the proposed Project, under Alternative 3 approximately 52% of the dwelling units would be offered at below-market-rate. To analyze this alternative, Fehr & Peers carried forward the same assumptions that were applied to the analysis of Home-Based VMT per Capita for the proposed Project regarding the person trip rates for market rate and affordable housing, average household size, mode split, average vehicle occupancy, and trip length. **Table 11** shows the calculation of Home-Based VMT per Capita for Alternative 3.

Table 11 – Home-Based VMT per Capita Calculation for Alternative 3

Dwelling Unit Type	Population	Mode Split (SOV)	Mode Split (HOV)	Average Vehicle Occupancy	Trip Length (Miles)	Person Trip Rate	VMT per Capita	Impact Threshold	Impact?
Market Rate	48	43%	40%	2.5	10.0	2.60	-	-	-
Affordable	53					1.48			
Total	101					-	**11.9**	***11.1***	**YES**

Because Alternative 3 provides the same number of total dwelling units as the proposed Project but provides more affordable housing, it would house the same number of residents while also generating less total VMT, which reduces the ratio of Home-Based VMT per Capita for Alternative 3 to 11.9. While this constitutes a significant impact, the required VMT reduction of 6.7% can be achieved if all of the TDM measures presented in **Table 9** are implemented, meaning the impact can be fully mitigated.

Because Alternative 3 would not alter the proposed Project's commercial square footage, the Home-Based Work VMT per Employee for Alternative 3 would be the same as that of the proposed Project shown in **Table 8**. As such, the inclusion of local hire considerations coupled with incentives, monitoring, and enforcement for the hiring of individuals living within approximately 10 miles of the Project site would be sufficient to mitigate the work VMT impact under Alternative 3.

4.5 Criterion 3: Geometric Design Hazards Impact Review

Impacts regarding the potential increase of hazards due to a geometric design feature generally relate to the design of access points to and from the Project site. Impacts can be related to vehicle/vehicle, vehicle/bicycle, or vehicle/pedestrian conflicts as well as to operational delays caused by vehicles slowing and/or queuing to access a project site. These conflicts may be created by the driveway configuration or through the placement of project driveway(s) in areas of inadequate visibility, adjacent to bicycle or pedestrian facilities, or too close to busy or congested intersections. These impacts are typically evaluated for permanent conditions after project completion but can also be evaluated for temporary conditions during project construction.

As shown in the Project site plan in **Figure 1**, the Project is not adding any additional driveways or curb cuts, and the driveways are perpendicular to the public right-of-way and adequately spaced from existing signalized intersections. Additionally, the Project does not introduce incompatible uses with the surrounding community. Based on the collision history detailed above, collisions are relatively infrequent adjacent to the Project site. Therefore, the Project is not expected to trigger significant impacts for this criterion.

4.6 Criterion 4: Emergency Access Impact Review

The Project is expected to increase the number of vehicles on the road during the AM and PM peak hours compared with existing conditions, as detailed above and shown in **Table 5**. While these typical commute periods are when traffic congestion is at its highest within the City of Redondo Beach, the Project's effect on response times would largely depend on the congestion level where the Project would be adding the most trips. The intersections along Catalina Avenue generally operate with less congestion, and these are the areas where the Project would add the most trips, so the Project is expected to have a negligible effect on response times. The Project would retain the existing driveways on Catalina Avenue and would widen the southernmost driveway, which would effectively provide two points of ingress and egress for emergency vehicles should they need to access the site. The Project is also located approximately ¼ mile from Redondo Beach Fire Station 2. Therefore, the Project is expected to have a less than significant impact in regard to provision of emergency access and no mitigation is required.

5. Summary

This study was prepared to analyze the potential transportation impacts associated with the Catalina Village Project. The following summarizes the results of the study:

- The Project involves the construction of 30 three-story mixed income apartment units and would preserve and retrofit approximately 3,000 square feet of commercial retail buildings, replacing the existing commercial uses on the site with a 1,784 square foot coffee shop and a 1,279 square foot beer tasting room. Site access would be provided via two driveways on Catalina Avenue, and the Project would provide 77 parking stalls, with an additional 7 parking spaces available on-street in front of the commercial retail uses.

- The Project is consistent with both the SCAG 2016 RTP/SCS, the South Bay Bicycle Master Plan, the City of Redondo Beach General Plan, and the City of Redondo Beach Harbor/Civic Center Specific Plan and so is not expected to have a significant impact related to Programs, Plans, Ordinances, and Policies Consistency.

- The Project does not meet the project size or low VMT area screening criteria provided by OPR. While the Project's commercial component does meet the locally serving retail screening criteria, City of Redondo Beach guidance indicates that if either component of the Project fails to meet screening criteria, the full Project must complete a VMT analysis. As such, the Project's VMT was evaluated using the 2016 SCAG RTP model and the VMT efficiency metrics of Home-Based VMT per Capita for the residential component and Home-Based Work VMT per Employee for the commercial component.

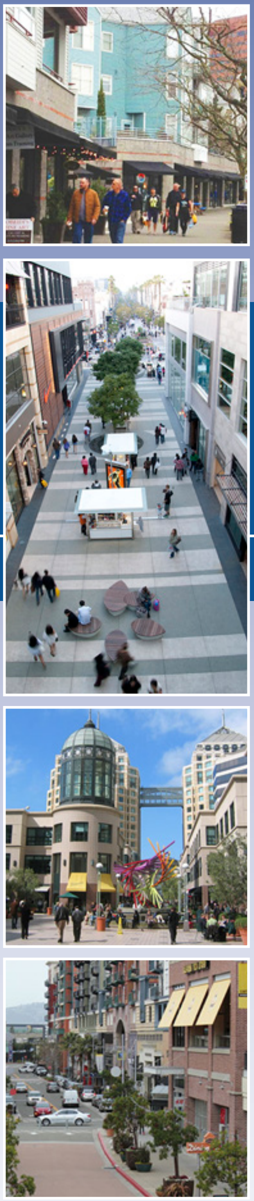
- Based on the results of the VMT methodologies presented in this report, the Project will result in significant impacts for both Home-Based VMT per Capita and Home-Based Work VMT per Employee.

- Based on the study of applicable mitigation measures, the Project was determined to have a significant and unavoidable Home-Based VMT per Capita impact. However, it was determined that the Project's Home-Based Work VMT per Employee impact could be mitigated below a level of significance pending the City's acceptance and review of local hire considerations.

- Three project alternatives were analyzed using the VMT methodologies presented in this report. Under Alternative 1, the proposed Project would not be constructed, and as such, the alternative would not have any significant impacts under CEQA. Under Alternative 2, the Project's commercial square footage would remain unchanged while the number of residential units proposed by the Project would be reduced to 22 dwelling units, which is what is allowed by right under the City's municipal code. This alternative would result in significant impacts for both Home-Based VMT per Capita and Home-Based Work VMT per Employee. While the Home-Based VMT per Capita impact would be significant and unavoidable, it was determined that the Project's Home-Based Work VMT per Employee impact could be mitigated below a level of significance pending the City's acceptance and review of local hire considerations. Under Alternative 3, the Project's commercial square footage would remain unchanged, and, like the proposed Project, 30 dwelling units would be constructed. However, in contrast to the proposed Project, under Alternative 3 approximately 52% of the dwelling units would be offered at below-market-rate. This alternative would result in significant impacts for Home-Based VMT per Capita and Home-Based Work VMT per Employee. It was determined that the Project's Home-Based VMT per Capita impact could be mitigated below a level of significance using the combination of TDM measures shown in **Table 9**, and the Home-Based Work VMT per Employee impact could be mitigated below a level of significance pending the City's acceptance and review of local hire considerations.

- The Project is not expected to have a significant impact related to geometric hazards or emergency response.

Appendix A – MXD Model Documentation



GETTING TRIP GENERATION RIGHT

Eliminating the Bias Against Mixed Use Development

By Jerry Walters, Brian Bochner, and Reid Ewing

APA

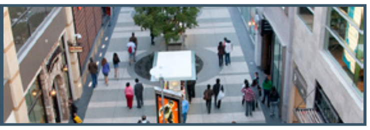
American Planning Association

Making Great Communities Happen

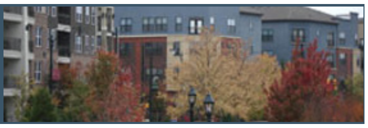
Originally published as a PAS Memo by the American Planning Association (APA) in May 2013. PAS Memo is a bimonthly online publication of APA's Planning Advisory Service, a subscription service providing its members with the latest planning resources and customized research assistance. Learn more at ***www.planning.org/pas/about/.***

Photos in document courtesy of Fehr & Peers.

TABLE OF CONTENTS






Introduction 4

The Problem with Conventional Traffic Impact Analysis 5

New Research Evidence for Mixed Use Development Trip Generation 7

New Models for Mixed Use Development Traffic Analysis 9

A New Approach: The MXD+ Method 12

Recommendations for Planners 16

Conclusion 17

When planners, developers, or traffic engineers conduct traffic impact analyses for proposed developments, they typically use the trip-generation data and analysis methods published by the Institute of Transportation Engineers (ITE) in its *Trip Generation* report and *Trip Generation Handbook*. However, standard traffic engineering practice does not account for project characteristics such as the mix and balance of land uses, compactness of design, neighborhood connectivity and walkability, infill versus remote location, and the variety of transportation choices offered. This can have significant implications when the project in question is a mixed use development.

The conventional methods used by traffic engineers throughout the U.S. to evaluate traffic impacts fail to account for the benefits of mixed use and other forms of lower-impact development. They exaggerate estimates of impacts and result in excessive development costs, skewed public perceptions, and decision maker resistance. These techniques overlook the full potential for internalizing trips through interaction among on-site activities and the extent to which development with a variety of nearby complementary destinations and high-quality transit access will produce less traffic. These effects can reduce the number of vehicle trips generated to a far greater degree than recognized in standard traffic engineering practice.

The ITE trip-generation data and analysis methods apply primarily to single-use and freestanding sites, which limits their applicability to compact, mixed-use, transit oriented developments (ITE 2004, 2012). The *Handbook* does include an approach based on limited data on mixed use developments, but only from six sites in Florida, not nearly enough to cover today's diverse mixed use developments across the United States.

It is important that planners and developers recognize the implications of using standard ITE trip generation data and methodologies for mixed use developments and use methods that more accurately estimate traffic generated by these projects. Commonly used methods unjustifiably favor types of development that consume greater resources and generate greater impacts, shifting our attention away from development forms and locations that stimulate higher levels of social interaction and benefit to established communities.

Researchers have attempted to analyze how a mix of uses in a compact, walkable project design affects trip generation and on-the-ground traffic impacts. In 2011, two major studies introduced methodologies for predicting traffic generation from mixed use development. The researchers on those studies have now collaborated to combine the advantages of both and provide, in this *PAS Memo*, an even more complete and reliable approach to measuring the benefits of such forms of development. Using this new approach, planners conducting trip-generation analysis for mixed use development projects will produce more accurate forecasts of traffic generation, which will allow more appropriate on-site design features and off-site mitigation measures.

The Problem with Conventional Traffic Impact Analysis

Traffic analysis is intended to inform planners, community members, and public officials of the most suitable planning features and infrastructure elements needed to support new development. However, the conventional methods were developed during an era when most new development was single use, stand alone, highway oriented, and suburban. Standard practices ascribe similar levels of impact to mixed-use, integrated, transit-oriented, and infill development, and consequently overlook the benefits of — and impose unreasonable obstacles to — appropriate planning and approval of such "smart growth" forms.

The standard analytic process used for planning, design, and impact analysis does not account for the degree to which well-designed mixed use development places shops, restaurants, offices, and residences in close proximity to one another, shortening internal trips between them and making more trips conducive to walking, biking, or riding transit. Such reductions in traffic and vehicle miles traveled reduce fuel consumption, greenhouse-gas and other emissions, and exposure of residents to passing traffic and the related threats to comfort, health, and safety. Reduced vehicular travel can also lessen the need to construct new or wider streets and highways, allowing communities to economize on infrastructure. Mixed use developments (MXD) also create opportunities for shared parking, which can reduce the number of spaces needed in parking lot and garage construction.

Traffic-Reducing Attributes of Mixed Use Development

Many of the attributes of lower-impact development can reduce traffic generation compared with conventional single-use suburban development forms:

Diverse land uses and activities can fill basic needs nearby, thereby reducing automobile travel. They allow for linkage of trips in multipurpose trip chains, with a single auto trip to an activity center followed by several short trips on foot. Mixed use sites also create the opportunity for shared parking, which in turn encourages multipurpose trips and reduces the tendency to make separate automobile trips from one destination to the next.

Higher densities and intensities of development provide opportunities for residents, employees, and visitors to circulate among larger numbers of businesses and activities by walking, bicycling, or making short trips by automobile. Higher concentrations of land use also support higher quality and higher-frequency transit service, offering tenants and visitors a viable alternative to driving. High land values and cost to provide parking also leads to higher parking prices, a disincentive to driving versus other available modes of travel.

Walkable urban design and interconnected streets generally reduce the perceived and real separation among destinations, encourage walking and cycling, and reduce the circuitousness and length of each trip.

Short distances to transit help make transit a viable alternative to the automobile and can create activity centers with sufficient street life, amenities, and walking connections where needs and entertainment can be accomplished without independent car trips.

Accessibility to complementary destinations outside the development reduces distances between jobs and housing, services and entertainment, and recreation, often making automobile travel unnecessary. Placed at infill locations, complementary new development that satisfies local needs can also reduce trip making by residents, employees, and shoppers in the surrounding community.

Socio-demographic compatibility can further reduce auto traffic to the extent that developments are designed to attract and accommodate residents with low auto ownership (through, for example, parking supply limits), low travel needs (based on, for example, family size,

fewer employed residents, lower income, or age range), or close affiliation with other project elements or surrounding land uses (linked, or simply compatible, jobs and residents).

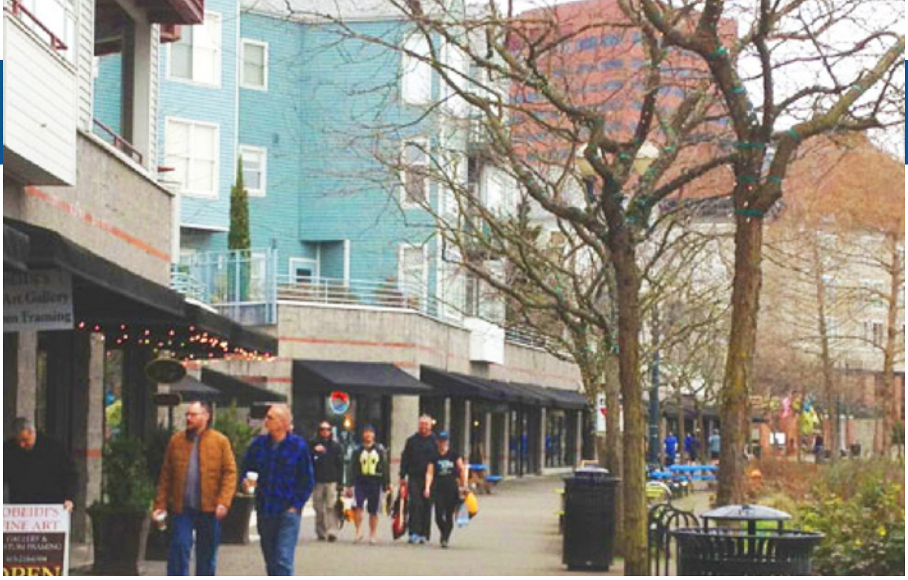
Scale of development affects feasibility for communities and employers to provide travel demand options and management services that can shift traveler modes from the auto to alternative modes of travel. Residents and businesses that self-select into such sites and settings are also often more amenable to travelling less or using alternatives to the automobile. Transportation demand management (TDM) programs are both more likely to be available and more likely to be successful in compact, central, transit-supported settings.

The danger of using traditional traffic-generation data based on single-use facilities is that it misrepresents the true traffic generation impacts of mixed use development. The consequences of miscalculating the benefits of mixed-use development may include unreasonable development cost, exaggerated impacts and mitigation responsibilities, skewed public perceptions, and decision maker resistance. This penalizes mixed use development proposals, often tipping the balance in favor of projects that offer fewer benefits and ultimately generate higher impacts. Denying "smart" forms of development does not reduce the overall market demand for housing and business, so the building disallowed ends up in other locations within the region, often in less accessible locations, at lower densities, and in less-mixed use configurations. The end result can be more traffic and higher regional vehicle-miles traveled than had the smart-growth development been approved.

Understandably, communities and public reviewers want to minimize the risk of unmitigated impacts. However, doing so through the application of overly conservative project evaluation criteria undermines the pursuit of other community values, such as vibrant neighborhoods with integrated development and activities that minimize the need to travel and the impacts produced by excessive unnecessary use of the automobile.

Conservative traffic-generation estimates have supply-side impacts, affecting design and cost of streets and parking. Within constrained sites, over design of traffic elements can limit the space available for revenue-producing land uses and increase other development costs. Development fee programs also rely heavily on traffic-generation estimates from the ITE *Trip Generation Manual*; this can lead to setting excessively high fee rates on mixed use development. Unquestioning use of the ITE data can unreasonably jeopardize a MXD project's approval, financial feasibility, and design quality.

Mixed use sites can take many forms, but all offer a diversity of uses in walkable settings. Oakland City Center BART (left); RiverPlace, Portland, Oregon (opposite page).



New Research Evidence for Mixed Use Development Trip Generation

Several hundred studies over the past 20 years have confirmed that the built environment affects travel generation (Ewing and Cervero 2010). Development features associated with reduced trip rates include a series of "D" variables: density, diversity of uses, design of urban environment, distance from transit, destination accessibility, development scale, demographics of inhabitants, and demand management. In the past three years, research has examined more directly the relative influence of each factor and their interactions and has sought to corroborate the research results through field verification. Organizations such as the U.S. Environmental Protection Agency and the National Academy of Sciences Transportation Research Board have sponsored several of the more reputable studies on the subject.

The Eight "D" Variables

The most advanced research has confirmed that trip rate reductions are quantifiably associated with the attributes of mixed use development, defined in terms of these characteristics of urban development patterns:

Density: dwellings, jobs per acre. Higher densities shorten trip lengths, allow for more walking and biking, and support quality transit.

Diversity: mix of housing, jobs, retail. A diverse neighborhood allows for easier trip linking and shortens distances between trips. It also promotes higher levels of walking and biking and allows for shared parking.

Design: connectivity, walkability. Good design improves connectivity, encourages walking and biking, and reduces travel distance.

Destinations: regional accessibility. Destination accessibility links travel purposes, shortens trips, and offers transportation options.

Distance to Transit: rail proximity. Close proximity to transit encourages its use, along with trip-linking and walking, and often creates accessible walking environments.

Development Scale: residents, jobs. Appropriate development scale provides critical mass, increases local opportunities, and supports transit investment.

Demographics: household size, income. Mixed use development allows self-selection by households into settings with their preferred activities and travel modes, allows businesses to locate convenient to clients, and supports a socioeconomic "fit" among residents, businesses, and activities.

Demand Management: pricing, incentives. Demand management ties incentives to the urban environment and allows alignment of auto disincentives with available alternate modes. It takes advantage of critical mass of travel resulting from density, diversity, and design.

A growing body of evidence indicates that these factors, individually or together, quantifiably explain the number of vehicle trips and vehicle-miles traveled for a development project and for a region as a whole. Each of the D factors influences traffic generation through a variety of mechanisms. There are also important interactions, both synergistic and mutually dampening, among the D factors that call for sophisticated techniques when quantifying the travel generation effects of different combinations proposed in any project or plan.

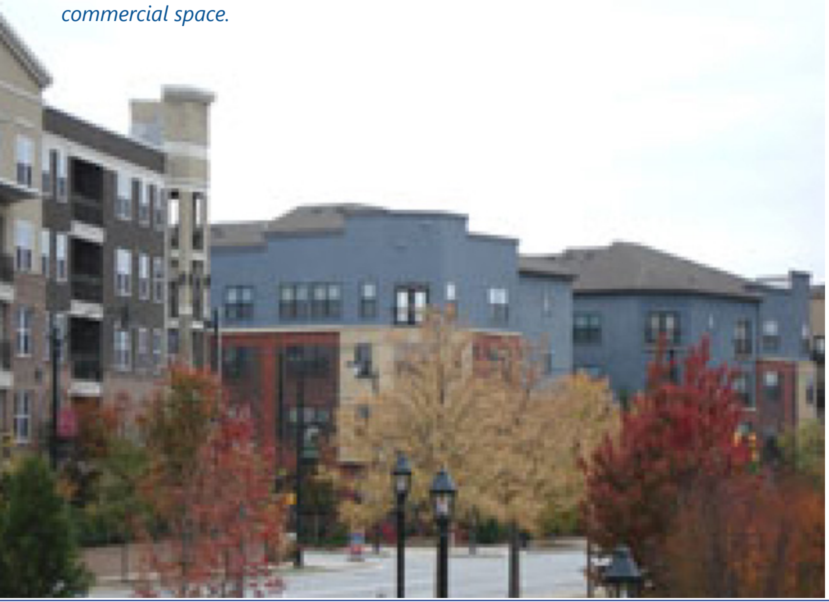
The Evidence that Conventional Methods Overstate MXD Impacts

Empirical evidence and research provides evidence that mixed-use, infill, and transit-oriented developments generate fewer external vehicle trips than equivalent stand-alone uses. A nationwide study sponsored by the U.S. EPA (Ewing et al. 2011) found statistical correlation between the D factors and increased trip internalization and increased walking and transit use. It further demonstrated, for 27 mixed-use development sites across the U.S., that:

1. On average, the sites' land uses would generate 49 percent more traffic if they were distributed among single-use sites in suburban settings, the situations to which the ITE *Trip Generation Manual* would apply.

2. The ITE *Handbook*, the current state-of-practice resource for estimating mixed use trip generation, would overestimate peak hour traffic by an average of 35 percent.

Atlantic Station offers residential units alongside walkable office and commercial space.



The following examples from recent studies demonstrate the degree by which such developments reduce traffic generation relative to what would be presumed under conventional traffic analysis methods.

Atlantic Station in Atlanta is a major mixed-use infill development located on a 138-acre former brownfield site in midtown Atlanta, connected by nonstop shuttle service to a MARTA metro rail station about a half-mile away. At the time it was studied, the development included 798 mid- and high-rise residential units, 550,600 square feet of office space, 434,500 square feet of retail space, a 101-room hotel, a restaurant, and a cinema.

For Atlantic Station, the "internal capture rate" (proportion of generated trips that remain internal to the site) is 15 percent in the morning peak hour and about 40 percent of evening peak-hour. Of the trips entering and leaving the site, between 5 and 7 percent use transit and another 5 to 7 percent walk or bicycle.

According to standard ITE trip-generation rates, were the Atlantic Station development elements located at single-use suburban sites, they would generate 37 percent more weekday traffic and 69 percent more PM peak traffic than actually counted at the centrally located, mixed use site.

RiverPlace in Portland is an award-winning mixed use waterfront development on a former brownfield within easy walking distance of downtown Portland, Oregon. Adjacent to the Tom McCall Waterfront Park, the site contains 700 residential units (condominiums and apartments), 40,000 square feet of office space, 26,500 square feet of small retail shops and restaurants, a 300-room hotel, and a marina, cinema, and athletic club. The waterfront walking environment conveniently links all of the activities within the development site and connects the site to the Portland central business district. Transit is also available at the site; the Portland Streetcar connects RiverPlace to downtown Portland and the greater Portland area.

RiverPlace (left) offers a mix of residential, office, and commercial uses on Portland's waterfront. Photo courtesy Fehr & Peers. Bay Street's walkable urban village (below) is designed on a Main Street theme.

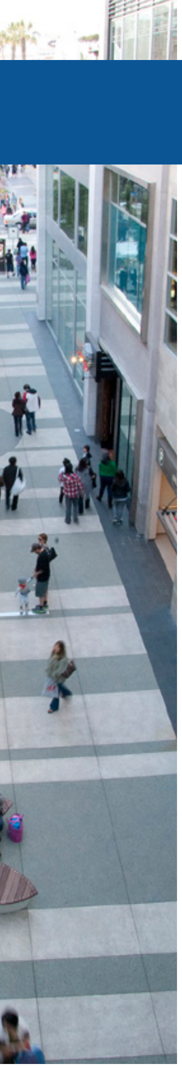
RiverPlace's internal capture rate is 36 percent. For internal and external trips combined, 40 percent are by walking and 5 percent by transit. These statistics are significantly higher than the regional averages of 15 percent of trips taken by walking and 2 percent by transit.

Bay Street in Emeryville is a vibrant, thriving recent redevelopment project in Emeryville, California, just outside San Francisco. The previously heavy-industrial area within and around Bay Street has undergone dramatic revitalization in the past two decades, and it now includes the headquarters of Pixar Studios and other businesses. Bay Street itself is a one-million-square-foot walkable urban village designed on a Main Street theme. It contains a major theater complex, hotel, and 382,000 square feet of fashionable retail shops (including an Apple Store) with 381 apartment units and offices above. The site is within walking distance of a Capitol Corridor commuter rail station and within a shuttle bus ride of BART metro rail.

Bay Street's daily traffic generation is about 41 percent less than the combined total that would be generated by similarly sized suburban shopping centers, theater complexes, residential uses, and office developments based on standard ITE trip rates for stand-alone land uses. It also generates 36 percent less daily traffic than would be estimated by traffic engineers applying the ITE *Handbook* and conventional analysis methods. In the PM peak hour, Bay Street traffic generation is 46 percent lower than would be generated by the same land uses scattered on individual suburban sites, and 41 percent lower than would be estimated by standard ITE traffic analysis.

New Models for Mixed Use Development Traffic Analysis

To address the shortcomings in conventional analysis methods, the National Cooperative Highway Research Program (NCHRP) and the U.S. EPA recently conducted significant research studies to improve quantification of the trip-reducing effects of mixed use development. Each study took a different approach: NCHRP undertook extensive visitor surveys and traffic counts at Atlantic Station and two mixed-use developments in Texas (Bochner et al. 2011), while EPA sponsored a nationwide study of more than 260 mixed use developments across the U.S. using regional travel survey data and verification traffic counts at a subset of the sites (Ewing et al. 2011). Using different analysis methods, each study developed a recommended approach to discounting traffic generation estimates to account for the mix of uses and other development characteristics. Each study represents a major advancement over conventional analysis methods.



NCHRP Report 684

National Cooperative Highway Research Program (NCHRP) Report 684, "Enhancing Internal Trip Capture Estimation for Mixed-Use Developments," analyzed internal-capture relationships of MXD sites and examined the travel interactions among six individual types of land uses: office, retail, restaurant, residential, cinema, and hotel. The study looked at three master-planned developments: Mockingbird Station, a single-block TOD in Dallas; Legacy Town Center, a multiblock district in suburban Plano, Texas, containing fully integrated and adjacent complementary uses; and Atlantic Station (see above). It compared the survey results to those found in prior ITE studies at three Florida sites, Boca del Mar, Country Isles, and Village Commons, all containing a variety of land uses, though in single-use pods.

Based on traveler and vehicle counts and interviews, the study ascertained interactions among the six land-use types of interest and compared them with site characteristics. It then examined the percentage of visitors to each land-use type who also visited each of the other uses during the same trip. The study considered site context factors and described percentage reductions in sitewide traffic generation that might result from the availability of transit service and other factors.

Researchers then performed verification tests by comparing the analysis results to those available from ITE for three earlier studies at Florida mixed use sites. The validation confirmed that the estimated values were a reasonable match for actual counted traffic. The product of the study is a series of tables and spreadsheets that balance and apply the discovered use-to-use visitation percentages to the land uses within the project site under study. The interaction percentages are then used to discount ITE trip-generation rates and to reduce what would otherwise represent the number of trips entering and leaving the entire site.

EPA MXD

The U.S. EPA–sponsored 2011 report, "Traffic Generated by Mixed-Use Developments — A Six-Region Study Using Consistent Built Environmental Measures," investigated trip generation, mode choice, and trip length for trips produced and attracted by mixed use developments. Researchers selected six regions — Atlanta, Boston, Houston, Portland, Sacramento, and Seattle — to represent a wide range of urban scale, form, and climatic conditions. Regional travel survey data with geographic coordinates and parcel-level detail available for these areas allowed researchers to isolate trips to, from, and within MXDs and relate travel choices to fine-grained characteristics of these developments.

In each region, researchers worked with local planners and traffic engineers to identify a total of 239 MXDs that met the ITE definition of multi-use development. The MXDs ranged from compact infill sites near regional cores to low-rise freeway-oriented developments. They varied in size, population and employment densities, mixes of jobs and housing, presence or absence of transit, and locations within their regions. In total, the MXD sample for the six regions provided survey data on almost 36,000 trips.

The analysis found that one or more variables in each of seven D categories (see above) were statistically significant predictors of internal capture, external walking, external transit use, and external private vehicle trip length. Specifically, an MXD's external traffic generation was related to population and employment within the site (density); the relative balance of jobs and housing within the site and the amount of employment within 1 mile of the site (diversity); the density of intersections within the site as a measure of street connectivity (design); the presence of bus stops within a quarter mile or the presence of a rail station (distance from transit); employment within a mile of site boundaries and percentage of regional employment within 20 minutes by car, 30 minutes by car, and 30 minutes by transit (destination accessibility); the gross acreage of the development (development scale); and the average number of household members as well as household vehicle ownership per capita(demographics). The accuracy of the EPA MXD method was verified through traffic generation comparisons at 27 mixed-use sites across the U.S.

The EPA MXD product is a series of equations and instructions captured in a spreadsheet workbook. The methodology calculates the percentage reductions in ITE trip generation resulting from the national statistical analysis of seven D effects on internal trip capture, walking, and transit use. The spreadsheets produce reduced estimates of traffic generation on a daily basis and for peak traffic hours.

Combining the Approaches

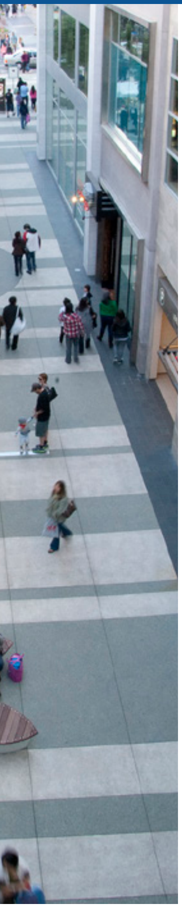
The NCHRP 684 method and EPA MXD method each derive from different research approaches and produce different methods of analyzing trip generation at mixed use developments. They focus on overlapping but not identical aspects of mixed-use development sites and their contexts and offer respective strengths and weaknesses in terms of factors considered and ease of application. Selecting which method to employ under different circumstances requires both a comparison of their capabilities as well as professional judgment of their respective strengths and weaknesses.

Report 684 includes a refined assessment of on-site land-use categories, specifically recognizing the roles of restaurants, theaters, and hotels within the site land-use mix, along with an adjustment to account for the spatial separations among individual land uses within the development site. It is directly useful for the evaluation of proposed development sites that are similar to the one or more of the three surveyed in Atlanta and Texas for the report. However, it is not responsive to factors such as regional location, transit availability, density of development, walkability factors, and the socio-demographic profile of site residents and businesses.

In contrast, the EPA MXD method accounts directly and quantitatively for these factors. However, while it accounts for the balances of retail, office, and residential development, it does not explicitly differentiate subcategories such as restaurants, theaters, and hotels. Furthermore, it requires the analyst to account for off-site development, including employment within a one-mile radius of the MXD and the number of jobs available within 30 minutes of the site.

To develop a method that captures the best of both sets of research findings, the authors of the two original studies decided to collaborate on an integrated method that recognizes the full array of on-site and context characteristics that contribute to traffic reduction and, through a focus on empirical verification, achieves greater accuracy than either method individually.

In developing the integrated approach, we compared the performances of the methods to actual traffic counts at a diverse group of mixed use developments in a variety of settings. The 27 verification sites were successful mixed-use development, exhibiting moderate to high levels of activity in terms of business sales, occupied residential units, property value, and household income, with average or above-average person trips, at the time of the survey. They included those studied for NCHRP 684, the sites used as the basis for the ITE *Trip Generation Handbook*, and others surveyed by Fehr & Peers, transportation consultants. Six of the 27 sites were located in Florida, and three were located in Atlanta and Texas. Three of these nine were nationally known examples of smart growth or transit-oriented development: Atlantic Station, Mockingbird Station, and Celebration, Florida. Six sites were located in San Diego County and were designated by local planners and traffic engineers in 2009 as representing a wide range of examples of smart growth trip generators in that region. The 12 remaining sites were MXD developments located elsewhere in California and in Utah, ranging from TOD sites (commuter rail and ferry) to conventional suburban freeway-oriented mixed use sites.



A New Approach: The MXD+ Method

The new analytical approach, the MXD+ method, combines the strengths of NCHRP 684 and EPA MXD. The authors sought to (1) address the fact that each method has strengths relative to the other, (2) create a method that is more accurate than either of the individual methods alone, and (3) reduce confusion among practitioners on which is the most appropriate method.

The proposed MXD+ method incorporates the underlying data sources and logic that the two methods share. It offers the ability to assess the effects of spatial separation of uses and recognition of more specific land-use categories and to consider the dynamic influences of local development context, regional accessibility, transit availability, development density and walkability factors, and the characteristics of residents.

To develop the preferred method, the authors experimented with different methods of integrating the two methods and arrived at a direct calibration approach. The appropriate combination of the results of the two individual methods was determined through regression analysis to identify the proportions that provided the best correlation with the traffic counted at the 27 validation sites. Table 1 presents results from the regression analysis, listing the proportions of the two methods found most effective at matching the traffic generation at the diverse set of mixed use validation sites. Weighting the results of the two individual analyses by the percentages in Table 1 and combining the results produces more accurate estimates of traffic generation and captures the effects of all of the site description variables included in the NCHRP and EPA methods.

TABLE 1 **OPTIMAL BLEND OF NCHRP 684 AND EPA MXD METHODS**

	AM PEAK TRAFFIC	PM PEAK TRAFFIC	AVERAGE DAILY TRAFFIC
NCHRP 684	10.1%	36.5%	n/a
EPA MXD	89.9%	63.5%	100%

The step-by-step method is as follows:

1. Apply the full EPA MXD methodology to predict external traffic generation as influenced by site development scale, density, accessibility, walkability and transit availability, resident demographics, and general mix of uses.

2. Apply the full NCHRP 684 method to capture the effects of detailed land-use categories, including hotel, theater, and restaurant, and the spatial separation of uses within small and medium sites.

3. Combine the results of the two methods in terms of percentages of trips remaining internal to the development site, using proportioning factors presented in the table above.

4. Apply adjustments to account for off-site walking and transit travel using the EPA MXD method.

5. Discount standard ITE traffic-generation rates by the percentages of internalization produced in step 3 and the percentage of walk and transit travel in step 4 to obtain the estimate of site- generated traffic.

TABLE 2 **COMPARISON OF THREE PRINCIPAL METHODS IN TERMS OF PROJECT CHARACTERISTICS CONSIDERED**

	EPA MXD METHOD	NCHRP 684 METHOD	MXD+ METHOD
Project Characteristics Considered			
Density of Development	◆		◆
Diversity of Uses: Jobs/Housing	◆	◆	◆
Diversity of Uses: Housing/Retail		◆	◆
Diversity of Uses: Jobs/Services		◆	◆
Diversity of Uses: Entertainment, Hotel		◆	◆
Design: Connectivity, Walkability	◆	◆	◆
Design: Separation Among Uses		◆	◆
Destination Accessibility by Transit	◆		◆
Destination Accessibility by Walk/Bike	◆		◆
Distance from Transit Stop	◆		◆
Development Scale	◆		◆
Distance from Transit Stop	◆		◆
Development Scale	◆		◆
Demographic Profile	◆		◆
Data Needs (beyond Project Site Plan)			
Average Residents per Dwelling Unit	◆		◆
Average Autos Owned per Dwelling Unit	◆		◆
Nearby (1/4 mi) Bus Stops and Rail Stations	◆		◆
Jobs Within 1 Mile of Site	◆		◆
Jobs Within 30-Minute Transit Trip	◆		◆
Regional Employment	◆		◆
Located in CBD or TOD?	◆		◆
Site Development by Classification		◆	◆
Vehicle Occupancy Estimate		◆	
Mode Split Estimate		◆	

As Table 2 indicates, the MXD+ method improves traffic generation estimates by considering the full array of 12 site development and context characteristics shown to influence internal capture and mode share, while the individual methods consider only 5 to 8 factors each. Effects considered in MXD+ that are not included in the NCHRP 684 method include household size and auto ownership, site proximity to bus and rail stops, and accessibility to local and regional jobs. Effects considered in the NCHRP 684 method that do not appear in the EPA MXD method include specific land uses and proximity of interacting land uses to each other.

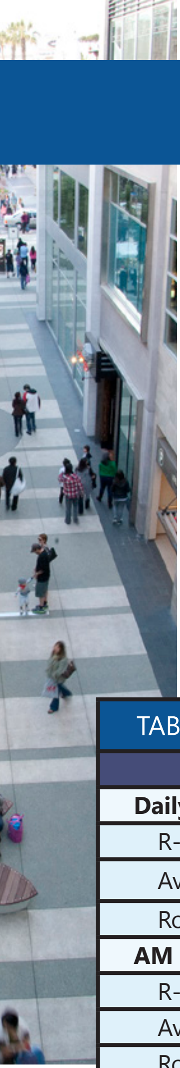


Table 3 presents the statistical performance of the MXD+ integrated method with the individual performance of the individual NCHRP 684 and EPA MXD methods. We compared the ability of each of the available methods to replicate the amount of traffic generated at the 27 validation sites in terms of statistical measures including percent root mean squared error, a metric used in the transportation field to evaluate model accuracy, and the coefficient of determination (or "R-squared"), which measures the ability of the analysis method to account for the variations in traffic generation among the 27 survey sites. For daily traffic generation, MXD+ is equivalent to the EPA MXD method, as the NCHRP 684 method does not address daily analysis. For peak hour traffic generation, MXD+ performs notably better than either of the individual methods.

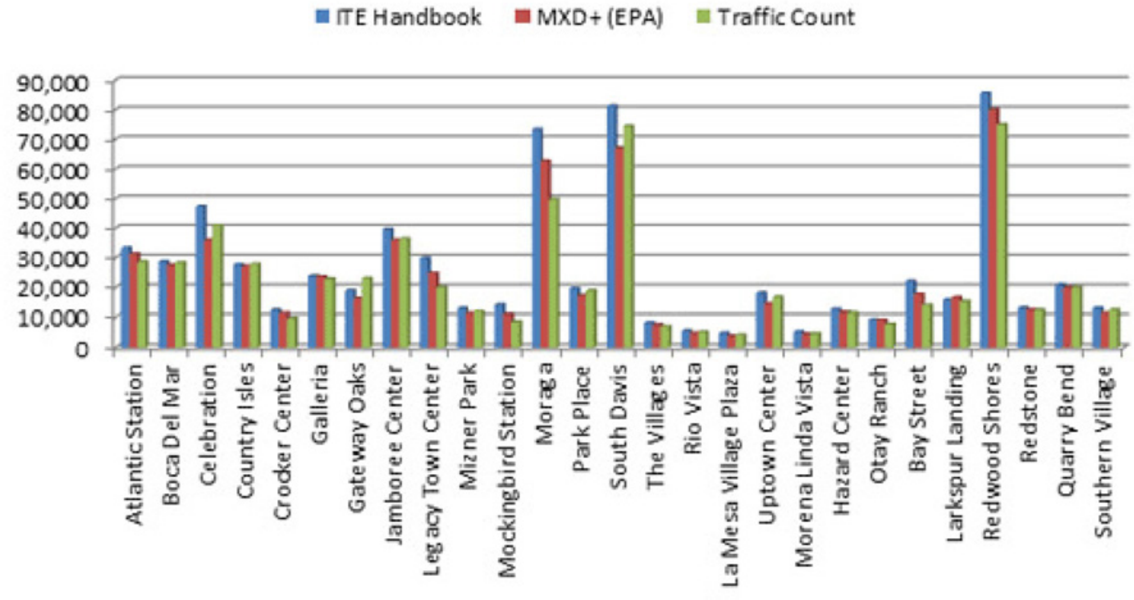
TABLE 3 **COMPARISON OF THREE PRINCIPAL METHODS IN TERMS OF PERFORMANCE AT VALIDATION SITES**

	EPA MXD METHOD	NCHRP 684 METHOD	MXD+ METHOD
Daily Traffic Generation			
R-squared	96%	89%*	**96%**
Average Error	2%	16%*	**2%**
Root Mean Square Error	17%	27%	**17%**
AM Peak Traffic Generation			
R-squared	97%	93%*	**97%**
Average Error	12%	30%	**12%**
Root Mean Square Error	21%	33%	**21%**
PM Peak Traffic Generation			
R-squared	95%	81%	**97%**
Average Error	8%	18%	**4%**
Root Mean Square Error	18%	36%	**15%**

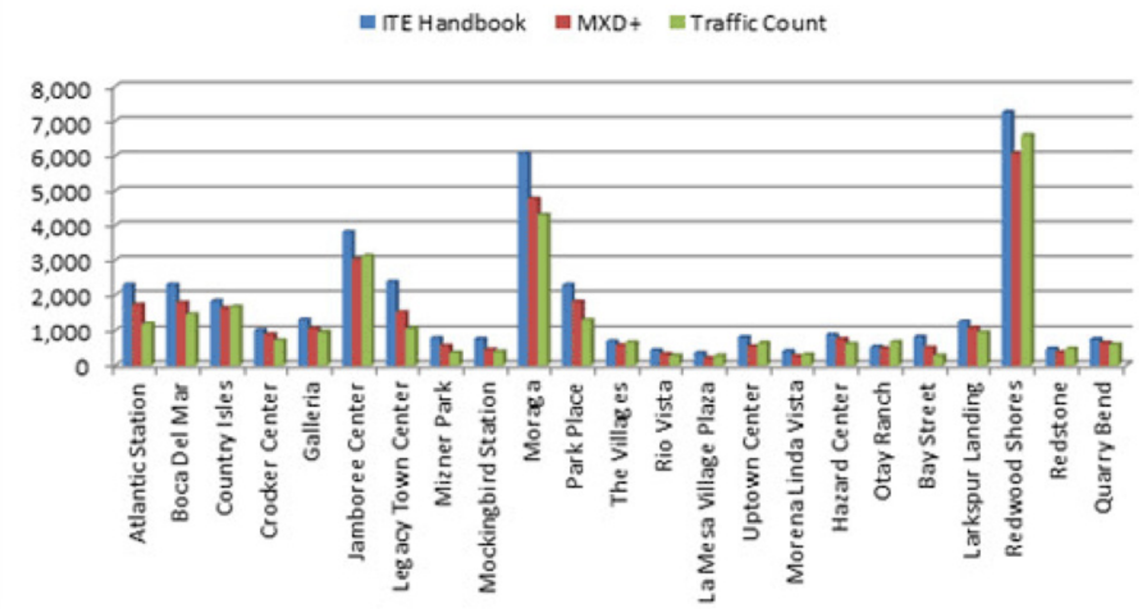
** ITE Handbook internalization statistics (NCHRP 684 method does not address daily trip generation)*

The graphs on the following page compare the performance of the MXD+ method to the ITE *Handbook* method at replicating traffic generation at the diverse group of mixed-use validation sites. Compared with the ITE *Handbook*, MXD+ method more accurately matches the amount of daily traffic actually counted at 20 of the 27 survey sites. In the AM peak hour, it is more accurate than the ITE Handbook at 21 of the 24 sites for which counts were available, and in the PM peak hour, MXD+ is more accurate than the ITE *Handbook* method at 23 of 25 sites.

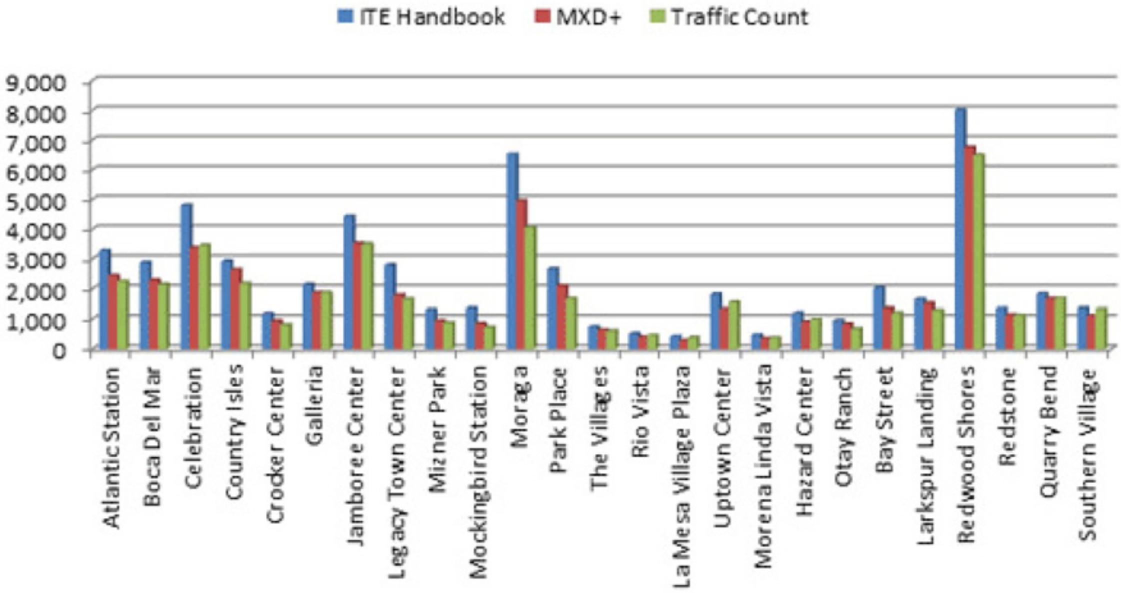
DAILY TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



AM PEAK HOUR TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



PM PEAK HOUR TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



The MXD+ method explains 97 percent of the variation in trip generation among mixed-use developments, compared with 65 percent for the ITE *Handbook* method. On average, the *Handbook* overestimates AM peak traffic generation by 49 percent, compared with 12 percent for MXD+. For the PM peak hour, the ITE *Handbook* overestimates actual traffic by 35 percent. The MXD+ method reduces this to 4 percent, remaining slightly conservative and unlikely to understate impacts.

By combining and refining the two most advanced methodologies for estimating traffic generation for mixed-use development, the MXD+ method provides transportation planners and engineers a more accurate single approach that accounts for the most important factors that distinguish lower impact development from other forms. Doing so advances development planning and impact assessment beyond the practices that have, to date, unreasonably discouraged mixed-use development.

Recommendations for Planners

We recommend that planners adopt the latest methods for evaluating traffic generation of mixed use and other forms of smart growth, including infill and transit-oriented development. The MXD methods developed under the U.S. EPA multiregional study and the NCHRP 684 study on enhancing trip-capture estimation each represent substantial advances to the conventional practices previously available through ITE. Combining the two new methods, as described above, improves upon both individual methods. Tools for all three approaches are available for use through the references and resources listed below.

Traffic engineers are beginning to take notice of the new methods, but we expect that natural sluggishness in adopting new practices will continue to impose unfair penalties on mixed use and other forms of lower-impact development. We recommend activism on the part of all planners, development reviewers, and impact analysts on behalf of the more accurate MXD methods.

Immediate adoption of the improved methods will allow planners to account for a project's regional location, transit availability, density of development, walkability factors, and the characteristics of residents and businesses and on-site adjacencies of land uses including residential, office, retail, restaurants, theaters, and hotels. Accounting for these factors through the MXD+ method will achieve the highest levels of accuracy possible in estimating traffic impacts of mixed use development.

We recommend applying and promoting the MXD+ method for day-to-day project planning and performance-based site-plan refinement, impact analysis, and discretionary review. Doing so will eliminate what is presently a systematic bias in traffic analysis that favors single-use, isolated, suburban-style development.

Conclusion

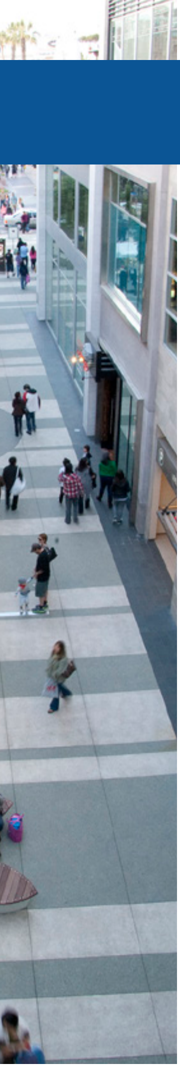
Standard traffic engineering practices are blind to the primary benefits of smart growth. A plan's development density, scale, design, accessibility, transit proximity, demographics, and mix of uses all affect traffic generation in ways unseen to prescribed methods. The Institute of Transportation Engineers (ITE) *Trip Generation Manual* and *Handbook* overestimate peak traffic generation for mixed-use development by an average of 35 percent. For conventional suburban stand-alone development, ITE rates portray the average for such sites; so hedging mixed-use analysis toward more conservative assumptions creates a systematic bias in favor of single-use suburban development.

ITE overestimation of traffic impacts reduces the likelihood of approval of mixed use and related forms of smart growth such as infill, compact, and transit-oriented development. Such overestimation escalates development costs, skews public perception, heightens community resistance, and favors isolated single-use development.

The methods of evaluating mixed use development described in this report represent a substantial improvement over conventional traffic-estimation methods. They improve accuracy and virtually eliminate overestimation bias, and they are supported by the substantial evidence of surveys and traffic counts at 266 mixed use sites across the U.S. The MXD+ analysis method explains 97 percent of the variation in trip generation among mixed use sites and all but eliminates the ITE systematic overestimation of traffic. We hope planners and other professionals will take advantage of the available spreadsheet tools listed below to help even the playing field between conventional development patterns and more sustainable, walkable, livable places.

About the Authors

Jerry Walters is a principal and sustainability practice leader with Fehr & Peers, transportation consultants. He has more than 30 years of experience in transportation planning, engineering, and travel forecasting and is a registered traffic engineer. Jerry developed project evaluation methods for the U.S. EPA study "Mixed-use Development and Vehicle Trips: Improving the Standard Estimation Methodology." He is a co-author of the book Growing Cooler – the Evidence on Urban Development and Climate Change (Urban Land Institute, 2008).



Brian S. Bochner is a senior research engineer at Texas Transportation Institute with over 40 years of experience in traffic engineering and planning. He is a certified professional traffic engineer, a professional traffic operations engineer and transportation planner, an affiliate with the Transportation Research Board, and past president and member of the International Board of Direction of the Institute of Transportation Engineers (ITE). His awards include Transportation Innovator, Texas Department of Transportation Research Program, and Transportation Engineer of the Year for the Texas Section of ITE.

Reid Ewing is a professor of city and metropolitan planning at the University of Utah, associate editor of the *Journal of the American Planning Association*, columnist for *Planning* magazine, and Fellow of the Urban Land Institute. His 2010 article, “Travel and the Built Environment: A Meta-Analysis,” won the Best Article of the Year award from the American Planning Association, and his book, Best Development Practices (APA Planners Press, 1996), is listed by APA as one of the 100 essential planning books of the past 100 years.

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Additional Resources

Description, documentation, and spreadsheet tools for the NCHRP 684 method, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments may be found at www.trb.org/Main/Blurbs/165014.aspx.

Description, documentation, and spreadsheet tools for the EPA MXD Trip Generation Tool for Mixed-Use Developments may be found at www.epa.gov/smartgrowth/mxd_tripgeneration.html.

Quick-response analysis tools for applying the EPA MXD method, the combined EPA /NCHRP method MXD+, and MXD in conjunction with analysis of vehicle-miles traveled, GHG emissions, and shared parking, Plan+, may be found at http://asap.fehrandpeers.com/tools/.

Appendix B – LADOT Local Affordable Housing Trip Generation Study

FEHR PEERS

Measuring the Miles
Developing new metrics for vehicle travel in LA

MEMORANDUM

Date: April 20, 2017

To: Claire Bowin & David Somers, Los Angeles Department of City Planning

Cc: Tom Carranza, Los Angeles Department of Transportation

From: Tom Gaul & Cary Bearn, Fehr & Peers

Subject: ***Infill and Complete Streets Study***
Task 2.1A Local Affordable Housing Trip Generation Study

Ref: LA15-2755

This memo serves as a summary of Task 2.1A, Local Affordable Housing Trip Generation Study, as part of the City of Los Angeles' *Infill and Complete Streets: Capturing VMT Impacts & Benefits Pursuant to CEQA* study. As part of Task 2.1A, vehicle trip generation and parking utilization surveys were conducted at numerous affordable housing locations throughout the City of Los Angeles in order to provide an improved understanding of vehicle trip generation and parking demand characteristics of affordable housing uses in Los Angeles.

The empirical trip generation data collected through this effort will be used to customize and calibrate the MXD model for Los Angeles to be integrated into the vehicle miles traveled (VMT) VMT Calculator to be developed for the City as part of later tasks in the study.

METHODOLOGY

Twenty-four hour driveway vehicle counts were conducted at the various survey sites using video cameras. Manual overnight parking utilization sweeps were also conducted.

Criteria for selection of the survey sites included:

- Sample Size – The Institute of Transportation Engineers (ITE) recommends that at least three and preferably five independent survey sites be used to establish a local trip generation rate for a particular land use. This recommendation was exceeded for all land use types included in this study, including for each of the subcategories of affordable housing sites.

- 100% Affordable – The affordable housing site must be 100% affordable (other than the manager's unit). This was to ensure that the counts reflect the trip generation behavior solely of affordable units.

- Isolatable Use – The sites must be standalone and not part of a mixed-use development.

- Countable Driveway(s) – Driveways must be serving parking lots for the use of the site and not also serving parking lots for other land uses in the surrounding area.

- Successful Development – The development should be mature, be located in a mature environment, and appear to be economically healthy.

- Permission of Property Owners/Managers – Permission was obtained in order to survey a site.

AFFORDABLE HOUSING TRIP GENERATION AND PARKING

Data Collection

Twenty-four hour driveway counts and overnight parking sweeps were conducted at a total of 42 affordable housing sites within the City of Los Angeles (35 sites counted in May-June 2016 and seven additional sites counted in November 2016). The affordable housing study locations were identified in consultation with the City of Los Angeles Department of City Planning and the City of Los Angeles Housing+Community Investment Department. The sites were categorized according to two criteria considered to influence the level of vehicle ownership and tripmaking but also considered to be available and applicable to future projects (i.e., measureable and able to be determined using a readily available data source): proximity to transit and affordable housing type:

- Proximity to Transit – The Southern California Association of Governments (SCAG) has defined "Transit Priority Areas" (TPAs) as the area within ½ mile of an existing major transit stop, and defines a major transit stop as either a rail station or an intersection of 2 or more major bus routes with peak service frequencies of 15 minutes or less. The transit priority area defined by SCAG applies a ½ mile radial from the station or intersection. For this study, a ½ mile walkshed along the transportation network was used in lieu of the ½ mile radius. Additionally, stations for the Metro Orange Line and Silver Line Busways were not included in the SCAG definition but were added as part of the rail stations. These busways provide peak hour service less than 15 minutes and operate in dedicated rights-of-way. Study locations were defined as either inside or outside a transit priority area. Twenty of the study locations were within a TPA and 22 were outside of a TPA.

- Housing Type – Affordable housing type was categorized as serving families, seniors, special needs, or permanent supportive. Family affordable housing offers affordable dwelling units designed for households with children. Senior affordable housing provides affordable dwelling units designed for mature residents. The category of special needs housing includes facilities serving a variety of populations, including foster youth, disabled, mentally ill, and HIV/AIDs. Permanent supportive housing provides long-term housing with supportive services designed to enable homeless persons and individuals/families at risk of homelessness to ensure that they remain housed and live as independently as possible. Fourteen of the study sites were designated as family housing, thirteen were senior, eight were special needs, and seven were permanent supportive. Each of these categories were divided roughly equally between sites within a TPA and sites outside of a TPA.

Retail job density was also considered as a possible variable influencing tripmaking but, based on exploratory data analysis and discussions with LADOT, the final trip generation analysis was disaggregated based on proximity to transit and housing type only.

Table 1 presents the list of properties included in the analysis. Table 2 shows the aggregated vehicle trip generation results based on proximity to transit and housing type. Table 2 also shows relevant trip generation rates from ITE's *Trip Generation, 9th Edition*, for comparison. Table 3 shows the aggregated parking demand and utilization results based on proximity to transit and housing type. For comparison, Table 3 also shows relevant parking requirements from the Los Angeles Municipal Code (LAMC).

Property managers for 36 of the 42 surveyed sites provided information regarding selected characteristics of the sites. All of the respondents stated that they provide parking but do not charge residents for parking on-site. None of the respondents provide partially or fully-subsidized transit passes to residents, none provide car-share services, and one provides a shuttle to grocery stores.

Results

Reviewing Table 2, the following observations can be made:

- The empirical vehicle trip generation rates across the affordable housing survey sites are higher for the affordable family units relative to the senior, special needs, and permanent supportive affordable units.
- The empirical trip generation rates are generally lower for units located within a TPA than for units located outside of a TPA.
- The empirical trip generation rates averaged across all 42 of the affordable housing survey sites are lower than the ITE trip rates for standard apartments for all three time periods (daily, AM peak hour, and PM peak hour). This holds true as well for almost all of the disaggregated subcategories (the sole exception being affordable family units outside of a TPA during the AM peak hour).
- Affordable family units both inside and outside of a TPA are the only categories with empirical rates higher than the ITE high-rise apartment rates (an ITE category which primarily consists of buildings within urban areas).
- The empirical rates for senior, special needs, and permanent supportive affordable housing are far lower than both the ITE apartment and ITE high-rise apartment rates.
- The empirical rates for the senior affordable housing are lower than ITE rates for senior adult housing.

Reviewing Table 3, the following observations can be made:

- The empirical parking demand ratios are higher for the affordable family units relative to the senior, special needs, and permanent supportive units.

- The empirical parking demand ratios for each of the subcategorizations of the affordable housing survey sites (by affordable housing type and by transit proximity) are lower than the LAMC parking requirement for apartments.
- The empirical parking demand ratios for family affordable housing range from 0.82 to 0.85 spaces per unit and are lower than the parking requirements under the LAMC Affordable Housing Density Bonus Option 2 (LAMC 12.22A.25(d)(2)) for restricted affordable units (1 space per unit).
- The empirical parking demand ratios for senior, special needs, and permanent supportive affordable housing range from 0.20 to 0.48 spaces per unit and are lower than the parking requirements under the LAMC Affordable Housing Density Bonus Option 2 (LAMC 12.22A.25(d)(2)) for units restricted to low or very low income senior citizen or disabled (0.5 spaces per unit).
- The empirical parking demand ratios are lower for units located within a TPA than for units located outside of a TPA for the senior, special need, and permanent supportive units but not for the family units.

SOURCES

Trip Generation, 9th Edition, Institute of Transportation Engineers, 2012.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, 2014.

Los Angeles Municipal Code.

TABLE 1

Affordable Housing Trip Generation and Parking Utilization Survey Locations

Count	Name	Address	Transit Priority Area	Housing Type
1	Barnsdall Court	1632 N Normandie Ave, Hollywood, CA 90027	Inside	Family
2	Parkside Apartments	900 S Grand Ave, Los Angeles, CA 90015	Inside	Family
3	El Dorado Family Apts	12129 N El Dorado Ave, Los Angeles, CA 91342	Inside	Family
4	Union Point	420 Union Dr, Los Angeles, CA 90017	Inside	Family
5	Coronita Family	204 S Lucas Ave, Los Angeles, CA 90026	Inside	Family
6	New Venice 1A	535 Santa Clara Ave, Venice, CA 90291	Inside	Family
7	New Venice 2C	1002 5th Ave, Venice, CA 90291	Inside	Family
8	Sichel Family Apts	1805 Sichel St, Los Angeles, CA 90031	Inside	Family
9	Bonnie Brae Village	208 S Bonnie Brae St, Los Angeles, CA 90057	Inside	Permanent Supportive
10	Gower Street Apts	1140 N Gower St, Los Angeles, CA 90038	Inside	Permanent Supportive
11	The Villas At Gower	1726 N Gower St, Hollywood, CA 90028	Inside	Permanent Supportive
12	NoHo Seniors Villa	5525 Klump Ave, North Hollywood, CA 91601	Inside	Seniors
13	Morgan Place Senior Apts	7301 S Crenshaw Blvd, Los Angeles, CA 90043	Inside	Seniors
14	Figueroa Senior Housing	7621 S Figueroa St, Los Angeles, CA 90044	Inside	Seniors
15	Hollenbeck Terrace	610 S Saint Louis St, Los Angeles, CA 90023	Inside	Seniors
16	Ward Villas	1177 W Adams Blvd, Los Angeles, CA 90007	Inside	Seniors
17	Vermont Manzanita	1225 S Vermont Ave, Los Angeles, CA 90006	Inside	Special Needs
18	New Carver	1624 S Hope St, Los Angeles, CA 90015	Inside	Special Needs
19	Charles Cobb Apts	521 S San Pedro St, Los Angeles, CA 90013	Inside	Special Needs
20	New Genesis	452 S Main St, Los Angeles, CA 90013	Inside	Special Needs
21	Rio Vista Apts	3000 N Verdugo Rd, Los Angeles, CA 90065	Outside	Family
22	New Venice 4B	915 7th Ave, Venice, CA 90291	Outside	Family
23	Cuatro Vientos	5331 E Huntington Dr, Los Angeles, CA 90032	Outside	Family
24	Lorena Terrace	611 South Lorena St, Los Angeles, CA 90023	Outside	Family
25	Laurel Village	9700 Laurel Canyon Blvd, Pacoima, CA 91331	Outside	Family
26	New Venice 2D	919 5th Ave, Venice, CA 90291	Outside	Family
27	Cornerstone Apts	14128 Calvert St, Van Nuys, CA 91401	Outside	Permanent Supportive
28	Willis Avenue Apts	14731 W Rayen St, Los Angeles, CA 91402	Outside	Permanent Supportive
29	PATH Villas At Del Rey	11734 Courtleigh Dr, CA 90066	Outside	Permanent Supportive
30	Winnetka Senior Apts	20750 Sherman Way, Los Angeles CA 91306	Outside	Permanent Supportive
31	TELACU Pointe	3100 Fletcher Dr, Los Angeles, CA 90065	Outside	Seniors
32	Asturias Senior Apts	9628 Van Nuys Blvd, Panorama City, CA 91402	Outside	Seniors
33	Cantabria Senior Apts	9640 N Van Nuys Blvd, Los Angeles, CA 91402	Outside	Seniors
34	TELACU Vista	4900 N Via Marisol, Highland Park, CA 90032	Outside	Seniors
35	Andalucia Senior Apts	15305 W Lanark St, Los Angeles, CA 91406	Outside	Seniors
36	TELACU Las Flores	12793 Mercer St, Pacoima, CA 91331	Outside	Seniors
37	Buckingham Sr. Housing	4020 S Buckingham Rd, Los Angeles, CA 90008	Outside	Seniors
38	Villa Valley	15950 Sherman Way, Los Angeles, CA 91406	Outside	Seniors
39	Allesandro Street Apts	1934 Allesandro St, Los Angeles, CA 90039	Outside	Special Needs
40	Innes Heights, Lp	1245 Innes Ave, Los Angeles, CA 90026	Outside	Special Needs
41	Woodland Terrace	15532 W Nordhoff St, North Hills, CA 91343	Outside	Special Needs
42	Guy Gabaldon Apts	3553 Beswick St, Los Angeles, CA 90023	Outside	Special Needs

TABLE 2
Vehicle Trip Rates for Affordable Housing Sites in Los Angeles
(By Transit Priority Area and Affordable Housing Type)
Counts conducted May, June, and November 2016

TPA Area	Affordable Housing Type	Bin	Sample Size	Daily Rate (Trips per DU)	Average AM Peak Hour Rate (Trips per DU)	AM Percent In	AM Percent Out	Average PM Peak Hour Rate (Trips per DU)	PM Percent In	PM Percent Out
Inside	-		20	2.32	0.26	40%	60%	0.20	56%	44%
Outside	-		22	2.48	0.25	46%	54%	0.24	52%	48%
-	Family		14	4.16	0.52	38%	62%	0.38	55%	45%
-	Seniors		13	1.72	0.12	38%	62%	0.15	52%	48%
-	Special Needs		8	1.49	0.17	43%	57%	0.11	54%	46%
-	Permanent Supportive		7	1.23	0.08	67%	33%	0.13	53%	47%
Inside	Family	Inside, Family	8	4.16	0.49	37%	63%	0.35	56%	44%
Inside	Seniors	Inside, Seniors	5	1.31	0.13	38%	62%	0.13	47%	53%
Inside	Special Needs	Inside, Special Needs	4	1.00	0.10	30%	70%	0.05	67%	33%
Inside	Permanent Supportive	Inside, Permanent Supportive	3	0.87	0.08	62%	38%	0.09	59%	41%
Outside	Family	Outside, Family	6	4.15	0.55	40%	60%	0.43	55%	45%
Outside	Seniors	Outside, Seniors	8	1.97	0.11	38%	62%	0.17	55%	45%
Outside	Special Needs	Outside, Special Needs	4	1.98	0.24	54%	46%	0.16	44%	56%
Outside	Permanent Supportive	Outside, Permanent Supportive	4	1.50	0.09	71%	29%	0.16	49%	51%

ITE for Comparison

ITE Record Number	Description	Sample Size	Daily Rate (Trips per DU)	Average AM Peak Hour Rate (Trips per DU)	AM Percent In	AM Percent Out	Average PM Peak Hour Rate (Trips per DU)	PM Percent In	PM Percent Out
ITE 220	Apartment	78-90	6.65	0.51	20%	80%	0.62	65%	35%
ITE 222	High-Rise Apartment	9-17	4.20	0.30	25%	75%	0.35	61%	39%
ITE 252	Senior Adult Housing-Attached	5-10	3.44	0.20	34%	66%	0.25	54%	46%
ITE 253	Congregate Care Facility	2-3	2.02	0.06	59%	41%	0.17	55%	45%
ITE 255	Continuing Care Retirement Community	4-6	2.40	0.14	65%	35%	0.16	39%	61%

TABLE 3

Parking Demand Rates for Affordable Housing Sites in Los Angeles

(By Transit Priority Area and Affordable Housing Type)

Surveys conducted May, June, and November 2016

TPA Area	Affordable Housing Type	Sample Size	Parking Demand Per Dwelling Unit	Parking Utilization
Inside	-	20	0.53	64%
Outside	-	22	0.56	63%
-	Family	14	0.84	72%
-	Seniors	13	0.46	71%
-	Special Needs	8	0.32	43%
-	Permanent Supportive	7	0.37	56%
Inside	Family	8	0.85	74%
Inside	Seniors	5	0.44	73%
Inside	Special Needs	4	0.20	34%
Inside	Permanent Supportive	3	0.29	64%
Outside	Family	6	0.82	70%
Outside	Seniors	8	0.48	69%
Outside	Special Needs	4	0.44	52%
Outside	Permanent Supportive	4	0.43	50%

LAMC for Comparison

		Parking Requirement per Unit
Apartments (LAMC 12.21A.4(a))		
	<3 habitable rooms	1
	3 habitable rooms	1.5
	>3 habitable rooms	2
Projects with Affordable Housing Density Bonus - Option 1 (applies to all units, not just restricted units) (LAMC 12.22A.25(d)(1))		
	0-1 bedroom	1
	2-3 bedrooms	2
	4 or more bedrooms	2.5
Projects with Affordable Housing Density Bonus - Option 2 (applies to restricted units only) (LAMC 12.22A.25(d)(2))		
	restricted affordable units	1
	restricted to low or very low income senior citizen or disabled	0.5
	restricted affordable units in residential hotel	0.25

Draft Local Transportation Assessment for the

Catalina Village Project

Prepared for:
Rincon Consultants

August 2021

LB20-0012

FEHR PEERS

Table of Contents

1. Introduction 1
1.1 Project Description 1
1.2 Localized Analysis Study Scope 3
1.2.1 Study Area 3
1.2.2 Localized Analysis Scenarios 5
1.2.3 Localized Analysis Methodologies & Operational Effect Criteria 6
1.2.4 Trip Generation 6
1.2.5 Trip Distribution 7
1.2.6 Signalized Intersection Operational Effect Analysis 8
1.3 Organization of the Report 9
2. Existing (2020) Conditions 10
2.1 Existing Roadway Facilities 10
2.2 Existing Pedestrian and Bicycle Facilities 11
2.3 Existing Public Transit Facilities 11
2.4 Existing Intersection Operating Conditions 15
2.4.1 Intersection Lane Geometries 15
2.4.2 Intersection Traffic Volumes 15
2.4.3 Level of Service Methodology 15
2.4.4 Level of Service Results 16
3. Cumulative (2023) Conditions 19
3.1 Cumulative Without Project (2023) Operating Conditions 19
3.1.1 Intersection Lane Geometries 19
3.1.2 Intersection Traffic Volumes 19
3.1.3 Level of Service Methodology 19
3.1.4 Level of Service Results 19
3.1.5 Cumulative without Project Pedestrian and Bicycle Conditions 21
3.1.6 Cumulative without Project Transit Conditions 21
4. Project Conditions & Operational Effects Analysis 22
4.1 Project Trip Generation 22
4.2 Project Trip Distribution 22
4.3 Existing Plus Project Conditions 25
4.3.1 Intersection Traffic Volumes 25

4.3.2 Level of Service Methodology 25
4.3.3 Level of Service Results 25
4.4 Cumulative Plus Project Conditions 27
4.4.1 Intersection Traffic Volumes 27
4.4.2 Level of Service Methodology 27
4.4.3 Level of Service Results 27
4.5 City of Redondo Beach General Plan LOS Consistency Check 27
5. Summary 29

Appendices

Appendix A – MXD Model Documentation
Appendix B – Peak Period Turning Movements & Lane Geometries
Appendix C – Traffic Count Sheets
Appendix D – Level of Service Worksheets

List of Figures

Figure 1 – Project Site Plan 2
Figure 2 – Study Area Intersections 4
Figure 3 – Existing and Planned Bicycle Facilities 13
Figure 4 – Study Area Transit Routes 14
Figure 5 – Project Trip Distribution 24

List of Tables

Table 1 – Study Area Intersections 3
Table 2 – Level of Service Definitions for Signalized Intersections – ICU Methodology 16
Table 3 – Existing Conditions Intersection Level of Service 18
Table 4 – Cumulative without Project Conditions Intersection Level of Service 20
Table 5 – Project Trip Generation 23
Table 6 – Existing Plus Project Conditions Intersection Level of Service 26
Table 7 – Cumulative Plus Project Conditions Intersection Level of Service 28

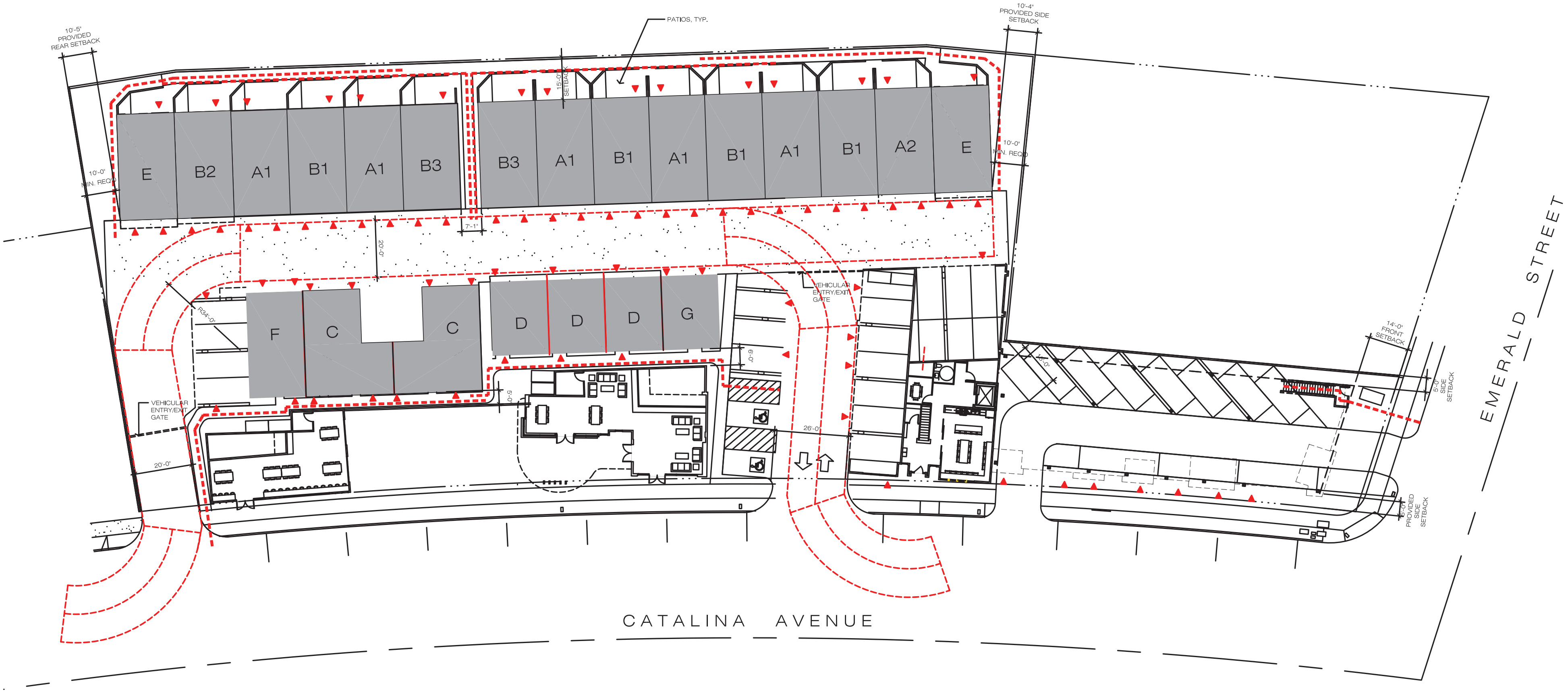
1. Introduction

This report analyzes the operational effects associated with the proposed Catalina Village Project ("Project"), in the City of Redondo Beach, California. The report documents the methodologies and criteria used to evaluate the Project and summarizes the analysis and operational effects of Existing and future Cumulative conditions.

1.1 Project Description

The proposed project (the Project) spans fourteen adjacent parcels across six addresses, including 100, 112, 116, 124, 126, and 132 N Catalina Avenue, and occupies almost the entire southwest quadrant of the block bounded by Diamond Street to the North, Emerald Street to the South, Catalina Avenue to the West, and North Broadway to the East. All of the Project parcels are currently zoned for Low-Density Multifamily Residential (R3-A).

Existing uses on the site include an office, a frame store, a cabinet shop, a tile and granite sales store, and a clothing store, as well as a vacant dry cleaner and coffee shop and a former Masonic Temple and United States Post Office. The Project involves the construction of 30 three-story mixed income apartment units and would preserve and retrofit approximately 3,000 square feet of commercial retail buildings, replacing the existing commercial uses with a 1,784 square foot coffee shop and a 1,279 square foot beer tasting room. Site access would be provided via two driveways on Catalina Avenue, and the Project would provide 72 parking stalls, with an additional 7 parking spaces available on-street in front of the commercial retail uses. **Figure 1** illustrates the ground level site plan for the Project.



▲ Access to Bedroom*

▬▬ 150′ Fire Hose

*All Bedrooms are located at 1st and 2nd Levels

N

scale: 1/16" = 1'-0"

0 16 32 48 64

Figure 1

Site Plan

1.2 Localized Analysis Study Scope

This section details the analysis scenarios, methodologies, and operational criteria used to assess the Project's potential to trigger transportation operational effects. This scope was prepared in accordance with the requirements of the City of Redondo Beach.

1.2.1 Study Area

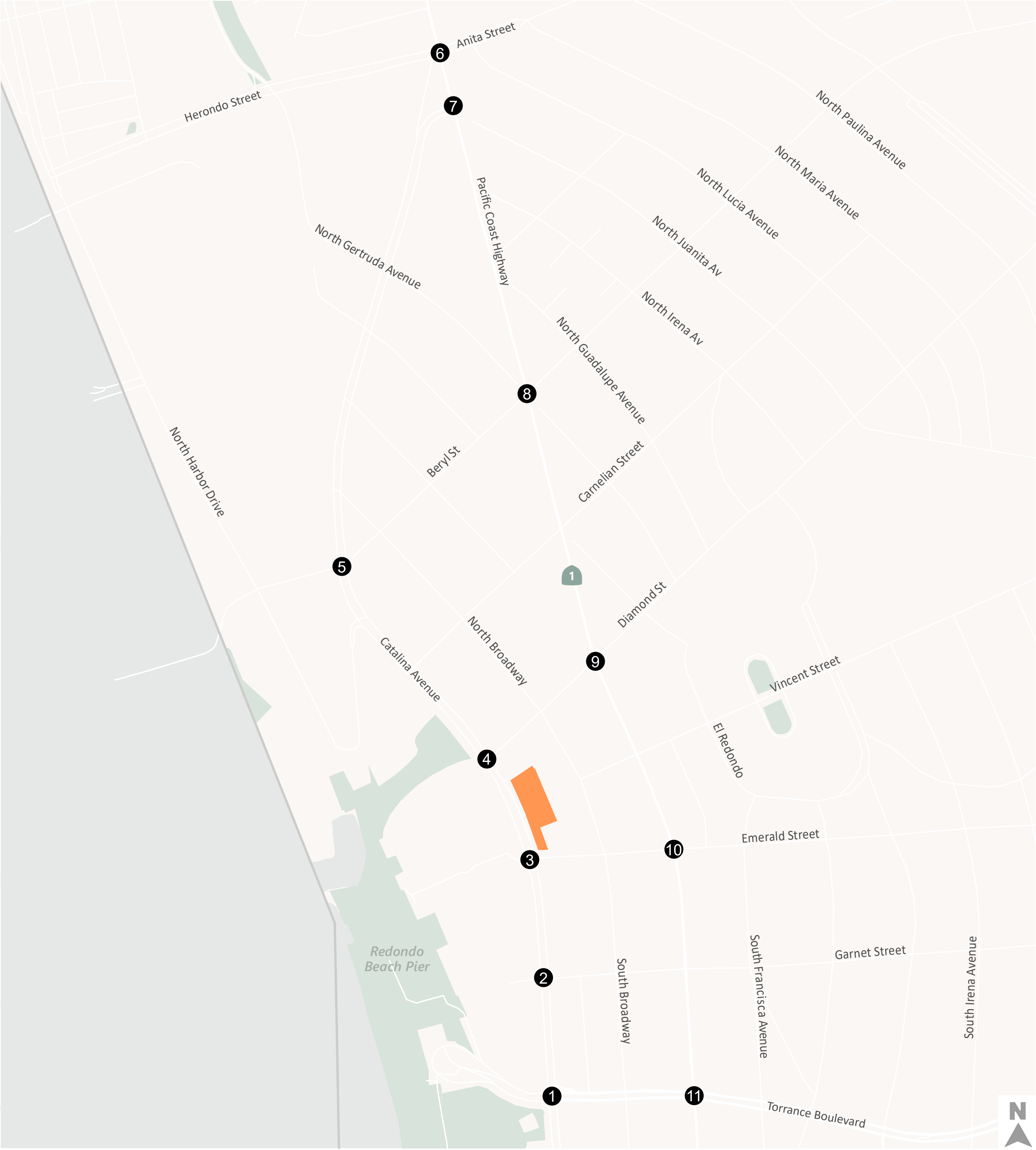
In consultation with City of Redondo Beach staff, the study area for the localized analysis was selected to include the intersections most likely to be affected by traffic generated by the Project. A total of 11 intersections were identified for analysis in the scenarios detailed below. These study intersections are shown in **Figure 2**. Each of the 11 study intersections, listed in **Table 1**, operates under signal control. AM and PM peak hour turning movement volumes were analyzed at these study intersections.

Due to the COVID-19 pandemic, the Existing Conditions analysis for most intersections relies on traffic counts that were collected in Spring 2017, while the traffic counts for the remaining intersections were collected in Spring 2014. An annual growth rate, described in greater detail below, was applied to estimate Year 2020 conditions. Because of the disruption to businesses and schools caused by COVID-19 and the resulting shelter-in-place orders throughout the region, new traffic counts would show lower traffic volumes than what would typically be observed under normal conditions. Therefore, using historical traffic counts and applying a growth rate results in a more conservative analysis.

Table 1 – Study Area Intersections

ID	North-South Street Name	East-West Street Name	Count Date
1	South Catalina Avenue	Torrance Boulevard	Spring 2014
2	South Catalina Avenue	Garnet Street	No Counts Available
3	North Catalina Avenue	Emerald Street	Spring 2014
4	North Catalina Avenue	Diamond Street	Spring 2014
5	North Catalina Avenue	Beryl Street	Summer 2017
6	Pacific Coast Highway	Herondo Street / Anita Street	Spring 2017
7	Pacific Coast Highway	North Catalina Avenue	Spring 2017
8	Pacific Coast Highway	Beryl Street	Spring 2017
9	Pacific Coast Highway	Diamond Street	Spring 2017
10	Pacific Coast Highway	Emerald Street	Spring 2017
11	Pacific Coast Highway	Torrance Boulevard	Spring 2017

Notes: Intersection 2 was analyzed qualitatively because existing traffic counts were not available at the time of the study.



🟧 Project Site

● Study Intersections

Figure 2

Study Intersections

1.2.2 Localized Analysis Scenarios

The scenarios described below were analyzed for this study.

1.2.2.1 Baseline Conditions

- Existing (Year 2020) Conditions – The analysis of Existing traffic conditions using existing counts and geometric lane configurations provides a basis for the remainder of the study and includes an assessment of the street system, traffic volumes, and operating conditions. The peak hour count for each intersection was selected for analysis, and an annual growth rate was applied to estimate Year 2020 conditions. The annual growth rate applied to the 2014 and 2017 traffic volumes was obtained from the Southern California Association of Government's (SCAG) population growth forecast for the City of Redondo Beach, an average annual growth rate of 0.38%.[1] Population growth rates, rather than traffic growth rates, were used to estimate existing Year 2020 conditions because SCAG forecasts a slight decline in average traffic volumes Citywide.
- Cumulative without Project Conditions (Year 2023) – Future traffic conditions are provided in this scenario without the proposed Project. The annual growth rate from the SCAG population growth forecast that was applied to estimate Existing Year 2020 traffic volumes was also applied to estimate future Year 2023 traffic volumes.

Fehr & Peers ran the 2016 SCAG RTP travel demand model and compared the model-assigned traffic on roadways in the City of Redondo Beach citywide between the base year and the forecast year. Because the net change in volumes shows a decline due to transportation infrastructure improvements, land use changes, and policy strategies associated with the RTP and the Sustainable Communities Strategy (SCS), the use of the population growth rate is considered a conservative worst-case analysis.[2] Detail about what the SCAG model is and how it was applied in this analysis is provided below.

While public agencies may rely exclusively upon growth projections for cumulative analyses, the City also incorporated a specific development project near the study area (the Foundry) to produce a highly conservative analysis.

1.2.2.2 Project Conditions

- Existing plus Project Conditions – This scenario provides the basis for the analysis of the effects of the Project's trips on Existing operating conditions. Project trips were assigned to the roadway network based on the trip generation and trip distribution analyses described in this report. This scenario was developed by adding Project trips to the Existing Conditions (2020) without Project scenario detailed above.
- Cumulative plus Project Conditions (Year 2023) – This scenario provides the basis for the analysis of future conditions with traffic generated by the Project. Project trips were assigned to the

---

[1] SCAG Integrated Growth Forecast available online at: http://www.scag.ca.gov/Documents/2016DraftGrowthForecastByJurisdiction.pdf

[2] SCAG 2016 RTP/SCS is available online at: http://scagrtpscs.net/Pages/FINAL2016RTPSCS.aspx

roadway network based on the trip generation and trip distribution analyses described in this report. This scenario was developed by adding Project trips to the Cumulative Conditions (2023) without Project scenario detailed above.

1.2.3 Localized Analysis Methodologies & Operational Effect Criteria

The following section documents the transportation analysis methodologies and thresholds used to evaluate the Project's potential for transportation operational effects.

1.2.4 Trip Generation

Standard trip generation methodologies typically use the Institute of Transportation (ITE) Engineers Trip Generation Manual (10th Edition) to establish trip rates for each individual land use in isolation. However, most of the empirical data used to develop ITE trip generation rates were collected in isolated, suburban settings, and do not accurately predict trip generation for mixed use and urban infill sites with transit proximity and a density, scale, and design that can facilitate walking and biking. Research indicates that the ITE manuals overestimate peak traffic generation for mixed-use development (MXD) by an average of 35%.[3] To overcome this shortcoming of the conventional ITE trip generation procedure, researchers have developed a mixed-use trip generation model. **Appendix A** includes *Getting Trip Generation Right - Eliminating the Bias Against Mixed Use Development* (Walters, Bochner, Ewiing 2013), a summary of the MXD model development, calibration and validation process published by the American Planning Association for their Planning Advisory Service. It includes references to several additional research papers documenting the MXD model development and process.

Reflecting the mixed-use nature of the Project, Fehr & Peers used the mixed-use trip generation model (MXD+). MXD+ represents a substantial improvement over conventional traffic estimation methods. It improves accuracy, virtually eliminates overestimation, and is supported by substantial evidence. The established MXD method developed by Fehr & Peers for the US EPA, and continuously refined through consulting for other state, regional and local clients, is based on:

- Pooled household survey data for 239 MXDs in six diverse US regions.
- Equations on internal trip capture and mode share that were developed using regression statistical analysis of MXD variables that affect trip generation, such as population and employment density, number of bus stops, and other factors to determine a statistically significant model. Additional detail on the variables included in the MXD+ model are summarized in Getting Trip Generation Right.

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[3] Ewing, Reid, Michael Greenwald, Ming Zhang, Jerry Walters, Robert Cervero, Lawrence Frank, and John Thomas. 2011. "Traffic Generated by Mixed-Use Developments — Six-Region Study Using Consistent Built Environmental Measures." ASCE Journal of Urban Planning and Development 137(3): 248–61. https://ascelibrary.org/doi/10.1061/%28ASCE%29UP.1943-5444.0000068

- Validation at 27 existing MXD sites across the US, including mixed-use developments in California, Georgia, Florida, Texas, and Georgia. The mixed-use sites ranged from transit-oriented developments, to suburban mixed-use retail centers.
- Peer reviews.

MXD+ 2.0 accounts for 97% of the statistical variation in trip generation among the 27 validation sites, compared to 65% for the ITE Handbook. It also all but eliminates the Handbook's systematic overestimation of traffic, found to be 35% for the validation sites. MXD+ 2.0 reduces the overestimation to 4%., meaning that the MXD model still slightly overestimates trip generation relative to the actual counted trip generation of the validation sites.

The model starts with ITE trip generation rates for each individual land use, but through the statistical processes of the model, calibrates the ITE rates to reflect the site specific and area contexts of the Project, including its mixture of uses, site and area demographics, accessibility to other land uses, such as adjacent residential development, availability of transit service, pedestrian connectivity, and other factors. The model calibrates ITE rates based on these factors to provide a much more accurate estimate of external project trip generation than the application of ITE trip rates alone. Project trip generation estimates are included in **Table 5** in Chapter 4.

1.2.5 Trip Distribution

A travel demand model is a tool that uses population, employment, and other demographic data to mathematically forecast transportation demand (usually in the form of traffic volumes on roadway links). Travel models typically have three or four steps: trip generation, trip distribution, mode-choice (if the model is a four-step model), and trip assignment. Using various mathematical equations the model will take input data from a set of transportation analysis zones (TAZs) that divide geographies (such as the City of Redondo Beach) into subareas, calculate trip generation for the TAZs based on different trip rates associated with different land uses, and distribute and assign those trips to different TAZs based on a series of equations that calculate the relative attractiveness of a particular zone (for example a zone with a lot of employment), and the shortest travel path to get to that TAZ. More complex models will include the mode-choice step, which uses probabilities to estimate how many trips could be vehicle trips versus transit trips. Ultimately, the primary use of the model is to estimate aggregate demand for travel on the street network.

To develop a trip distribution pattern for the Project, the Southern California Association of Governments (SCAG) 2016 Regional Transportation Plan (RTP) Travel Demand Model, which is the most recent available regionally valid travel demand model, was used.[4] The SCAG model is a trip-based four-step model used to forecast travel demand for the RTP and can be used for the analysis of localized projects. The model development and validation process is described by SCAG in SCAG Regional Travel Demand Model and

---

[4] The SCAG 2020 RTP Travel Demand Model is in development but has not yet been made widely available for use at the time of this study.

2012 Model Validation (SCAG 2016).[5] The model uses TAZ data as described above to estimate future transportation demand.

The SCAG model was used to run a select zone analysis for the TAZ that contains the Project site. A select zone analysis tracks trips generated by, or attracted to, the Project TAZ through the street network, and quantifies the percentage of Project TAZ trips assigned to particular roadways. The SCAG model assignment accounts for congested travel time on roadways and iteratively assigns trips until equilibrium is reached (e.g. no trips can be assigned to a quicker route than the route they are assigned).

Based on the evaluation of the select zone assignment analysis, Fehr & Peers developed a trip distribution pattern for the Project. **Figure 5** in Chapter 4 shows the trip distribution for the Project.

1.2.6 Signalized Intersection Operational Effect Analysis

1.2.6.1 Analysis Methodology

Consistent with past City practice, all study intersections were analyzed using the Intersection Capacity Utilization (ICU) methodology because each study intersection is signalized. The ICU methodology is used to determine the intersection V/C ratio and corresponding level of service (LOS) for the turning movements and intersection characteristics at the signalized intersections. The ICU value is calculated by summing the V/C ratio sum of the critical movements, plus a factor for yellow signal time. AM and PM peak hour ICU ratios and levels of service (LOS) were calculated using the Fehr & Peers' ICU spreadsheet tool. Lane capacity assumptions do not exceed 1,600 vehicles per lane per hour. This methodology addresses operational effects on all motor vehicles utilizing City of Redondo Beach roadways, including transit vehicles.

1.2.6.2 Thresholds of Evaluation

The following thresholds of evaluation for the incremental increase in ICU ratio were used to assess transportation operational effects at the study intersections. The level of effect of the Project's incremental increase in the ICU ratio is dependent upon the underlying LOS value for that specific peak hour based on the following operational thresholds:

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[5] SCAG Regional Travel Demand Model and 2012 Model Validation: http://www.scag.ca.gov/Documents/SCAG_RTDM_2012ModelValidation.pdf

Intersection LOS Under Without Project Conditions	Change in Volume to Capacity (Future w/Project less Future w/o Project)
A	----
B	----
C	0.040
D	0.020
E	0.010
F	0.010

1.3 Organization of the Report

This report is divided into five chapters, including this introduction. Chapter 2 introduces the localized analysis and documents Existing Conditions in the study area. Chapter 3 describes the methodologies used to develop traffic forecasts for the Cumulative (2023) Without Project scenario and assesses Cumulative operating conditions. Chapter 4 summarizes the methodologies to forecast Project conditions and includes an assessment of the Project’s potential transportation operational effects compared with the Existing and Cumulative baseline scenarios. Chapter 5 summarizes the results of the study.

2. Existing (2020) Conditions

This chapter details the comprehensive data collection and analysis effort undertaken to assess Existing Conditions in the study area.

2.1 Existing Roadway Facilities

The street network in the City of Redondo Beach is primarily gridded with good connectivity. A few large land uses, including the AES Power Plant, Sea Hawk Stadium, and Redondo Union High School contribute to a "super-block" roadway network. Arterial streets in the study area generally provide two to three vehicle travel lanes in each direction, with left-turn pockets at most intersections and right-turn pockets at some intersections. Posted travel speeds in the study area range from 35 to 50 miles per hour (mph), with the majority of streets allowing travel up to 35 mph. As described in detail below, regional access to the Project site is provided by PCH and a network of arterial and collector streets. The arterial street network that serves the proposed project area includes Anita Street, Beryl Street, Catalina Avenue, Herondo Street, and Torrance Boulevard. The local streets include Diamond Street, Emerald Street, and Garnet Street. The following describes the key roadway facilities that serve the project site:

The following details the key roadway facilities that serve the Project site:

- Pacific Coast Highway (State Route 1) - PCH is a 4-lane north/south major arterial. Left-turn lanes are provided at major intersections. A raised median is provided south of Avenue H. On-street parking is prohibited along sections of PCH at Torrance Boulevard, Catalina Avenue and Diamond Street, and generally permitted elsewhere. As a state route, PCH is under the jurisdiction of Caltrans.

- Anita Street - Anita Street is an east/west major arterial that runs east of Pacific Coast Highway (PCH) with two lanes in each direction. Between Maria and Prospect Avenue, it has a center turning lane. East of Prospect, there are left-turn pockets at most intersections, with a raised median. On-street parking is generally permitted on both sides of Anita Street.

- Beryl Street - Beryl Street is an east-west secondary arterial that runs from Harbor Drive to 190th Street. Between Prospect Street and Catalina Avenue, Beryl Street has one lane in each direction with a center turning lane. Beryl Street narrows to two lanes east of Flagler Lane. On- street parking is permitted between Catalina Avenue and Flagler Lane.

- Catalina Avenue - Catalina Avenue is a 4-lane north/south secondary arterial that runs from PCH near the northern City boundary to Palos Verdes Boulevard at the southern City boundary. On-street parking is metered on the west side from Carnelian Street to Torrance Boulevard and on the east side from Emerald Street to Pearl Street. On-street parking is metered on both the west and east side from Avenue I to Palos Verdes Boulevard. It has a raised median between Beryl Street and Torrance Boulevard.

- Herondo Street - Herondo Street is an east/west secondary arterial that runs from PCH to Harbor Drive with one lane in each direction. It has a raised median, and left-turn pockets are provided at most intersections. Diagonal on-street parking is generally provided on both sides of Herondo Street. On-street striped bike lanes are also provided.
- Torrance Boulevard - Torrance Boulevard is a 4-lane east/west major arterial that ends in a cul- de-sac west of Catalina Avenue. On-street parking is permitted along most of its length in the study area.
- Diamond Street – Diamond Street is a 2-lane east/west collector with a shared left-turn lane that runs from Catalina Avenue to Prospect Avenue. On-street parking is provided on both sides of the street.
- Emerald Street – Emerald Street is a 2-lane east/west local street that runs from Catalina Avenue to Edgemere Drive. East of Edgemere Drive, it continues on as Wayne Avenue. On-street parking is provided on both sides of the street.
- Garnet Street – Garnet Street is a 4-lane east/west collector between Catalina Avenue and PCH. East of PCH, it continues as local street with one lane in each direction, ending at Prospect Avenue. On-street parking is provided on both sides of the street in the study area.

2.2 Existing Pedestrian and Bicycle Facilities

Sidewalks are generally present throughout the study area and Project site, and marked crosswalks are provided at all major arterial intersections. Most signalized intersections of major arterials and collector streets in the study area provide marked crossings on all four legs of the intersection, while some do not provide crossing facilities on all four legs of the intersection. Pedestrian access to the Project site is provided via a sidewalk on Catalina Avenue, with marked crosswalks provided at the intersection of Catalina Avenue and Emerald Street and Catalina Avenue and Diamond Street.

Class I bicycle facilities in the study area include the bicycle path/cycle track connecting the Hermosa Beach Strand to the Redondo Beach Pier. Class II bicycle lanes are located on Herondo Street west of the PCH, Catalina Avenue north of Torrance Boulevard and south of Pacific Avenue, and Diamond Street. A Class III bicycle route is located on Catalina Avenue south of Torrance Boulevard. The South Bay Bicycle Master Plan indicates that additional Class I, II, and III facilities are planned throughout the study area. Existing and planned bicycle facilities are presented in **Figure 3**. Bicycle access to the Project site is provided via a Class II bicycle lane on the east side of Catalina Avenue.

2.3 Existing Public Transit Facilities

The study area is served by several bus routes operated by four transit operators, including the Los Angeles County Metropolitan Transportation Authority (Metro), Los Angeles Department of Transportation Commuter Express (CE), Beach Cities Transit (BCT), and Torrance Transit (TT). **Figure 4** illustrates transit routes in the study area. The following details each individual line that serves the study area. Importantly, the information presented regarding weekday peak period headways is reflective of COVID-19 conditions.

- Metro Line 130 - Metro Line 130 provides local service between the Los Cerritos Center in Cerritos and Redondo Beach. In the study area, Line 130 travels north and south along Harbor Boulevard and Catalina Avenue. Service is provided seven days per week, with weekday peak period headways of approximately 20 to 30 minutes.

- Metro Line 232 - Metro Line 232 provides local service between the LAX bus center and Downtown Long Beach. In the study area, Line 232 travels north and south along PCH. Service is provided seven days per week with weekday peak period headways of approximately 10 to 20 minutes.

- CE Line 438 - Commuter Express (CE) Line 438 (operated by LADOT) provides express service between Downtown Los Angeles and the City of Redondo Beach. In the study area, Line 438 travels north and south along Harbor Drive and Catalina Avenue. Service is provided Monday through Friday, with peak period headways of approximately 15 minutes.

- BCT Line 102 - Beach Cities Transit (BCT) Line 102 provides local service between the Metro Green Line, the South Bay Galleria, and the Redondo Beach Pier. In the study area, Line 102 travels north and south along Catalina Avenue and northeast and southwest along Diamond Street. Service is provided seven days per week, with weekday peak period headways of approximately 30 to 45 minutes.

- BCT Line 109 - BCT Line 109 provides local service between the LAX Bus Center, Redondo Beach Pier, and Riviera Village. In the study area, Line 109 travels north and south along Catalina Avenue. Service is provided seven days per week, with weekday peak period headways of approximately 40 to 50 minutes.

- TT Line 3 - Torrance Transit (TT) Line 3 provides local service between Downtown Long Beach and the Redondo Beach Pier. In the study area, Line 3 travels east and west along Torrance Boulevard. Service is provided seven days per week, with weekday peak period headways of approximately 10 to 15 minutes.

- TT Line 7 - Line 7 provides local service between Carson and the Redondo Beach Pier. In the study area, Line 7 travels east and west along Torrance Boulevard. Service is provided Monday through Saturday, with weekday peak period headways of approximately 15 minutes.

N:\Projects\Active\2020\0012_100-132 N Catalina Ave\Graphics\GIS\MXD\CatalinaRedondo_Bikeways.mxd

	Existing	Proposed
Bike Route	▬	▪▪▪▪
Bike Lane	▬	▪▪▪▪
Bike Path	▬	
Cycle Track	▬	

Figure 3

Existing and Proposed Bikeways

N:\Projects\Active\2020\0012_100-132 N Catalina Ave\Graphics\GIS\MXD\CatalinaRedondo_Transit.mxd

Figure 4

Transit Routes

2.4 Existing Intersection Operating Conditions

This section details Existing intersection operating conditions, including the peak hour turning movement traffic volumes developed for the intersections analyzed in the study, as well as the resulting operating conditions at each intersection, analyzed by the calculation of volume-to-capacity (V/C) ratios, and the corresponding LOS.

2.4.1 Intersection Lane Geometries

A detailed field review of each study intersection was conducted to document the Existing geometric lane configurations to be used as input to the LOS analysis.

2.4.2 Intersection Traffic Volumes

To analyze Existing Conditions, weekday morning and afternoon peak period intersection turning movement counts were conducted at the study intersections in the spring/summer of 2017 and spring of 2014. The maximum peak hour traffic volumes for each intersection from the combined data sets were selected to reflect peak volumes at each intersection, regardless of the season. As described above, these counts were grown using the SCAG population growth forecast for Redondo Beach to reflect Year 2020 conditions.

Peak hour turning movement volumes, as well as intersection lane configurations are included in **Appendix B**. Traffic count data sheets are provided in **Appendix C**.

2.4.3 Level of Service Methodology

LOS is a qualitative measure used to describe the condition of traffic flow on the street system, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. All 11 study intersections are signalized. As described in Chapter 1, the Intersection Capacity Utilization (ICU) methodology was used to analyze these intersections. LOS definitions for the ICU methodology are provided in **Table 2**.

The ICU method of intersection analysis was used to determine the intersection V/C ratio and corresponding LOS for the turning movements and intersection characteristics. The ICU value is determined by summing the V/C ratio sum of the critical movements, plus a factor for yellow signal time.

Table 2 – Level of Service Definitions for Signalized Intersections – ICU Methodology

Level of Service	Intersection Capacity Utilization (ICU)	Definition
A	0.000-0.600	**EXCELLENT.** No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601-0.700	**VERY GOOD.** An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701-0.800	**GOOD.** Occasionally drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801-0.900	**FAIR.** Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901-1.000	**POOR.** Represents the most vehicles intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	>1.000	**FAILURE.** Backups from nearby locations or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: Adapted from Transportation Research Board

2.4.4 Level of Service Results

The Existing peak hour traffic volumes shown in **Appendix B** were analyzed using the ICU methodology described above to determine the Existing operating conditions at the 11 study intersections selected for analysis under Existing Conditions. LOS calculation worksheets are included in **Appendix D**.

Table 3 summarizes the results of the AM and PM peak hour intersection analysis. As shown in **Table 3**, the following intersection operates at LOS E during the AM and PM peak hour under Existing Conditions. All other intersections currently operate at LOS D or better during both peak hours.

6) Pacific Coast Highway & Herondo Street/Anita Street (AM & PM peak hour)[6]

Intersection 2 (Catalina Avenue & Garnet Street) is located directly north of Intersection 1 (Catalina Avenue & Torrance Boulevard) and directly south of Intersection 3 (Catalina Avenue & Emerald Street) and likely has peak hour traffic volumes that are comparable to the peak hour traffic volumes at those intersections, particularly in the north-south directions of travel. Given that Intersections 1 and 3 operate at LOS A during

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[6] The lane configuration shown in Appendix B differs from what is shown in Appendix D. Additional right turn lanes are shown for the eastbound and southbound approaches to distinguish between vehicles turning onto the Pacific Coast Highway and vehicles turning onto Catalina Avenue.

both peak hours under Existing conditions, it is estimated that Intersection 2 also operates at LOS A under this scenario.

TABLE 3
EXISTING CONDITIONS INTERSECTION LEVEL OF SERVICE

Int	N/S Street Name	E/W Street Name	Peak Hour	LOS	V/C
1	South Catalina Avenue	Torrance Boulevard	AM	A	0.448
			PM	A	0.503
2	South Catalina Avenue [a]	Garnet Street [a]	AM	-	-
			PM	-	-
3	South Catalina Avenue	Emerald Street	AM	A	0.459
			PM	A	0.449
4	South Catalina Avenue	Diamond Street	AM	A	0.439
			PM	A	0.458
5	South Catalina Avenue	Beryl Street	AM	A	0.444
			PM	B	0.666
6	Pacific Coast Highway	Herondo/Anita Street	AM	**E**	**0.972**
			PM	**E**	**0.948**
7	Pacific Coast Highway	North Catalina Avenue	AM	D	0.840
			PM	D	0.817
8	Pacific Coast Highway	Beryl Street	AM	C	0.734
			PM	D	0.884
9	Pacific Coast Highway	Diamond Street	AM	C	0.793
			PM	C	0.733
10	Pacific Coast Highway	Emerald Street	AM	C	0.747
			PM	B	0.676
11	Pacific Coast Highway	Torrance Boulevard	AM	D	0.844
			PM	D	0.818

Note: Intersections operating at LOS E or F are noted in **Bold**.

[a] Intersection 2 was not analyzed using the ICU methodology because existing counts were not available to inform the analysis, requiring a qualitative analysis to be performed for this intersection instead.

3. Cumulative (2023) Conditions

This chapter details the traffic volume forecasts prepared to evaluate Cumulative conditions, and the resulting forecasted Cumulative operating conditions.

3.1 Cumulative Without Project (2023) Operating Conditions

3.1.1 Intersection Lane Geometries

Study intersections are expected to remain consistent with their Existing lane geometries under the Cumulative without Project scenario.

3.1.2 Intersection Traffic Volumes

To estimate Cumulative (2023) Without Project traffic volumes, the Existing (2020) traffic volumes were increased by 0.38% per year, (1.14% total growth over three years), using the SCAG population growth rate. CEQA typically allows a public agency to rely upon (1) growth projections, and/or (2) a list of projects for assessing cumulative impacts. As described in Chapter 1, in addition to forecasted growth projections, the City also incorporated a specific development project near the study area (the Foundry) to produce a highly conservative cumulative analysis. Cumulative without Project AM and PM peak hour traffic volumes are illustrated in **Appendix B**.

3.1.3 Level of Service Methodology

The AM and PM peak hour Cumulative (2019) without Project traffic volumes and intersection lane geometries were analyzed using the ICU methodology documented above.

3.1.4 Level of Service Results

As shown in **Table 4**, of the 11 study area intersections, one intersection is projected to operate at LOS E during both peak hours:

6) PCH/Catalina Avenue & Herondo Street/Anita Street (AM & PM peak hour)[7]

All other intersections are estimated to operate at LOS D or better during both peak hours. Given that Intersections 1 and 3 operate at LOS A during both peak hours under Cumulative without Project conditions, it is estimated that Intersection 2 also operates at LOS A under this scenario. Detailed LOS worksheets are provided in **Appendix D**.

---

[7] The lane configuration shown in Appendix B differs from what is shown in Appendix D. Additional right turn lanes are shown for the eastbound and southbound approaches to distinguish between vehicles turning onto the Pacific Coast Highway and vehicles turning onto Catalina Avenue.

TABLE 4
CUMULATIVE WITHOUT PROJECT CONDITIONS INTERSECTION LEVEL OF SERVICE

Int	N/S Street Name	E/W Street Name	Peak Hour	LOS	V/C
1	South Catalina Avenue	Torrance Boulevard	AM	A	0.451
			PM	A	0.509
2	South Catalina Avenue [a]	Garnet Street [a]	AM	-	-
			PM	-	-
3	South Catalina Avenue	Emerald Street	AM	A	0.462
			PM	A	0.451
4	South Catalina Avenue	Diamond Street	AM	A	0.441
			PM	A	0.461
5	South Catalina Avenue	Beryl Street	AM	A	0.449
			PM	B	0.671
6	Pacific Coast Highway	Herondo/Anita Street	AM	**E**	**0.982**
			PM	**E**	**0.956**
7	Pacific Coast Highway	North Catalina Avenue	AM	D	0.846
			PM	D	0.824
8	Pacific Coast Highway	Beryl Street	AM	C	0.740
			PM	D	0.892
9	Pacific Coast Highway	Diamond Street	AM	D	0.801
			PM	C	0.739
10	Pacific Coast Highway	Emerald Street	AM	C	0.754
			PM	B	0.682
11	Pacific Coast Highway	Torrance Boulevard	AM	D	0.852
			PM	D	0.828

Note: Intersections operating at LOS E or F are noted in **Bold**.

[a] Intersection 2 was not analyzed using the ICU methodology because existing counts were not available to inform the analysis, requiring a qualitative analysis to be performed for this intersection instead.

3.1.5 Cumulative without Project Pedestrian and Bicycle Conditions

No substantial changes to the pedestrian and bicycle system are expected under Cumulative without Project conditions by 2023, although the South Bay Bicycle Master Plan indicates that additional Class I, II, and III facilities are planned in the study area.

3.1.6 Cumulative without Project Transit Conditions

No substantial changes to the transit system are expected under Cumulative without Project conditions, though the SCAG RTP anticipates increases in transit ridership in the future. The Metro C Line (Green) Extension to Torrance is a planned regional transit project on the east side of the City of Redondo Beach, but is not expected to be implemented by the 2023 Project opening year.

4. Project Conditions & Operational Effects Analysis

This chapter details the assessment of traffic conditions with the completion of the Project.

4.1 Project Trip Generation

The MXD+ model was used in combination with trip rates from ITE's *Trip Generation 10th Edition* to estimate Project trip generation. A summary of the input data the model is sensitive to, and the accuracy benefits of the MXD+ model over traditional ITE trip generation methods, are described above in Chapter 1. Based on the outputs from the MXD+ model, internal capture and walk/bike credits were applied to the trip generation estimates derived from the ITE rates. Accounting for these credits, and an additional credit for the existing land uses on the Project site, the Project is estimated to generate a net increase of 525 daily trips, 108 AM peak hour trips (51 inbound, 57 outbound), and 47 PM peak hour trips (27 inbound, 20 outbound). **Table 5** presents the Project trip generation estimates.

Importantly, the operational effects analysis presented in this report is based on a previous version of the Project trip generation estimates that does not account for the existing land uses on the Project site or the distinct trip generation rates that were applied to the affordable housing units in **Table 5**. As such, the operational effects analysis is more conservative than what would result from applying the Project trip generation estimates shown in **Table 5**. Because no operational effects were found under existing or cumulative conditions using the more conservative trip generation estimates, it is expected that operations may improve somewhat at the study intersections if the trip generation estimates shown in **Table 5** were applied, but the conclusions of the study would not be altered. For the operational effects analysis, it is assumed that the Project is estimated to generate a net increase of 745 daily trips, 115 AM peak hour trips (55 inbound, 60 outbound), and 69 PM peak hour trips (38 inbound, 31 outbound).

4.2 Project Trip Distribution

As described in Chapter 1, the SCAG travel demand model was used to run a select zone analysis for the TAZ that contains the Project. Fehr & Peers developed a trip distribution pattern from the model, taking into account the hierarchy of streets in the study area and areas of known congestion. The trip generation estimates were then assigned to the roadway network based on this distribution pattern. Project-Only traffic volumes reflecting this trip distribution/assignment pattern are provided in **Appendix B**, and trip distribution percentages are shown in **Figure 5**.

TABLE 5
CATALINA VILLAGE PROJECT
VEHICLE TRIP GENERATION ESTIMATES

			Trip Generation Rates [a]							Estimated Trip Generation						
				AM Peak Hour			PM Peak Hour				AM Peak Hour Trips			PM Peak Hour Trips		
Land Use	ITE Land Use Code	Size	Daily	Rate	In%	Out%	Rate	In%	Out%	Daily	In	Out	Total	In	Out	Total
PROPOSED PROJECT																
Multifamily Residential (Low-Rise)	220	26 DU	7.32	0.46	23%	77%	0.56	63%	37%	190	3	9	12	9	6	15
Multifamfily Residential (Affordable)	[b]	4 DU	4.16	0.52	38%	62%	0.38	55%	45%	17	1	1	2	1	1	2
Coffee Shop [c]	936	1.784 ksf	364.35	101.14	51%	49%	36.31	50%	50%	650	92	88	180	33	32	65
Internal Capture [d]			*1%*		*3%*	*3%*		*6%*	*6%*	(6)	(3)	(3)	(6)	(2)	(2)	(4)
Walk/Bike [e]			*37%*		*40%*	*40%*		*29%*	*29%*	(242)	(37)	(36)	(73)	(10)	(9)	(19)
Net External Coffee Shop										402	52	49	101	21	21	42
Tasting Room [f]	925	1.279 ksf	155.30	-	-	-	11.36	66%	34%	199	0	0	0	10	5	15
Internal Capture [d]			*1%*					*6%*	*6%*	(2)	0	0	0	(1)	0	(1)
Walk/Bike [d]			*37%*					*29%*	*29%*	(74)	0	0	0	(3)	(1)	(4)
Net External Tasting Room										123	0	0	0	6	4	10
Total External Vehicle Trips										*732*	*56*	*59*	*115*	*38*	*32*	*69*
EXISTING USE CREDIT																
General Office	710	1.3 ksf	9.74	1.16	86%	14%	1.15	16%	84%	(13)	(2)	0	(2)	0	(1)	(1)
Commercial Retail	820	8.3 ksf	37.75	0.94	62%	38%	3.81	48%	52%	(313)	(5)	(3)	(8)	(15)	(17)	(32)
Internal Capture [d]			*1%*		*3%*	*3%*		*6%*	*6%*	3	0	0	0	1	1	2
Walk/Bike [e]			*37%*		*40%*	*40%*		*29%*	*29%*	116	2	1	3	4	5	9
Net Commercial Retail										(194)	(3)	(2)	(5)	(10)	(11)	(21)
Total Existing Use Credit										*(207)*	*(5)*	*(2)*	*(7)*	*(10)*	*(12)*	*(22)*
NET EXTERNAL VEHICLE TRIPS										525	51	57	108	27	20	47

Notes:

[a] Source: Institute of Transportation Engineers (ITE), *Trip Generation, 10th Edition* , 2017. Unless otherwise notes, all rates are Peak Hour of Adjacent Street Traffic.

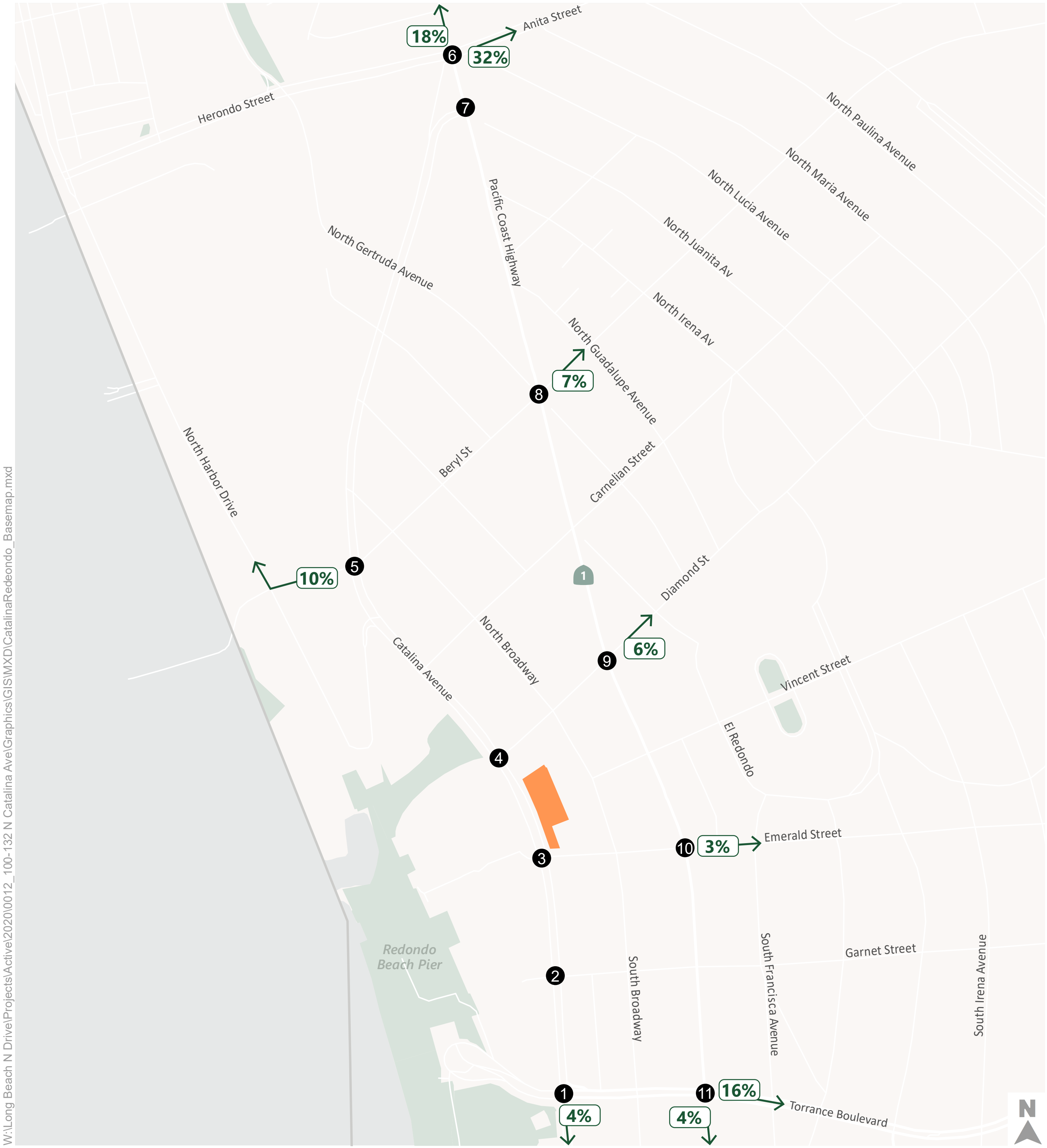
[b] Source: City of Los Angeles' Local Affordable Housing Trip Generation Study (see Appendix B).

[c] The number of daily trips was estimated to be 10 times greater than the total PM peak hour trips.

[d] Internal capture represents the percentage of trips between land uses that occur within the site. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[e] The Walk/Bike credit includes non-auto trips from the surrounding neighborhood. This percentage is informed by the Fehr & Peers Mainstreet/MXD+ tool, which uses census data to account for demographic characteristics of the area surrounding the project site, including residential density and local employment.

[f] The number of daily trips was estimated to be 10 times greater than the total PM Peak Hour trips based on the PM Peak Hour of the Generator rate (15.53 trips/ksf).



🟧 Project Site

● Study Intersections

→ Trip Distribution

Figure 5

Trip Distribution

4.3 Existing Plus Project Conditions

4.3.1 Intersection Traffic Volumes

The Project-only AM and PM peak hour traffic volumes described above were added to the Existing traffic volumes to develop Existing plus Project traffic volumes.

4.3.2 Level of Service Methodology

The AM and PM peak hour Existing plus Project traffic volumes and intersection lane geometries were analyzed using the ICU methodology documented above.

4.3.3 Level of Service Results

Table 6 summarizes the results of the AM and PM peak hour intersection LOS analysis for Existing plus Project conditions. The following intersection is projected to operate at LOS E during both peak hours under this scenario:

6) PCH & Herondo Street/Anita Street (AM & PM peak hours)[8]

To determine the Project's operational effects under existing conditions, the City compared (1) the Existing (2020) plus Project Conditions scenario, against (2) the Existing (2020) Conditions scenario. As shown in **Table 6**, after applying the City of Redondo Beach operational effect criteria detailed in Chapter 1, the Project is not expected to result in a substantial traffic operational effect at any study intersection during either peak hour under Existing plus Project conditions. Given that Intersections 1 and 3 operate at LOS A during both peak hours under Existing plus Project conditions, it is estimated that Intersection 2 also operates at LOS A under this scenario.

---

[8] The lane configuration shown in Appendix B differs from what is shown in Appendix D. Additional right turn lanes are shown for the eastbound and southbound approaches to distinguish between vehicles turning onto the Pacific Coast Highway and vehicles turning onto Catalina Avenue.

TABLE 6
EXISTING PLUS PROJECT LEVEL OF SERVICE

Int	N/S Street Name	E/W Street Name	Peak Hour	EX		EP		Change in V/C	Operational Effect?
				LOS	V/C	LOS	V/C		
1	South Catalina Avenue	Torrance Boulevard	AM	A	0.448	A	0.454	0.006	NO
			PM	A	0.503	A	0.509	0.006	NO
2	South Catalina Avenue [a]	Garnet Street [a]	AM	-	-	-	-	-	-
			PM	-	-	-	-	-	-
3	South Catalina Avenue	Emerald Street	AM	A	0.459	A	0.491	0.032	NO
			PM	A	0.449	A	0.469	0.020	NO
4	South Catalina Avenue	Diamond Street	AM	A	0.439	A	0.459	0.020	NO
			PM	A	0.458	A	0.459	0.001	NO
5	South Catalina Avenue	Beryl Street	AM	A	0.444	A	0.451	0.007	NO
			PM	B	0.666	B	0.672	0.006	NO
6	Pacific Coast Highway	Herondo/Anita Street	AM	**E**	**0.972**	**E**	**0.974**	**0.002**	**NO**
			PM	**E**	**0.948**	**E**	**0.953**	**0.005**	**NO**
7	Pacific Coast Highway	North Catalina Avenue	AM	D	0.84	D	0.852	0.012	NO
			PM	D	0.817	D	0.826	0.009	NO
8	Pacific Coast Highway	Beryl Street	AM	C	0.734	C	0.739	0.005	NO
			PM	D	0.884	D	0.889	0.005	NO
9	Pacific Coast Highway	Diamond Street	AM	C	0.793	C	0.798	0.005	NO
			PM	C	0.733	C	0.739	0.006	NO
10	Pacific Coast Highway	Emerald Street	AM	C	0.747	C	0.750	0.003	NO
			PM	B	0.676	B	0.682	0.006	NO
11	Pacific Coast Highway	Torrance Boulevard	AM	D	0.844	D	0.850	0.006	NO
			PM	D	0.818	D	0.821	0.003	NO

Note: Intersections operating at LOS E or F are noted in **Bold**.

[a] Intersection 2 was not analyzed using the ICU methodology because existing counts were not available to inform the analysis, requiring a qualitative analysis to be performed for this intersection instead.

4.4 Cumulative Plus Project Conditions

4.4.1 Intersection Traffic Volumes

The Project-only AM and PM peak hour traffic volumes described above were added to the Cumulative without Project traffic volumes to develop Cumulative plus Project traffic volumes.

4.4.2 Level of Service Methodology

The AM and PM peak hour Cumulative plus Project traffic volumes and intersection lane geometries were analyzed using the ICU methodology documented above.

4.4.3 Level of Service Results

Table 7 summarizes the results of the AM and PM peak hour intersection LOS analysis for Cumulative plus Project conditions. Based on the analysis, the following intersection is projected to operate at LOS E during both peak hours under this scenario:

6) PCH & Herondo Street/Anita Street (AM & PM peak hours)[9]

To determine the Project's operational effects under Cumulative conditions, the City compared: (1) the Cumulative plus Project Conditions (2023) scenario, against (2) the Cumulative Conditions (2023) Without Project scenario. As shown in **Table 7**, after applying the City of Redondo Beach operational effect criteria detailed in Chapter 1, the Project is not expected to result in substantial traffic operational effects at any study intersection during either peak hour under Cumulative plus Project conditions. Given that Intersections 1 and 3 operate at LOS A during both peak hours under Cumulative plus Project conditions, it is estimated that Intersection 2 also operates at LOS A under this scenario.

4.5 City of Redondo Beach General Plan LOS Consistency Check

The City of Redondo Beach's General Plan Circulation Element includes a policy to maintain LOS D at City intersections, where feasible. The addition of Project trips to the street network does not degrade operations below LOS D at any study intersections. While one study intersection, Pacific Coast Highway & Herondo Street/Anita Street, operates at LOS E under Existing conditions and Cumulative without Project conditions, the addition of Project trips does not degrade operations beyond the existing level of service.

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[9] The lane configuration shown in Appendix B differs from what is shown in Appendix D. Additional right turn lanes are shown for the eastbound and southbound approaches to distinguish between vehicles turning onto the Pacific Coast Highway and vehicles turning onto Catalina Avenue.

TABLE 7
CUMULATIVE PLUS PROJECT CONDITIONS LEVEL OF SERVICE

Int	N/S Street Name	E/W Street Name	Peak Hour	CB		CP		Change in V/C	Operational Effect?
				LOS	V/C	LOS	V/C		
1	South Catalina Avenue	Torrance Boulevard	AM	A	0.452	A	0.458	0.006	NO
			PM	A	0.508	A	0.514	0.006	NO
2	South Catalina Avenue [a]	Garnet Street [a]	AM	-	-	-	-	-	-
			PM	-	-	-	-	-	-
3	South Catalina Avenue	Emerald Street	AM	A	0.463	A	0.494	0.031	NO
			PM	A	0.452	A	0.471	0.019	NO
4	South Catalina Avenue	Diamond Street	AM	A	0.442	A	0.461	0.019	NO
			PM	A	0.462	A	0.463	0.001	NO
5	South Catalina Avenue	Beryl Street	AM	A	0.448	A	0.455	0.007	NO
			PM	B	0.672	B	0.677	0.005	NO
6	Pacific Coast Highway	Herondo/Anita Street	AM	**E**	**0.981**	**E**	**0.984**	**0.003**	**NO**
			PM	**E**	**0.957**	**E**	**0.961**	**0.004**	**NO**
7	Pacific Coast Highway	North Catalina Avenue	AM	D	0.849	D	0.858	0.009	NO
			PM	D	0.825	D	0.834	0.009	NO
8	Pacific Coast Highway	Beryl Street	AM	C	0.741	C	0.744	0.003	NO
			PM	D	0.893	D	0.898	0.005	NO
9	Pacific Coast Highway	Diamond Street	AM	D	0.802	D	0.804	0.002	NO
			PM	C	0.740	C	0.745	0.005	NO
10	Pacific Coast Highway	Emerald Street	AM	C	0.754	C	0.756	0.002	NO
			PM	B	0.683	B	0.688	0.005	NO
11	Pacific Coast Highway	Torrance Boulevard	AM	D	0.853	D	0.858	0.005	NO
			PM	D	0.826	D	0.831	0.005	NO

Note: Intersections operating at LOS E or F are noted in **Bold**.

[a] Intersection 2 was not analyzed using the ICU methodology because existing counts were not available to inform the analysis, requiring a qualitative analysis to be performed for this intersection instead.

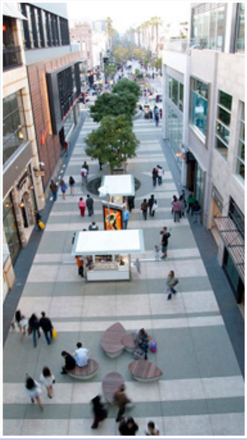
5. Summary

This study was prepared to analyze the potential operational effects associated with the Catalina Village Project. The following summarizes the results of the study:

- The Project involves the construction of 30 three-story mixed income apartment units and would preserve and retrofit approximately 3,000 square feet of commercial retail buildings, replacing the existing commercial uses on the site with a 1,784 square foot coffee shop and a 1,279 square foot beer tasting room. Site access would be provided via two driveways on Catalina Avenue, and the Project would provide 77 parking stalls, with an additional 7 parking spaces available on-street in front of the commercial retail uses.
- In consultation with City of Redondo Beach staff, the study area was selected to include the intersections most likely to be affected by traffic generated by the Project. A total of 11 intersections where identified for analysis, all of them operating under signal control. All intersections were analyzed using the ICU methodology per the City's requirements, with the exception of Intersection 2 (Catalina Avenue & Garnet Street), which was analyzed qualitatively due to a lack of existing traffic counts. New traffic counts could not be obtained because of the COVID-19 pandemic.
- The Project's potential for substantial traffic operational effects was assessed against an Existing baseline (2020), as well as a Cumulative Baseline (2023).
- The Project is not expected to have any operational effects compared to both the Existing baseline and the Cumulative baseline. Under baseline and plus project conditions, all intersections operate at LOS D or better, with the exception of Intersection 6 (Pacific Coast Highway & Herondo Street/Anita Street), which operates at LOS E under all scenarios.
- The Project is not expected to significantly degrade transit operations and facilities or pedestrian and bicycle modes.

Appendix A:

MXD Model Documentation



GETTING TRIP GENERATION RIGHT

Eliminating the Bias Against Mixed Use Development

By Jerry Walters, Brian Bochner, and Reid Ewing

APA

American Planning Association

Making Great Communities Happen

Originally published as a PAS Memo by the American Planning Association (APA) in May 2013. PAS Memo is a bimonthly online publication of APA's Planning Advisory Service, a subscription service providing its members with the latest planning resources and customized research assistance. Learn more at ***www.planning.org/pas/about/.***

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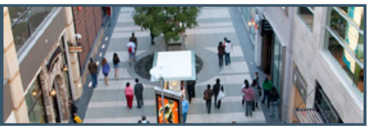
TABLE OF CONTENTS

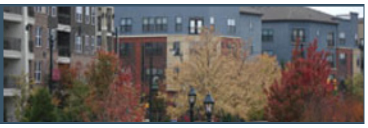

Introduction 4


The Problem with Conventional Traffic Impact Analysis 5


New Research Evidence for Mixed Use Development Trip Generation 7


New Models for Mixed Use Development Traffic Analysis 9


A New Approach: The MXD+ Method 12


Recommendations for Planners 16


Conclusion 17

When planners, developers, or traffic engineers conduct traffic impact analyses for proposed developments, they typically use the trip-generation data and analysis methods published by the Institute of Transportation Engineers (ITE) in its *Trip Generation* report and *Trip Generation Handbook*. However, standard traffic engineering practice does not account for project characteristics such as the mix and balance of land uses, compactness of design, neighborhood connectivity and walkability, infill versus remote location, and the variety of transportation choices offered. This can have significant implications when the project in question is a mixed use development.

The conventional methods used by traffic engineers throughout the U.S. to evaluate traffic impacts fail to account for the benefits of mixed use and other forms of lower-impact development. They exaggerate estimates of impacts and result in excessive development costs, skewed public perceptions, and decision maker resistance. These techniques overlook the full potential for internalizing trips through interaction among on-site activities and the extent to which development with a variety of nearby complementary destinations and high-quality transit access will produce less traffic. These effects can reduce the number of vehicle trips generated to a far greater degree than recognized in standard traffic engineering practice.

The ITE trip-generation data and analysis methods apply primarily to single-use and freestanding sites, which limits their applicability to compact, mixed-use, transit oriented developments (ITE 2004, 2012). The *Handbook* does include an approach based on limited data on mixed use developments, but only from six sites in Florida, not nearly enough to cover today's diverse mixed use developments across the United States.

It is important that planners and developers recognize the implications of using standard ITE trip generation data and methodologies for mixed use developments and use methods that more accurately estimate traffic generated by these projects. Commonly used methods unjustifiably favor types of development that consume greater resources and generate greater impacts, shifting our attention away from development forms and locations that stimulate higher levels of social interaction and benefit to established communities.

Researchers have attempted to analyze how a mix of uses in a compact, walkable project design affects trip generation and on-the-ground traffic impacts. In 2011, two major studies introduced methodologies for predicting traffic generation from mixed use development. The researchers on those studies have now collaborated to combine the advantages of both and provide, in this *PAS Memo*, an even more complete and reliable approach to measuring the benefits of such forms of development. Using this new approach, planners conducting trip-generation analysis for mixed use development projects will produce more accurate forecasts of traffic generation, which will allow more appropriate on-site design features and off-site mitigation measures.

The Problem with Conventional Traffic Impact Analysis

Traffic analysis is intended to inform planners, community members, and public officials of the most suitable planning features and infrastructure elements needed to support new development. However, the conventional methods were developed during an era when most new development was single use, stand alone, highway oriented, and suburban. Standard practices ascribe similar levels of impact to mixed-use, integrated, transit-oriented, and infill development, and consequently overlook the benefits of — and impose unreasonable obstacles to — appropriate planning and approval of such "smart growth" forms.

The standard analytic process used for planning, design, and impact analysis does not account for the degree to which well-designed mixed use development places shops, restaurants, offices, and residences in close proximity to one another, shortening internal trips between them and making more trips conducive to walking, biking, or riding transit. Such reductions in traffic and vehicle miles traveled reduce fuel consumption, greenhouse-gas and other emissions, and exposure of residents to passing traffic and the related threats to comfort, health, and safety. Reduced vehicular travel can also lessen the need to construct new or wider streets and highways, allowing communities to economize on infrastructure. Mixed use developments (MXD) also create opportunities for shared parking, which can reduce the number of spaces needed in parking lot and garage construction.

Traffic-Reducing Attributes of Mixed Use Development

Many of the attributes of lower-impact development can reduce traffic generation compared with conventional single-use suburban development forms:

Diverse land uses and activities can fill basic needs nearby, thereby reducing automobile travel. They allow for linkage of trips in multipurpose trip chains, with a single auto trip to an activity center followed by several short trips on foot. Mixed use sites also create the opportunity for shared parking, which in turn encourages multipurpose trips and reduces the tendency to make separate automobile trips from one destination to the next.

Higher densities and intensities of development provide opportunities for residents, employees, and visitors to circulate among larger numbers of businesses and activities by walking, bicycling, or making short trips by automobile. Higher concentrations of land use also support higher quality and higher-frequency transit service, offering tenants and visitors a viable alternative to driving. High land values and cost to provide parking also leads to higher parking prices, a disincentive to driving versus other available modes of travel.

Walkable urban design and interconnected streets generally reduce the perceived and real separation among destinations, encourage walking and cycling, and reduce the circuitousness and length of each trip.

Short distances to transit help make transit a viable alternative to the automobile and can create activity centers with sufficient street life, amenities, and walking connections where needs and entertainment can be accomplished without independent car trips.

Accessibility to complementary destinations outside the development reduces distances between jobs and housing, services and entertainment, and recreation, often making automobile travel unnecessary. Placed at infill locations, complementary new development that satisfies local needs can also reduce trip making by residents, employees, and shoppers in the surrounding community.

Socio-demographic compatibility can further reduce auto traffic to the extent that developments are designed to attract and accommodate residents with low auto ownership (through, for example, parking supply limits), low travel needs (based on, for example, family size,

fewer employed residents, lower income, or age range), or close affiliation with other project elements or surrounding land uses (linked, or simply compatible, jobs and residents).

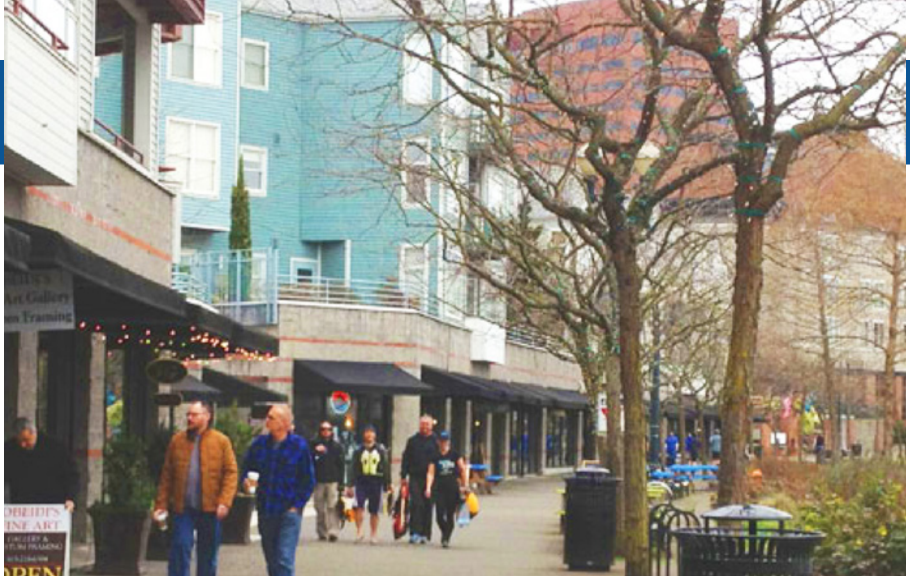
Scale of development affects feasibility for communities and employers to provide travel demand options and management services that can shift traveler modes from the auto to alternative modes of travel. Residents and businesses that self-select into such sites and settings are also often more amenable to travelling less or using alternatives to the automobile. Transportation demand management (TDM) programs are both more likely to be available and more likely to be successful in compact, central, transit-supported settings.

The danger of using traditional traffic-generation data based on single-use facilities is that it misrepresents the true traffic generation impacts of mixed use development. The consequences of miscalculating the benefits of mixed-use development may include unreasonable development cost, exaggerated impacts and mitigation responsibilities, skewed public perceptions, and decision maker resistance. This penalizes mixed use development proposals, often tipping the balance in favor of projects that offer fewer benefits and ultimately generate higher impacts. Denying "smart" forms of development does not reduce the overall market demand for housing and business, so the building disallowed ends up in other locations within the region, often in less accessible locations, at lower densities, and in less-mixed use configurations. The end result can be more traffic and higher regional vehicle-miles traveled than had the smart-growth development been approved.

Understandably, communities and public reviewers want to minimize the risk of unmitigated impacts. However, doing so through the application of overly conservative project evaluation criteria undermines the pursuit of other community values, such as vibrant neighborhoods with integrated development and activities that minimize the need to travel and the impacts produced by excessive unnecessary use of the automobile.

Conservative traffic-generation estimates have supply-side impacts, affecting design and cost of streets and parking. Within constrained sites, over design of traffic elements can limit the space available for revenue-producing land uses and increase other development costs. Development fee programs also rely heavily on traffic-generation estimates from the ITE *Trip Generation Manual*; this can lead to setting excessively high fee rates on mixed use development. Unquestioning use of the ITE data can unreasonably jeopardize a MXD project's approval, financial feasibility, and design quality.

Mixed use sites can take many forms, but all offer a diversity of uses in walkable settings. Oakland City Center BART (left); RiverPlace, Portland, Oregon (opposite page).



New Research Evidence for Mixed Use Development Trip Generation

Several hundred studies over the past 20 years have confirmed that the built environment affects travel generation (Ewing and Cervero 2010). Development features associated with reduced trip rates include a series of "D" variables: density, diversity of uses, design of urban environment, distance from transit, destination accessibility, development scale, demographics of inhabitants, and demand management. In the past three years, research has examined more directly the relative influence of each factor and their interactions and has sought to corroborate the research results through field verification. Organizations such as the U.S. Environmental Protection Agency and the National Academy of Sciences Transportation Research Board have sponsored several of the more reputable studies on the subject.

The Eight "D" Variables

The most advanced research has confirmed that trip rate reductions are quantifiably associated with the attributes of mixed use development, defined in terms of these characteristics of urban development patterns:

Density: dwellings, jobs per acre. Higher densities shorten trip lengths, allow for more walking and biking, and support quality transit.

Diversity: mix of housing, jobs, retail. A diverse neighborhood allows for easier trip linking and shortens distances between trips. It also promotes higher levels of walking and biking and allows for shared parking.

Design: connectivity, walkability. Good design improves connectivity, encourages walking and biking, and reduces travel distance.

Destinations: regional accessibility. Destination accessibility links travel purposes, shortens trips, and offers transportation options.

Distance to Transit: rail proximity. Close proximity to transit encourages its use, along with trip-linking and walking, and often creates accessible walking environments.

Development Scale: residents, jobs. Appropriate development scale provides critical mass, increases local opportunities, and supports transit investment.

Demographics: household size, income. Mixed use development allows self-selection by households into settings with their preferred activities and travel modes, allows businesses to locate convenient to clients, and supports a socioeconomic "fit" among residents, businesses, and activities.

Demand Management: pricing, incentives. Demand management ties incentives to the urban environment and allows alignment of auto disincentives with available alternate modes. It takes advantage of critical mass of travel resulting from density, diversity, and design.

A growing body of evidence indicates that these factors, individually or together, quantifiably explain the number of vehicle trips and vehicle-miles traveled for a development project and for a region as a whole. Each of the D factors influences traffic generation through a variety of mechanisms. There are also important interactions, both synergistic and mutually dampening, among the D factors that call for sophisticated techniques when quantifying the travel generation effects of different combinations proposed in any project or plan.

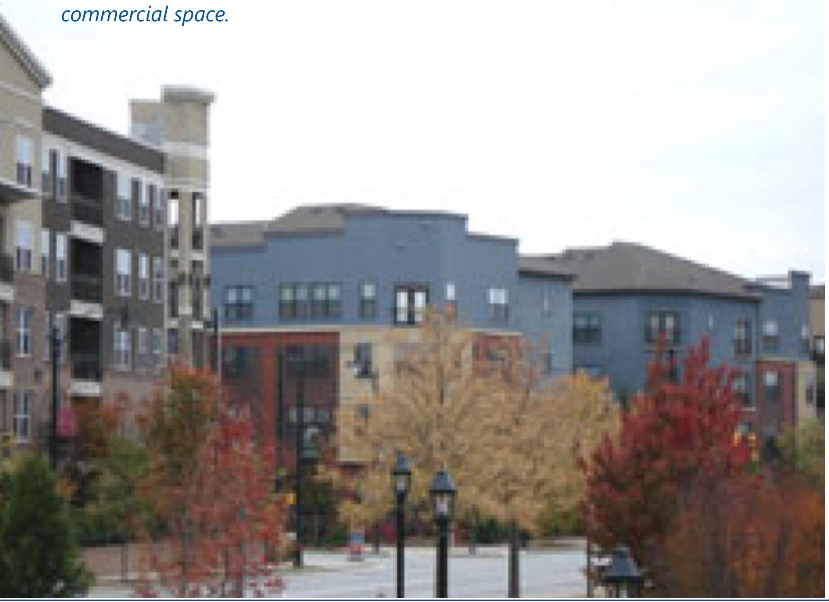
The Evidence that Conventional Methods Overstate MXD Impacts

Empirical evidence and research provides evidence that mixed-use, infill, and transit-oriented developments generate fewer external vehicle trips than equivalent stand-alone uses. A nationwide study sponsored by the U.S. EPA (Ewing et al. 2011) found statistical correlation between the D factors and increased trip internalization and increased walking and transit use. It further demonstrated, for 27 mixed-use development sites across the U.S., that:

1. On average, the sites' land uses would generate 49 percent more traffic if they were distributed among single-use sites in suburban settings, the situations to which the ITE *Trip Generation Manual* would apply.

2. The ITE *Handbook*, the current state-of-practice resource for estimating mixed use trip generation, would overestimate peak hour traffic by an average of 35 percent.

Atlantic Station offers residential units alongside walkable office and commercial space.



The following examples from recent studies demonstrate the degree by which such developments reduce traffic generation relative to what would be presumed under conventional traffic analysis methods.

Atlantic Station in Atlanta is a major mixed-use infill development located on a 138-acre former brownfield site in midtown Atlanta, connected by nonstop shuttle service to a MARTA metro rail station about a half-mile away. At the time it was studied, the development included 798 mid- and high-rise residential units, 550,600 square feet of office space, 434,500 square feet of retail space, a 101-room hotel, a restaurant, and a cinema.

For Atlantic Station, the "internal capture rate" (proportion of generated trips that remain internal to the site) is 15 percent in the morning peak hour and about 40 percent of evening peak-hour. Of the trips entering and leaving the site, between 5 and 7 percent use transit and another 5 to 7 percent walk or bicycle.

According to standard ITE trip-generation rates, were the Atlantic Station development elements located at single-use suburban sites, they would generate 37 percent more weekday traffic and 69 percent more PM peak traffic than actually counted at the centrally located, mixed use site.

RiverPlace in Portland is an award-winning mixed use waterfront development on a former brownfield within easy walking distance of downtown Portland, Oregon. Adjacent to the Tom McCall Waterfront Park, the site contains 700 residential units (condominiums and apartments), 40,000 square feet of office space, 26,500 square feet of small retail shops and restaurants, a 300-room hotel, and a marina, cinema, and athletic club. The waterfront walking environment conveniently links all of the activities within the development site and connects the site to the Portland central business district. Transit is also available at the site; the Portland Streetcar connects RiverPlace to downtown Portland and the greater Portland area.

RiverPlace (left) offers a mix of residential, office, and commercial uses on Portland's waterfront. Photo courtesy Fehr & Peers. Bay Street's walkable urban village (below) is designed on a Main Street theme.

RiverPlace's internal capture rate is 36 percent. For internal and external trips combined, 40 percent are by walking and 5 percent by transit. These statistics are significantly higher than the regional averages of 15 percent of trips taken by walking and 2 percent by transit.

Bay Street in Emeryville is a vibrant, thriving recent redevelopment project in Emeryville, California, just outside San Francisco. The previously heavy-industrial area within and around Bay Street has undergone dramatic revitalization in the past two decades, and it now includes the headquarters of Pixar Studios and other businesses. Bay Street itself is a one-million-square-foot walkable urban village designed on a Main Street theme. It contains a major theater complex, hotel, and 382,000 square feet of fashionable retail shops (including an Apple Store) with 381 apartment units and offices above. The site is within walking distance of a Capitol Corridor commuter rail station and within a shuttle bus ride of BART metro rail.

Bay Street's daily traffic generation is about 41 percent less than the combined total that would be generated by similarly sized suburban shopping centers, theater complexes, residential uses, and office developments based on standard ITE trip rates for stand-alone land uses. It also generates 36 percent less daily traffic than would be estimated by traffic engineers applying the ITE *Handbook* and conventional analysis methods. In the PM peak hour, Bay Street traffic generation is 46 percent lower than would be generated by the same land uses scattered on individual suburban sites, and 41 percent lower than would be estimated by standard ITE traffic analysis.

New Models for Mixed Use Development Traffic Analysis

To address the shortcomings in conventional analysis methods, the National Cooperative Highway Research Program (NCHRP) and the U.S. EPA recently conducted significant research studies to improve quantification of the trip-reducing effects of mixed use development. Each study took a different approach: NCHRP undertook extensive visitor surveys and traffic counts at Atlantic Station and two mixed-use developments in Texas (Bochner et al. 2011), while EPA sponsored a nationwide study of more than 260 mixed use developments across the U.S. using regional travel survey data and verification traffic counts at a subset of the sites (Ewing et al. 2011). Using different analysis methods, each study developed a recommended approach to discounting traffic generation estimates to account for the mix of uses and other development characteristics. Each study represents a major advancement over conventional analysis methods.

NCHRP Report 684

National Cooperative Highway Research Program (NCHRP) Report 684, "Enhancing Internal Trip Capture Estimation for Mixed-Use Developments," analyzed internal-capture relationships of MXD sites and examined the travel interactions among six individual types of land uses: office, retail, restaurant, residential, cinema, and hotel. The study looked at three master-planned developments: Mockingbird Station, a single-block TOD in Dallas; Legacy Town C enter, a multiblock district in suburban Plano, Texas, containing fully integrated and adjacent complementary uses; and Atlantic Station (see above). It compared the survey results to those found in prior ITE studies at three Florida sites, Boca del Mar, Country Isles, and Village Commons, all containing a variety of land uses, though in single-use pods.

Based on traveler and vehicle counts and interviews, the study ascertained interactions among the six land-use types of interest and compared them with site characteristics. It then examined the percentage of visitors to each land-use type who also visited each of the other uses during the same trip. The study considered site context factors and described percentage reductions in sitewide traffic generation that might result from the availability of transit service and other factors.

Researchers then performed verification tests by comparing the analysis results to those available from ITE for three earlier studies at Florida mixed use sites. The validation confirmed that the estimated values were a reasonable match for actual counted traffic. The product of the study is a series of tables and spreadsheets that balance and apply the discovered use-to-use visitation percentages to the land uses within the project site under study. The interaction percentages are then used to discount ITE trip-generation rates and to reduce what would otherwise represent the number of trips entering and leaving the entire site.

EPA MXD

The U.S. EPA–sponsored 2011 report, "Traffic Generated by Mixed-Use Developments — A Six-Region Study Using Consistent Built Environmental Measures," investigated trip generation, mode choice, and trip length for trips produced and attracted by mixed use developments. Researchers selected six regions — Atlanta, Boston, Houston, Portland, Sacramento, and Seattle — to represent a wide range of urban scale, form, and climatic conditions. Regional travel survey data with geographic coordinates and parcel-level detail available for these areas allowed researchers to isolate trips to, from, and within MXDs and relate travel choices to fine-grained characteristics of these developments.

In each region, researchers worked with local planners and traffic engineers to identify a total of 239 MXDs that met the ITE definition of multi-use development. The MXDs ranged from compact infill sites near regional cores to low-rise freeway-oriented developments. They varied in size, population and employment densities, mixes of jobs and housing, presence or absence of transit, and locations within their regions. In total, the MXD sample for the six regions provided survey data on almost 36,000 trips.

The analysis found that one or more variables in each of seven D categories (see above) were statistically significant predictors of internal capture, external walking, external transit use, and external private vehicle trip length. Specifically, an MXD's external traffic generation was related to population and employment within the site (density); the relative balance of jobs and housing within the site and the amount of employment within 1 mile of the site (diversity); the density of intersections within the site as a measure of street connectivity (design); the presence of bus stops within a quarter mile or the presence of a rail station (distance from transit); employment within a mile of site boundaries and percentage of regional employment within 20 minutes by car, 30 minutes by car, and 30 minutes by transit (destination accessibility); the gross acreage of the development (development scale); and the average number of household members as well as household vehicle ownership per capita(demographics). The accuracy of the EPA MXD method was verified through traffic generation comparisons at 27 mixed-use sites across the U.S.

The EPA MXD product is a series of equations and instructions captured in a spreadsheet workbook. The methodology calculates the percentage reductions in ITE trip generation resulting from the national statistical analysis of seven D effects on internal trip capture, walking, and transit use. The spreadsheets produce reduced estimates of traffic generation on a daily basis and for peak traffic hours.

Combining the Approaches

The NCHRP 684 method and EPA MXD method each derive from different research approaches and produce different methods of analyzing trip generation at mixed use developments. They focus on overlapping but not identical aspects of mixed-use development sites and their contexts and offer respective strengths and weaknesses in terms of factors considered and ease of application. Selecting which method to employ under different circumstances requires both a comparison of their capabilities as well as professional judgment of their respective strengths and weaknesses.

Report 684 includes a refined assessment of on-site land-use categories, specifically recognizing the roles of restaurants, theaters, and hotels within the site land-use mix, along with an adjustment to account for the spatial separations among individual land uses within the development site. It is directly useful for the evaluation of proposed development sites that are similar to the one or more of the three surveyed in Atlanta and Texas for the report. However, it is not responsive to factors such as regional location, transit availability, density of development, walkability factors, and the socio-demographic profile of site residents and businesses.

In contrast, the EPA MXD method accounts directly and quantitatively for these factors. However, while it accounts for the balances of retail, office, and residential development, it does not explicitly differentiate subcategories such as restaurants, theaters, and hotels. Furthermore, it requires the analyst to account for off-site development, including employment within a one-mile radius of the MXD and the number of jobs available within 30 minutes of the site.

To develop a method that captures the best of both sets of research findings, the authors of the two original studies decided to collaborate on an integrated method that recognizes the full array of on-site and context characteristics that contribute to traffic reduction and, through a focus on empirical verification, achieves greater accuracy than either method individually.

In developing the integrated approach, we compared the performances of the methods to actual traffic counts at a diverse group of mixed use developments in a variety of settings. The 27 verification sites were successful mixed-use development, exhibiting moderate to high levels of activity in terms of business sales, occupied residential units, property value, and household income, with average or above-average person trips, at the time of the survey. They included those studied for NCHRP 684, the sites used as the basis for the ITE *Trip Generation Handbook*, and others surveyed by Fehr & Peers, transportation consultants. Six of the 27 sites were located in Florida, and three were located in Atlanta and Texas. Three of these nine were nationally known examples of smart growth or transit-oriented development: Atlantic Station, Mockingbird Station, and Celebration, Florida. Six sites were located in San Diego County and were designated by local planners and traffic engineers in 2009 as representing a wide range of examples of smart growth trip generators in that region. The 12 remaining sites were MXD developments located elsewhere in California and in Utah, ranging from TOD sites (commuter rail and ferry) to conventional suburban freeway-oriented mixed use sites.

A New Approach: The MXD+ Method

The new analytical approach, the MXD+ method, combines the strengths of NCHRP 684 and EPA MXD. The authors sought to (1) address the fact that each method has strengths relative to the other, (2) create a method that is more accurate than either of the individual methods alone, and (3) reduce confusion among practitioners on which is the most appropriate method.

The proposed MXD+ method incorporates the underlying data sources and logic that the two methods share. It offers the ability to assess the effects of spatial separation of uses and recognition of more specific land-use categories and to consider the dynamic influences of local development context, regional accessibility, transit availability, development density and walkability factors, and the characteristics of residents.

To develop the preferred method, the authors experimented with different methods of integrating the two methods and arrived at a direct calibration approach. The appropriate combination of the results of the two individual methods was determined through regression analysis to identify the proportions that provided the best correlation with the traffic counted at the 27 validation sites. Table 1 presents results from the regression analysis, listing the proportions of the two methods found most effective at matching the traffic generation at the diverse set of mixed use validation sites. Weighting the results of the two individual analyses by the percentages in Table 1 and combining the results produces more accurate estimates of traffic generation and captures the effects of all of the site description variables included in the NCHRP and EPA methods.

TABLE 1 **OPTIMAL BLEND OF NCHRP 684 AND EPA MXD METHODS**

	AM PEAK TRAFFIC	PM PEAK TRAFFIC	AVERAGE DAILY TRAFFIC
NCHRP 684	10.1%	36.5%	n/a
EPA MXD	89.9%	63.5%	100%

The step-by-step method is as follows:

1. Apply the full EPA MXD methodology to predict external traffic generation as influenced by site development scale, density, accessibility, walkability and transit availability, resident demographics, and general mix of uses.

2. Apply the full NCHRP 684 method to capture the effects of detailed land-use categories, including hotel, theater, and restaurant, and the spatial separation of uses within small and medium sites.

3. Combine the results of the two methods in terms of percentages of trips remaining internal to the development site, using proportioning factors presented in the table above.

4. Apply adjustments to account for off-site walking and transit travel using the EPA MXD method.

5. Discount standard ITE traffic-generation rates by the percentages of internalization produced in step 3 and the percentage of walk and transit travel in step 4 to obtain the estimate of site- generated traffic.

TABLE 2 **COMPARISON OF THREE PRINCIPAL METHODS IN TERMS OF PROJECT CHARACTERISTICS CONSIDERED**

	EPA MXD METHOD	NCHRP 684 METHOD	MXD+ METHOD
Project Characteristics Considered			
Density of Development	◆		◆
Diversity of Uses: Jobs/Housing	◆	◆	◆
Diversity of Uses: Housing/Retail		◆	◆
Diversity of Uses: Jobs/Services		◆	◆
Diversity of Uses: Entertainment, Hotel		◆	◆
Design: Connectivity, Walkability	◆	◆	◆
Design: Separation Among Uses		◆	◆
Destination Accessibility by Transit	◆		◆
Destination Accessibility by Walk/Bike	◆		◆
Distance from Transit Stop	◆		◆
Development Scale	◆		◆
Distance from Transit Stop	◆		◆
Development Scale	◆		◆
Demographic Profile	◆		◆
Data Needs (beyond Project Site Plan)			
Average Residents per Dwelling Unit	◆		◆
Average Autos Owned per Dwelling Unit	◆		◆
Nearby (1/4 mi) Bus Stops and Rail Stations	◆		◆
Jobs Within 1 Mile of Site	◆		◆
Jobs Within 30-Minute Transit Trip	◆		◆
Regional Employment	◆		◆
Located in CBD or TOD?	◆		◆
Site Development by Classification		◆	◆
Vehicle Occupancy Estimate		◆	
Mode Split Estimate		◆	

As Table 2 indicates, the MXD+ method improves traffic generation estimates by considering the full array of 12 site development and context characteristics shown to influence internal capture and mode share, while the individual methods consider only 5 to 8 factors each. Effects considered in MXD+ that are not included in the NCHRP 684 method include household size and auto ownership, site proximity to bus and rail stops, and accessibility to local and regional jobs. Effects considered in the NCHRP 684 method that do not appear in the EPA MXD method include specific land uses and proximity of interacting land uses to each other.

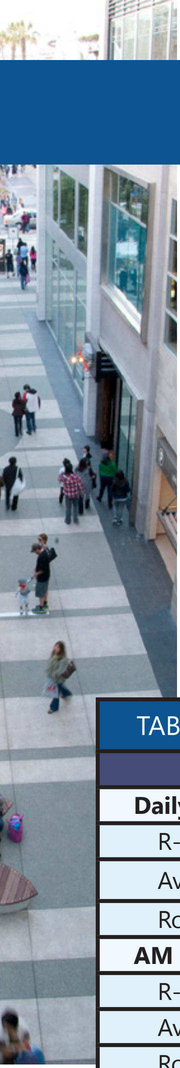


Table 3 presents the statistical performance of the MXD+ integrated method with the individual performance of the individual NCHRP 684 and EPA MXD methods. We compared the ability of each of the available methods to replicate the amount of traffic generated at the 27 validation sites in terms of statistical measures including percent root mean squared error, a metric used in the transportation field to evaluate model accuracy, and the coefficient of determination (or "R-squared"), which measures the ability of the analysis method to account for the variations in traffic generation among the 27 survey sites. For daily traffic generation, MXD+ is equivalent to the EPA MXD method, as the NCHRP 684 method does not address daily analysis. For peak hour traffic generation, MXD+ performs notably better than either of the individual methods.

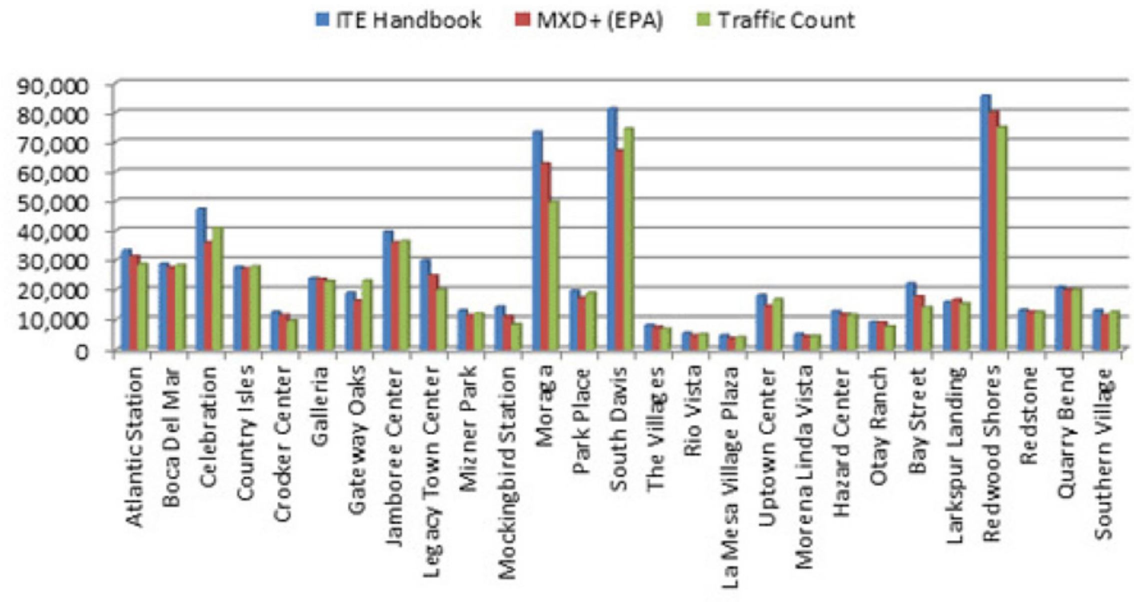
TABLE 3 **COMPARISON OF THREE PRINCIPAL METHODS IN TERMS OF PERFORMANCE AT VALIDATION SITES**

	EPA MXD METHOD	NCHRP 684 METHOD	MXD+ METHOD
Daily Traffic Generation			
R-squared	96%	89%*	**96%**
Average Error	2%	16%*	**2%**
Root Mean Square Error	17%	27%	**17%**
AM Peak Traffic Generation			
R-squared	97%	93%*	**97%**
Average Error	12%	30%	**12%**
Root Mean Square Error	21%	33%	**21%**
PM Peak Traffic Generation			
R-squared	95%	81%	**97%**
Average Error	8%	18%	**4%**
Root Mean Square Error	18%	36%	**15%**

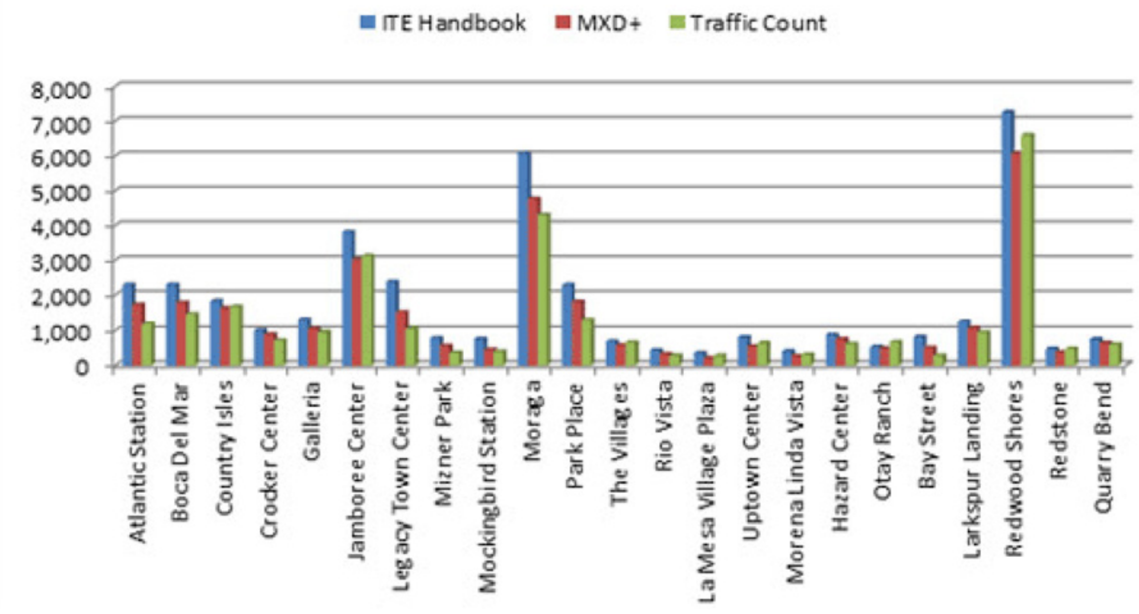
** ITE Handbook internalization statistics (NCHRP 684 method does not address daily trip generation)*

The graphs on the following page compare the performance of the MXD+ method to the ITE *Handbook* method at replicating traffic generation at the diverse group of mixed-use validation sites. Compared with the ITE *Handbook*, MXD+ method more accurately matches the amount of daily traffic actually counted at 20 of the 27 survey sites. In the AM peak hour, it is more accurate than the ITE Handbook at 21 of the 24 sites for which counts were available, and in the PM peak hour, MXD+ is more accurate than the ITE *Handbook* method at 23 of 25 sites.

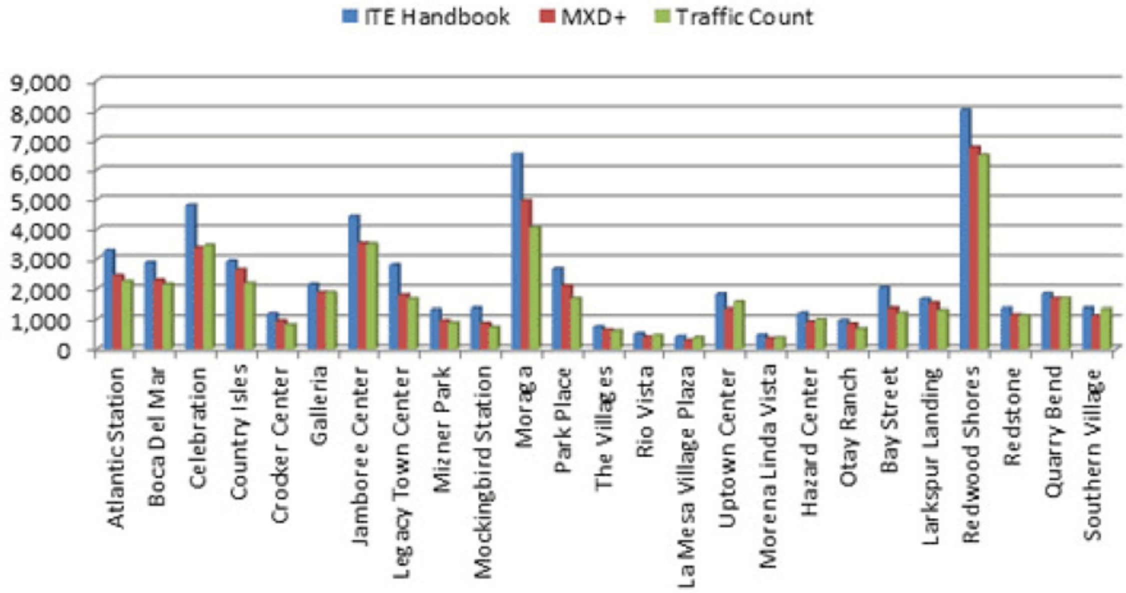
DAILY TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



AM PEAK HOUR TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



PM PEAK HOUR TRAFFIC GENERATION COMPARISON OF ITE HANDBOOK & MXD+ METHODS



The MXD+ method explains 97 percent of the variation in trip generation among mixed-use developments, compared with 65 percent for the ITE *Handbook* method. On average, the *Handbook* overestimates AM peak traffic generation by 49 percent, compared with 12 percent for MXD+. For the PM peak hour, the ITE *Handbook* overestimates actual traffic by 35 percent. The MXD+ method reduces this to 4 percent, remaining slightly conservative and unlikely to understate impacts.

By combining and refining the two most advanced methodologies for estimating traffic generation for mixed-use development, the MXD+ method provides transportation planners and engineers a more accurate single approach that accounts for the most important factors that distinguish lower impact development from other forms. Doing so advances development planning and impact assessment beyond the practices that have, to date, unreasonably discouraged mixed-use development.

Recommendations for Planners

We recommend that planners adopt the latest methods for evaluating traffic generation of mixed use and other forms of smart growth, including infill and transit-oriented development. The MXD methods developed under the U.S. EPA multiregional study and the NCHRP 684 study on enhancing trip-capture estimation each represent substantial advances to the conventional practices previously available through ITE. Combining the two new methods, as described above, improves upon both individual methods. Tools for all three approaches are available for use through the references and resources listed below.

Traffic engineers are beginning to take notice of the new methods, but we expect that natural sluggishness in adopting new practices will continue to impose unfair penalties on mixed use and other forms of lower-impact development. We recommend activism on the part of all planners, development reviewers, and impact analysts on behalf of the more accurate MXD methods.

Immediate adoption of the improved methods will allow planners to account for a project's regional location, transit availability, density of development, walkability factors, and the characteristics of residents and businesses and on-site adjacencies of land uses including residential, office, retail, restaurants, theaters, and hotels. Accounting for these factors through the MXD+ method will achieve the highest levels of accuracy possible in estimating traffic impacts of mixed use development.

We recommend applying and promoting the MXD+ method for day-to-day project planning and performance-based site-plan refinement, impact analysis, and discretionary review. Doing so will eliminate what is presently a systematic bias in traffic analysis that favors single-use, isolated, suburban-style development.

Conclusion

Standard traffic engineering practices are blind to the primary benefits of smart growth. A plan's development density, scale, design, accessibility, transit proximity, demographics, and mix of uses all affect traffic generation in ways unseen to prescribed methods. The Institute of Transportation Engineers (ITE) *Trip Generation Manual* and *Handbook* overestimate peak traffic generation for mixed-use development by an average of 35 percent. For conventional suburban stand-alone development, ITE rates portray the average for such sites; so hedging mixed-use analysis toward more conservative assumptions creates a systematic bias in favor of single-use suburban development.

ITE overestimation of traffic impacts reduces the likelihood of approval of mixed use and related forms of smart growth such as infill, compact, and transit-oriented development. Such overestimation escalates development costs, skews public perception, heightens community resistance, and favors isolated single-use development.

The methods of evaluating mixed use development described in this report represent a substantial improvement over conventional traffic-estimation methods. They improve accuracy and virtually eliminate overestimation bias, and they are supported by the substantial evidence of surveys and traffic counts at 266 mixed use sites across the U.S. The MXD+ analysis method explains 97 percent of the variation in trip generation among mixed use sites and all but eliminates the ITE systematic overestimation of traffic. We hope planners and other professionals will take advantage of the available spreadsheet tools listed below to help even the playing field between conventional development patterns and more sustainable, walkable, livable places.

About the Authors

Jerry Walters is a principal and sustainability practice leader with Fehr & Peers, transportation consultants. He has more than 30 years of experience in transportation planning, engineering, and travel forecasting and is a registered traffic engineer. Jerry developed project evaluation methods for the U.S. EPA study "Mixed-use Development and Vehicle Trips: Improving the Standard Estimation Methodology." He is a co-author of the book Growing Cooler – the Evidence on Urban Development and Climate Change (Urban Land Institute, 2008).

Brian S. Bochner is a senior research engineer at Texas Transportation Institute with over 40 years of experience in traffic engineering and planning. He is a certified professional traffic engineer, a professional traffic operations engineer and transportation planner, an affiliate with the Transportation Research Board, and past president and member of the International Board of Direction of the Institute of Transportation Engineers (ITE). His awards include Transportation Innovator, Texas Department of Transportation Research Program, and Transportation Engineer of the Year for the Texas Section of ITE.

Reid Ewing is a professor of city and metropolitan planning at the University of Utah, associate editor of the *Journal of the American Planning Association*, columnist for *Planning* magazine, and Fellow of the Urban Land Institute. His 2010 article, "Travel and the Built Environment: A Meta-Analysis," won the Best Article of the Year award from the American Planning Association, and his book, Best Development Practices (APA Planners Press, 1996), is listed by APA as one of the 100 essential planning books of the past 100 years.

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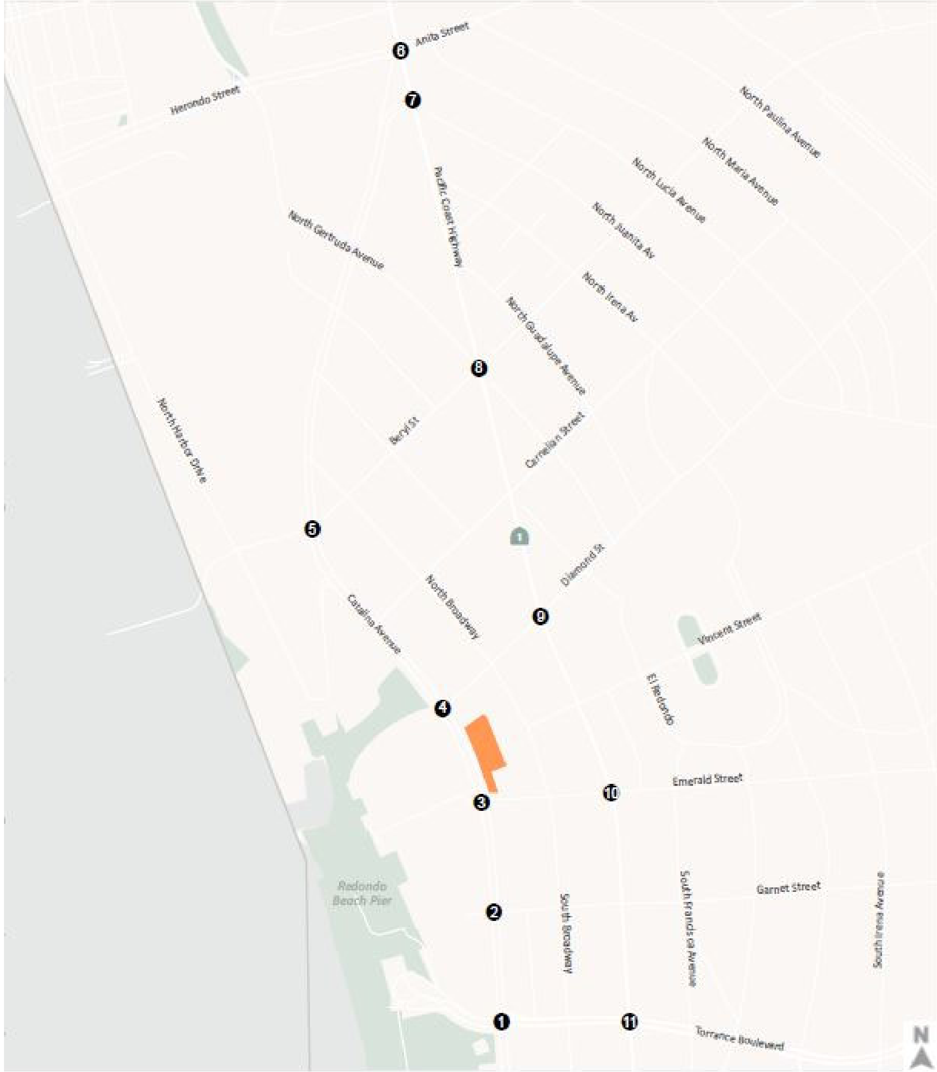
Additional Resources

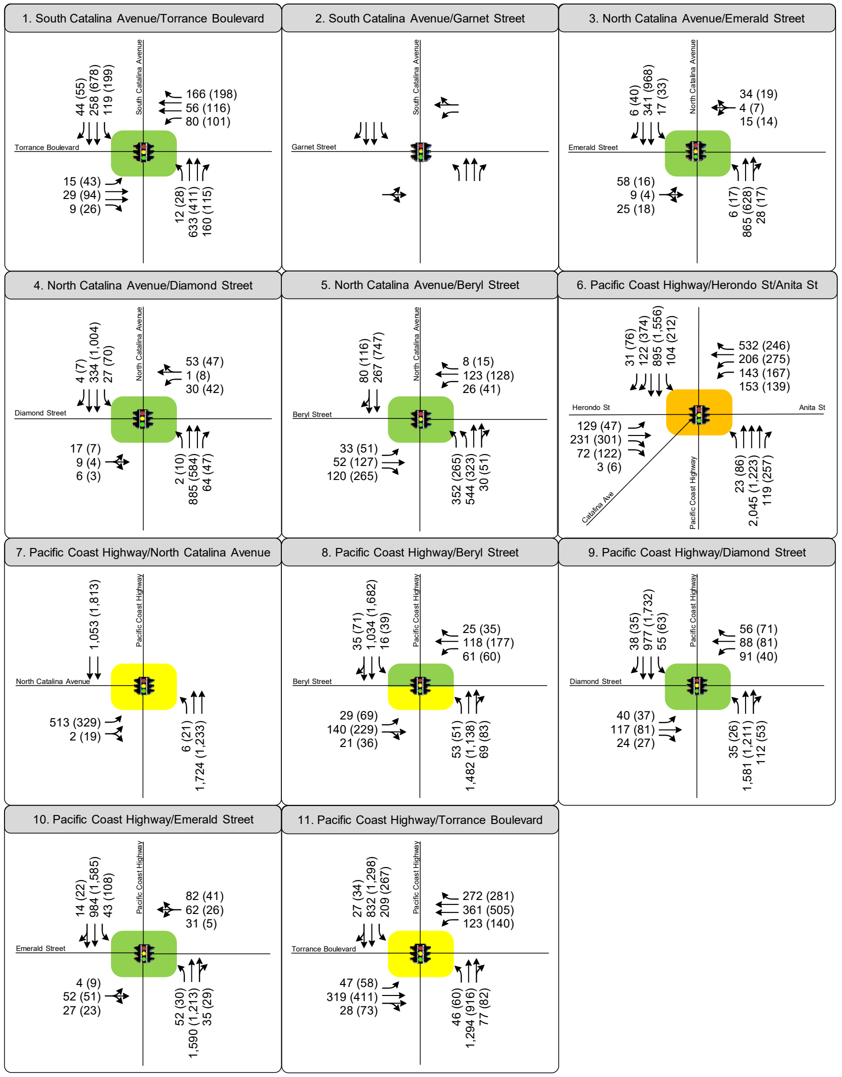
Description, documentation, and spreadsheet tools for the NCHRP 684 method, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments may be found at www.trb.org/Main/Blurbs/165014.aspx.

Description, documentation, and spreadsheet tools for the EPA MXD Trip Generation Tool for Mixed-Use Developments may be found at www.epa.gov/smartgrowth/mxd_tripgeneration.html.

Quick-response analysis tools for applying the EPA MXD method, the combined EPA /NCHRP method MXD+, and MXD in conjunction with analysis of vehicle-miles traveled, GHG emissions, and shared parking, Plan+, may be found at http://asap.fehrandpeers.com/tools/.

Appendix B:
Peak Period
Turning Movements & Lane Geometries



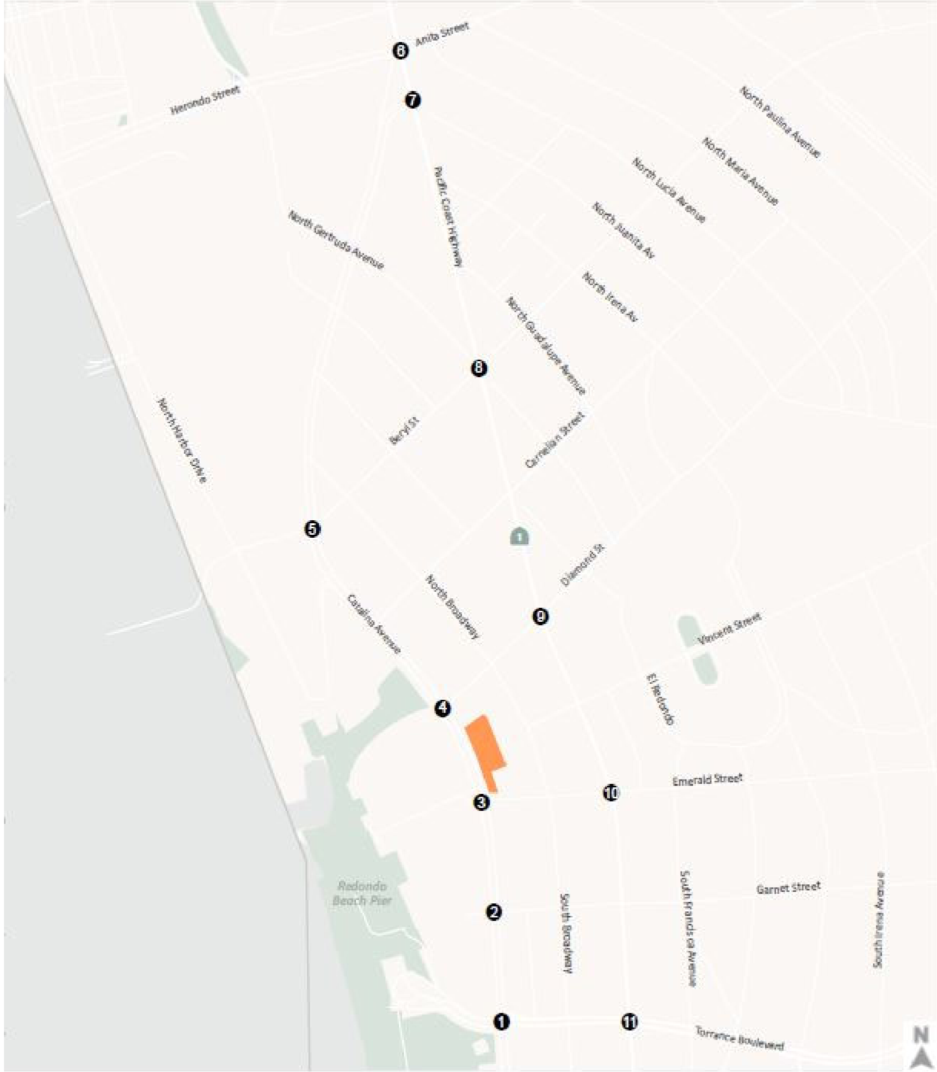


AM PM | A-C | D | E | F

Study Intersection

AM (PM) Peak Hour Traffic Volume

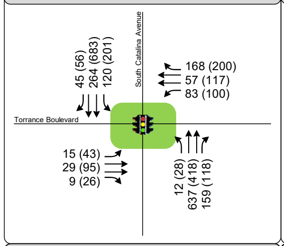
Appendix B
Traffic Volumes, Lane Configurations, and Level of Service Existing (2020) Conditions



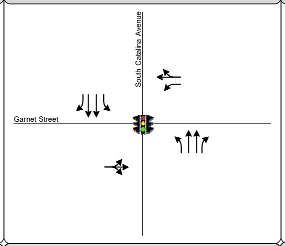
AM PM
A-C D E F
Study Intersection

AM (PM) Peak Hour Traffic Volume

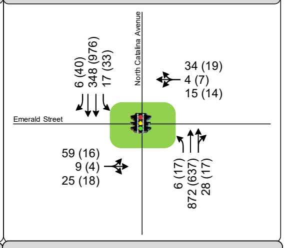
1. South Catalina Avenue/Torrance Boulevard



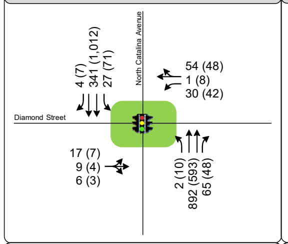
2. South Catalina Avenue/Garnet Street



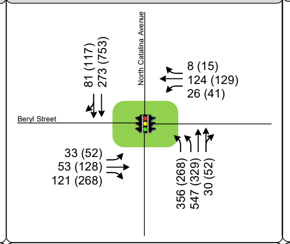
3. North Catalina Avenue/Emerald Street



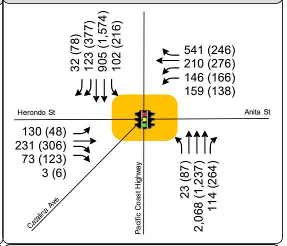
4. North Catalina Avenue/Diamond Street



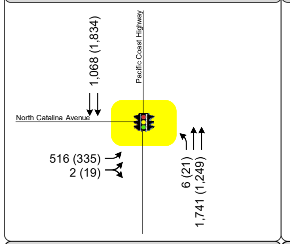
5. North Catalina Avenue/Beryl Street



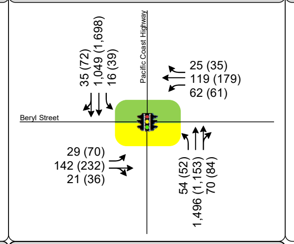
6. Pacific Coast Highway/Herondo St/Anita St



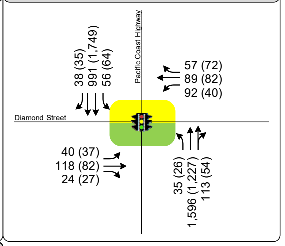
7. Pacific Coast Highway/North Catalina Avenue



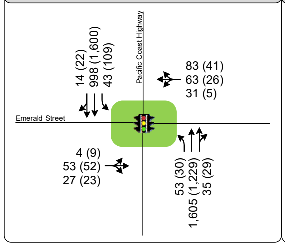
8. Pacific Coast Highway/Beryl Street



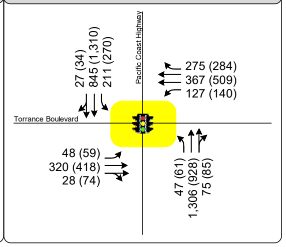
9. Pacific Coast Highway/Diamond Street



10. Pacific Coast Highway/Emerald Street



11. Pacific Coast Highway/Torrance Boulevard



Appendix B

Traffic Volumes, Lane Configurations, and Level of Service Cumulative Without Project (2023) Conditions

Appendix B

Traffic Volumes, Lane Configurations, and Level of Service Existing Plus Project (2020) Conditions

Appendix B

Traffic Volumes, Lane Configurations, and Level of Service
Cumulative Plus Project (2023) Conditions

● Study Intersection

AM (PM) Peak Hour Traffic Volume

Appendix B

Traffic Volumes and Lane Configurations
Project Only Volumes

Appendix C:
Traffic Count Sheets

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Catalina Ave and Torrance Blvd , Redondo Beach

Date: 3/20/2014

Day: Thursday

Project #: 14-5156-025

City: Redondo Beach

AM Peak Hour	745 AM
NOON Peak Hour	
PM Peak Hour	500 PM

Peak Hour Summary

Catalina Ave

Torrance Blvd

Southbound Approach

Lanes	1	2	1	
	↲	↓	↳	⇧
AM	43	252	116	796
NOON	0	0	0	0
PM	54	663	195	638

Eastbound Approach

Lanes		AM	NOON	PM
	⇦	110	0	194
1	↱	15	0	42
2	→	28	0	92
1	↴	9	0	25

Westbound Approach

	AM	NOON	PM	Lanes
↰	162	0	194	1
←	55	0	113	2
↙	78	0	99	1
⇨	300	0	399	

CONTROL

Signalized

Northbound Approach

	⇩	↰	↑	↱
AM	339	12	619	156
NOON	0	0	0	0
PM	787	27	402	112
Lanes		1	2	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

AM	411	796
NOON	0	0
PM	912	638

West Leg

	AM	NOON	PM
←	110	0	194
→	52	0	159

East Leg

	AM	NOON	PM
←	295	0	406
→	300	0	399

South Leg

AM	339	787
NOON	0	0
PM	787	541

Total Volume Per Leg

	North Leg	West Leg	East Leg	South Leg
AM	1207	162	595	1126
NOON	0	0	0	0
PM	1550	353	805	1328

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Catalina Ave and Emerald St , Redondo Beach

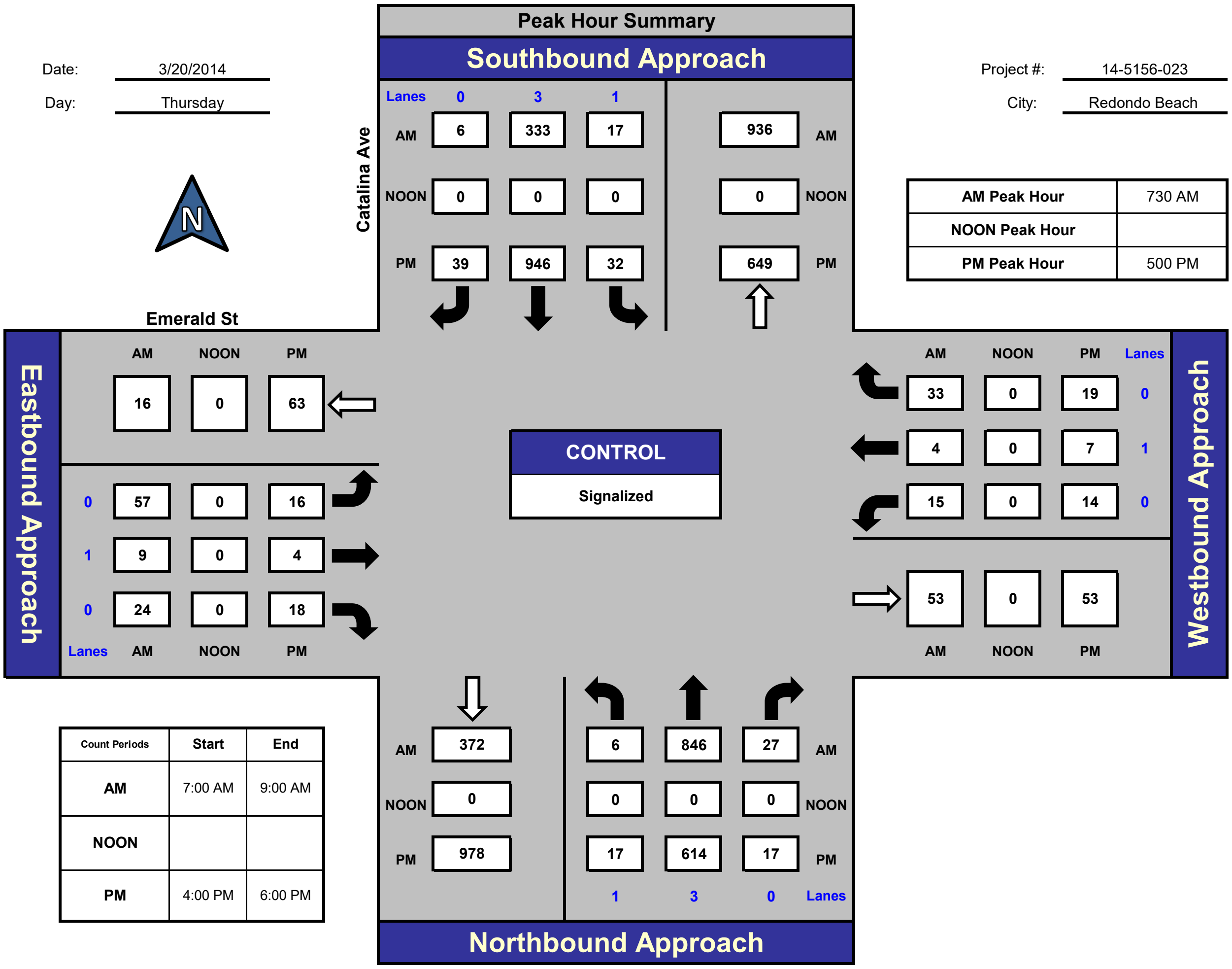
Date: 3/20/2014

Day: Thursday

Project #: 14-5156-023

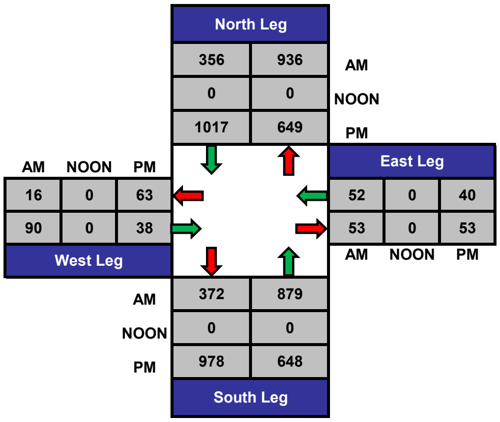
City: Redondo Beach

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	500 PM

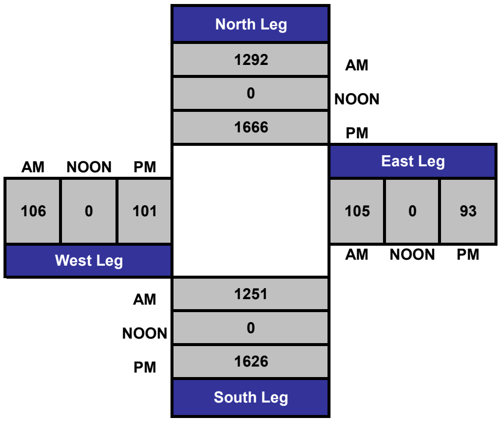


Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs



Total Volume Per Leg



ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Catalina Ave and Diamond St , Redondo Beach

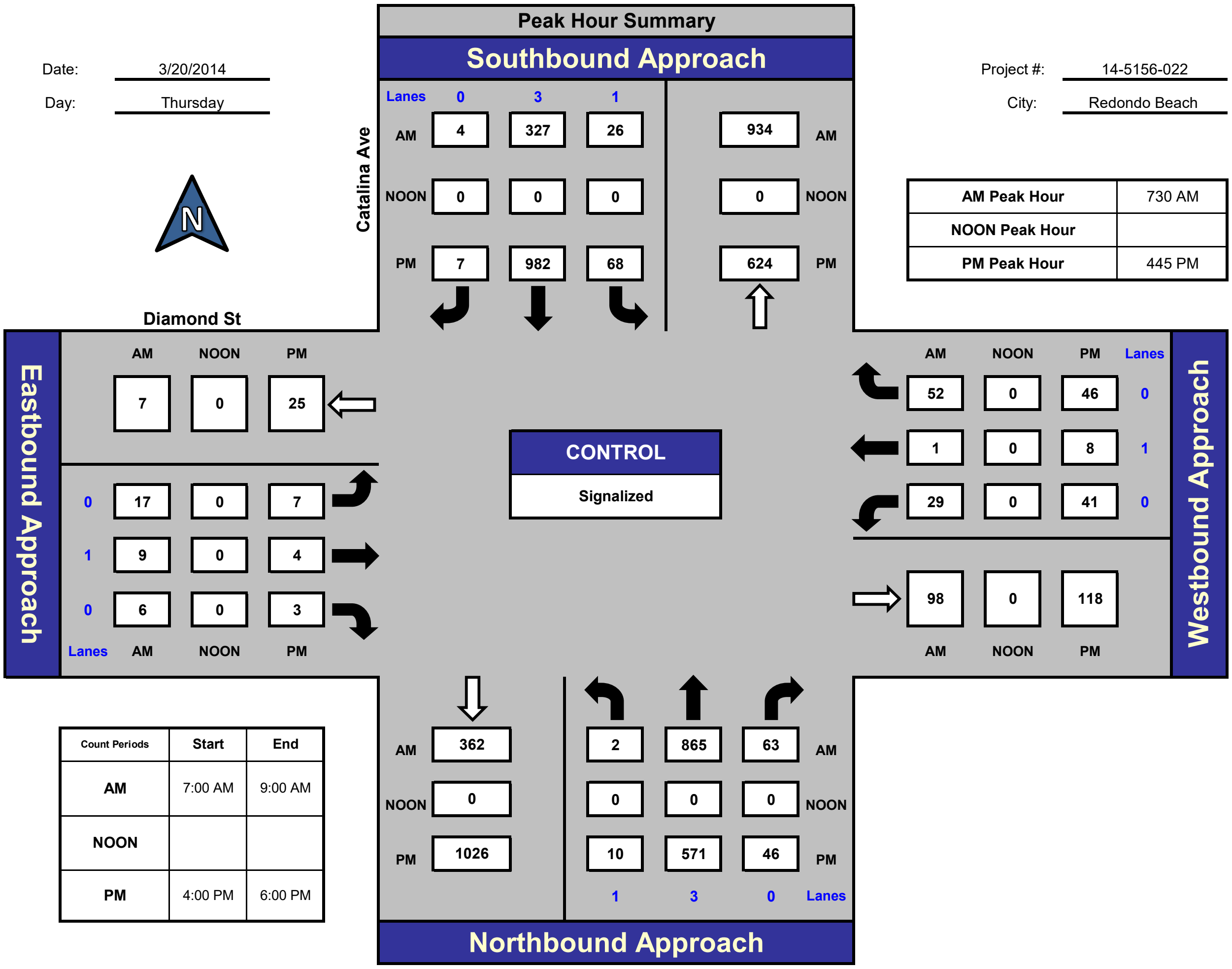
Date: 3/20/2014

Day: Thursday

Project #: 14-5156-022

City: Redondo Beach

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	445 PM



Peak Hour Summary

Southbound Approach

Lanes	0	3	1		
AM	4	327	26	934	AM
NOON	0	0	0	0	NOON
PM	7	982	68	624	PM

Eastbound Approach

	AM	NOON	PM
	7	0	25
0	17	0	7
1	9	0	4
0	6	0	3
Lanes	AM	NOON	PM

CONTROL

Signalized

Westbound Approach

AM	NOON	PM	Lanes
52	0	46	0
1	0	8	1
29	0	41	0
98	0	118	
AM	NOON	PM	

Northbound Approach

AM	362	2	865	63	AM
NOON	0	0	0	0	NOON
PM	1026	10	571	46	PM
		1	3	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON		
PM	4:00 PM	6:00 PM

Total Ins & Outs

North Leg

357	934	AM
0	0	NOON
1057	624	PM

East Leg

AM	NOON	PM
82	0	95
98	0	118

West Leg

AM	NOON	PM
7	0	25
32	0	14

South Leg

AM	362	930
NOON	0	0
PM	1026	627

Total Volume Per Leg

North Leg

1291	AM
0	NOON
1681	PM

East Leg

AM	NOON	PM
180	0	213

West Leg

AM	NOON	PM
39	0	39

South Leg

AM	1292
NOON	0
PM	1653

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Catalina Ave and Beryl St , Redondo Beach

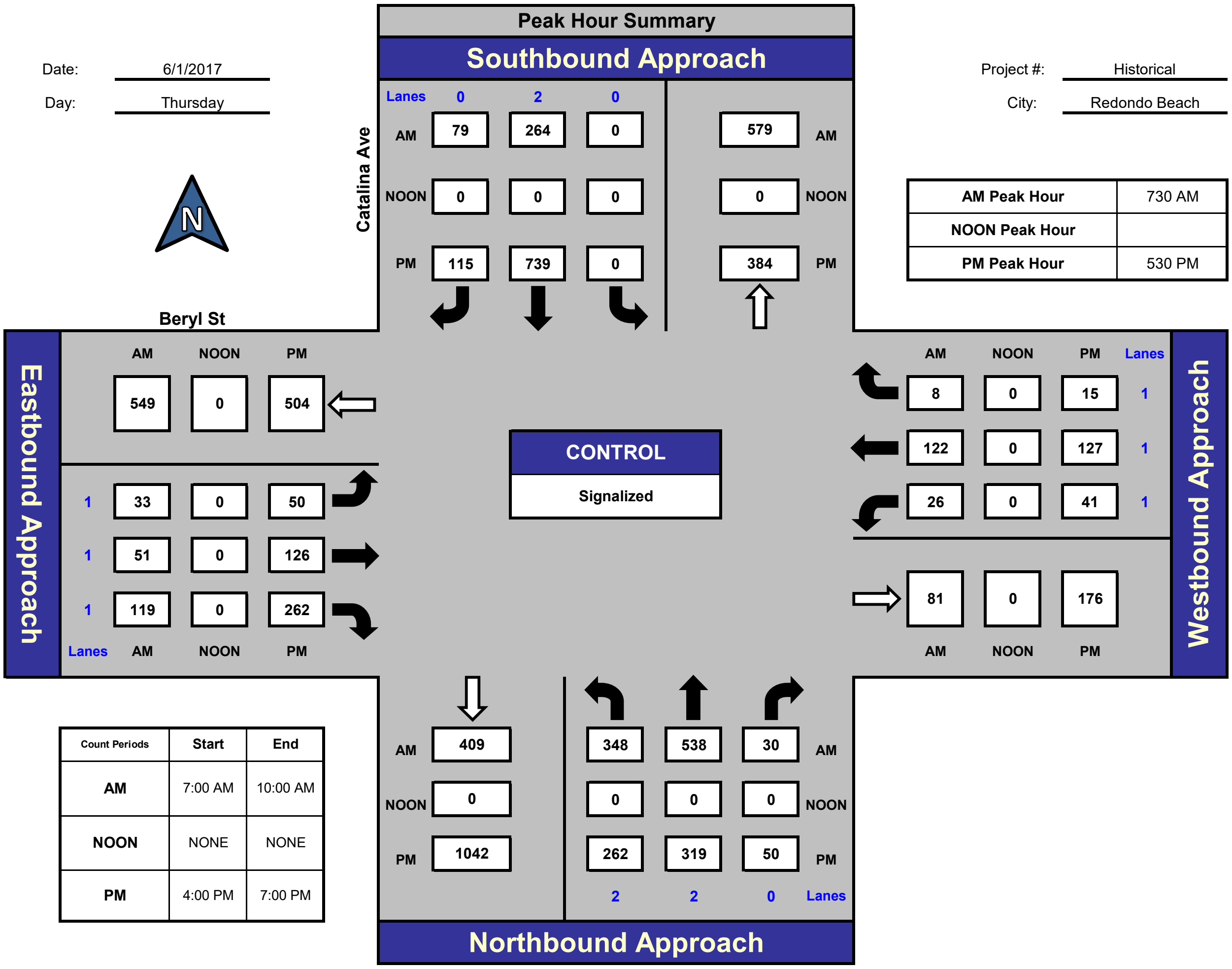
Date: 6/1/2017

Day: Thursday

Project #: Historical

City: Redondo Beach

AM Peak Hour	730 AM
NOON Peak Hour	
PM Peak Hour	530 PM



Peak Hour Summary

Southbound Approach

Lanes	0	2	0		
AM	79	264	0	579	AM
NOON	0	0	0	0	NOON
PM	115	739	0	384	PM

Eastbound Approach

	AM	NOON	PM
	549	0	504
1	33	0	50
1	51	0	126
1	119	0	262
Lanes	AM	NOON	PM

CONTROL

Signalized

Westbound Approach

AM	NOON	PM	Lanes
8	0	15	1
122	0	127	1
26	0	41	1
81	0	176	
AM	NOON	PM	

Northbound Approach

AM	409	348	538	30	AM
NOON	0	0	0	0	NOON
PM	1042	262	319	50	PM
		2	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	10:00 AM
NOON	NONE	NONE
PM	4:00 PM	7:00 PM

Total Ins & Outs

North Leg

343	579	AM
0	0	NOON
854	384	PM

West Leg

AM	NOON	PM
549	0	504
203	0	438

East Leg

156	0	183
81	0	176
AM	NOON	PM

South Leg

AM	409	916
NOON	0	0
PM	1042	631

Total Volume Per Leg

North Leg

922	AM
0	NOON
1238	PM

West Leg

AM	NOON	PM
752	0	942

East Leg

237	0	359
AM	NOON	PM

South Leg

AM	1325
NOON	0
PM	1673

ITM Peak Hour Summary

Prepared by:

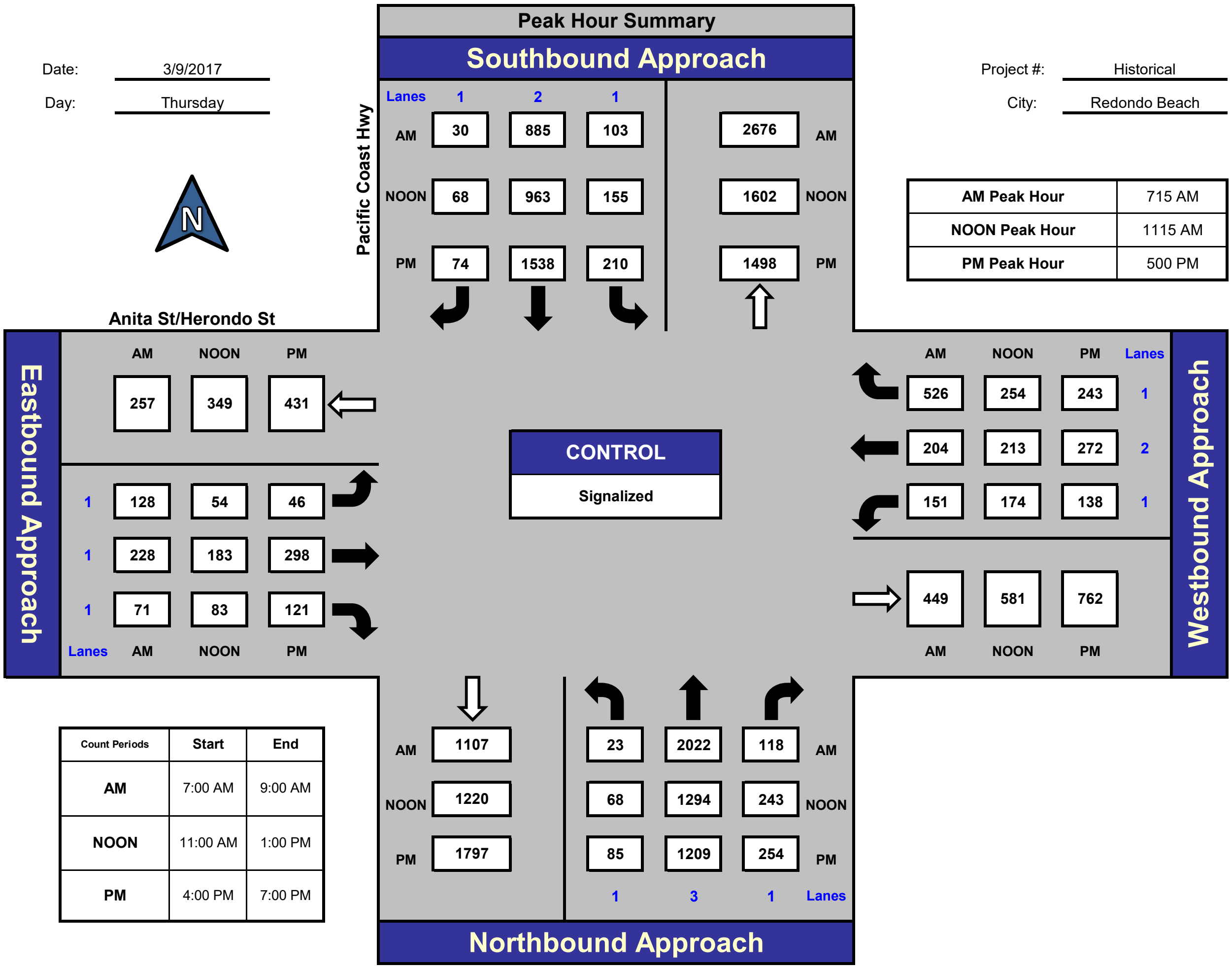
National Data & Surveying Services

Pacific Coast Hwy and Anita St/Herondo St , Redondo Beach

Date: 3/9/2017
Day: Thursday

Project #: Historical
City: Redondo Beach

AM Peak Hour	715 AM
NOON Peak Hour	1115 AM
PM Peak Hour	500 PM



Southbound Approach

Lanes	1	2	1	
AM	30	885	103	2676
NOON	68	963	155	1602
PM	74	1538	210	1498

Eastbound Approach

Lanes	AM	NOON	PM
	257	349	431
1	128	54	46
1	228	183	298
1	71	83	121

Westbound Approach

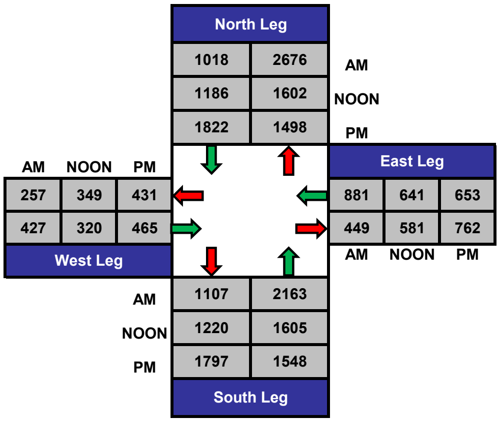
AM	NOON	PM	Lanes
526	254	243	1
204	213	272	2
151	174	138	1
449	581	762	

Northbound Approach

AM	1107	23	2022	118
NOON	1220	68	1294	243
PM	1797	85	1209	254
Lanes		1	3	1

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs



North Leg

AM	1018	2676
NOON	1186	1602
PM	1822	1498

West Leg

AM	NOON	PM
257	349	431
427	320	465

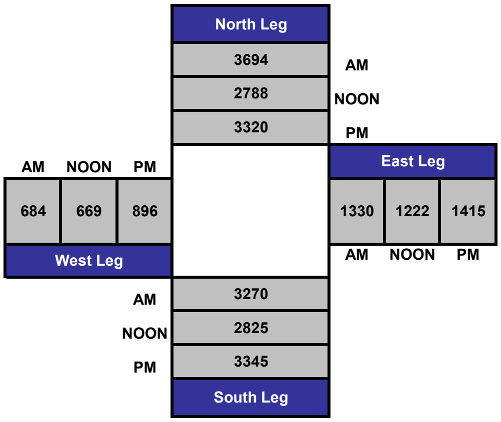
East Leg

AM	NOON	PM
881	641	653
449	581	762

South Leg

AM	1107	2163
NOON	1220	1605
PM	1797	1548

Total Volume Per Leg



Leg	AM	NOON	PM
North Leg	3694	2788	3320
West Leg	684	669	896
East Leg	1330	1222	1415
South Leg	3270	2825	3345

ITM Peak Hour Summary

Prepared by:

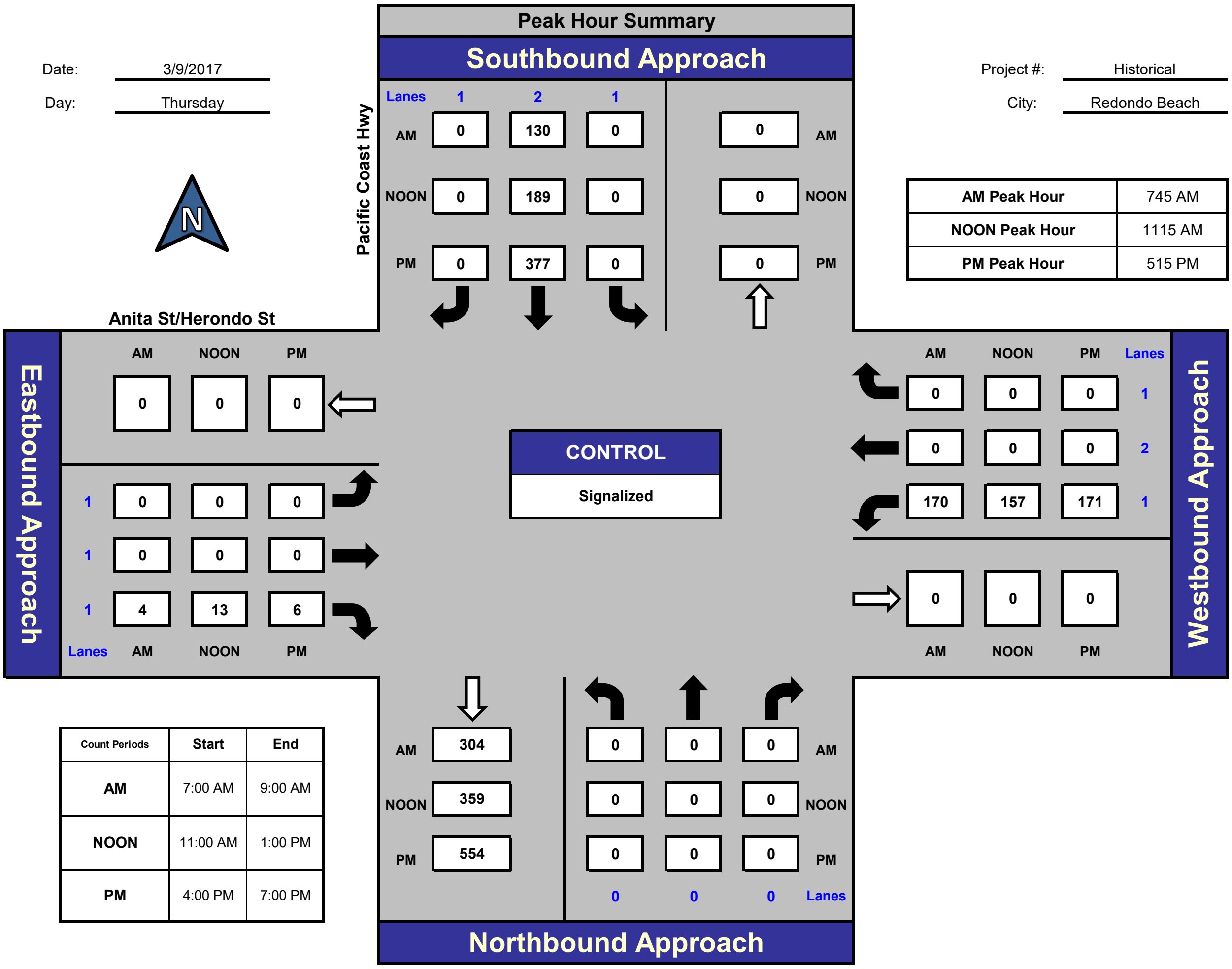
National Data & Surveying Services

Pacific Coast Hwy and Anita St/Herondo St , Redondo Beach

Date: 3/9/2017
Day: Thursday

Project #: Historical
City: Redondo Beach

AM Peak Hour	745 AM
NOON Peak Hour	1115 AM
PM Peak Hour	515 PM



Southbound Approach

	Left	Through	Right	Departing
Lanes	1	2	1	
AM	0	130	0	0
NOON	0	189	0	0
PM	0	377	0	0

Eastbound Approach

Lanes		AM	NOON	PM
	Departing	0	0	0
1	Left	0	0	0
1	Through	0	0	0
1	Right	4	13	6

Westbound Approach

	AM	NOON	PM	Lanes
Right	0	0	0	1
Through	0	0	0	2
Left	170	157	171	1
Departing	0	0	0	

Northbound Approach

	Departing	Left	Through	Right
AM	304	0	0	0
NOON	359	0	0	0
PM	554	0	0	0
Lanes		0	0	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs

North Leg

AM	130	0
NOON	189	0
PM	377	0

East Leg

	AM	NOON	PM
	170	157	171
	0	0	0

West Leg

AM	NOON	PM
0	0	0
4	13	6

South Leg

AM	304	0
NOON	359	0
PM	554	0

Total Volume Per Leg

North Leg

AM	130
NOON	189
PM	377

East Leg

AM	NOON	PM
170	157	171

West Leg

AM	NOON	PM
4	13	6

South Leg

AM	304
NOON	359
PM	554

ITM Peak Hour Summary

Prepared by:

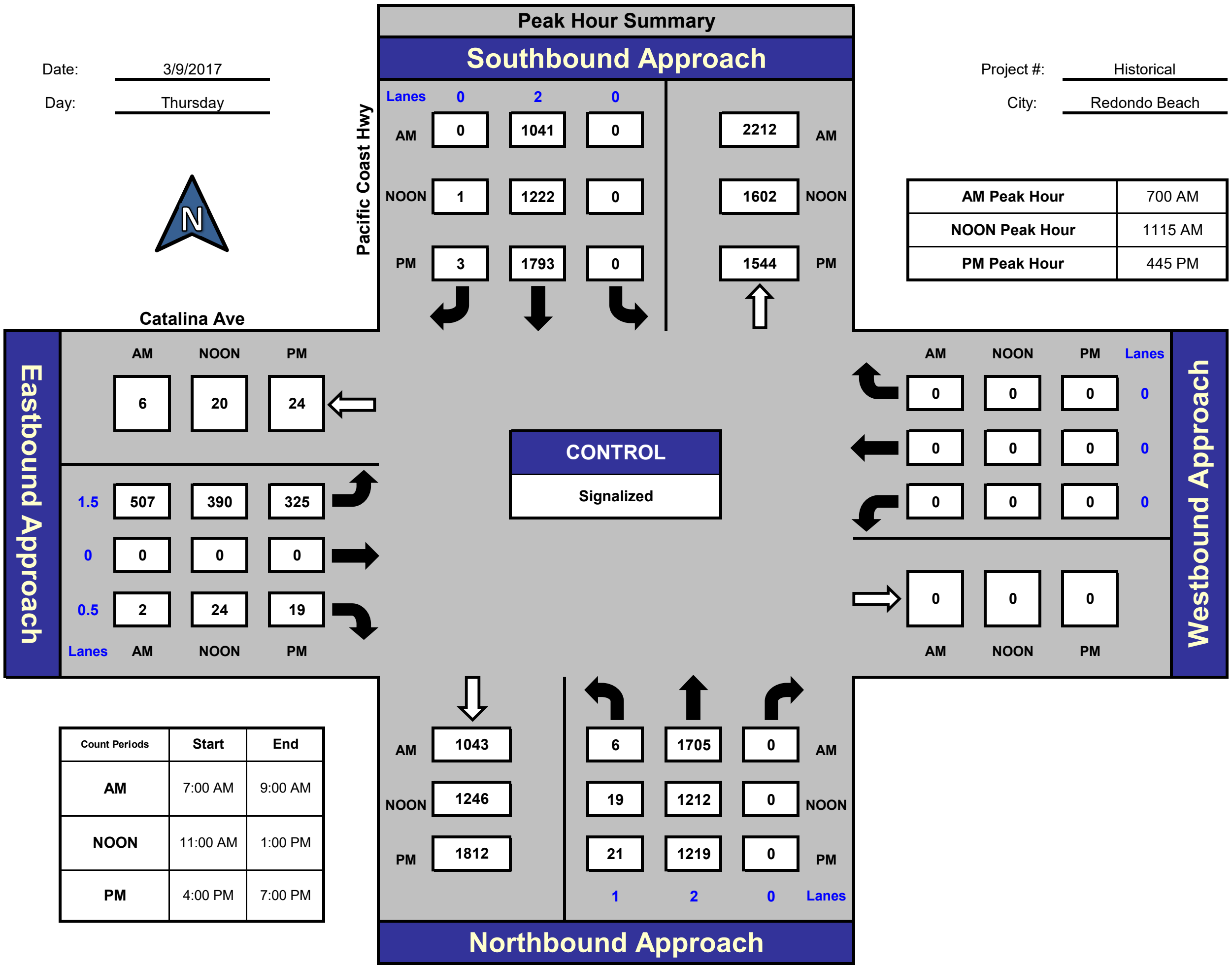
National Data & Surveying Services

Pacific Coast Hwy and Catalina Ave , Redondo Beach

Date: 3/9/2017
Day: Thursday

Project #: Historical
City: Redondo Beach

AM Peak Hour	700 AM
NOON Peak Hour	1115 AM
PM Peak Hour	445 PM



Southbound Approach

	↲	↓	↳	⇧
Lanes	0	2	0	
AM	0	1041	0	2212
NOON	1	1222	0	1602
PM	3	1793	0	1544

Eastbound Approach

		AM	NOON	PM
⇦		6	20	24
↱	1.5	507	390	325
→	0	0	0	0
↴	0.5	2	24	19
	Lanes	AM	NOON	PM

Westbound Approach

	AM	NOON	PM	Lanes
↰	0	0	0	0
←	0	0	0	0
↙	0	0	0	0
⇨	0	0	0	

CONTROL

Signalized

Northbound Approach

	⇩	↰	↑	↱
AM	1043	6	1705	0
NOON	1246	19	1212	0
PM	1812	21	1219	0
Lanes		1	2	0

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs

North Leg

1041	2212	AM
1223	1602	NOON
1796	1544	PM

East Leg

AM	NOON	PM
0	0	0
0	0	0

West Leg

AM	NOON	PM
6	20	24
509	414	344

South Leg

AM	1043	1711
NOON	1246	1231
PM	1812	1240

Total Volume Per Leg

North Leg

3253	AM
2825	NOON
3340	PM

East Leg

AM	NOON	PM
0	0	0

West Leg

AM	NOON	PM
515	434	368

South Leg

AM	2754
NOON	2477
PM	3052

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Pacific Coast Hwy and Beryl St , Redondo Beach

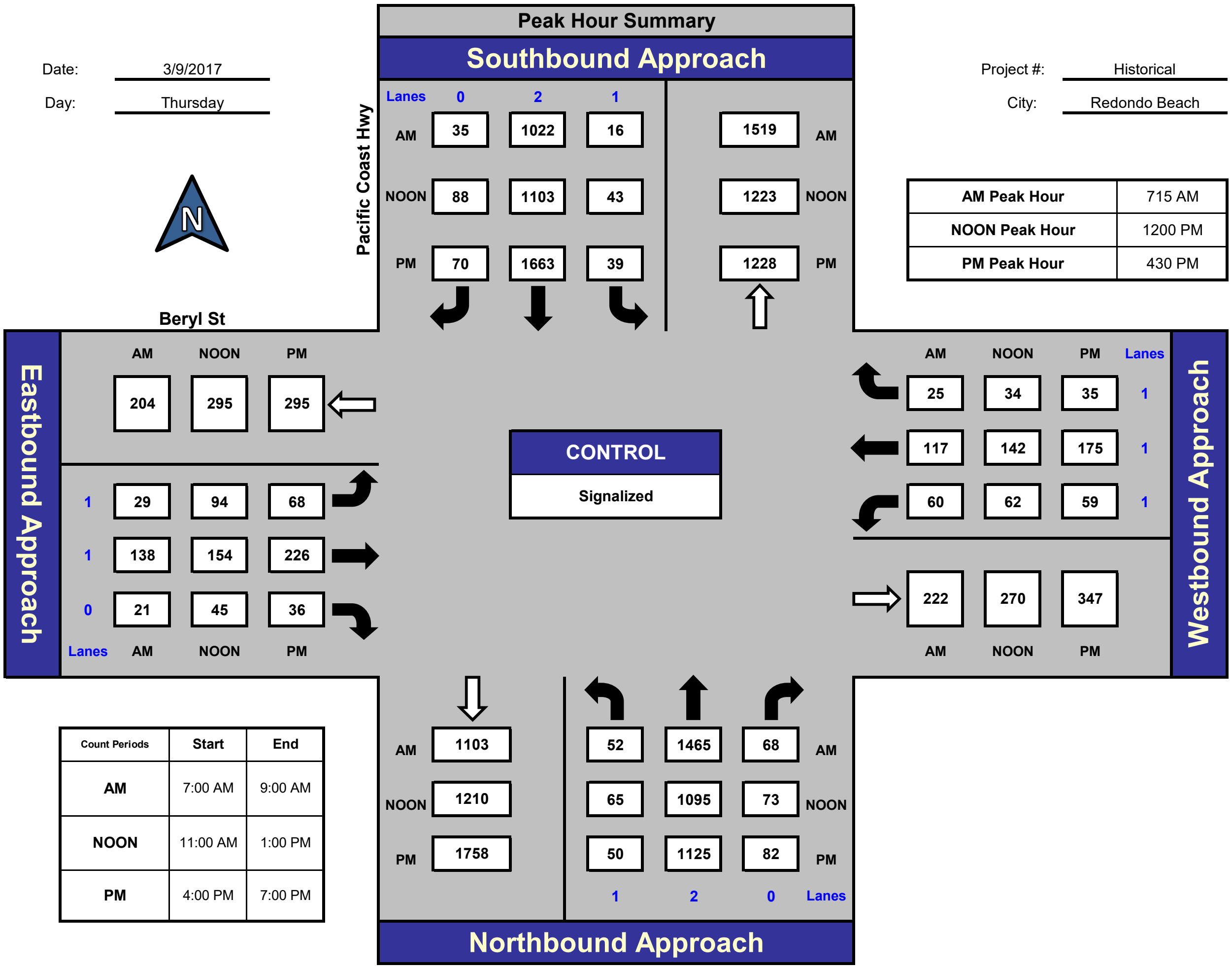
Date: 3/9/2017

Day: Thursday

Project #: Historical

City: Redondo Beach

AM Peak Hour	715 AM
NOON Peak Hour	1200 PM
PM Peak Hour	430 PM



Peak Hour Summary

Southbound Approach

Lanes	0	2	1		
AM	35	1022	16	1519	AM
NOON	88	1103	43	1223	NOON
PM	70	1663	39	1228	PM

Eastbound Approach

	AM	NOON	PM
	204	295	295
1	29	94	68
1	138	154	226
0	21	45	36
Lanes	AM	NOON	PM

CONTROL

Signalized

Westbound Approach

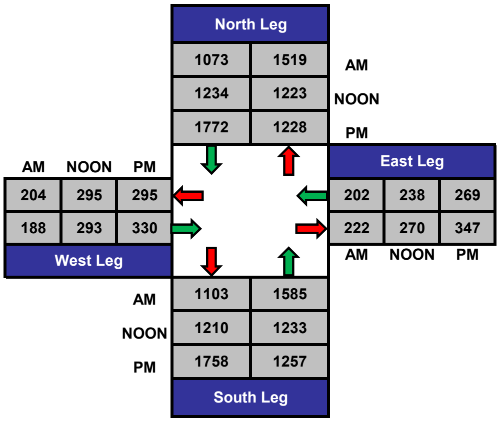
AM	NOON	PM	Lanes
25	34	35	1
117	142	175	1
60	62	59	1
222	270	347	
AM	NOON	PM	

Northbound Approach

AM	1103	52	1465	68	AM
NOON	1210	65	1095	73	NOON
PM	1758	50	1125	82	PM
		1	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs



North Leg

1073	1519	AM
1234	1223	NOON
1772	1228	PM

West Leg

AM	NOON	PM
204	295	295
188	293	330

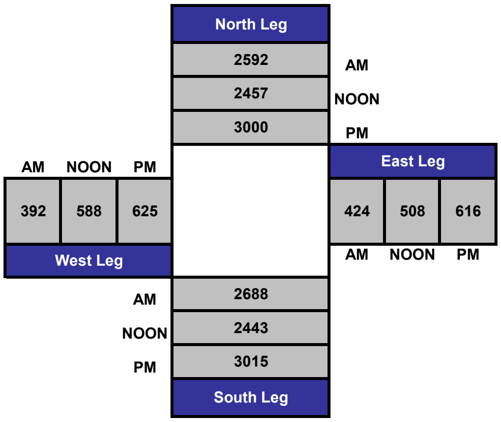
East Leg

202	238	269
222	270	347
AM	NOON	PM

South Leg

AM	1103	1585
NOON	1210	1233
PM	1758	1257

Total Volume Per Leg



North Leg

2592	AM
2457	NOON
3000	PM

West Leg

AM	NOON	PM
392	588	625

East Leg

424	508	616
AM	NOON	PM

South Leg

AM	2688
NOON	2443
PM	3015

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Pacific Coast Hwy and Diamond St , Redondo Beach

Date: 3/9/2017

Day: Thursday

Project #: Historical

City: Redondo Beach

AM Peak Hour	715 AM
NOON Peak Hour	1145 AM
PM Peak Hour	430 PM

Peak Hour Summary

Southbound Approach

Pacific Coast Hwy

Lanes	1	2	1		
AM	38	966	54	1658	AM
NOON	51	1183	46	1325	NOON
PM	35	1712	62	1304	PM
	↲	↓	↳	⇧	

Diamond St

Eastbound Approach

	AM	NOON	PM	
	160	143	141	⇦
1	40	70	37	↱
2	116	82	80	→
0	24	50	27	↴
Lanes	AM	NOON	PM	

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
↰	55	71	70	0
←	87	62	80	2
↙	90	62	40	1
⇨	281	188	194	
	AM	NOON	PM	

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

	⇩	↰	↑	↱	
AM	1080	35	1563	111	AM
NOON	1295	30	1184	60	NOON
PM	1779	26	1197	52	PM
		1	2	0	Lanes

Northbound Approach

Total Ins & Outs

North Leg

AM	1058	1658
NOON	1280	1325
PM	1809	1304

West Leg

AM	NOON	PM
160	143	141
180	202	144

East Leg

AM	NOON	PM
232	195	190
281	188	194

South Leg

AM	1080	1709
NOON	1295	1274
PM	1779	1275

Total Volume Per Leg

North Leg

AM	2716
NOON	2605
PM	3113

West Leg

AM	NOON	PM
340	345	285

East Leg

AM	NOON	PM
513	383	384

South Leg

AM	2789
NOON	2569
PM	3054

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Pacific Coast Hwy and Emerald St , Redondo Beach

Date: 3/9/2017

Day: Thursday

Project #: Historical

City: Redondo Beach

AM Peak Hour	715 AM
NOON Peak Hour	1145 AM
PM Peak Hour	500 PM

Peak Hour Summary

Southbound Approach

Pacific Coast Hwy

Lanes	0	2	1		
AM	14	973	43	1657	AM
NOON	8	1156	68	1224	NOON
PM	22	1567	107	1249	PM
	↲	↓	↳	⇧	

Emerald St

Eastbound Approach

	AM	NOON	PM	
	126	70	78	⇦
0	4	12	9	↱
1	51	48	50	→
0	27	28	23	↴
Lanes	AM	NOON	PM	

CONTROL

Signalized

Westbound Approach

	AM	NOON	PM	Lanes
↰	81	69	41	0
←	61	39	26	1
↙	31	37	5	0
⇨	129	146	186	
	AM	NOON	PM	

Northbound Approach

	⇩	↰	↑	↱	
AM	1031	51	1572	35	AM
NOON	1221	23	1143	30	NOON
PM	1595	30	1199	29	PM
		1	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs

North Leg

1030	1657	AM
1232	1224	NOON
1696	1249	PM

West Leg

AM	NOON	PM
126	70	78
82	88	82

East Leg

AM	NOON	PM
173	145	72
129	146	186

South Leg

AM	1031	1658
NOON	1221	1196
PM	1595	1258

Total Volume Per Leg

North Leg

2687	AM
2456	NOON
2945	PM

West Leg

AM	NOON	PM
208	158	160

East Leg

AM	NOON	PM
302	291	258

South Leg

AM	2689
NOON	2417
PM	2853

ITM Peak Hour Summary

Prepared by:

National Data & Surveying Services

Pacific Coast Hwy and Torrance Blvd , Redondo Beach

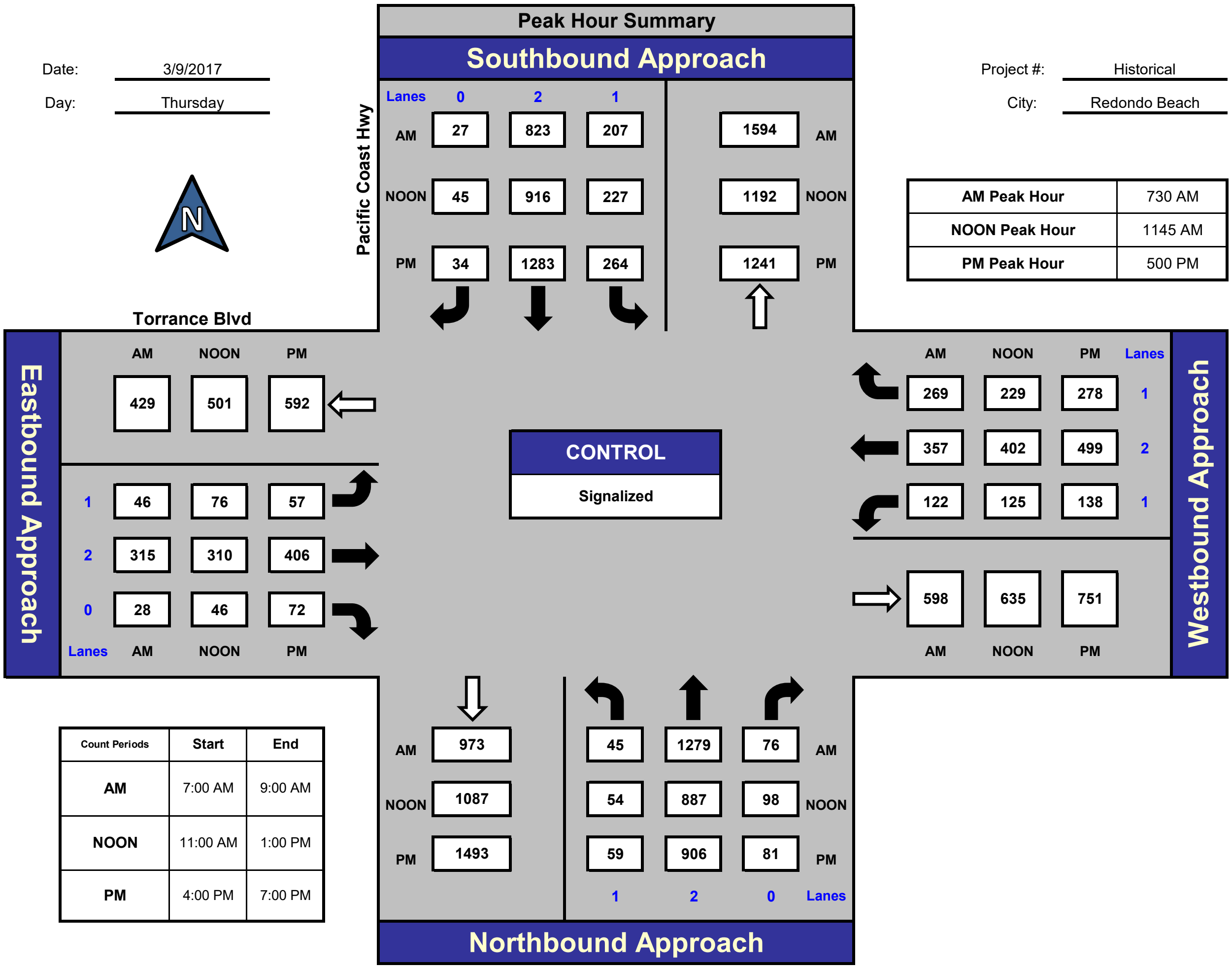
Date: 3/9/2017

Day: Thursday

Project #: Historical

City: Redondo Beach

AM Peak Hour	730 AM
NOON Peak Hour	1145 AM
PM Peak Hour	500 PM



Southbound Approach

Lanes	0	2	1		
AM	27	823	207	1594	AM
NOON	45	916	227	1192	NOON
PM	34	1283	264	1241	PM

Eastbound Approach

	AM	NOON	PM
	429	501	592
1	46	76	57
2	315	310	406
0	28	46	72
Lanes	AM	NOON	PM

Westbound Approach

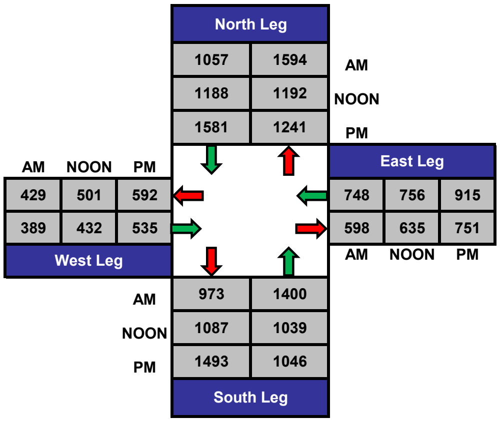
AM	NOON	PM	Lanes
269	229	278	1
357	402	499	2
122	125	138	1
598	635	751	
AM	NOON	PM	

Northbound Approach

AM	973	45	1279	76	AM
NOON	1087	54	887	98	NOON
PM	1493	59	906	81	PM
		1	2	0	Lanes

Count Periods	Start	End
AM	7:00 AM	9:00 AM
NOON	11:00 AM	1:00 PM
PM	4:00 PM	7:00 PM

Total Ins & Outs



North Leg

1057	1594	AM
1188	1192	NOON
1581	1241	PM

West Leg

AM	NOON	PM
429	501	592
389	432	535

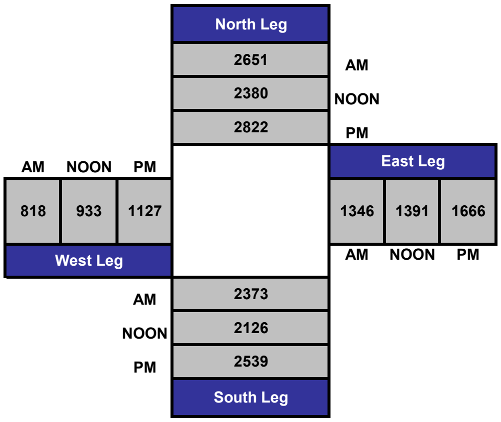
East Leg

748	756	915
598	635	751
AM	NOON	PM

South Leg

AM	973	1400
NOON	1087	1039
PM	1493	1046

Total Volume Per Leg



North Leg

2651	AM
2380	NOON
2822	PM

West Leg

AM	NOON	PM
818	933	1127

East Leg

1346	1391	1666
AM	NOON	PM

South Leg

AM	2373
NOON	2126
PM	2539

Appendix D:
Level of Service Worksheets

EXISTING CONDITIONS

Project Title: **Catalina Village**
Intersection: **1 - South Catalina Avenue & Torrance Boulevard**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	44	1,600	0.023	N-S(1):	0.272 *
	TH	2.00	258	3,200	0.081	N-S(2):	0.089
	LT	1.00	119	1,600	0.074 *	E-W(1):	0.059
Westbound	RT	1.00	166	1,600	0.067 *	E-W(2):	0.076 *
	TH	2.00	56	3,200	0.018		
	LT	1.00	80	1,600	0.050	V/C:	0.348
Northbound	RT	1.00	160	1,600	0.075	Lost Time:	0.100
	TH	2.00	633	3,200	0.198 *	ITS:	0.000
	LT	1.00	12	1,600	0.008		
Eastbound	RT	1.00	9	1,600	0.002	ICU:	0.448
	TH	2.00	29	3,200	0.009		
	LT	1.00	15	1,600	0.009 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	55	1,600	0.034	N-S(1):	0.252 *
	TH	2.00	678	3,200	0.212	N-S(2):	0.230
	LT	1.00	199	1,600	0.124 *	E-W(1):	0.092
Westbound	RT	1.00	198	1,600	0.124 *	E-W(2):	0.151 *
	TH	2.00	116	3,200	0.036		
	LT	1.00	101	1,600	0.063	V/C:	0.403
Northbound	RT	1.00	115	1,600	0.072	Lost Time:	0.100
	TH	2.00	411	3,200	0.128 *	ITS:	0.000
	LT	1.00	28	1,600	0.018		
Eastbound	RT	1.00	26	1,600	0.016	ICU:	0.503
	TH	2.00	94	3,200	0.029		
	LT	1.00	43	1,600	0.027 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **3 - North Catalina Avenue & Emerald Street**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	6	1,600	0.000	N-S(1):	0.290 *
	TH	2.00	341	3,200	0.107	N-S(2):	0.111
	LT	1.00	17	1,600	0.011 *	E-W(1):	0.067
Westbound	RT	0.00	34	0	0.000	E-W(2):	0.069 *
	TH	1.00	4	1,600	0.033 *		
	LT	0.00	15	1,600	0.009	V/C:	0.359
Northbound	RT	0.00	28	0	0.000	Lost Time:	0.100
	TH	2.00	865	3,200	0.279 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.00	25	0	0.000	ICU:	0.459
	TH	1.00	9	1,600	0.058		
	LT	0.00	58	1,600	0.036 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.025	N-S(1):	0.223
	TH	2.00	968	3,200	0.303 *	N-S(2):	0.314 *
	LT	1.00	33	1,600	0.021	E-W(1):	0.033
Westbound	RT	0.00	19	0	0.000	E-W(2):	0.035 *
	TH	1.00	7	1,600	0.025 *		
	LT	0.00	14	1,600	0.009	V/C:	0.349
Northbound	RT	0.00	17	0	0.000	Lost Time:	0.100
	TH	2.00	628	3,200	0.202	ITS:	0.000
	LT	1.00	17	1,600	0.011 *		
Eastbound	RT	0.00	18	0	0.000	ICU:	0.449
	TH	1.00	4	1,600	0.024		
	LT	0.00	16	1,600	0.010 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **4 - North Catalina Avenue & Diamond Street**
Description: **Existing**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	4	1,600	0.000	N-S(1):	0.294 *
	TH	2.00	334	3,200	0.104	N-S(2):	0.105
	LT	1.00	27	1,600	0.017 *	E-W(1):	0.039
Westbound	RT	0.98	53	1,570	0.025	E-W(2):	0.045 *
	TH	0.02	1	30	0.034 *		
	LT	1.00	30	1,600	0.019	V/C:	0.339
Northbound	RT	1.00	64	1,600	0.031	Lost Time:	0.100
	TH	2.00	885	3,200	0.277 *	ITS:	0.000
	LT	1.00	2	1,600	0.001		
Eastbound	RT	0.00	6	0	0.000	ICU:	0.439
	TH	1.00	9	1,600	0.020		
	LT	0.00	17	1,600	0.011 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	7	1,600	0.004	N-S(1):	0.227
	TH	2.00	1,004	3,200	0.314 *	N-S(2):	0.320 *
	LT	1.00	70	1,600	0.044	E-W(1):	0.035
Westbound	RT	0.85	47	1,367	0.034	E-W(2):	0.038 *
	TH	0.15	8	233	0.034 *		
	LT	1.00	42	1,600	0.026	V/C:	0.358
Northbound	RT	1.00	47	1,600	0.029	Lost Time:	0.100
	TH	2.00	584	3,200	0.183	ITS:	0.000
	LT	1.00	10	1,600	0.006 *		
Eastbound	RT	0.00	3	0	0.000	ICU:	0.458
	TH	1.00	4	1,600	0.009		
	LT	0.00	7	1,600	0.004 *	LOS:	A

* - Denotes critical movement

Project Title: Catalina Village
Intersection: 5 - North Catalina Avenue & Beryl Street
Description: Existing

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	80	0	0.000	N-S(1):	0.179
	TH	2.00	267	3,200	0.108 *	N-S(2):	0.246 *
	LT	0.00	0	0	0.000	E-W(1):	0.049
Westbound	RT	1.00	8	1,600	0.005	E-W(2):	0.098 *
	TH	1.00	123	1,600	0.077 *		
	LT	1.00	26	1,600	0.016	V/C:	0.344
Northbound	RT	0.00	30	0	0.000	Lost Time:	0.100
	TH	2.00	544	3,200	0.179	ITS:	0.000
	LT	2.00	352	2,560	0.138 *		
Eastbound	RT	1.00	120	1,600	0.006	ICU:	0.444
	TH	1.00	52	1,600	0.033		
	LT	1.00	33	1,600	0.021 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	116	0	0.000	N-S(1):	0.117
	TH	2.00	747	3,200	0.270 *	N-S(2):	0.374 *
	LT	0.00	0	0	0.000	E-W(1):	0.192 *
Westbound	RT	1.00	15	1,600	0.009	E-W(2):	0.112
	TH	1.00	128	1,600	0.080		
	LT	1.00	41	1,600	0.026 *	V/C:	0.566
Northbound	RT	0.00	51	0	0.000	Lost Time:	0.100
	TH	2.00	323	3,200	0.117	ITS:	0.000
	LT	2.00	265	2,560	0.104 *		
Eastbound	RT	1.00	265	1,600	0.166 *	ICU:	0.666
	TH	1.00	127	1,600	0.079		
	LT	1.00	51	1,600	0.032	LOS:	B

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **6 - Pacific Coast Highway & Herondo Street**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	153	1,600	0.055	N-S(1):	0.491 *
	TH	2.00	895	3,200	0.280	N-S(2):	0.294
	LT	1.00	104	1,600	0.065 *	E-W(1):	0.260
Westbound	RT	1.00	532	1,600	0.300 *	E-W(2):	0.381 *
	TH	1.00	206	1,600	0.129		
	LT	2.00	296	2,560	0.116	V/C:	0.872
Northbound	RT	1.00	119	1,600	0.017	Lost Time:	0.100
	TH	3.00	2,045	4,800	0.426 *	ITS:	0.000
	LT	1.00	23	1,600	0.014		
Eastbound	RT	1.00	75	1,600	0.040	ICU:	0.972
	TH	1.00	231	1,600	0.144		
	LT	1.00	129	1,600	0.081 *	LOS:	E

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	450	1,600	0.281	N-S(1):	0.388
	TH	2.00	1,556	3,200	0.486 *	N-S(2):	0.540 *
	LT	1.00	212	1,600	0.133	E-W(1):	0.308 *
Westbound	RT	1.00	246	1,600	0.154	E-W(2):	0.201
	TH	1.00	275	1,600	0.172		
	LT	2.00	306	2,560	0.120 *	V/C:	0.848
Northbound	RT	1.00	257	1,600	0.161	Lost Time:	0.100
	TH	3.00	1,223	4,800	0.255	ITS:	0.000
	LT	1.00	86	1,600	0.054 *		
Eastbound	RT	1.00	128	1,600	0.080	ICU:	0.948
	TH	1.00	301	1,600	0.188 *		
	LT	1.00	47	1,600	0.029	LOS:	E

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **7 - Pacific Coast Highway & North Catalina Avenue**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	0	0	0.000	N-S(1):	0.539 *
	TH	2.00	1,053	3,200	0.329	N-S(2):	0.333
	LT	0.00	0	0	0.000 *	E-W(1):	0.159
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.201 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.740
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,724	3,200	0.539 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.01	2	12	0.159	ICU:	0.840
	TH	0.00	0	0	0.000		
	LT	1.99	513	2,550	0.201 *	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	3	0	0.000	N-S(1):	0.385
	TH	2.00	1,813	3,200	0.568 *	N-S(2):	0.581 *
	LT	0.00	0	0	0.000	E-W(1):	0.109
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.136 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.717
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,233	3,200	0.385	ITS:	0.000
	LT	1.00	21	1,600	0.013 *		
Eastbound	RT	0.11	19	175	0.109	ICU:	0.817
	TH	0.00	0	0	0.000		
	LT	1.89	329	2,420	0.136 *	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **8 - Pacific Coast Highway & Beryl Street**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.495 *
	TH	2.00	1,034	3,200	0.334	N-S(2):	0.367
	LT	1.00	16	1,600	0.010 *	E-W(1):	0.139 *
Westbound	RT	1.00	25	1,600	0.011	E-W(2):	0.092
	TH	1.00	118	1,600	0.074		
	LT	1.00	61	1,600	0.038 *	V/C:	0.634
Northbound	RT	0.00	69	0	0.000	Lost Time:	0.100
	TH	2.00	1,482	3,200	0.485 *	ITS:	0.000
	LT	1.00	53	1,600	0.033		
Eastbound	RT	0.13	21	209	0.084	ICU:	0.734
	TH	0.87	140	1,391	0.101 *		
	LT	1.00	29	1,600	0.018	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	71	0	0.000	N-S(1):	0.406
	TH	2.00	1,682	3,200	0.548 *	N-S(2):	0.580 *
	LT	1.00	39	1,600	0.024	E-W(1):	0.204 *
Westbound	RT	1.00	35	1,600	0.022	E-W(2):	0.154
	TH	1.00	177	1,600	0.111		
	LT	1.00	60	1,600	0.038 *	V/C:	0.784
Northbound	RT	0.00	83	0	0.000	Lost Time:	0.100
	TH	2.00	1,138	3,200	0.382	ITS:	0.000
	LT	1.00	51	1,600	0.032 *		
Eastbound	RT	0.14	36	217	0.166	ICU:	0.884
	TH	0.86	229	1,383	0.166 *		
	LT	1.00	69	1,600	0.043	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **9 - Pacific Coast Highway & Diamond Street**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	38	1,600	0.011	N-S(1):	0.563 *
	TH	2.00	977	3,200	0.305	N-S(2):	0.327
	LT	1.00	55	1,600	0.034 *	E-W(1):	0.130 *
Westbound	RT	1.00	56	1,600	0.018	E-W(2):	0.080
	TH	1.00	88	1,600	0.055		
	LT	1.00	91	1,600	0.057 *	V/C:	0.693
Northbound	RT	0.00	112	0	0.000	Lost Time:	0.100
	TH	2.00	1,581	3,200	0.529 *	ITS:	0.000
	LT	1.00	35	1,600	0.022		
Eastbound	RT	1.00	24	1,600	0.004	ICU:	0.793
	TH	1.00	117	1,600	0.073 *		
	LT	1.00	40	1,600	0.025	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	35	1,600	0.022	N-S(1):	0.434
	TH	2.00	1,732	3,200	0.541 *	N-S(2):	0.557 *
	LT	1.00	63	1,600	0.039	E-W(1):	0.076 *
Westbound	RT	1.00	71	1,600	0.044	E-W(2):	0.074
	TH	1.00	81	1,600	0.051		
	LT	1.00	40	1,600	0.025 *	V/C:	0.633
Northbound	RT	0.00	53	0	0.000	Lost Time:	0.100
	TH	2.00	1,211	3,200	0.395	ITS:	0.000
	LT	1.00	26	1,600	0.016 *		
Eastbound	RT	1.00	27	1,600	0.017	ICU:	0.733
	TH	1.00	81	1,600	0.051 *		
	LT	1.00	37	1,600	0.023	LOS:	C

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **10 - Pacific Coast Highway & Emerald Street**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	14	0	0.000	N-S(1):	0.535 *
	TH	2.00	984	3,200	0.312	N-S(2):	0.345
	LT	1.00	43	1,600	0.027 *	E-W(1):	0.071
Westbound	RT	0.00	82	0	0.000	E-W(2):	0.112 *
	TH	1.00	62	1,600	0.109 *		
	LT	0.00	31	1,600	0.019	V/C:	0.647
Northbound	RT	0.00	35	0	0.000	Lost Time:	0.100
	TH	2.00	1,590	3,200	0.508 *	ITS:	0.000
	LT	1.00	52	1,600	0.033		
Eastbound	RT	0.00	27	0	0.000	ICU:	0.747
	TH	1.00	52	1,600	0.052		
	LT	0.00	4	1,600	0.003 *	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	22	0	0.000	N-S(1):	0.456
	TH	2.00	1,585	3,200	0.502 *	N-S(2):	0.521 *
	LT	1.00	108	1,600	0.068	E-W(1):	0.055 *
Westbound	RT	0.00	41	0	0.000	E-W(2):	0.051
	TH	1.00	26	1,600	0.045		
	LT	0.00	5	1,600	0.003 *	V/C:	0.576
Northbound	RT	0.00	29	0	0.000	Lost Time:	0.100
	TH	2.00	1,213	3,200	0.388	ITS:	0.000
	LT	1.00	30	1,600	0.019 *		
Eastbound	RT	0.00	23	0	0.000	ICU:	0.676
	TH	1.00	51	1,600	0.052 *		
	LT	0.00	9	1,600	0.006	LOS:	B

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **11 - Pacific Coast Highway & Torrance Boulevard**
Description: **Existing**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	27	0	0.000	N-S(1):	0.559 *
	TH	2.00	832	3,200	0.268	N-S(2):	0.297
	LT	1.00	209	1,600	0.131 *	E-W(1):	0.185 *
Westbound	RT	1.00	272	1,600	0.105	E-W(2):	0.142
	TH	2.00	361	3,200	0.113		
	LT	1.00	123	1,600	0.077 *	V/C:	0.744
Northbound	RT	0.00	77	0	0.000	Lost Time:	0.100
	TH	2.00	1,294	3,200	0.428 *	ITS:	0.000
	LT	1.00	46	1,600	0.029		
Eastbound	RT	0.00	28	0	0.000	ICU:	0.844
	TH	2.00	319	3,200	0.108 *		
	LT	1.00	47	1,600	0.029	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	34	0	0.000	N-S(1):	0.479 *
	TH	2.00	1,298	3,200	0.416	N-S(2):	0.454
	LT	1.00	267	1,600	0.167 *	E-W(1):	0.239 *
Westbound	RT	1.00	281	1,600	0.176	E-W(2):	0.212
	TH	2.00	505	3,200	0.158		
	LT	1.00	140	1,600	0.088 *	V/C:	0.718
Northbound	RT	0.00	82	0	0.000	Lost Time:	0.100
	TH	2.00	916	3,200	0.312 *	ITS:	0.000
	LT	1.00	60	1,600	0.038		
Eastbound	RT	0.00	73	0	0.000	ICU:	0.818
	TH	2.00	411	3,200	0.151 *		
	LT	1.00	58	1,600	0.036	LOS:	D

* - Denotes critical movement

EXISTING PLUS PROJECT

Project Title: **Catalina Village**
Intersection: **1 - South Catalina Avenue & Torrance Boulevard**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	44	1,600	0.023		N-S(1):	0.272	*
	TH	2.00	260	3,200	0.081		N-S(2):	0.089	
	LT	1.00	119	1,600	0.074	*	E-W(1):	0.059	
Westbound	RT	1.00	177	1,600	0.073	*	E-W(2):	0.082	*
	TH	2.00	56	3,200	0.018				
	LT	1.00	80	1,600	0.050		V/C:	0.354	
Northbound	RT	1.00	160	1,600	0.075		Lost Time:	0.100	
	TH	2.00	635	3,200	0.198	*	ITS:	0.000	
	LT	1.00	12	1,600	0.008				
Eastbound	RT	1.00	9	1,600	0.002		ICU:	0.454	
	TH	2.00	29	3,200	0.009				
	LT	1.00	15	1,600	0.009	*	LOS:	A	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	55	1,600	0.034		N-S(1):	0.253	*
	TH	2.00	679	3,200	0.212		N-S(2):	0.230	
	LT	1.00	199	1,600	0.124	*	E-W(1):	0.092	
Westbound	RT	1.00	206	1,600	0.129	*	E-W(2):	0.156	*
	TH	2.00	116	3,200	0.036				
	LT	1.00	101	1,600	0.063		V/C:	0.409	
Northbound	RT	1.00	115	1,600	0.072		Lost Time:	0.100	
	TH	2.00	413	3,200	0.129	*	ITS:	0.000	
	LT	1.00	28	1,600	0.018				
Eastbound	RT	1.00	26	1,600	0.016		ICU:	0.509	
	TH	2.00	94	3,200	0.029				
	LT	1.00	43	1,600	0.027	*	LOS:	A	

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **3 - North Catalina Avenue & Emerald Street**
Description: **Existing + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	6	1,600	0.000	N-S(1):	0.294 *
	TH	2.00	347	3,200	0.108	N-S(2):	0.112
	LT	1.00	17	1,600	0.011 *	E-W(1):	0.069
Westbound	RT	0.00	76	0	0.000	E-W(2):	0.097 *
	TH	1.00	4	1,600	0.061 *		
	LT	0.00	17	1,600	0.011	V/C:	0.391
Northbound	RT	0.00	28	0	0.000	Lost Time:	0.100
	TH	2.00	878	3,200	0.283 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.00	25	0	0.000	ICU:	0.491
	TH	1.00	9	1,600	0.058		
	LT	0.00	58	1,600	0.036 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.025	N-S(1):	0.225
	TH	2.00	972	3,200	0.304 *	N-S(2):	0.315 *
	LT	1.00	33	1,600	0.021	E-W(1):	0.033
Westbound	RT	0.00	48	0	0.000	E-W(2):	0.054 *
	TH	1.00	7	1,600	0.044 *		
	LT	0.00	15	1,600	0.009	V/C:	0.369
Northbound	RT	0.00	17	0	0.000	Lost Time:	0.100
	TH	2.00	637	3,200	0.204	ITS:	0.000
	LT	1.00	17	1,600	0.011 *		
Eastbound	RT	0.00	18	0	0.000	ICU:	0.469
	TH	1.00	4	1,600	0.024		
	LT	0.00	16	1,600	0.010 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **4 - North Catalina Avenue & Diamond Street**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	4	1,600	0.000	N-S(1):	0.314 *
	TH	2.00	340	3,200	0.106	N-S(2):	0.107
	LT	1.00	40	1,600	0.025 *	E-W(1):	0.039
Westbound	RT	0.98	53	1,570	0.021	E-W(2):	0.045 *
	TH	0.02	1	30	0.034 *		
	LT	1.00	30	1,600	0.019	V/C:	0.359
Northbound	RT	1.00	84	1,600	0.043	Lost Time:	0.100
	TH	2.00	925	3,200	0.289 *	ITS:	0.000
	LT	1.00	2	1,600	0.001		
Eastbound	RT	0.00	6	0	0.000	ICU:	0.459
	TH	1.00	9	1,600	0.020		
	LT	0.00	17	1,600	0.011 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	7	1,600	0.004	N-S(1):	0.238
	TH	2.00	1,008	3,200	0.315 *	N-S(2):	0.321 *
	LT	1.00	79	1,600	0.049	E-W(1):	0.035
Westbound	RT	0.85	47	1,367	0.034	E-W(2):	0.038 *
	TH	0.15	8	233	0.034 *		
	LT	1.00	42	1,600	0.026	V/C:	0.359
Northbound	RT	1.00	57	1,600	0.036	Lost Time:	0.100
	TH	2.00	605	3,200	0.189	ITS:	0.000
	LT	1.00	10	1,600	0.006 *		
Eastbound	RT	0.00	3	0	0.000	ICU:	0.459
	TH	1.00	4	1,600	0.009		
	LT	0.00	7	1,600	0.004 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **5 - North Catalina Avenue & Beryl Street**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	80	0	0.000		N-S(1):	0.190	
	TH	2.00	281	3,200	0.113	*	N-S(2):	0.253	*
	LT	0.00	0	0	0.000		E-W(1):	0.049	
Westbound	RT	1.00	8	1,600	0.005		E-W(2):	0.098	*
	TH	1.00	123	1,600	0.077	*			
	LT	1.00	26	1,600	0.016		V/C:	0.351	
Northbound	RT	0.00	34	0	0.000		Lost Time:	0.100	
	TH	2.00	574	3,200	0.190		ITS:	0.000	
	LT	2.00	358	2,560	0.140	*			
Eastbound	RT	1.00	126	1,600	0.009		ICU:	0.451	
	TH	1.00	52	1,600	0.033				
	LT	1.00	33	1,600	0.021	*	LOS:	A	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	116	0	0.000		N-S(1):	0.123	
	TH	2.00	757	3,200	0.273	*	N-S(2):	0.378	*
	LT	0.00	0	0	0.000		E-W(1):	0.194	*
Westbound	RT	1.00	15	1,600	0.009		E-W(2):	0.112	
	TH	1.00	128	1,600	0.080				
	LT	1.00	41	1,600	0.026	*	V/C:	0.572	
Northbound	RT	0.00	53	0	0.000		Lost Time:	0.100	
	TH	2.00	339	3,200	0.123		ITS:	0.000	
	LT	2.00	268	2,560	0.105	*			
Eastbound	RT	1.00	269	1,600	0.168	*	ICU:	0.672	
	TH	1.00	127	1,600	0.079				
	LT	1.00	51	1,600	0.032		LOS:	B	

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **6 - Pacific Coast Highway & Herondo Street**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	158	1,600	0.058	N-S(1):	0.493 *
	TH	2.00	900	3,200	0.281	N-S(2):	0.295
	LT	1.00	104	1,600	0.065 *	E-W(1):	0.267
Westbound	RT	1.00	532	1,600	0.300 *	E-W(2):	0.381 *
	TH	1.00	206	1,600	0.129		
	LT	2.00	314	2,560	0.123	V/C:	0.874
Northbound	RT	1.00	138	1,600	0.025	Lost Time:	0.100
	TH	3.00	2,056	4,800	0.428 *	ITS:	0.000
	LT	1.00	23	1,600	0.014		
Eastbound	RT	1.00	75	1,600	0.040	ICU:	0.974
	TH	1.00	231	1,600	0.144		
	LT	1.00	129	1,600	0.081 *	LOS:	E

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	453	1,600	0.283	N-S(1):	0.389
	TH	2.00	1,559	3,200	0.487 *	N-S(2):	0.541 *
	LT	1.00	212	1,600	0.133	E-W(1):	0.312 *
Westbound	RT	1.00	246	1,600	0.154	E-W(2):	0.201
	TH	1.00	275	1,600	0.172		
	LT	2.00	318	2,560	0.124 *	V/C:	0.853
Northbound	RT	1.00	267	1,600	0.167	Lost Time:	0.100
	TH	3.00	1,229	4,800	0.256	ITS:	0.000
	LT	1.00	86	1,600	0.054 *		
Eastbound	RT	1.00	128	1,600	0.080	ICU:	0.953
	TH	1.00	301	1,600	0.188 *		
	LT	1.00	47	1,600	0.029	LOS:	E

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **7 - Pacific Coast Highway & North Catalina Avenue**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	0	0	0.000	N-S(1):	0.539 *
	TH	2.00	1,067	3,200	0.333	N-S(2):	0.337
	LT	0.00	0	0	0.000 *	E-W(1):	0.168
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.213 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.752
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,724	3,200	0.539 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.01	2	12	0.168	ICU:	0.852
	TH	0.00	0	0	0.000		
	LT	1.99	543	2,551	0.213 *	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	3	0	0.000	N-S(1):	0.385
	TH	2.00	1,823	3,200	0.571 *	N-S(2):	0.584 *
	LT	0.00	0	0	0.000	E-W(1):	0.114
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.142 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.726
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,233	3,200	0.385	ITS:	0.000
	LT	1.00	21	1,600	0.013 *		
Eastbound	RT	0.10	19	167	0.114	ICU:	0.826
	TH	0.00	0	0	0.000		
	LT	1.90	345	2,426	0.142 *	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **8 - Pacific Coast Highway & Beryl Street**
Description: **Existing + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.495 *
	TH	2.00	1,048	3,200	0.338	N-S(2):	0.371
	LT	1.00	16	1,600	0.010 *	E-W(1):	0.144 *
Westbound	RT	1.00	25	1,600	0.011	E-W(2):	0.092
	TH	1.00	118	1,600	0.074		
	LT	1.00	65	1,600	0.041 *	V/C:	0.639
Northbound	RT	0.00	69	0	0.000	Lost Time:	0.100
	TH	2.00	1,482	3,200	0.485 *	ITS:	0.000
	LT	1.00	53	1,600	0.033		
Eastbound	RT	0.13	21	204	0.087	ICU:	0.739
	TH	0.87	144	1,396	0.103 *		
	LT	1.00	29	1,600	0.018	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	71	0	0.000	N-S(1):	0.406
	TH	2.00	1,692	3,200	0.551 *	N-S(2):	0.583 *
	LT	1.00	39	1,600	0.024	E-W(1):	0.206 *
Westbound	RT	1.00	35	1,600	0.022	E-W(2):	0.154
	TH	1.00	177	1,600	0.111		
	LT	1.00	63	1,600	0.039 *	V/C:	0.789
Northbound	RT	0.00	83	0	0.000	Lost Time:	0.100
	TH	2.00	1,138	3,200	0.382	ITS:	0.000
	LT	1.00	51	1,600	0.032 *		
Eastbound	RT	0.13	36	216	0.167	ICU:	0.889
	TH	0.87	231	1,384	0.167 *		
	LT	1.00	69	1,600	0.043	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **9 - Pacific Coast Highway & Diamond Street**
Description: **Existing + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.013	N-S(1):	0.563 *
	TH	2.00	993	3,200	0.310	N-S(2):	0.332
	LT	1.00	55	1,600	0.034 *	E-W(1):	0.135 *
Westbound	RT	1.00	56	1,600	0.018	E-W(2):	0.080
	TH	1.00	88	1,600	0.055		
	LT	1.00	94	1,600	0.059 *	V/C:	0.698
Northbound	RT	0.00	112	0	0.000	Lost Time:	0.100
	TH	2.00	1,581	3,200	0.529 *	ITS:	0.000
	LT	1.00	35	1,600	0.022		
Eastbound	RT	1.00	38	1,600	0.013	ICU:	0.798
	TH	1.00	121	1,600	0.076 *		
	LT	1.00	40	1,600	0.025	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	36	1,600	0.023	N-S(1):	0.434
	TH	2.00	1,743	3,200	0.545 *	N-S(2):	0.561 *
	LT	1.00	63	1,600	0.039	E-W(1):	0.078 *
Westbound	RT	1.00	71	1,600	0.044	E-W(2):	0.074
	TH	1.00	81	1,600	0.051		
	LT	1.00	42	1,600	0.026 *	V/C:	0.639
Northbound	RT	0.00	53	0	0.000	Lost Time:	0.100
	TH	2.00	1,211	3,200	0.395	ITS:	0.000
	LT	1.00	26	1,600	0.016 *		
Eastbound	RT	1.00	34	1,600	0.021	ICU:	0.739
	TH	1.00	83	1,600	0.052 *		
	LT	1.00	37	1,600	0.023	LOS:	C

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **10 - Pacific Coast Highway & Emerald Street**
Description: **Existing + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	33	0	0.000	N-S(1):	0.536 *
	TH	2.00	996	3,200	0.322	N-S(2):	0.355
	LT	1.00	45	1,600	0.028 *	E-W(1):	0.071
Westbound	RT	0.00	82	0	0.000	E-W(2):	0.114 *
	TH	1.00	64	1,600	0.111 *		
	LT	0.00	31	1,600	0.019	V/C:	0.650
Northbound	RT	0.00	35	0	0.000	Lost Time:	0.100
	TH	2.00	1,590	3,200	0.508 *	ITS:	0.000
	LT	1.00	52	1,600	0.033		
Eastbound	RT	0.00	27	0	0.000	ICU:	0.750
	TH	1.00	52	1,600	0.052		
	LT	0.00	4	1,600	0.003 *	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.456
	TH	2.00	1,591	3,200	0.508 *	N-S(2):	0.527 *
	LT	1.00	109	1,600	0.068	E-W(1):	0.055 *
Westbound	RT	0.00	41	0	0.000	E-W(2):	0.052
	TH	1.00	27	1,600	0.046		
	LT	0.00	5	1,600	0.003 *	V/C:	0.582
Northbound	RT	0.00	29	0	0.000	Lost Time:	0.100
	TH	2.00	1,213	3,200	0.388	ITS:	0.000
	LT	1.00	30	1,600	0.019 *		
Eastbound	RT	0.00	23	0	0.000	ICU:	0.682
	TH	1.00	51	1,600	0.052 *		
	LT	0.00	9	1,600	0.006	LOS:	B

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **11 - Pacific Coast Highway & Torrance Boulevard**
Description: **Existing + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	27	0	0.000		N-S(1):	0.565	*
	TH	2.00	834	3,200	0.269		N-S(2):	0.299	
	LT	1.00	219	1,600	0.137	*	E-W(1):	0.185	*
Westbound	RT	1.00	272	1,600	0.102		E-W(2):	0.145	
	TH	2.00	370	3,200	0.116				
	LT	1.00	123	1,600	0.077	*	V/C:	0.750	
Northbound	RT	0.00	77	0	0.000		Lost Time:	0.100	
	TH	2.00	1,294	3,200	0.428	*	ITS:	0.000	
	LT	1.00	48	1,600	0.030				
Eastbound	RT	0.00	28	0	0.000		ICU:	0.850	
	TH	2.00	319	3,200	0.108	*			
	LT	1.00	47	1,600	0.029		LOS:	D	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	34	0	0.000		N-S(1):	0.482	*
	TH	2.00	1,299	3,200	0.417		N-S(2):	0.456	
	LT	1.00	272	1,600	0.170	*	E-W(1):	0.239	*
Westbound	RT	1.00	281	1,600	0.176		E-W(2):	0.212	
	TH	2.00	511	3,200	0.160				
	LT	1.00	140	1,600	0.088	*	V/C:	0.721	
Northbound	RT	0.00	82	0	0.000		Lost Time:	0.100	
	TH	2.00	916	3,200	0.312	*	ITS:	0.000	
	LT	1.00	62	1,600	0.039				
Eastbound	RT	0.00	73	0	0.000		ICU:	0.821	
	TH	2.00	411	3,200	0.151	*			
	LT	1.00	58	1,600	0.036		LOS:	D	

* - Denotes critical movement

CUMULATIVE BASE

Project Title: **Catalina Village**
Intersection: **1 - South Catalina Avenue & Torrance Boulevard**
Description: **Cumulative Base**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	45	1,600	0.023	N-S(1):	0.274 *
	TH	2.00	264	3,200	0.083	N-S(2):	0.091
	LT	1.00	120	1,600	0.075 *	E-W(1):	0.061
Westbound	RT	1.00	168	1,600	0.068 *	E-W(2):	0.077 *
	TH	2.00	57	3,200	0.018		
	LT	1.00	83	1,600	0.052	V/C:	0.351
Northbound	RT	1.00	159	1,600	0.073	Lost Time:	0.100
	TH	2.00	637	3,200	0.199 *	ITS:	0.000
	LT	1.00	12	1,600	0.008		
Eastbound	RT	1.00	9	1,600	0.002	ICU:	0.451
	TH	2.00	29	3,200	0.009		
	LT	1.00	15	1,600	0.009 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	56	1,600	0.035	N-S(1):	0.257 *
	TH	2.00	683	3,200	0.213	N-S(2):	0.231
	LT	1.00	201	1,600	0.126 *	E-W(1):	0.093
Westbound	RT	1.00	200	1,600	0.125 *	E-W(2):	0.152 *
	TH	2.00	117	3,200	0.037		
	LT	1.00	100	1,600	0.063	V/C:	0.409
Northbound	RT	1.00	118	1,600	0.074	Lost Time:	0.100
	TH	2.00	418	3,200	0.131 *	ITS:	0.000
	LT	1.00	28	1,600	0.018		
Eastbound	RT	1.00	26	1,600	0.016	ICU:	0.509
	TH	2.00	95	3,200	0.030		
	LT	1.00	43	1,600	0.027 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **3 - North Catalina Avenue & Emerald Street**
Description: **Cumulative Base**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	6	1,600	0.000	N-S(1):	0.292 *
	TH	2.00	348	3,200	0.109	N-S(2):	0.113
	LT	1.00	17	1,600	0.011 *	E-W(1):	0.067
Westbound	RT	0.00	34	0	0.000	E-W(2):	0.070 *
	TH	1.00	4	1,600	0.033 *		
	LT	0.00	15	1,600	0.009	V/C:	0.362
Northbound	RT	0.00	28	0	0.000	Lost Time:	0.100
	TH	2.00	872	3,200	0.281 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.00	25	0	0.000	ICU:	0.462
	TH	1.00	9	1,600	0.058		
	LT	0.00	59	1,600	0.037 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.025	N-S(1):	0.225
	TH	2.00	976	3,200	0.305 *	N-S(2):	0.316 *
	LT	1.00	33	1,600	0.021	E-W(1):	0.033
Westbound	RT	0.00	19	0	0.000	E-W(2):	0.035 *
	TH	1.00	7	1,600	0.025 *		
	LT	0.00	14	1,600	0.009	V/C:	0.351
Northbound	RT	0.00	17	0	0.000	Lost Time:	0.100
	TH	2.00	637	3,200	0.204	ITS:	0.000
	LT	1.00	17	1,600	0.011 *		
Eastbound	RT	0.00	18	0	0.000	ICU:	0.451
	TH	1.00	4	1,600	0.024		
	LT	0.00	16	1,600	0.010 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **4 - North Catalina Avenue & Diamond Street**
Description: **Cumulative Base**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	4	1,600	0.000	N-S(1):	0.296 *
	TH	2.00	341	3,200	0.107	N-S(2):	0.108
	LT	1.00	27	1,600	0.017 *	E-W(1):	0.039
Westbound	RT	0.98	54	1,571	0.026	E-W(2):	0.045 *
	TH	0.02	1	29	0.034 *		
	LT	1.00	30	1,600	0.019	V/C:	0.341
Northbound	RT	1.00	65	1,600	0.031	Lost Time:	0.100
	TH	2.00	892	3,200	0.279 *	ITS:	0.000
	LT	1.00	2	1,600	0.001		
Eastbound	RT	0.00	6	0	0.000	ICU:	0.441
	TH	1.00	9	1,600	0.020		
	LT	0.00	17	1,600	0.011 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	7	1,600	0.004	N-S(1):	0.229
	TH	2.00	1,012	3,200	0.316 *	N-S(2):	0.322 *
	LT	1.00	71	1,600	0.044	E-W(1):	0.035
Westbound	RT	0.86	48	1,371	0.035	E-W(2):	0.039 *
	TH	0.14	8	229	0.035 *		
	LT	1.00	42	1,600	0.026	V/C:	0.361
Northbound	RT	1.00	48	1,600	0.030	Lost Time:	0.100
	TH	2.00	593	3,200	0.185	ITS:	0.000
	LT	1.00	10	1,600	0.006 *		
Eastbound	RT	0.00	3	0	0.000	ICU:	0.461
	TH	1.00	4	1,600	0.009		
	LT	0.00	7	1,600	0.004 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **5 - North Catalina Avenue & Beryl Street**
Description: **Cumulative Base**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	81	0	0.000	N-S(1):	0.180
	TH	2.00	273	3,200	0.111 *	N-S(2):	0.250 *
	LT	0.00	0	0	0.000	E-W(1):	0.049
Westbound	RT	1.00	8	1,600	0.005	E-W(2):	0.099 *
	TH	1.00	124	1,600	0.078 *		
	LT	1.00	26	1,600	0.016	V/C:	0.349
Northbound	RT	0.00	30	0	0.000	Lost Time:	0.100
	TH	2.00	547	3,200	0.180	ITS:	0.000
	LT	2.00	356	2,560	0.139 *		
Eastbound	RT	1.00	121	1,600	0.006	ICU:	0.449
	TH	1.00	53	1,600	0.033		
	LT	1.00	33	1,600	0.021 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	117	0	0.000	N-S(1):	0.119
	TH	2.00	753	3,200	0.272 *	N-S(2):	0.377 *
	LT	0.00	0	0	0.000	E-W(1):	0.194 *
Westbound	RT	1.00	15	1,600	0.009	E-W(2):	0.114
	TH	1.00	129	1,600	0.081		
	LT	1.00	41	1,600	0.026 *	V/C:	0.571
Northbound	RT	0.00	52	0	0.000	Lost Time:	0.100
	TH	2.00	329	3,200	0.119	ITS:	0.000
	LT	2.00	268	2,560	0.105 *		
Eastbound	RT	1.00	268	1,600	0.168 *	ICU:	0.671
	TH	1.00	128	1,600	0.080		
	LT	1.00	52	1,600	0.033	LOS:	B

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **6 - Pacific Coast Highway & Herondo Street**
Description: **Cumulative Base**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	155	1,600	0.056		N-S(1):	0.495	*
	TH	2.00	905	3,200	0.283		N-S(2):	0.297	
	LT	1.00	102	1,600	0.064	*	E-W(1):	0.263	
Westbound	RT	1.00	541	1,600	0.306	*	E-W(2):	0.387	*
	TH	1.00	210	1,600	0.131				
	LT	2.00	305	2,560	0.119		V/C:	0.882	
Northbound	RT	1.00	114	1,600	0.012		Lost Time:	0.100	
	TH	3.00	2,068	4,800	0.431	*	ITS:	0.000	
	LT	1.00	23	1,600	0.014				
Eastbound	RT	1.00	76	1,600	0.040		ICU:	0.982	
	TH	1.00	231	1,600	0.144				
	LT	1.00	130	1,600	0.081	*	LOS:	E	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	455	1,600	0.284		N-S(1):	0.393	
	TH	2.00	1,574	3,200	0.492	*	N-S(2):	0.546	*
	LT	1.00	216	1,600	0.135		E-W(1):	0.310	*
Westbound	RT	1.00	246	1,600	0.154		E-W(2):	0.203	
	TH	1.00	276	1,600	0.173				
	LT	2.00	304	2,560	0.119	*	V/C:	0.856	
Northbound	RT	1.00	264	1,600	0.165		Lost Time:	0.100	
	TH	3.00	1,237	4,800	0.258		ITS:	0.000	
	LT	1.00	87	1,600	0.054	*			
Eastbound	RT	1.00	129	1,600	0.081		ICU:	0.956	
	TH	1.00	306	1,600	0.191	*			
	LT	1.00	48	1,600	0.030		LOS:	E	

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **7 - Pacific Coast Highway & North Catalina Avenue**
Description: **Cumulative Base**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	0	0	0.000	N-S(1):	0.544 *
	TH	2.00	1,068	3,200	0.334	N-S(2):	0.338
	LT	0.00	0	0	0.000 *	E-W(1):	0.160
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.202 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.746
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,741	3,200	0.544 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.01	2	12	0.160	ICU:	0.846
	TH	0.00	0	0	0.000		
	LT	1.99	516	2,550	0.202 *	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	3	0	0.000	N-S(1):	0.390
	TH	2.00	1,831	3,200	0.573 *	N-S(2):	0.586 *
	LT	0.00	0	0	0.000	E-W(1):	0.111
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.138 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.724
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,249	3,200	0.390	ITS:	0.000
	LT	1.00	21	1,600	0.013 *		
Eastbound	RT	0.11	19	172	0.111	ICU:	0.824
	TH	0.00	0	0	0.000		
	LT	1.89	335	2,423	0.138 *	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **8 - Pacific Coast Highway & Beryl Street**
Description: **Cumulative Base**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.499 *
	TH	2.00	1,049	3,200	0.339	N-S(2):	0.373
	LT	1.00	16	1,600	0.010 *	E-W(1):	0.141 *
Westbound	RT	1.00	25	1,600	0.011	E-W(2):	0.092
	TH	1.00	119	1,600	0.074		
	LT	1.00	62	1,600	0.039 *	V/C:	0.640
Northbound	RT	0.00	70	0	0.000	Lost Time:	0.100
	TH	2.00	1,496	3,200	0.489 *	ITS:	0.000
	LT	1.00	54	1,600	0.034		
Eastbound	RT	0.13	21	206	0.085	ICU:	0.740
	TH	0.87	142	1,394	0.102 *		
	LT	1.00	29	1,600	0.018	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	72	0	0.000	N-S(1):	0.411
	TH	2.00	1,698	3,200	0.553 *	N-S(2):	0.586 *
	LT	1.00	39	1,600	0.024	E-W(1):	0.206 *
Westbound	RT	1.00	35	1,600	0.022	E-W(2):	0.156
	TH	1.00	179	1,600	0.112		
	LT	1.00	61	1,600	0.038 *	V/C:	0.792
Northbound	RT	0.00	84	0	0.000	Lost Time:	0.100
	TH	2.00	1,153	3,200	0.387	ITS:	0.000
	LT	1.00	52	1,600	0.033 *		
Eastbound	RT	0.13	36	215	0.168	ICU:	0.892
	TH	0.87	232	1,385	0.168 *		
	LT	1.00	70	1,600	0.044	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **9 - Pacific Coast Highway & Diamond Street**
Description: **Cumulative Base**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	38	1,600	0.011		N-S(1):	0.569	*
	TH	2.00	991	3,200	0.310		N-S(2):	0.332	
	LT	1.00	56	1,600	0.035	*	E-W(1):	0.132	*
Westbound	RT	1.00	57	1,600	0.018		E-W(2):	0.081	
	TH	1.00	89	1,600	0.056				
	LT	1.00	92	1,600	0.058	*	V/C:	0.701	
Northbound	RT	0.00	113	0	0.000		Lost Time:	0.100	
	TH	2.00	1,596	3,200	0.534	*	ITS:	0.000	
	LT	1.00	35	1,600	0.022				
Eastbound	RT	1.00	24	1,600	0.004		ICU:	0.801	
	TH	1.00	118	1,600	0.074	*			
	LT	1.00	40	1,600	0.025		LOS:	D	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	35	1,600	0.022		N-S(1):	0.440	
	TH	2.00	1,749	3,200	0.547	*	N-S(2):	0.563	*
	LT	1.00	64	1,600	0.040		E-W(1):	0.076	*
Westbound	RT	1.00	72	1,600	0.045		E-W(2):	0.074	
	TH	1.00	82	1,600	0.051				
	LT	1.00	40	1,600	0.025	*	V/C:	0.639	
Northbound	RT	0.00	54	0	0.000		Lost Time:	0.100	
	TH	2.00	1,227	3,200	0.400		ITS:	0.000	
	LT	1.00	26	1,600	0.016	*			
Eastbound	RT	1.00	27	1,600	0.017		ICU:	0.739	
	TH	1.00	82	1,600	0.051	*			
	LT	1.00	37	1,600	0.023		LOS:	C	

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **10 - Pacific Coast Highway & Emerald Street**
Description: **Cumulative Base**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	14	0	0.000	N-S(1):	0.540 *
	TH	2.00	998	3,200	0.316	N-S(2):	0.349
	LT	1.00	43	1,600	0.027 *	E-W(1):	0.072
Westbound	RT	0.00	83	0	0.000	E-W(2):	0.114 *
	TH	1.00	63	1,600	0.111 *		
	LT	0.00	31	1,600	0.019	V/C:	0.654
Northbound	RT	0.00	35	0	0.000	Lost Time:	0.100
	TH	2.00	1,605	3,200	0.513 *	ITS:	0.000
	LT	1.00	53	1,600	0.033		
Eastbound	RT	0.00	27	0	0.000	ICU:	0.754
	TH	1.00	53	1,600	0.053		
	LT	0.00	4	1,600	0.003 *	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	22	0	0.000	N-S(1):	0.461
	TH	2.00	1,600	3,200	0.507 *	N-S(2):	0.526 *
	LT	1.00	109	1,600	0.068	E-W(1):	0.056 *
Westbound	RT	0.00	41	0	0.000	E-W(2):	0.051
	TH	1.00	26	1,600	0.045		
	LT	0.00	5	1,600	0.003 *	V/C:	0.582
Northbound	RT	0.00	29	0	0.000	Lost Time:	0.100
	TH	2.00	1,229	3,200	0.393	ITS:	0.000
	LT	1.00	30	1,600	0.019 *		
Eastbound	RT	0.00	23	0	0.000	ICU:	0.682
	TH	1.00	52	1,600	0.053 *		
	LT	0.00	9	1,600	0.006	LOS:	B

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **11 - Pacific Coast Highway & Torrance Boulevard**
Description: **Cumulative Base**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	27	0	0.000	N-S(1):	0.564 *
	TH	2.00	845	3,200	0.273	N-S(2):	0.302
	LT	1.00	211	1,600	0.132 *	E-W(1):	0.188 *
Westbound	RT	1.00	275	1,600	0.106	E-W(2):	0.145
	TH	2.00	367	3,200	0.115		
	LT	1.00	127	1,600	0.079 *	V/C:	0.752
Northbound	RT	0.00	75	0	0.000	Lost Time:	0.100
	TH	2.00	1,306	3,200	0.432 *	ITS:	0.000
	LT	1.00	47	1,600	0.029		
Eastbound	RT	0.00	28	0	0.000	ICU:	0.852
	TH	2.00	320	3,200	0.109 *		
	LT	1.00	48	1,600	0.030	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	34	0	0.000	N-S(1):	0.486 *
	TH	2.00	1,310	3,200	0.420	N-S(2):	0.458
	LT	1.00	270	1,600	0.169 *	E-W(1):	0.242 *
Westbound	RT	1.00	284	1,600	0.178	E-W(2):	0.215
	TH	2.00	509	3,200	0.159		
	LT	1.00	140	1,600	0.088 *	V/C:	0.728
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	928	3,200	0.317 *	ITS:	0.000
	LT	1.00	61	1,600	0.038		
Eastbound	RT	0.00	74	0	0.000	ICU:	0.828
	TH	2.00	418	3,200	0.154 *		
	LT	1.00	59	1,600	0.037	LOS:	D

* - Denotes critical movement

CUMULATIVE PLUS PROJECT

Project Title: **Catalina Village**
Intersection: **1 - South Catalina Avenue & Torrance Boulevard**
Description: **Cumulative + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	45	1,600	0.023	N-S(1):	0.275 *
	TH	2.00	266	3,200	0.083	N-S(2):	0.091
	LT	1.00	120	1,600	0.075 *	E-W(1):	0.061
Westbound	RT	1.00	179	1,600	0.074 *	E-W(2):	0.083 *
	TH	2.00	57	3,200	0.018		
	LT	1.00	83	1,600	0.052	V/C:	0.358
Northbound	RT	1.00	159	1,600	0.073	Lost Time:	0.100
	TH	2.00	639	3,200	0.200 *	ITS:	0.000
	LT	1.00	12	1,600	0.008		
Eastbound	RT	1.00	9	1,600	0.002	ICU:	0.458
	TH	2.00	29	3,200	0.009		
	LT	1.00	15	1,600	0.009 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	56	1,600	0.035	N-S(1):	0.257 *
	TH	2.00	684	3,200	0.214	N-S(2):	0.232
	LT	1.00	201	1,600	0.126 *	E-W(1):	0.093
Westbound	RT	1.00	208	1,600	0.130 *	E-W(2):	0.157 *
	TH	2.00	117	3,200	0.037		
	LT	1.00	100	1,600	0.063	V/C:	0.414
Northbound	RT	1.00	118	1,600	0.074	Lost Time:	0.100
	TH	2.00	420	3,200	0.131 *	ITS:	0.000
	LT	1.00	28	1,600	0.018		
Eastbound	RT	1.00	26	1,600	0.016	ICU:	0.514
	TH	2.00	95	3,200	0.030		
	LT	1.00	43	1,600	0.027 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **3 - North Catalina Avenue & Emerald Street**
Description: **Cumulative + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	6	1,600	0.000	N-S(1):	0.296 *
	TH	2.00	354	3,200	0.111	N-S(2):	0.115
	LT	1.00	17	1,600	0.011 *	E-W(1):	0.069
Westbound	RT	0.00	76	0	0.000	E-W(2):	0.098 *
	TH	1.00	4	1,600	0.061 *		
	LT	0.00	17	1,600	0.011	V/C:	0.394
Northbound	RT	0.00	28	0	0.000	Lost Time:	0.100
	TH	2.00	885	3,200	0.285 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.00	25	0	0.000	ICU:	0.494
	TH	1.00	9	1,600	0.058		
	LT	0.00	59	1,600	0.037 *	LOS:	A

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.025	N-S(1):	0.228
	TH	2.00	980	3,200	0.306 *	N-S(2):	0.317 *
	LT	1.00	33	1,600	0.021	E-W(1):	0.033
Westbound	RT	0.00	48	0	0.000	E-W(2):	0.054 *
	TH	1.00	7	1,600	0.044 *		
	LT	0.00	15	1,600	0.009	V/C:	0.371
Northbound	RT	0.00	17	0	0.000	Lost Time:	0.100
	TH	2.00	646	3,200	0.207	ITS:	0.000
	LT	1.00	17	1,600	0.011 *		
Eastbound	RT	0.00	18	0	0.000	ICU:	0.471
	TH	1.00	4	1,600	0.024		
	LT	0.00	16	1,600	0.010 *	LOS:	A

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **4 - North Catalina Avenue & Diamond Street**
Description: **Cumulative + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	4	1,600	0.000		N-S(1):	0.316	*
	TH	2.00	347	3,200	0.108		N-S(2):	0.109	
	LT	1.00	40	1,600	0.025	*	E-W(1):	0.039	
Westbound	RT	0.98	54	1,571	0.022		E-W(2):	0.045	*
	TH	0.02	1	29	0.034	*			
	LT	1.00	30	1,600	0.019		V/C:	0.361	
Northbound	RT	1.00	85	1,600	0.044		Lost Time:	0.100	
	TH	2.00	932	3,200	0.291	*	ITS:	0.000	
	LT	1.00	2	1,600	0.001				
Eastbound	RT	0.00	6	0	0.000		ICU:	0.461	
	TH	1.00	9	1,600	0.020				
	LT	0.00	17	1,600	0.011	*	LOS:	A	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	1.00	7	1,600	0.004		N-S(1):	0.242	
	TH	2.00	1,016	3,200	0.318	*	N-S(2):	0.324	*
	LT	1.00	80	1,600	0.050		E-W(1):	0.035	
Westbound	RT	0.86	48	1,371	0.035		E-W(2):	0.039	*
	TH	0.14	8	229	0.035	*			
	LT	1.00	42	1,600	0.026		V/C:	0.363	
Northbound	RT	1.00	58	1,600	0.036		Lost Time:	0.100	
	TH	2.00	614	3,200	0.192		ITS:	0.000	
	LT	1.00	10	1,600	0.006	*			
Eastbound	RT	0.00	3	0	0.000		ICU:	0.463	
	TH	1.00	4	1,600	0.009				
	LT	0.00	7	1,600	0.004	*	LOS:	A	

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **5 - North Catalina Avenue & Beryl Street**
Description: **Cumulative + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	81	0	0.000		N-S(1):	0.191	
	TH	2.00	287	3,200	0.115	*	N-S(2):	0.256	*
	LT	0.00	0	0	0.000		E-W(1):	0.049	
Westbound	RT	1.00	8	1,600	0.005		E-W(2):	0.099	*
	TH	1.00	124	1,600	0.078	*			
	LT	1.00	26	1,600	0.016		V/C:	0.355	
Northbound	RT	0.00	34	0	0.000		Lost Time:	0.100	
	TH	2.00	577	3,200	0.191		ITS:	0.000	
	LT	2.00	362	2,560	0.141	*			
Eastbound	RT	1.00	127	1,600	0.009		ICU:	0.455	
	TH	1.00	53	1,600	0.033				
	LT	1.00	33	1,600	0.021	*	LOS:	A	

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C		ICU ANALYSIS		
Southbound	RT	0.00	117	0	0.000		N-S(1):	0.125	
	TH	2.00	763	3,200	0.275	*	N-S(2):	0.381	*
	LT	0.00	0	0	0.000		E-W(1):	0.196	*
Westbound	RT	1.00	15	1,600	0.009		E-W(2):	0.114	
	TH	1.00	129	1,600	0.081				
	LT	1.00	41	1,600	0.026	*	V/C:	0.577	
Northbound	RT	0.00	54	0	0.000		Lost Time:	0.100	
	TH	2.00	345	3,200	0.125		ITS:	0.000	
	LT	2.00	271	2,560	0.106	*			
Eastbound	RT	1.00	272	1,600	0.170	*	ICU:	0.677	
	TH	1.00	128	1,600	0.080				
	LT	1.00	52	1,600	0.033		LOS:	B	

* - Denotes critical movement

Project Title: Catalina Village
Intersection: 6 - Pacific Coast Highway & Herondo Street
Description: Cumulative + Project

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: AM PEAK HOUR

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	160	1,600	0.059	N-S(1):	0.497 *
	TH	2.00	910	3,200	0.284	N-S(2):	0.298
	LT	1.00	102	1,600	0.064 *	E-W(1):	0.270
Westbound	RT	1.00	541	1,600	0.306 *	E-W(2):	0.387 *
	TH	1.00	210	1,600	0.131		
	LT	2.00	323	2,560	0.126	V/C:	0.884
Northbound	RT	1.00	133	1,600	0.020	Lost Time:	0.100
	TH	3.00	2,079	4,800	0.433 *	ITS:	0.000
	LT	1.00	23	1,600	0.014		
Eastbound	RT	1.00	76	1,600	0.040	ICU:	0.984
	TH	1.00	231	1,600	0.144		
	LT	1.00	130	1,600	0.081 *	LOS:	E

Date/Time: PM PEAK HOUR

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	458	1,600	0.286	N-S(1):	0.394
	TH	2.00	1,577	3,200	0.493 *	N-S(2):	0.547 *
	LT	1.00	216	1,600	0.135	E-W(1):	0.314 *
Westbound	RT	1.00	246	1,600	0.154	E-W(2):	0.203
	TH	1.00	276	1,600	0.173		
	LT	2.00	316	2,560	0.123 *	V/C:	0.861
Northbound	RT	1.00	274	1,600	0.171	Lost Time:	0.100
	TH	3.00	1,243	4,800	0.259	ITS:	0.000
	LT	1.00	87	1,600	0.054 *		
Eastbound	RT	1.00	129	1,600	0.081	ICU:	0.961
	TH	1.00	306	1,600	0.191 *		
	LT	1.00	48	1,600	0.030	LOS:	E

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **7 - Pacific Coast Highway & North Catalina Avenue**
Description: **Cumulative + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	0	0	0.000	N-S(1):	0.544 *
	TH	2.00	1,082	3,200	0.338	N-S(2):	0.342
	LT	0.00	0	0	0.000 *	E-W(1):	0.169
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.214 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.758
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,741	3,200	0.544 *	ITS:	0.000
	LT	1.00	6	1,600	0.004		
Eastbound	RT	0.01	2	12	0.169	ICU:	0.858
	TH	0.00	0	0	0.000		
	LT	1.99	546	2,551	0.214 *	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	3	0	0.000	N-S(1):	0.390
	TH	2.00	1,841	3,200	0.576 *	N-S(2):	0.589 *
	LT	0.00	0	0	0.000	E-W(1):	0.116
Westbound	RT	0.00	0	0	0.000	E-W(2):	0.145 *
	TH	0.00	0	0	0.000 *		
	LT	0.00	0	0	0.000	V/C:	0.734
Northbound	RT	0.00	0	0	0.000	Lost Time:	0.100
	TH	2.00	1,249	3,200	0.390	ITS:	0.000
	LT	1.00	21	1,600	0.013 *		
Eastbound	RT	0.10	19	164	0.116	ICU:	0.834
	TH	0.00	0	0	0.000		
	LT	1.90	351	2,429	0.145 *	LOS:	D

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **8 - Pacific Coast Highway & Beryl Street**
Description: **Cumulative + Project**

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.499 *
	TH	2.00	1,063	3,200	0.343	N-S(2):	0.377
	LT	1.00	16	1,600	0.010 *	E-W(1):	0.145 *
Westbound	RT	1.00	25	1,600	0.011	E-W(2):	0.092
	TH	1.00	119	1,600	0.074		
	LT	1.00	66	1,600	0.041 *	V/C:	0.644
Northbound	RT	0.00	70	0	0.000	Lost Time:	0.100
	TH	2.00	1,496	3,200	0.489 *	ITS:	0.000
	LT	1.00	54	1,600	0.034		
Eastbound	RT	0.13	21	201	0.088	ICU:	0.744
	TH	0.87	146	1,399	0.104 *		
	LT	1.00	29	1,600	0.018	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	72	0	0.000	N-S(1):	0.411
	TH	2.00	1,708	3,200	0.556 *	N-S(2):	0.589 *
	LT	1.00	39	1,600	0.024	E-W(1):	0.209 *
Westbound	RT	1.00	35	1,600	0.022	E-W(2):	0.156
	TH	1.00	179	1,600	0.112		
	LT	1.00	64	1,600	0.040 *	V/C:	0.798
Northbound	RT	0.00	84	0	0.000	Lost Time:	0.100
	TH	2.00	1,153	3,200	0.387	ITS:	0.000
	LT	1.00	52	1,600	0.033 *		
Eastbound	RT	0.13	36	213	0.169	ICU:	0.898
	TH	0.87	234	1,387	0.169 *		
	LT	1.00	70	1,600	0.044	LOS:	D

* - Denotes critical movement

Project Title: Catalina Village
Intersection: 9 - Pacific Coast Highway & Diamond Street
Description: Cumulative + Project

Thru Lane:	1600 vph	N-S Split Phase :	N
Left Lane:	1600 vph	E-W Split Phase :	N
Double Lt Penalty:	20 %	Lost Time (% of cycle) :	10
ITS:	0 %	V/C Round Off (decs.) :	3
OLA Movements :			
FF Movements:			

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	40	1,600	0.013	N-S(1):	0.569 *
	TH	2.00	1,007	3,200	0.315	N-S(2):	0.337
	LT	1.00	56	1,600	0.035 *	E-W(1):	0.135 *
Westbound	RT	1.00	57	1,600	0.018	E-W(2):	0.081
	TH	1.00	89	1,600	0.056		
	LT	1.00	95	1,600	0.059 *	V/C:	0.704
Northbound	RT	0.00	113	0	0.000	Lost Time:	0.100
	TH	2.00	1,596	3,200	0.534 *	ITS:	0.000
	LT	1.00	35	1,600	0.022		
Eastbound	RT	1.00	38	1,600	0.013	ICU:	0.804
	TH	1.00	122	1,600	0.076 *		
	LT	1.00	40	1,600	0.025	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	1.00	36	1,600	0.023	N-S(1):	0.440
	TH	2.00	1,760	3,200	0.550 *	N-S(2):	0.566 *
	LT	1.00	64	1,600	0.040	E-W(1):	0.079 *
Westbound	RT	1.00	72	1,600	0.045	E-W(2):	0.074
	TH	1.00	82	1,600	0.051		
	LT	1.00	42	1,600	0.026 *	V/C:	0.645
Northbound	RT	0.00	54	0	0.000	Lost Time:	0.100
	TH	2.00	1,227	3,200	0.400	ITS:	0.000
	LT	1.00	26	1,600	0.016 *		
Eastbound	RT	1.00	34	1,600	0.021	ICU:	0.745
	TH	1.00	84	1,600	0.053 *		
	LT	1.00	37	1,600	0.023	LOS:	C

* - Denotes critical movement

Project Title: **Catalina Village**
Intersection: **10 - Pacific Coast Highway & Emerald Street**
Description: **Cumulative + Project**

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	33	0	0.000	N-S(1):	0.541 *
	TH	2.00	1,010	3,200	0.326	N-S(2):	0.359
	LT	1.00	45	1,600	0.028 *	E-W(1):	0.072
Westbound	RT	0.00	83	0	0.000	E-W(2):	0.115 *
	TH	1.00	65	1,600	0.112 *		
	LT	0.00	31	1,600	0.019	V/C:	0.656
Northbound	RT	0.00	35	0	0.000	Lost Time:	0.100
	TH	2.00	1,605	3,200	0.513 *	ITS:	0.000
	LT	1.00	53	1,600	0.033		
Eastbound	RT	0.00	27	0	0.000	ICU:	0.756
	TH	1.00	53	1,600	0.053		
	LT	0.00	4	1,600	0.003 *	LOS:	C

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	35	0	0.000	N-S(1):	0.462
	TH	2.00	1,606	3,200	0.513 *	N-S(2):	0.532 *
	LT	1.00	110	1,600	0.069	E-W(1):	0.056 *
Westbound	RT	0.00	41	0	0.000	E-W(2):	0.052
	TH	1.00	27	1,600	0.046		
	LT	0.00	5	1,600	0.003 *	V/C:	0.588
Northbound	RT	0.00	29	0	0.000	Lost Time:	0.100
	TH	2.00	1,229	3,200	0.393	ITS:	0.000
	LT	1.00	30	1,600	0.019 *		
Eastbound	RT	0.00	23	0	0.000	ICU:	0.688
	TH	1.00	52	1,600	0.053 *		
	LT	0.00	9	1,600	0.006	LOS:	B

* - Denotes critical movement

Project Title: Catalina Village
Intersection: 11 - Pacific Coast Highway & Torrance Boulevard
Description: Cumulative + Project

Thru Lane: 1600 vph
Left Lane: 1600 vph
Double Lt Penalty: 20 %
ITS: 0 %
OLA Movements :
FF Movements:

N-S Split Phase : N
E-W Split Phase : N
Lost Time (% of cycle) : 10
V/C Round Off (decs.) : 3

Date/Time: **AM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	27	0	0.000	N-S(1):	0.570 *
	TH	2.00	847	3,200	0.273	N-S(2):	0.304
	LT	1.00	221	1,600	0.138 *	E-W(1):	0.188 *
Westbound	RT	1.00	275	1,600	0.103	E-W(2):	0.148
	TH	2.00	376	3,200	0.118		
	LT	1.00	127	1,600	0.079 *	V/C:	0.758
Northbound	RT	0.00	75	0	0.000	Lost Time:	0.100
	TH	2.00	1,306	3,200	0.432 *	ITS:	0.000
	LT	1.00	49	1,600	0.031		
Eastbound	RT	0.00	28	0	0.000	ICU:	0.858
	TH	2.00	320	3,200	0.109 *		
	LT	1.00	48	1,600	0.030	LOS:	D

Date/Time: **PM PEAK HOUR**

APPROACH	MVMT	LANES	VOLUME	CAPACITY	V/C	ICU ANALYSIS	
Southbound	RT	0.00	34	0	0.000	N-S(1):	0.489 *
	TH	2.00	1,311	3,200	0.420	N-S(2):	0.459
	LT	1.00	275	1,600	0.172 *	E-W(1):	0.242 *
Westbound	RT	1.00	284	1,600	0.178	E-W(2):	0.215
	TH	2.00	515	3,200	0.161		
	LT	1.00	140	1,600	0.088 *	V/C:	0.731
Northbound	RT	0.00	85	0	0.000	Lost Time:	0.100
	TH	2.00	928	3,200	0.317 *	ITS:	0.000
	LT	1.00	63	1,600	0.039		
Eastbound	RT	0.00	74	0	0.000	ICU:	0.831
	TH	2.00	418	3,200	0.154 *		
	LT	1.00	59	1,600	0.037	LOS:	D

* - Denotes critical movement

Appendix D

CalEEMod Results

100-132 North Catalina Avenue Proposed Project- Air Quality Modeling

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.38	Acre	0.38	16,552.80	0
Parking Lot	11.00	Space	0.10	4,400.00	0
Unenclosed Parking Structure	22.00	Space	0.00	8,800.00	0
Fast Food Restaurant w/o Drive Thru	1.78	1000sqft	0.04	1,784.00	0
High Turnover (Sit Down Restaurant)	1.28	1000sqft	0.03	1,279.00	0
Apartments Low Rise	8.00	Dwelling Unit	0.20	9,025.00	23
Condo/Townhouse High Rise	22.00	Dwelling Unit	0.51	40,286.00	63

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project plans

Construction Phase - Per applicant provided information

Demolition -

Grading - Per applicant-provided info

Architectural Coating - Per SCAQMD Rule 1113

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Vehicle Trips - Trip rates from traffic study

Woodstoves - Per SCAQMD Rule 445; no fireplaces per applicant-provided info

Area Coating - Per SCAQMD Rule 1113

Water And Wastewater - Aerobic only

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Mobile Land Use Mitigation - 13.3% of units affordable housing

Area Mitigation - SCAQMD Rule 1113

Energy Mitigation - EnergyStar appliances in residential units per applicant provided info

Water Mitigation - Project complies with CALGreen for landscaping

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	10.00	105.00
tblConstructionPhase	NumDays	200.00	445.00
tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	4.00	27.00
tblConstructionPhase	NumDays	10.00	105.00
tblConstructionPhase	NumDays	2.00	24.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblFireplaces	FireplaceDayYear	25.00	0.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	6.80	0.00
tblFireplaces	NumberGas	18.70	0.00
tblFireplaces	NumberNoFireplace	0.80	0.00
tblFireplaces	NumberNoFireplace	2.20	0.00
tblFireplaces	NumberWood	0.40	0.00
tblFireplaces	NumberWood	1.10	0.00
tblGrading	MaterialImported	0.00	909.00
tblLandUse	LandUseSquareFeet	1,780.00	1,784.00
tblLandUse	LandUseSquareFeet	1,280.00	1,279.00
tblLandUse	LandUseSquareFeet	8,000.00	9,025.00
tblLandUse	LandUseSquareFeet	22,000.00	40,286.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.50	0.20
tblLandUse	LotAcreage	0.34	0.51
tblVehicleTrips	WD_TR	5.44	7.32
tblVehicleTrips	WD_TR	346.23	225.33
tblVehicleTrips	WD_TR	112.18	96.17
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	0.40	0.00
tblWoodstoves	NumberCatalytic	1.10	0.00
tblWoodstoves	NumberNoncatalytic	0.40	0.00
tblWoodstoves	NumberNoncatalytic	1.10	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.7845	17.6864	14.5164	0.0273	7.2720	0.8409	8.0204	3.4752	0.7857	4.1639	0.0000	2,567.1648	2,567.1648	0.6648	0.0475	2,588.3772
2023	5.7078	19.6956	25.2739	0.0456	0.6724	0.8990	1.5714	0.1796	0.8572	1.0368	0.0000	4,308.1985	4,308.1985	0.7879	0.0381	4,339.2339
Maximum	**5.7078**	**19.6956**	**25.2739**	**0.0456**	**7.2720**	**0.8990**	**8.0204**	**3.4752**	**0.8572**	**4.1639**	**0.0000**	**4,308.1985**	**4,308.1985**	**0.7879**	**0.0475**	**4,339.2339**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.7845	17.6864	14.5164	0.0273	3.3745	0.8409	4.1229	1.5913	0.7857	2.2800	0.0000	2,567.1648	2,567.1648	0.6648	0.0475	2,588.3772
2023	5.7078	19.6956	25.2739	0.0456	0.6724	0.8990	1.5714	0.1796	0.8572	1.0368	0.0000	4,308.1985	4,308.1985	0.7879	0.0381	4,339.2339
Maximum	**5.7078**	**19.6956**	**25.2739**	**0.0456**	**3.3745**	**0.8990**	**4.1229**	**1.5913**	**0.8572**	**2.2800**	**0.0000**	**4,308.1985**	**4,308.1985**	**0.7879**	**0.0475**	**4,339.2339**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	49.06	0.00	40.63	51.55	0.00	36.22	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Energy	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
Mobile	3.7976	3.4091	31.7248	0.0664	6.8794	0.0486	6.9280	1.8332	0.0452	1.8783		6,877.6592	6,877.6592	0.4788	0.3084	6,981.5448
Total	**5.0441**	**3.7374**	**34.4182**	**0.0683**	**6.8794**	**0.0856**	**6.9649**	**1.8332**	**0.0821**	**1.9153**	**0.0000**	**7,248.4483**	**7,248.4483**	**0.4902**	**0.3152**	**7,354.6183**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Energy	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
Mobile	3.5740	3.0395	27.9754	0.0565	5.8218	0.0421	5.8639	1.5513	0.0391	1.5905		5,856.9829	5,856.9829	0.4317	0.2750	5,949.7252
Total	**4.8206**	**3.3678**	**30.6688**	**0.0585**	**5.8218**	**0.0791**	**5.9008**	**1.5513**	**0.0761**	**1.6274**	**0.0000**	**6,227.7721**	**6,227.7721**	**0.4430**	**0.2817**	**6,322.7987**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**4.43**	**9.89**	**10.89**	**14.42**	**15.37**	**7.60**	**15.28**	**15.37**	**7.37**	**15.03**	**0.00**	**14.08**	**14.08**	**9.63**	**10.61**	**14.03**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/3/2022	1/31/2022	6	25	
2	Site Preparation	Site Preparation	2/1/2022	2/28/2022	6	24	
3	Grading	Grading	3/1/2022	3/31/2022	6	27	
4	Building Construction	Building Construction	4/1/2022	9/1/2023	6	445	
5	Paving	Paving	6/1/2023	10/1/2023	6	105	
6	Architectural Coating	Architectural Coating	6/1/2023	10/1/2023	6	105	

Acres of Grading (Site Preparation Phase): 22.5

Acres of Grading (Grading Phase): 27

Acres of Paving: 0.48

Residential Indoor: 99,855; Residential Outdoor: 33,285; Non-Residential Indoor: 4,595; Non-Residential Outdoor: 1,532; Striped Parking Area: 1,785 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40

Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	41.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	114.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	35.00	9.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	7.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3516	0.0000	0.3516	0.0532	0.0000	0.0532			0.0000			0.0000
Off-Road	1.6889	16.6217	13.9605	0.0241		0.8379	0.8379		0.7829	0.7829		2,323.4168	2,323.4168	0.5921		2,338.2191
Total	**1.6889**	**16.6217**	**13.9605**	**0.0241**	**0.3516**	**0.8379**	**1.1895**	**0.0532**	**0.7829**	**0.8361**		**2,323.4168**	**2,323.4168**	**0.5921**		**2,338.2191**

3.2 Demolition - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.1700e-003	0.2636	0.0627	1.0000e-003	0.0287	2.1000e-003	0.0308	7.8600e-003	2.0100e-003	9.8700e-003		110.1404	110.1404	6.5200e-003	0.0175	115.5193
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0444	0.0313	0.4932	1.3100e-003	0.1453	8.7000e-004	0.1462	0.0385	8.0000e-004	0.0393		133.6076	133.6076	3.4700e-003	3.1700e-003	134.6388
Total	**0.0515**	**0.2950**	**0.5559**	**2.3100e-003**	**0.1740**	**2.9700e-003**	**0.1770**	**0.0464**	**2.8100e-003**	**0.0492**		**243.7480**	**243.7480**	**9.9900e-003**	**0.0207**	**250.1581**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1582	0.0000	0.1582	0.0240	0.0000	0.0240			0.0000			0.0000
Off-Road	1.6889	16.6217	13.9605	0.0241		0.8379	0.8379		0.7829	0.7829	0.0000	2,323.4168	2,323.4168	0.5921		2,338.2191
Total	**1.6889**	**16.6217**	**13.9605**	**0.0241**	**0.1582**	**0.8379**	**0.9961**	**0.0240**	**0.7829**	**0.8068**	**0.0000**	**2,323.4168**	**2,323.4168**	**0.5921**		**2,338.2191**

3.2 Demolition - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.1700e-003	0.2636	0.0627	1.0000e-003	0.0287	2.1000e-003	0.0308	7.8600e-003	2.0100e-003	9.8700e-003		110.1404	110.1404	6.5200e-003	0.0175	115.5193
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0444	0.0313	0.4932	1.3100e-003	0.1453	8.7000e-004	0.1462	0.0385	8.0000e-004	0.0393		133.6076	133.6076	3.4700e-003	3.1700e-003	134.6388
Total	**0.0515**	**0.2950**	**0.5559**	**2.3100e-003**	**0.1740**	**2.9700e-003**	**0.1770**	**0.0464**	**2.8100e-003**	**0.0492**		**243.7480**	**243.7480**	**9.9900e-003**	**0.0207**	**250.1581**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2635	0.0000	6.2635	3.0038	0.0000	3.0038			0.0000			0.0000
Off-Road	1.3122	14.6277	7.0939	0.0172		0.6225	0.6225		0.5727	0.5727		1,666.1738	1,666.1738	0.5389		1,679.6457
Total	**1.3122**	**14.6277**	**7.0939**	**0.0172**	**6.2635**	**0.6225**	**6.8861**	**3.0038**	**0.5727**	**3.5765**		**1,666.1738**	**1,666.1738**	**0.5389**		**1,679.6457**

3.3 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0273	0.0193	0.3035	8.1000e-004	0.0894	5.4000e-004	0.0900	0.0237	4.9000e-004	0.0242		82.2200	82.2200	2.1400e-003	1.9500e-003	82.8547
Total	**0.0273**	**0.0193**	**0.3035**	**8.1000e-004**	**0.0894**	**5.4000e-004**	**0.0900**	**0.0237**	**4.9000e-004**	**0.0242**		**82.2200**	**82.2200**	**2.1400e-003**	**1.9500e-003**	**82.8547**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8186	0.0000	2.8186	1.3517	0.0000	1.3517			0.0000			0.0000
Off-Road	1.3122	14.6277	7.0939	0.0172		0.6225	0.6225		0.5727	0.5727	0.0000	1,666.1738	1,666.1738	0.5389		1,679.6457
Total	**1.3122**	**14.6277**	**7.0939**	**0.0172**	**2.8186**	**0.6225**	**3.4411**	**1.3517**	**0.5727**	**1.9244**	**0.0000**	**1,666.1738**	**1,666.1738**	**0.5389**		**1,679.6457**

3.3 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0273	0.0193	0.3035	8.1000e-004	0.0894	5.4000e-004	0.0900	0.0237	4.9000e-004	0.0242		82.2200	82.2200	2.1400e-003	1.9500e-003	82.8547
Total	**0.0273**	**0.0193**	**0.3035**	**8.1000e-004**	**0.0894**	**5.4000e-004**	**0.0900**	**0.0237**	**4.9000e-004**	**0.0242**		**82.2200**	**82.2200**	**2.1400e-003**	**1.9500e-003**	**82.8547**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0864	0.0000	7.0864	3.4253	0.0000	3.4253			0.0000			0.0000
Off-Road	1.5403	16.9836	9.2202	0.0206		0.7423	0.7423		0.6829	0.6829		1,995.4825	1,995.4825	0.6454		2,011.6169
Total	**1.5403**	**16.9836**	**9.2202**	**0.0206**	**7.0864**	**0.7423**	**7.8287**	**3.4253**	**0.6829**	**4.1082**		**1,995.4825**	**1,995.4825**	**0.6454**		**2,011.6169**

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0185	0.6787	0.1614	2.5800e-003	0.0738	5.4100e-003	0.0792	0.0202	5.1800e-003	0.0254		283.5594	283.5594	0.0168	0.0451	297.4074
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0341	0.0241	0.3794	1.0100e-003	0.1118	6.7000e-004	0.1125	0.0296	6.2000e-004	0.0303		102.7750	102.7750	2.6700e-003	2.4400e-003	103.5683
Total	**0.0526**	**0.7028**	**0.5408**	**3.5900e-003**	**0.1856**	**6.0800e-003**	**0.1917**	**0.0499**	**5.8000e-003**	**0.0557**		**386.3344**	**386.3344**	**0.0195**	**0.0475**	**400.9757**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.1889	0.0000	3.1889	1.5414	0.0000	1.5414			0.0000			0.0000
Off-Road	1.5403	16.9836	9.2202	0.0206		0.7423	0.7423		0.6829	0.6829	0.0000	1,995.4825	1,995.4825	0.6454		2,011.6169
Total	**1.5403**	**16.9836**	**9.2202**	**0.0206**	**3.1889**	**0.7423**	**3.9312**	**1.5414**	**0.6829**	**2.2243**	**0.0000**	**1,995.4825**	**1,995.4825**	**0.6454**		**2,011.6169**

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0185	0.6787	0.1614	2.5800e-003	0.0738	5.4100e-003	0.0792	0.0202	5.1800e-003	0.0254		283.5594	283.5594	0.0168	0.0451	297.4074
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0341	0.0241	0.3794	1.0100e-003	0.1118	6.7000e-004	0.1125	0.0296	6.2000e-004	0.0303		102.7750	102.7750	2.6700e-003	2.4400e-003	103.5683
Total	**0.0526**	**0.7028**	**0.5408**	**3.5900e-003**	**0.1856**	**6.0800e-003**	**0.1917**	**0.0499**	**5.8000e-003**	**0.0557**		**386.3344**	**386.3344**	**0.0195**	**0.0475**	**400.9757**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689		2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**		**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0164	0.4247	0.1420	1.7200e-003	0.0576	4.3300e-003	0.0620	0.0166	4.1400e-003	0.0207		185.8921	185.8921	6.8400e-003	0.0270	194.1080
Worker	0.1194	0.0843	1.3279	3.5400e-003	0.3912	2.3500e-003	0.3936	0.1038	2.1600e-003	0.1059		359.7126	359.7126	9.3500e-003	8.5300e-003	362.4892
Total	**0.1359**	**0.5090**	**1.4699**	**5.2600e-003**	**0.4488**	**6.6800e-003**	**0.4555**	**0.1203**	**6.3000e-003**	**0.1266**		**545.6047**	**545.6047**	**0.0162**	**0.0355**	**556.5971**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689	0.0000	2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**	**0.0000**	**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0164	0.4247	0.1420	1.7200e-003	0.0576	4.3300e-003	0.0620	0.0166	4.1400e-003	0.0207		185.8921	185.8921	6.8400e-003	0.0270	194.1080
Worker	0.1194	0.0843	1.3279	3.5400e-003	0.3912	2.3500e-003	0.3936	0.1038	2.1600e-003	0.1059		359.7126	359.7126	9.3500e-003	8.5300e-003	362.4892
Total	**0.1359**	**0.5090**	**1.4699**	**5.2600e-003**	**0.4488**	**6.6800e-003**	**0.4555**	**0.1203**	**6.3000e-003**	**0.1266**		**545.6047**	**545.6047**	**0.0162**	**0.0355**	**556.5971**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5233	11.7104	12.6111	0.0221		0.5145	0.5145		0.4968	0.4968		2,001.7877	2,001.7877	0.3399		2,010.2858
Total	**1.5233**	**11.7104**	**12.6111**	**0.0221**		**0.5145**	**0.5145**		**0.4968**	**0.4968**		**2,001.7877**	**2,001.7877**	**0.3399**		**2,010.2858**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.6500e-003	0.3293	0.1264	1.6400e-003	0.0576	1.8200e-003	0.0594	0.0166	1.7400e-003	0.0183		176.9221	176.9221	6.5500e-003	0.0257	184.7326
Worker	0.1108	0.0746	1.2237	3.4200e-003	0.3912	2.2100e-003	0.3934	0.1038	2.0400e-003	0.1058		350.2244	350.2244	8.3900e-003	7.8800e-003	352.7835
Total	**0.1204**	**0.4040**	**1.3501**	**5.0600e-003**	**0.4488**	**4.0300e-003**	**0.4529**	**0.1203**	**3.7800e-003**	**0.1241**		**527.1465**	**527.1465**	**0.0149**	**0.0335**	**537.5161**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5233	11.7104	12.6111	0.0221		0.5145	0.5145		0.4968	0.4968	0.0000	2,001.7877	2,001.7877	0.3399		2,010.2858
Total	**1.5233**	**11.7104**	**12.6111**	**0.0221**		**0.5145**	**0.5145**		**0.4968**	**0.4968**	**0.0000**	**2,001.7877**	**2,001.7877**	**0.3399**		**2,010.2858**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.6500e-003	0.3293	0.1264	1.6400e-003	0.0576	1.8200e-003	0.0594	0.0166	1.7400e-003	0.0183		176.9221	176.9221	6.5500e-003	0.0257	184.7326
Worker	0.1108	0.0746	1.2237	3.4200e-003	0.3912	2.2100e-003	0.3934	0.1038	2.0400e-003	0.1058		350.2244	350.2244	8.3900e-003	7.8800e-003	352.7835
Total	**0.1204**	**0.4040**	**1.3501**	**5.0600e-003**	**0.4488**	**4.0300e-003**	**0.4529**	**0.1203**	**3.7800e-003**	**0.1241**		**527.1465**	**527.1465**	**0.0149**	**0.0335**	**537.5161**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846		1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0120					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6566**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**		**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0411	0.0277	0.4545	1.2700e-003	0.1453	8.2000e-004	0.1461	0.0385	7.6000e-004	0.0393		130.0833	130.0833	3.1200e-003	2.9300e-003	131.0339
Total	**0.0411**	**0.0277**	**0.4545**	**1.2700e-003**	**0.1453**	**8.2000e-004**	**0.1461**	**0.0385**	**7.6000e-004**	**0.0393**		**130.0833**	**130.0833**	**3.1200e-003**	**2.9300e-003**	**131.0339**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846	0.0000	1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0120					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6566**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**	**0.0000**	**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0411	0.0277	0.4545	1.2700e-003	0.1453	8.2000e-004	0.1461	0.0385	7.6000e-004	0.0393		130.0833	130.0833	3.1200e-003	2.9300e-003	131.0339
Total	**0.0411**	**0.0277**	**0.4545**	**1.2700e-003**	**0.1453**	**8.2000e-004**	**0.1461**	**0.0385**	**7.6000e-004**	**0.0393**		**130.0833**	**130.0833**	**3.1200e-003**	**2.9300e-003**	**131.0339**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.1526					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**3.3443**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0222	0.0149	0.2447	6.8000e-004	0.0782	4.4000e-004	0.0787	0.0208	4.1000e-004	0.0212		70.0449	70.0449	1.6800e-003	1.5800e-003	70.5567
Total	**0.0222**	**0.0149**	**0.2447**	**6.8000e-004**	**0.0782**	**4.4000e-004**	**0.0787**	**0.0208**	**4.1000e-004**	**0.0212**		**70.0449**	**70.0449**	**1.6800e-003**	**1.5800e-003**	**70.5567**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.1526					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**3.3443**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0222	0.0149	0.2447	6.8000e-004	0.0782	4.4000e-004	0.0787	0.0208	4.1000e-004	0.0212		70.0449	70.0449	1.6800e-003	1.5800e-003	70.5567
Total	**0.0222**	**0.0149**	**0.2447**	**6.8000e-004**	**0.0782**	**4.4000e-004**	**0.0787**	**0.0208**	**4.1000e-004**	**0.0212**		**70.0449**	**70.0449**	**1.6800e-003**	**1.5800e-003**	**70.5567**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.5740	3.0395	27.9754	0.0565	5.8218	0.0421	5.8639	1.5513	0.0391	1.5905		5,856.9829	5,856.9829	0.4317	0.2750	5,949.7252
Unmitigated	3.7976	3.4091	31.7248	0.0664	6.8794	0.0486	6.9280	1.8332	0.0452	1.8783		6,877.6592	6,877.6592	0.4788	0.3084	6,981.5448

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	58.56	65.12	50.24	199,249	168,617
Condo/Townhouse High Rise	161.04	108.02	89.98	489,727	414,438
Fast Food Restaurant w/o Drive Thru	401.09	1,238.88	890.00	1,069,633	905,191
High Turnover (Sit Down Restaurant)	123.10	156.67	182.58	185,878	157,302
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	743.79	1,568.69	1,212.80	1,944,487	1,645,548

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Fast Food Restaurant w/o Drive	16.60	8.40	6.90	1.50	79.50	19.00	51	37	12
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Condo/Townhouse High Rise	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Fast Food Restaurant w/o Drive Thru	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
High Turnover (Sit Down Restaurant)	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Other Asphalt Surfaces	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Parking Lot	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Unenclosed Parking Structure	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
NaturalGas Unmitigated	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	272.2	2.9400e-003	0.0251	0.0107	1.6000e-004		2.0300e-003	2.0300e-003		2.0300e-003	2.0300e-003		32.0236	32.0236	6.1000e-004	5.9000e-004	32.2139
Condo/Townhouse High Rise	672.032	7.2500e-003	0.0619	0.0264	4.0000e-004		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003		79.0626	79.0626	1.5200e-003	1.4500e-003	79.5324
Fast Food Restaurant w/o Drive Thru	1263.61	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.6600	148.6600	2.8500e-003	2.7300e-003	149.5434
High Turnover (Sit Down Restaurant)	905.917	9.7700e-003	0.0888	0.0746	5.3000e-004		6.7500e-003	6.7500e-003		6.7500e-003	6.7500e-003		106.5785	106.5785	2.0400e-003	1.9500e-003	107.2119
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0336**	**0.2997**	**0.2157**	**1.8300e-003**		**0.0232**	**0.0232**		**0.0232**	**0.0232**		**366.3246**	**366.3246**	**7.0200e-003**	**6.7200e-003**	**368.5015**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	0.2722	2.9400e-003	0.0251	0.0107	1.6000e-004		2.0300e-003	2.0300e-003		2.0300e-003	2.0300e-003		32.0236	32.0236	6.1000e-004	5.9000e-004	32.2139
Condo/Townhouse High Rise	0.672032	7.2500e-003	0.0619	0.0264	4.0000e-004		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003		79.0626	79.0626	1.5200e-003	1.4500e-003	79.5324
Fast Food Restaurant w/o Drive Thru	1.26361	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.6600	148.6600	2.8500e-003	2.7300e-003	149.5434
High Turnover (Sit Down Restaurant)	0.905917	9.7700e-003	0.0888	0.0746	5.3000e-004		6.7500e-003	6.7500e-003		6.7500e-003	6.7500e-003		106.5785	106.5785	2.0400e-003	1.9500e-003	107.2119
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0336**	**0.2997**	**0.2157**	**1.8300e-003**		**0.0232**	**0.0232**		**0.0232**	**0.0232**		**366.3246**	**366.3246**	**7.0200e-003**	**6.7200e-003**	**368.5015**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Unmitigated	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0907					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0475					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0747	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4645	4.4645	4.3000e-003		4.5720
Total	**1.2130**	**0.0285**	**2.4777**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4645**	**4.4645**	**4.3000e-003**	**0.0000**	**4.5720**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0907					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0475					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0747	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4645	4.4645	4.3000e-003		4.5720
Total	**1.2130**	**0.0285**	**2.4777**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4645**	**4.4645**	**4.3000e-003**	**0.0000**	**4.5720**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

100-132 North Catalina Avenue Proposed Project- Air Quality Modeling

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.38	Acre	0.38	16,552.80	0
Parking Lot	11.00	Space	0.10	4,400.00	0
Unenclosed Parking Structure	22.00	Space	0.00	8,800.00	0
Fast Food Restaurant w/o Drive Thru	1.78	1000sqft	0.04	1,784.00	0
High Turnover (Sit Down Restaurant)	1.28	1000sqft	0.03	1,279.00	0
Apartments Low Rise	8.00	Dwelling Unit	0.20	9,025.00	23
Condo/Townhouse High Rise	22.00	Dwelling Unit	0.51	40,286.00	63

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Per project plans

Construction Phase - Per applicant provided information

Demolition -

Grading - Per applicant-provided info

Architectural Coating - Per SCAQMD Rule 1113

Vehicle Trips - Trip rates from traffic study

Woodstoves - Per SCAQMD Rule 445; no fireplaces per applicant-provided info

Area Coating - Per SCAQMD Rule 1113

Water And Wastewater - Aerobic only

Construction Off-road Equipment Mitigation - Per SCAQMD Rule 403

Mobile Land Use Mitigation - 13.3% of units affordable housing

Area Mitigation - SCAQMD Rule 1113

Energy Mitigation - EnergyStar appliances in residential units per applicant provided info

Water Mitigation - Project complies with CALGreen for landscaping

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	10.00	105.00
tblConstructionPhase	NumDays	200.00	445.00
tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	4.00	27.00
tblConstructionPhase	NumDays	10.00	105.00
tblConstructionPhase	NumDays	2.00	24.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblFireplaces	FireplaceDayYear	25.00	0.00

tblFireplaces	FireplaceDayYear	25.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceHourDay	3.00	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	FireplaceWoodMass	1,019.20	0.00
tblFireplaces	NumberGas	6.80	0.00
tblFireplaces	NumberGas	18.70	0.00
tblFireplaces	NumberNoFireplace	0.80	0.00
tblFireplaces	NumberNoFireplace	2.20	0.00
tblFireplaces	NumberWood	0.40	0.00
tblFireplaces	NumberWood	1.10	0.00
tblGrading	MaterialImported	0.00	909.00
tblLandUse	LandUseSquareFeet	1,780.00	1,784.00
tblLandUse	LandUseSquareFeet	1,280.00	1,279.00
tblLandUse	LandUseSquareFeet	8,000.00	9,025.00
tblLandUse	LandUseSquareFeet	22,000.00	40,286.00
tblLandUse	LotAcreage	0.20	0.00
tblLandUse	LotAcreage	0.50	0.20
tblLandUse	LotAcreage	0.34	0.51
tblVehicleTrips	WD_TR	5.44	7.32
tblVehicleTrips	WD_TR	346.23	225.33
tblVehicleTrips	WD_TR	112.18	96.17
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00
tblWater	AerobicPercent	87.46	100.00

tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	AnaerobicandFacultativeLagoonsPercent	2.21	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWater	SepticTankPercent	10.33	0.00
tblWoodstoves	NumberCatalytic	0.40	0.00
tblWoodstoves	NumberCatalytic	1.10	0.00
tblWoodstoves	NumberNoncatalytic	0.40	0.00
tblWoodstoves	NumberNoncatalytic	1.10	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveDayYear	25.00	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00
tblWoodstoves	WoodstoveWoodMass	999.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.7916	17.7169	14.4734	0.0271	7.2720	0.8409	8.0204	3.4752	0.7857	4.1639	0.0000	2,559.7333	2,559.7333	0.6649	0.0477	2,581.0079
2023	5.7188	19.7225	25.1078	0.0453	0.6724	0.8991	1.5714	0.1796	0.8572	1.0368	0.0000	4,277.8206	4,277.8206	0.7880	0.0389	4,309.1113
Maximum	**5.7188**	**19.7225**	**25.1078**	**0.0453**	**7.2720**	**0.8991**	**8.0204**	**3.4752**	**0.8572**	**4.1639**	**0.0000**	**4,277.8206**	**4,277.8206**	**0.7880**	**0.0477**	**4,309.1113**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.7916	17.7169	14.4734	0.0271	3.3745	0.8409	4.1229	1.5913	0.7857	2.2800	0.0000	2,559.7333	2,559.7333	0.6649	0.0477	2,581.0079
2023	5.7188	19.7225	25.1078	0.0453	0.6724	0.8991	1.5714	0.1796	0.8572	1.0368	0.0000	4,277.8206	4,277.8206	0.7880	0.0389	4,309.1113
Maximum	**5.7188**	**19.7225**	**25.1078**	**0.0453**	**3.3745**	**0.8991**	**4.1229**	**1.5913**	**0.8572**	**2.2800**	**0.0000**	**4,277.8206**	**4,277.8206**	**0.7880**	**0.0477**	**4,309.1113**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**49.06**	**0.00**	**40.63**	**51.55**	**0.00**	**36.22**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Energy	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
Mobile	3.6601	3.6642	31.4431	0.0634	6.8794	0.0487	6.9281	1.8332	0.0452	1.8784		6,576.2154	6,576.2154	0.4998	0.3215	6,684.5038
Total	**4.9067**	**3.9924**	**34.1365**	**0.0654**	**6.8794**	**0.0856**	**6.9650**	**1.8332**	**0.0822**	**1.9153**	**0.0000**	**6,947.0045**	**6,947.0045**	**0.5111**	**0.3282**	**7,057.5773**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Energy	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
Mobile	3.4349	3.2672	27.9468	0.0540	5.8218	0.0422	5.8639	1.5513	0.0392	1.5905		5,602.4168	5,602.4168	0.4529	0.2868	5,699.2142
Total	**4.6815**	**3.5955**	**30.6402**	**0.0560**	**5.8218**	**0.0791**	**5.9009**	**1.5513**	**0.0761**	**1.6274**	**0.0000**	**5,973.2060**	**5,973.2060**	**0.4642**	**0.2936**	**6,072.2877**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	4.59	9.94	10.24	14.36	15.37	7.59	15.28	15.37	7.35	15.03	0.00	14.02	14.02	9.17	10.55	13.96

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/3/2022	1/31/2022	6	25	
2	Site Preparation	Site Preparation	2/1/2022	2/28/2022	6	24	
3	Grading	Grading	3/1/2022	3/31/2022	6	27	
4	Building Construction	Building Construction	4/1/2022	9/1/2023	6	445	
5	Paving	Paving	6/1/2023	10/1/2023	6	105	
6	Architectural Coating	Architectural Coating	6/1/2023	10/1/2023	6	105	

Acres of Grading (Site Preparation Phase): 22.5

Acres of Grading (Grading Phase): 27

Acres of Paving: 0.48

Residential Indoor: 99,855; Residential Outdoor: 33,285; Non-Residential Indoor: 4,595; Non-Residential Outdoor: 1,532; Striped Parking Area: 1,785 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Rubber Tired Dozers	1	8.00	247	0.40
Demolition	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40

Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	2	7.00	97	0.37
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Building Construction	Welders	3	8.00	46	0.45
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	1	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Architectural Coating	Air Compressors	1	6.00	78	0.48

<u>Trips and VMT</u>

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	5	13.00	0.00	41.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	3	8.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	114.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	35.00	9.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	7.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Demolition - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.3516	0.0000	0.3516	0.0532	0.0000	0.0532			0.0000			0.0000
Off-Road	1.6889	16.6217	13.9605	0.0241		0.8379	0.8379		0.7829	0.7829		2,323.4168	2,323.4168	0.5921		2,338.2191
Total	**1.6889**	**16.6217**	**13.9605**	**0.0241**	**0.3516**	**0.8379**	**1.1895**	**0.0532**	**0.7829**	**0.8361**		**2,323.4168**	**2,323.4168**	**0.5921**		**2,338.2191**

3.2 Demolition - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.9900e-003	0.2746	0.0638	1.0000e-003	0.0287	2.1100e-003	0.0308	7.8600e-003	2.0100e-003	9.8700e-003		110.1713	110.1713	6.5100e-003	0.0175	115.5515
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0471	0.0344	0.4491	1.2400e-003	0.1453	8.7000e-004	0.1462	0.0385	8.0000e-004	0.0393		126.1452	126.1452	3.5200e-003	3.3700e-003	127.2374
Total	**0.0541**	**0.3089**	**0.5129**	**2.2400e-003**	**0.1740**	**2.9800e-003**	**0.1770**	**0.0464**	**2.8100e-003**	**0.0492**		**236.3165**	**236.3165**	**0.0100**	**0.0209**	**242.7889**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1582	0.0000	0.1582	0.0240	0.0000	0.0240			0.0000			0.0000
Off-Road	1.6889	16.6217	13.9605	0.0241		0.8379	0.8379		0.7829	0.7829	0.0000	2,323.4168	2,323.4168	0.5921		2,338.2191
Total	**1.6889**	**16.6217**	**13.9605**	**0.0241**	**0.1582**	**0.8379**	**0.9961**	**0.0240**	**0.7829**	**0.8068**	**0.0000**	**2,323.4168**	**2,323.4168**	**0.5921**		**2,338.2191**

3.2 Demolition - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.9900e-003	0.2746	0.0638	1.0000e-003	0.0287	2.1100e-003	0.0308	7.8600e-003	2.0100e-003	9.8700e-003		110.1713	110.1713	6.5100e-003	0.0175	115.5515
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0471	0.0344	0.4491	1.2400e-003	0.1453	8.7000e-004	0.1462	0.0385	8.0000e-004	0.0393		126.1452	126.1452	3.5200e-003	3.3700e-003	127.2374
Total	**0.0541**	**0.3089**	**0.5129**	**2.2400e-003**	**0.1740**	**2.9800e-003**	**0.1770**	**0.0464**	**2.8100e-003**	**0.0492**		**236.3165**	**236.3165**	**0.0100**	**0.0209**	**242.7889**

3.3 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.2635	0.0000	6.2635	3.0038	0.0000	3.0038			0.0000			0.0000
Off-Road	1.3122	14.6277	7.0939	0.0172		0.6225	0.6225		0.5727	0.5727		1,666.1738	1,666.1738	0.5389		1,679.6457
Total	**1.3122**	**14.6277**	**7.0939**	**0.0172**	**6.2635**	**0.6225**	**6.8861**	**3.0038**	**0.5727**	**3.5765**		**1,666.1738**	**1,666.1738**	**0.5389**		**1,679.6457**

3.3 Site Preparation - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0290	0.0212	0.2764	7.6000e-004	0.0894	5.4000e-004	0.0900	0.0237	4.9000e-004	0.0242		77.6278	77.6278	2.1700e-003	2.0700e-003	78.2999
Total	**0.0290**	**0.0212**	**0.2764**	**7.6000e-004**	**0.0894**	**5.4000e-004**	**0.0900**	**0.0237**	**4.9000e-004**	**0.0242**		**77.6278**	**77.6278**	**2.1700e-003**	**2.0700e-003**	**78.2999**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8186	0.0000	2.8186	1.3517	0.0000	1.3517			0.0000			0.0000
Off-Road	1.3122	14.6277	7.0939	0.0172		0.6225	0.6225		0.5727	0.5727	0.0000	1,666.1738	1,666.1738	0.5389		1,679.6457
Total	**1.3122**	**14.6277**	**7.0939**	**0.0172**	**2.8186**	**0.6225**	**3.4411**	**1.3517**	**0.5727**	**1.9244**	**0.0000**	**1,666.1738**	**1,666.1738**	**0.5389**		**1,679.6457**

3.3 Site Preparation - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0290	0.0212	0.2764	7.6000e-004	0.0894	5.4000e-004	0.0900	0.0237	4.9000e-004	0.0242		77.6278	77.6278	2.1700e-003	2.0700e-003	78.2999
Total	**0.0290**	**0.0212**	**0.2764**	**7.6000e-004**	**0.0894**	**5.4000e-004**	**0.0900**	**0.0237**	**4.9000e-004**	**0.0242**		**77.6278**	**77.6278**	**2.1700e-003**	**2.0700e-003**	**78.2999**

3.4 Grading - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.0864	0.0000	7.0864	3.4253	0.0000	3.4253			0.0000			0.0000
Off-Road	1.5403	16.9836	9.2202	0.0206		0.7423	0.7423		0.6829	0.6829		1,995.4825	1,995.4825	0.6454		2,011.6169
Total	**1.5403**	**16.9836**	**9.2202**	**0.0206**	**7.0864**	**0.7423**	**7.8287**	**3.4253**	**0.6829**	**4.1082**		**1,995.4825**	**1,995.4825**	**0.6454**		**2,011.6169**

3.4 Grading - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0180	0.7069	0.1642	2.5800e-003	0.0738	5.4200e-003	0.0793	0.0202	5.1900e-003	0.0254		283.6388	283.6388	0.0168	0.0451	297.4903
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0362	0.0264	0.3455	9.5000e-004	0.1118	6.7000e-004	0.1125	0.0296	6.2000e-004	0.0303		97.0348	97.0348	2.7100e-003	2.5900e-003	97.8749
Total	**0.0542**	**0.7333**	**0.5097**	**3.5300e-003**	**0.1856**	**6.0900e-003**	**0.1917**	**0.0499**	**5.8100e-003**	**0.0557**		**380.6736**	**380.6736**	**0.0195**	**0.0477**	**395.3652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					3.1889	0.0000	3.1889	1.5414	0.0000	1.5414			0.0000			0.0000
Off-Road	1.5403	16.9836	9.2202	0.0206		0.7423	0.7423		0.6829	0.6829	0.0000	1,995.4825	1,995.4825	0.6454		2,011.6169
Total	**1.5403**	**16.9836**	**9.2202**	**0.0206**	**3.1889**	**0.7423**	**3.9312**	**1.5414**	**0.6829**	**2.2243**	**0.0000**	**1,995.4825**	**1,995.4825**	**0.6454**		**2,011.6169**

3.4 Grading - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0180	0.7069	0.1642	2.5800e-003	0.0738	5.4200e-003	0.0793	0.0202	5.1900e-003	0.0254		283.6388	283.6388	0.0168	0.0451	297.4903
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0362	0.0264	0.3455	9.5000e-004	0.1118	6.7000e-004	0.1125	0.0296	6.2000e-004	0.0303		97.0348	97.0348	2.7100e-003	2.5900e-003	97.8749
Total	**0.0542**	**0.7333**	**0.5097**	**3.5300e-003**	**0.1856**	**6.0900e-003**	**0.1917**	**0.0499**	**5.8100e-003**	**0.0557**		**380.6736**	**380.6736**	**0.0195**	**0.0477**	**395.3652**

3.5 Building Construction - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689		2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**		**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.5 Building Construction - 2022

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.4423	0.1471	1.7200e-003	0.0576	4.3400e-003	0.0620	0.0166	4.1500e-003	0.0207		185.9595	185.9595	6.8200e-003	0.0270	194.1839
Worker	0.1268	0.0925	1.2091	3.3400e-003	0.3912	2.3500e-003	0.3936	0.1038	2.1600e-003	0.1059		339.6217	339.6217	9.4700e-003	9.0700e-003	342.5621
Total	**0.1430**	**0.5348**	**1.3562**	**5.0600e-003**	**0.4488**	**6.6900e-003**	**0.4555**	**0.1203**	**6.3100e-003**	**0.1267**		**525.5812**	**525.5812**	**0.0163**	**0.0361**	**536.7460**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6487	12.5031	12.7264	0.0221		0.5889	0.5889		0.5689	0.5689	0.0000	2,001.5429	2,001.5429	0.3486		2,010.2581
Total	**1.6487**	**12.5031**	**12.7264**	**0.0221**		**0.5889**	**0.5889**		**0.5689**	**0.5689**	**0.0000**	**2,001.5429**	**2,001.5429**	**0.3486**		**2,010.2581**

3.5 Building Construction - 2022

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0162	0.4423	0.1471	1.7200e-003	0.0576	4.3400e-003	0.0620	0.0166	4.1500e-003	0.0207		185.9595	185.9595	6.8200e-003	0.0270	194.1839
Worker	0.1268	0.0925	1.2091	3.3400e-003	0.3912	2.3500e-003	0.3936	0.1038	2.1600e-003	0.1059		339.6217	339.6217	9.4700e-003	9.0700e-003	342.5621
Total	**0.1430**	**0.5348**	**1.3562**	**5.0600e-003**	**0.4488**	**6.6900e-003**	**0.4555**	**0.1203**	**6.3100e-003**	**0.1267**		**525.5812**	**525.5812**	**0.0163**	**0.0361**	**536.7460**

3.5 Building Construction - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5233	11.7104	12.6111	0.0221		0.5145	0.5145		0.4968	0.4968		2,001.7877	2,001.7877	0.3399		2,010.2858
Total	**1.5233**	**11.7104**	**12.6111**	**0.0221**		**0.5145**	**0.5145**		**0.4968**	**0.4968**		**2,001.7877**	**2,001.7877**	**0.3399**		**2,010.2858**

3.5 Building Construction - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.2800e-003	0.3449	0.1304	1.6400e-003	0.0576	1.8300e-003	0.0595	0.0166	1.7500e-003	0.0183		177.2162	177.2162	6.5200e-003	0.0257	185.0450
Worker	0.1180	0.0819	1.1154	3.2300e-003	0.3912	2.2100e-003	0.3934	0.1038	2.0400e-003	0.1058		330.7059	330.7059	8.5200e-003	8.3800e-003	333.4158
Total	**0.1273**	**0.4267**	**1.2459**	**4.8700e-003**	**0.4488**	**4.0400e-003**	**0.4529**	**0.1203**	**3.7900e-003**	**0.1241**		**507.9221**	**507.9221**	**0.0150**	**0.0341**	**518.4608**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.5233	11.7104	12.6111	0.0221		0.5145	0.5145		0.4968	0.4968	0.0000	2,001.7877	2,001.7877	0.3399		2,010.2858
Total	**1.5233**	**11.7104**	**12.6111**	**0.0221**		**0.5145**	**0.5145**		**0.4968**	**0.4968**	**0.0000**	**2,001.7877**	**2,001.7877**	**0.3399**		**2,010.2858**

3.5 Building Construction - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.2800e-003	0.3449	0.1304	1.6400e-003	0.0576	1.8300e-003	0.0595	0.0166	1.7500e-003	0.0183		177.2162	177.2162	6.5200e-003	0.0257	185.0450
Worker	0.1180	0.0819	1.1154	3.2300e-003	0.3912	2.2100e-003	0.3934	0.1038	2.0400e-003	0.1058		330.7059	330.7059	8.5200e-003	8.3800e-003	333.4158
Total	**0.1273**	**0.4267**	**1.2459**	**4.8700e-003**	**0.4488**	**4.0400e-003**	**0.4529**	**0.1203**	**3.7900e-003**	**0.1241**		**507.9221**	**507.9221**	**0.0150**	**0.0341**	**518.4608**

3.6 Paving - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846		1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0120					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6566**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**		**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0438	0.0304	0.4143	1.2000e-003	0.1453	8.2000e-004	0.1461	0.0385	7.6000e-004	0.0393		122.8336	122.8336	3.1600e-003	3.1100e-003	123.8401
Total	**0.0438**	**0.0304**	**0.4143**	**1.2000e-003**	**0.1453**	**8.2000e-004**	**0.1461**	**0.0385**	**7.6000e-004**	**0.0393**		**122.8336**	**122.8336**	**3.1600e-003**	**3.1100e-003**	**123.8401**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.6446	6.2357	8.8024	0.0136		0.3084	0.3084		0.2846	0.2846	0.0000	1,297.6880	1,297.6880	0.4114		1,307.9725
Paving	0.0120					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6566**	**6.2357**	**8.8024**	**0.0136**		**0.3084**	**0.3084**		**0.2846**	**0.2846**	**0.0000**	**1,297.6880**	**1,297.6880**	**0.4114**		**1,307.9725**

3.6 Paving - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0438	0.0304	0.4143	1.2000e-003	0.1453	8.2000e-004	0.1461	0.0385	7.6000e-004	0.0393		122.8336	122.8336	3.1600e-003	3.1100e-003	123.8401
Total	**0.0438**	**0.0304**	**0.4143**	**1.2000e-003**	**0.1453**	**8.2000e-004**	**0.1461**	**0.0385**	**7.6000e-004**	**0.0393**		**122.8336**	**122.8336**	**3.1600e-003**	**3.1100e-003**	**123.8401**

3.7 Architectural Coating - 2023

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.1526					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708		281.4481	281.4481	0.0168		281.8690
Total	**3.3443**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**		**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0236	0.0164	0.2231	6.5000e-004	0.0782	4.4000e-004	0.0787	0.0208	4.1000e-004	0.0212		66.1412	66.1412	1.7000e-003	1.6800e-003	66.6832
Total	**0.0236**	**0.0164**	**0.2231**	**6.5000e-004**	**0.0782**	**4.4000e-004**	**0.0787**	**0.0208**	**4.1000e-004**	**0.0212**		**66.1412**	**66.1412**	**1.7000e-003**	**1.6800e-003**	**66.6832**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	3.1526					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.1917	1.3030	1.8111	2.9700e-003		0.0708	0.0708		0.0708	0.0708	0.0000	281.4481	281.4481	0.0168		281.8690
Total	**3.3443**	**1.3030**	**1.8111**	**2.9700e-003**		**0.0708**	**0.0708**		**0.0708**	**0.0708**	**0.0000**	**281.4481**	**281.4481**	**0.0168**		**281.8690**

3.7 Architectural Coating - 2023

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0236	0.0164	0.2231	6.5000e-004	0.0782	4.4000e-004	0.0787	0.0208	4.1000e-004	0.0212		66.1412	66.1412	1.7000e-003	1.6800e-003	66.6832
Total	**0.0236**	**0.0164**	**0.2231**	**6.5000e-004**	**0.0782**	**4.4000e-004**	**0.0787**	**0.0208**	**4.1000e-004**	**0.0212**		**66.1412**	**66.1412**	**1.7000e-003**	**1.6800e-003**	**66.6832**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Increase Density

Integrate Below Market Rate Housing

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.4349	3.2672	27.9468	0.0540	5.8218	0.0422	5.8639	1.5513	0.0392	1.5905		5,602.4168	5,602.4168	0.4529	0.2868	5,699.2142
Unmitigated	3.6601	3.6642	31.4431	0.0634	6.8794	0.0487	6.9281	1.8332	0.0452	1.8784		6,576.2154	6,576.2154	0.4998	0.3215	6,684.5038

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Apartments Low Rise	58.56	65.12	50.24	199,249	168,617
Condo/Townhouse High Rise	161.04	108.02	89.98	489,727	414,438
Fast Food Restaurant w/o Drive Thru	401.09	1,238.88	890.00	1,069,633	905,191
High Turnover (Sit Down Restaurant)	123.10	156.67	182.58	185,878	157,302
Other Asphalt Surfaces	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Unenclosed Parking Structure	0.00	0.00	0.00		
Total	743.79	1,568.69	1,212.80	1,944,487	1,645,548

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Apartments Low Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Condo/Townhouse High Rise	14.70	5.90	8.70	40.20	19.20	40.60	86	11	3
Fast Food Restaurant w/o Drive	16.60	8.40	6.90	1.50	79.50	19.00	51	37	12
High Turnover (Sit Down	16.60	8.40	6.90	8.50	72.50	19.00	37	20	43
Other Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Unenclosed Parking Structure	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Apartments Low Rise	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Condo/Townhouse High Rise	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Fast Food Restaurant w/o Drive Thru	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
High Turnover (Sit Down Restaurant)	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Other Asphalt Surfaces	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Parking Lot	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706
Unenclosed Parking Structure	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

Install Energy Efficient Appliances

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015
NaturalGas Unmitigated	0.0336	0.2997	0.2157	1.8300e-003		0.0232	0.0232		0.0232	0.0232		366.3246	366.3246	7.0200e-003	6.7200e-003	368.5015

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	272.2	2.9400e-003	0.0251	0.0107	1.6000e-004		2.0300e-003	2.0300e-003		2.0300e-003	2.0300e-003		32.0236	32.0236	6.1000e-004	5.9000e-004	32.2139
Condo/Townhouse High Rise	672.032	7.2500e-003	0.0619	0.0264	4.0000e-004		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003		79.0626	79.0626	1.5200e-003	1.4500e-003	79.5324
Fast Food Restaurant w/o Drive Thru	1263.61	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.6600	148.6600	2.8500e-003	2.7300e-003	149.5434
High Turnover (Sit Down Restaurant)	905.917	9.7700e-003	0.0888	0.0746	5.3000e-004		6.7500e-003	6.7500e-003		6.7500e-003	6.7500e-003		106.5785	106.5785	2.0400e-003	1.9500e-003	107.2119
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0336**	**0.2997**	**0.2157**	**1.8300e-003**		**0.0232**	**0.0232**		**0.0232**	**0.0232**		**366.3246**	**366.3246**	**7.0200e-003**	**6.7200e-003**	**368.5015**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Apartments Low Rise	0.2722	2.9400e-003	0.0251	0.0107	1.6000e-004		2.0300e-003	2.0300e-003		2.0300e-003	2.0300e-003		32.0236	32.0236	6.1000e-004	5.9000e-004	32.2139
Condo/Townhouse High Rise	0.672032	7.2500e-003	0.0619	0.0264	4.0000e-004		5.0100e-003	5.0100e-003		5.0100e-003	5.0100e-003		79.0626	79.0626	1.5200e-003	1.4500e-003	79.5324
Fast Food Restaurant w/o Drive Thru	1.26361	0.0136	0.1239	0.1041	7.4000e-004		9.4200e-003	9.4200e-003		9.4200e-003	9.4200e-003		148.6600	148.6600	2.8500e-003	2.7300e-003	149.5434
High Turnover (Sit Down Restaurant)	0.905917	9.7700e-003	0.0888	0.0746	5.3000e-004		6.7500e-003	6.7500e-003		6.7500e-003	6.7500e-003		106.5785	106.5785	2.0400e-003	1.9500e-003	107.2119
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Unenclosed Parking Structure	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0336**	**0.2997**	**0.2157**	**1.8300e-003**		**0.0232**	**0.0232**		**0.0232**	**0.0232**		**366.3246**	**366.3246**	**7.0200e-003**	**6.7200e-003**	**368.5015**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720
Unmitigated	1.2130	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137	0.0000	4.4645	4.4645	4.3000e-003	0.0000	4.5720

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0907					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0475					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0747	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4645	4.4645	4.3000e-003		4.5720
Total	**1.2130**	**0.0285**	**2.4777**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4645**	**4.4645**	**4.3000e-003**	**0.0000**	**4.5720**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0907					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0475					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Hearth	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0747	0.0285	2.4777	1.3000e-004		0.0137	0.0137		0.0137	0.0137		4.4645	4.4645	4.3000e-003		4.5720
Total	**1.2130**	**0.0285**	**2.4777**	**1.3000e-004**		**0.0137**	**0.0137**		**0.0137**	**0.0137**	**0.0000**	**4.4645**	**4.4645**	**4.3000e-003**	**0.0000**	**4.5720**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Irrigation System

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

100-132 North Catalina Avenue Existing Uses Air Quality Modeling

South Coast Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.97	Acre	0.97	42,253.20	0
Strip Mall	12.68	1000sqft	0.29	12,680.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Existing use, no construction

Off-road Equipment -

Trips and VMT - No construction

Area Coating - Per SCAQMD Rule 1113

Energy Use -

Area Mitigation - SCAQMD Rule 1113

Fleet Mix -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Energy	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Mobile	1.2755	1.1300	10.4882	0.0218	2.2526	0.0160	2.2686	0.6003	0.0149	0.6151		2,255.3196	2,255.3196	0.1591	0.1022	2,289.7648
Total	**1.5617**	**1.1372**	**10.4957**	**0.0218**	**2.2526**	**0.0166**	**2.2692**	**0.6003**	**0.0154**	**0.6157**		**2,263.9462**	**2,263.9462**	**0.1593**	**0.1024**	**2,298.4429**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Energy	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Mobile	1.2755	1.1300	10.4882	0.0218	2.2526	0.0160	2.2686	0.6003	0.0149	0.6151		2,255.3196	2,255.3196	0.1591	0.1022	2,289.7648
Total	**1.5617**	**1.1372**	**10.4957**	**0.0218**	**2.2526**	**0.0166**	**2.2692**	**0.6003**	**0.0154**	**0.6157**		**2,263.9462**	**2,263.9462**	**0.1593**	**0.1024**	**2,298.4429**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	No construction	Site Preparation	7/28/2021	7/29/2021	5	2	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.97

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
No construction	Aerial Lifts			63	0.31

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
No construction	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 No construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 No construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2755	1.1300	10.4882	0.0218	2.2526	0.0160	2.2686	0.6003	0.0149	0.6151		2,255.3196	2,255.3196	0.1591	0.1022	2,289.7648
Unmitigated	1.2755	1.1300	10.4882	0.0218	2.2526	0.0160	2.2686	0.6003	0.0149	0.6151		2,255.3196	2,255.3196	0.1591	0.1022	2,289.7648

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Strip Mall	561.98	533.07	259.05	979,023	979,023
Total	561.98	533.07	259.05	979,023	979,023

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Strip Mall	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
NaturalGas Unmitigated	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	73.3008	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Total		**7.9000e-004**	**7.1900e-003**	**6.0400e-003**	**4.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**		**8.6236**	**8.6236**	**1.7000e-004**	**1.6000e-004**	**8.6749**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.0733008	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Total		**7.9000e-004**	**7.1900e-003**	**6.0400e-003**	**4.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**		**8.6236**	**8.6236**	**1.7000e-004**	**1.6000e-004**	**8.6749**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Unmitigated	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2660					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Total	**0.2855**	**1.0000e-005**	**1.3900e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.9900e-003**	**2.9900e-003**	**1.0000e-005**		**3.1800e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2660					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Total	**0.2855**	**1.0000e-005**	**1.3900e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.9900e-003**	**2.9900e-003**	**1.0000e-005**		**3.1800e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

100-132 North Catalina Avenue Existing Uses Air Quality Modeling

South Coast Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Parking Lot	0.97	Acre	0.97	42,253.20	0
Strip Mall	12.68	1000sqft	0.29	12,680.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	31
Climate Zone	8			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Existing use, no construction

Off-road Equipment -

Trips and VMT - No construction

Area Coating - Per SCAQMD Rule 1113

Energy Use -

Area Mitigation - SCAQMD Rule 1113

Fleet Mix -

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblOffRoadEquipment	LoadFactor	0.31	0.31
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Maximum	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Energy	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Mobile	1.2284	1.2146	10.4146	0.0208	2.2526	0.0160	2.2687	0.6003	0.0149	0.6152		2,156.6602	2,156.6602	0.1663	0.1066	2,192.5764
Total	**1.5147**	**1.2218**	**10.4220**	**0.0208**	**2.2526**	**0.0166**	**2.2692**	**0.6003**	**0.0154**	**0.6157**		**2,165.2868**	**2,165.2868**	**0.1665**	**0.1067**	**2,201.2544**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Energy	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Mobile	1.2284	1.2146	10.4146	0.0208	2.2526	0.0160	2.2687	0.6003	0.0149	0.6152		2,156.6602	2,156.6602	0.1663	0.1066	2,192.5764
Total	**1.5147**	**1.2218**	**10.4220**	**0.0208**	**2.2526**	**0.0166**	**2.2692**	**0.6003**	**0.0154**	**0.6157**		**2,165.2868**	**2,165.2868**	**0.1665**	**0.1067**	**2,201.2544**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	No construction	Site Preparation	7/28/2021	7/29/2021	5	2	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.97

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
No construction	Aerial Lifts			63	0.31

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
No construction	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 No construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.2 No construction - 2021

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2284	1.2146	10.4146	0.0208	2.2526	0.0160	2.2687	0.6003	0.0149	0.6152		2,156.6602	2,156.6602	0.1663	0.1066	2,192.5764
Unmitigated	1.2284	1.2146	10.4146	0.0208	2.2526	0.0160	2.2687	0.6003	0.0149	0.6152		2,156.6602	2,156.6602	0.1663	0.1066	2,192.5764

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Parking Lot	0.00	0.00	0.00		
Strip Mall	561.98	533.07	259.05	979,023	979,023
Total	561.98	533.07	259.05	979,023	979,023

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Parking Lot	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0
Strip Mall	16.60	8.40	6.90	16.60	64.40	19.00	45	40	15

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Parking Lot	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

Strip Mall	0.543401	0.061496	0.184986	0.128935	0.023820	0.006437	0.011961	0.008652	0.000812	0.000508	0.024540	0.000745	0.003706

5.0 Energy Detail

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
NaturalGas Unmitigated	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	73.3008	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Total		**7.9000e-004**	**7.1900e-003**	**6.0400e-003**	**4.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**		**8.6236**	**8.6236**	**1.7000e-004**	**1.6000e-004**	**8.6749**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Strip Mall	0.0733008	7.9000e-004	7.1900e-003	6.0400e-003	4.0000e-005		5.5000e-004	5.5000e-004		5.5000e-004	5.5000e-004		8.6236	8.6236	1.7000e-004	1.6000e-004	8.6749
Total		**7.9000e-004**	**7.1900e-003**	**6.0400e-003**	**4.0000e-005**		**5.5000e-004**	**5.5000e-004**		**5.5000e-004**	**5.5000e-004**		**8.6236**	**8.6236**	**1.7000e-004**	**1.6000e-004**	**8.6749**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Unmitigated	0.2855	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2660					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Total	**0.2855**	**1.0000e-005**	**1.3900e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.9900e-003**	**2.9900e-003**	**1.0000e-005**		**3.1800e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0193					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.2660					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.3000e-004	1.0000e-005	1.3900e-003	0.0000		0.0000	0.0000		0.0000	0.0000		2.9900e-003	2.9900e-003	1.0000e-005		3.1800e-003
Total	**0.2855**	**1.0000e-005**	**1.3900e-003**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.9900e-003**	**2.9900e-003**	**1.0000e-005**		**3.1800e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Appendix E

Health Risk Assessment

100-132 North Catalina Avenue Project

Health Risk Assessment

prepared for

City of Redondo Beach
Community Development Department
415 Diamond Street
Redondo Beach, California 90277
Contact: Antonio Gardea, AICP, Senior Planner

prepared by

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November 2021

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Table of Contents

1 Project Description 1
  1.1 Introduction 1
  1.2 Executive Summary 1
  1.3 Project Site and Description 2
2 Air Quality Background 5
  2.1 Local Climate and Meteorology 5
  2.2 Toxic Air Contaminants 5
  2.3 Air Quality Regulation 7
3 Impact Analysis 10
  3.1 Methodology 10
  3.2 Significance Thresholds 11
  3.3 Results 13
4 Conclusions 15
5 References 17

Tables

Table 1 Federal and State Ambient Air Quality Standards 8
Table 2 Ambient Air Quality at Monitoring Stations 9
Table 3 Potential Health Risks at the MEIR 14

Figures

Figure 1 Regional Location 3
Figure 2 Project Location 4
Figure 3 Sources and Receptors 12

Appendices

Appendix HRA-1 Emissions Estimates and HARP Risk Results

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1 Project Description

1.1 Introduction

This Health Risk Assessment (HRA) analyzes the possible health effects associated with toxic air contaminant (TAC) emissions from the Pacific Coast Highway (State Route 1 [SR-1]) at the proposed 100-132 North Catalina Avenue Project (hereafter referred to as “proposed project” or “project”) in Redondo Beach, California. The report has been prepared under contract to the City of Redondo Beach (City).

1.2 Executive Summary

The project involves the demolition of the existing commercial building located at 116 North Catalina Avenue, rehabilitation and reuse of three commercial buildings at 112, 124, and 126 North Catalina Avenue for further commercial use (i.e., coffee shop and tasting room); and rehabilitation and reuse of the remaining building at 132 North Catalina Avenue for residential use. The project also involves the construction of 22 three-story townhomes, four apartment units in the building located at 112 North Catalina Avenue, and a separate three-story apartment building consisting of four additional apartment units, for a combined total of 30 units. The 22 townhomes would be behind (east of) the commercial buildings fronting North Catalina Avenue while the residential apartment building would be adjacent to (south of) the commercial buildings and would front both North Catalina Avenue and Emerald Street. This HRA conducts site-specific air dispersion modeling to determine whether health risks to future site residents from SR-1 exceed the South Coast Air Quality Management District’s (SCAQMD) health risk criteria for residences.

The California Air Resources Board’s (CARB) Air Quality and Land Use Handbook: A Community Health Perspective recommends that local agencies avoid siting new, sensitive land uses within specific distances of potential sources of TACs, such as freeways and high-traffic roads, distribution centers, railroads, and ports (CARB 2005). In particular, CARB recommends that local agencies avoid siting new, sensitive land uses within 500 feet of a freeway. The primary concern is the effect of diesel particulate matter (diesel PM), a TAC, on sensitive uses, such as residences. Near the project site, the primary source of diesel PM is truck traffic traveling on SR-1. In California, approximately 70 percent of total known cancer risk related to air toxics is attributable to diesel PM (CARB 2020a). In addition to diesel PM, this analysis also examined five other vehicle exhaust pollutants of concern that are emitted from both diesel and gasoline-fueled vehicles: acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene.

Cancer risk is expressed as the maximum number of new cases of cancer projected to occur in a population of one million people due to exposure to the cancer-causing substance, typically over a specific exposure duration, such as the high-end residency (95th percentile) of 30 years (SCAQMD 2017). For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer as the result of the exposure to the substance causing that risk. Thirty years is the exposure duration scenario recommended by the SCAQMD for residential receptors in Risk Assessment Procedures for Rules 1401, 1401.1, and 212 (SCAQMD 2017).

An analysis using the U.S. Environmental Protection Agency's (USEPA) AERMOD dispersion model and CARB's Hotspots Analysis and Reporting Program (HARP) risk analysis tool determined that the maximum exposed individual receptor (MEIR) on the project site would be exposed to a high end (95th percentile), 30-year excess cancer risk of approximately 1.1 in one million, which is below SCAQMD's recommended cancer risk criteria of 10 excess cases of cancer in one million individuals (1.0E-05) (SCAQMD 2015). Potential acute and chronic (such as lung inflammation, immune suppression, and immune sensitization) health risks for on-site residential units were also determined to be within SCAQMD health risk criteria.

1.3 Project Site and Description

The project site is located at 100, 112, 116, 124, 126, and 132 North Catalina Avenue at the intersection of North Catalina Avenue and Emerald Street in the City of Redondo Beach, Los Angeles County. The project site encompasses 54,739 square feet, or approximately 1.26 acres, and consists of six adjacent parcels, which are identified as Assessor Parcel Numbers (APNs) 7505-005-012, 7505-005-019, 7505-005-021, 7505-005-008, 7505-005-007, and 7505-005-006. Existing development on the site includes five buildings that front Catalina Avenue, including four one-story structures (116, 124, 126, and 132 North Catalina Avenue) and one two-story structure (112 North Catalina Avenue) as well as associated surface parking lots. There is also a shed on the east side of the project site (rear end of 116 North Catalina Avenue) that would be demolished. Three of the buildings are vacant and two buildings currently serve commercial uses. Former uses on the project site were a restaurant and dry cleaner, and the 132 North Catalina structure was historically used as a blacksmith and ironworks shop that was associated with the Redondo Railway. The project site is surrounded by commercial/retail buildings, residences, and Diamond Street to the north; a church, commercial/retail buildings, residences, and North Broadway to the east; Emerald Street and residences to the south; and North Catalina Avenue and residences to the west. The site is regionally accessible from SR-1 and the San Diego Freeway (Interstate 405, or I-405) and locally accessible from Catalina Avenue and Torrance Boulevard. The project site is approximately 560 feet west of the centerline of SR-1.

Figure 1 shows the project's regional location. Figure 2 shows the project site location.

Figure 1 Regional Location

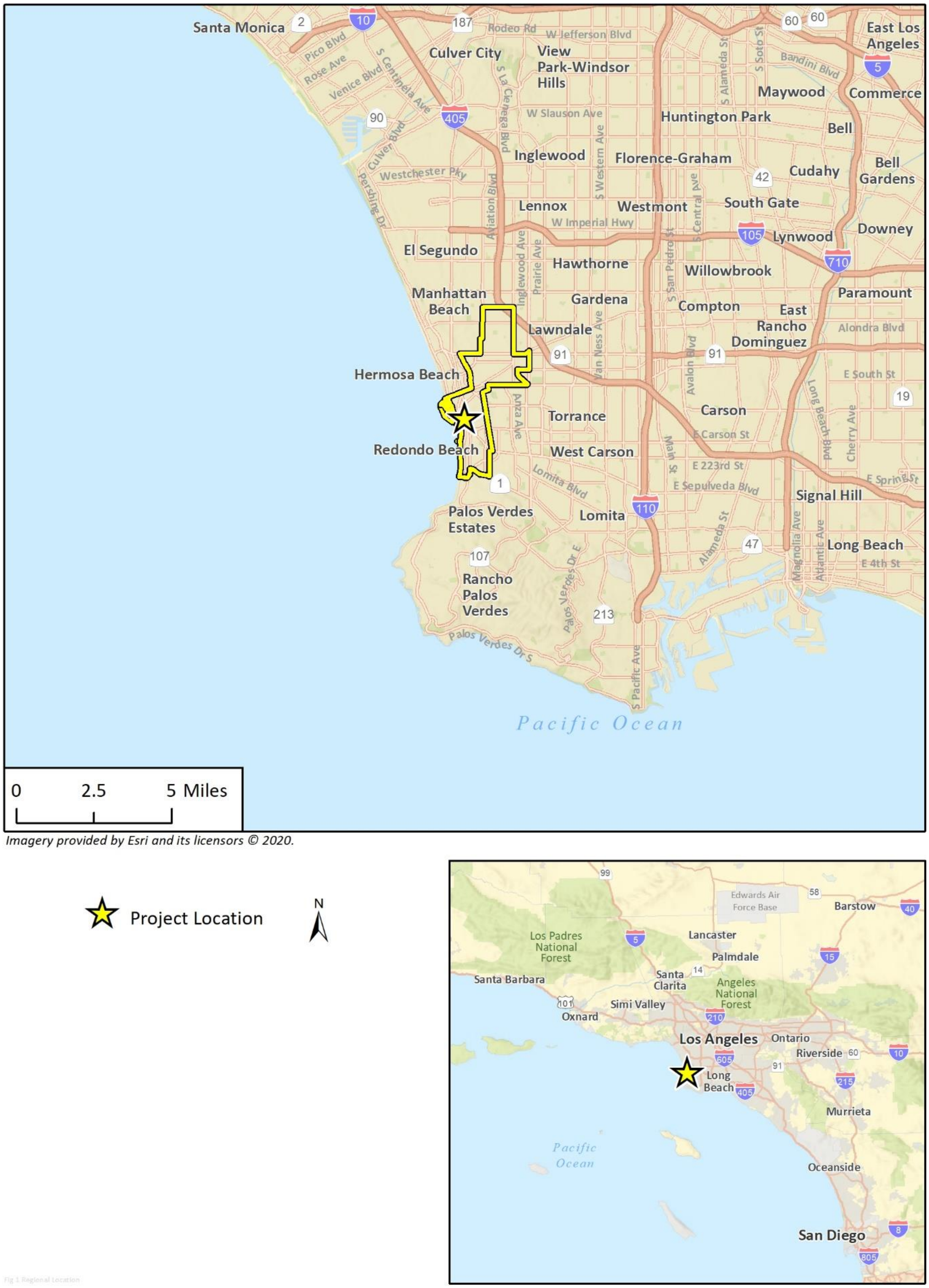

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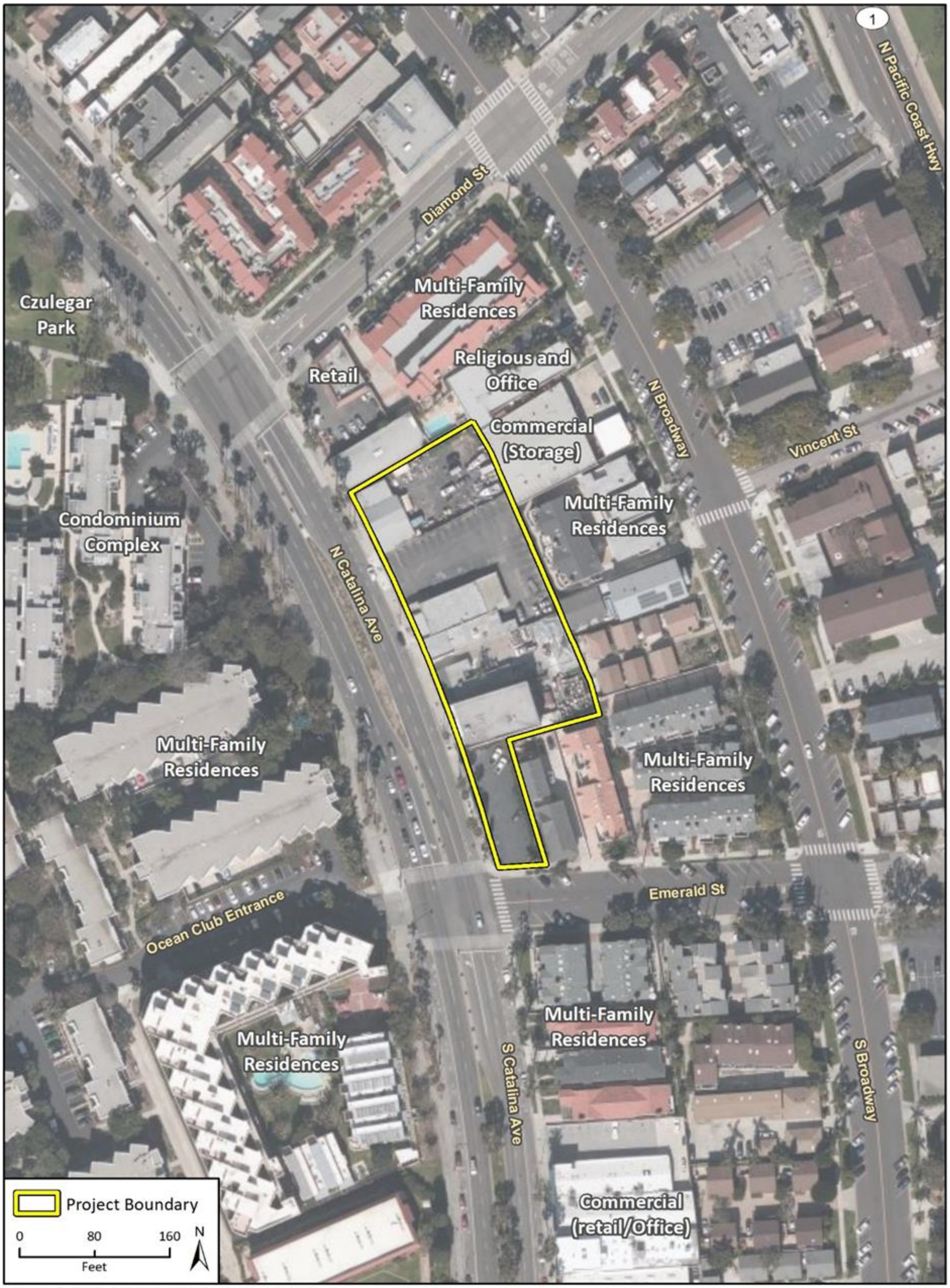
Figure 2 Project Location



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2 Air Quality Background

2.1 Local Climate and Meteorology

The project site is in the South Coast Air Basin (SCAB), which is bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east, and includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties, in addition to the San Gorgonio Pass area in Riverside County. The regional climate in the SCAB is considered semi-arid and is characterized by warm summers, mild winters, infrequent seasonal rainfall, moderate daytime onshore breezes, and moderate humidity. The air quality within the SCAB is primarily influenced by meteorology and a wide range of emissions sources, such as dense population centers, substantial vehicular traffic, and industry.

Stationary and mobile sources primarily generate air pollutant emissions in the SCAB. Stationary sources can be divided into two major subcategories: point and area sources. Point sources occur at a specific location and are often identified by an exhaust vent or stack. Examples include boilers or combustion equipment that produce electricity or generate heat. Area sources are widely distributed and include such sources as residential and commercial water heaters, painting operations, lawn mowers, agricultural fields, landfills, and some consumer products. Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions, and are classified as either on-road or off-road. On-road sources may be legally operated on roadways and highways. Off-road sources include aircraft, ships, trains, and self-propelled construction equipment. The natural environment can also generate air pollutants, such as when high winds suspend fine dust particles.

2.2 Toxic Air Contaminants

Diesel Particulate Matter

Fine particulates are generally associated with combustion processes and form in the atmosphere as a secondary pollutant through chemical reactions. PM_{10} (particulate matter measuring no more than 10 microns in diameter) and $PM_{2.5}$(particulate matter measuring no more than 2.5 microns in diameter) are a by-product of fuel combustion and wind erosion of soil and unpaved roads, and it is directly emitted into the atmosphere through these processes. Chemical reactions in the atmosphere also create PM_{10} and $PM_{2.5}$. Fine particulate matter poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. More than half of the fine particulate matter inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an adsorbed toxic substance.

Diesel engine fuel combustion forms an important fraction of the particulate matter emission inventory, as particulates in diesel emissions are very small and readily respirable. The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens. The Office of Environmental Health Hazard Assessment (OEHHA) reviewed and evaluated the potential for diesel exhaust to affect human health, and the associated scientific uncertainties (CARB 1998). Based on the available scientific evidence, it was determined that a level of diesel PM exposure, below which no carcinogenic effects are anticipated, has not been identified.

The Scientific Review Panel that approved the OEHHA report determined that, based on studies to date, 3 x 10^{-4} micrograms per cubic meter ($\mu g/m^3$) is a reasonable estimate of the unit risk for diesel PM. This means that a person exposed to a diesel PM concentration of 1 $\mu g/m^3$ continuously over the course of a lifetime has a 3 per 10,000 chance (or 300 in one million chance) of contracting cancer due to this exposure. Based on an estimated year 2000 statewide average concentration of 1.26 $\mu g/m^3$ for indoor and outdoor ambient air, about 380 excess cancers per one million population could be expected if diesel PM concentrations remained the same (CARB 2000). Therefore, these particulate emissions have been determined by CARB to be a TAC.

Diesel PM emissions are estimated to be responsible for about 70 percent of the total ambient air toxics risk. In addition to these general risks, diesel PM can also be responsible for elevated localized or near-source exposures (“hot-spots”). Depending on the activity and nearness to receptors, these potential risks can range from small to 1,500 per million or more (CARB 2000).

CARB staff have conducted risk characterization scenarios to determine the potential excess cancer risks involved when individuals are near various sources of diesel engine emissions, ranging from school buses to high-volume freeways. The purpose of the risk characterization was to estimate, through air dispersion modeling, the cancer risk associated with typical diesel-fueled engine or vehicle activities based on modeled diesel PM concentration at the point of maximum impact. The study included various sources of diesel PM emissions, including idling school buses, truck stops, low- and high-volume freeways, and other sources. High-volume freeways (20,000 trucks per day) were estimated to cause 800-1,700 per million potential excess cases of cancers, while low-volume freeways (2,000 trucks per day) were estimated to cause about 100-200 per million potential excess cases of cancers (CARB 2000).

Other Mobile Source Contaminants

Besides diesel PM, several other pollutants that are a public health concern are emitted by vehicle exhausts. The USEPA has identified six pollutants of highest priority: diesel particulate matter, acrolein, acetaldehyde, formaldehyde, benzene, and 1,3-butadiene. The latter five pollutants are part of the total organic gases emitted by diesel and gasoline fueled vehicles. A brief description of each of these chemicals follows:

- **Acrolein** is the simplest unsaturated aldehyde. It is a widely produced substance with a piercing, disagreeable, acrid smell similar to that of burning fat. Acrolein is an unstable toxic substance that can burn the nose and throat and is a severe pulmonary irritant. It is a flammable and poisonous substance prepared industrially by the oxidation of propene. Small amounts of acrolein are formed and enter the air when trees, tobacco, other plants, gasoline, and oil are burned.
- **Acetaldehyde**, sometimes known as ethanol, is an organic chemical compound used as an intermediate in the production of acetic acid, certain esters, and a number of other chemicals. It is a flammable liquid with a fruity smell. Acetaldehyde is a toxic when applied externally for prolonged periods, an irritant, and a probable carcinogen.
- **Formaldehyde** is an organic chemical compound containing a terminal carbonyl group. It is produced in the atmosphere by the action of sunlight and oxygen on atmospheric methane and other hydrocarbons, becoming a part of smog. Additionally, formaldehyde is an intermediate in the oxidation (or combustion) of methane as well as other carbon compounds including automobile exhaust. Formaldehyde is a flammable substance that can be toxic, allergenic, and carcinogenic. It is naturally made in small amounts in human bodies and is found in small

amounts in household sources, such as fiberglass, carpets, permanent press fabrics, paper products, and some household cleaners.

- **Benzene**, or benzol, is an organic chemical compound and a known carcinogen. It is a colorless and highly flammable liquid with a sweet smell and a relatively high melting point. Benzene is an important industrial solvent and precursor in the production of drugs, plastics, synthetic rubber, and dyes. Benzene is a natural constituent of crude oil and may be synthesized from other compounds present in petroleum. It is found in gasoline and cigarette smoke. Natural sources of benzene include emissions from volcanoes and forest fires.
- **1,3-Butadiene** is an important industrial chemical used in the production of synthetic rubber (about 75 percent of manufactured 1,3-butadiene), which is then used primarily in the production of automobile tires. It is a colorless gas with a mild gasoline-like odor. Gasoline contains small amounts that are exhausted into the air after the combustion process. It is a carcinogen, highly irritative, and flammable.

2.3 Air Quality Regulation

Federal and state governments have established ambient air quality standards for the protection of public health. The USEPA is the federal agency designated to administer air quality regulation, while CARB is the state equivalent in the California Environmental Protection Agency. County- and regional-level Air Quality Management Districts (AQMD) provide local management of air quality. CARB has established air quality standards and is responsible for the control of mobile emission sources, while the local AQMDs are responsible for enforcing standards and regulating stationary sources. CARB has established 15 air basins statewide.

The USEPA has set primary national ambient air quality standards for ozone, CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), PM_{10}, $PM_{2.5}$, and lead (Pb). Primary standards are those levels of air quality deemed necessary, with an adequate margin of safety, to protect public health. In addition, the State of California has established health-based ambient air quality standards for these and other pollutants, some of which are more stringent than the federal standards. Table 1 lists the current federal and State standards for regulated pollutants.

Table 1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	Federal Primary Standards	California Standard
Ozone	1-Hour	N/A	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	Annual	0.03 ppm	N/A
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	N/A	20 µg/m
	24-Hour	150 µg/m	50 µg/m
$PM_{2.5}$	Annual	12 µg/m	12 µg/m
	24-Hour	35 µg/m	N/A
Lead	30-Day Average	N/A	1.5 µg/m
	3-Month Average	0.15 µg/m	N/A

N/A: Not applicable because no standard is currently established for California; ppm = parts per million; µg/m = micrograms per cubic meter; PM_{10}: coarse particulate matter; $PM_{2.5}$: fine particulate matter

Source: CARB 2016

The SCAQMD is the designated air quality control agency in the SCAB. The SCAB is designated a nonattainment area for the federal and State one-hour and eight-hour ozone standards, the State PM_{10} standards, the federal 24-hour $PM_{2.5}$ standard, the State and federal annual $PM_{2.5}$ standard, and a partial nonattainment for lead. The SCAB is designated unclassifiable/attainment for all other federal and State standards.

Current Air Quality

The SCAB monitoring station located nearest to the project site that provides ozone, NO_2, and PM_{10} measurements is the Los Angeles-Westchester Parkway monitoring station located approximately eight miles north of the project site. The SCAB monitoring station located nearest to the project site that provides $PM_{2.5}$ measurements is the Long Beach-Route 710 Near Road monitoring station located 10.8 miles southeast of the project site. Table 2 indicates the number of days the standards have been exceeded at this station in each of the last three years for which data is available.

Table 2 Ambient Air Quality at Monitoring Stations

Pollutant	2016	2017	2018
8 Hour Ozone (ppm), 8-Hr Maximum	0.080	0.070	0.065
Number of Days of State exceedances (>0.070)	3	0	0
Number of days of Federal exceedances (>0.070)	2	0	0
Ozone (ppm), Worst Hour	0.087	0.086	0.074
Number of days of State exceedances (>0.09 ppm)	0	0	0
Number of days of Federal exceedances (>0.124 ppm)	0	0	0
Nitrogen Dioxide (ppm) – Worst Hour	0.0815	0.0722	0.0596
Number of days of State exceedances (>0.18 ppm)	0	0	0
Number of days of Federal exceedances (0.10 ppm)	0	0	0
Particulate Matter 10 microns, μg/m^3, Worst 24 Hours	43.9	46.5	64.6
Number of days above Federal standard (>150 μg/m^3)	0	0	0
Number of days of State exceedances (>50 μg/m^3)	0	0	0
Particulate Matter <2.5 microns, μg/m^3, Worst 24 Hours	33.3	85.4	103.8
Number of days above Federal standard (>35 μg/m^3)	0	8	9

ppm = parts per million; μg/m = micrograms per cubic meter

Source: CARB 2020b

Toxic Air Contaminants

The Air Toxic “Hot Spots” Information and Assessment Act of 1987 (AB 2588) seeks to identify and evaluate risk from air toxics sources but does not directly regulate air toxics emissions. Under AB 2588, TAC emissions from individual facilities are quantified and prioritized. “High priority” facilities are required to perform a health risk assessment and, if specific thresholds are violated, are required to communicate the results to the public in the form of notices and public meetings. Although TACs and $PM_{2.5}$ tend to be localized and are found in relatively low concentrations in ambient air, exposure to low concentrations over long periods can result in increased risk of cancer and/or adverse health effects in local communities.

3 Impact Analysis

3.1 Methodology

Health risks from roadway pollutant sources for future residents at the project site were modeled for SR-1 only and did not include other nearby roads such as Catalina Avenue due to the relatively low traffic volumes on roads in the vicinity of the project site. CARB recommends avoiding siting new sensitive land uses within 500 feet of a freeway, urban roads with 100,000 vehicles per day, or rural roads with 50,000 vehicles per day (CARB 2005). The annual average daily traffic (AADT) volume along SR-1 in the project area is only 39,500 vehicles, which is below the CARB-recommended threshold for residential siting (Caltrans 2018a). However, SR-1 is part of the State highway system with linkage to major interstate transportation corridors and, therefore, is more likely to contain substantial truck traffic, the primary source of DPM. Pursuant to the Redondo Beach Municipal Code Section 3-7.903, SR-1 is the only designated truck route in the vicinity of the project site. Truck traffic through the area would be expected to remain on SR-1 and not use neighborhood streets like Emerald Street or Catalina Avenue. In addition, according to the most recent traffic counts conducted by the City, Catalina Avenue in the vicinity of the project site had an AADT of 20,050 daily trips (Redondo Beach 2008).[1]

Site-specific air dispersion modeling was conducted using the latest version of the American Meteorological Society/USEPA air dispersion model, AERMOD Version 19121. Mobile source TACs associated with vehicle traffic on SR-1 were estimated based on the methodology developed by the UC Davis-Caltrans Air Quality Project, Estimating Mobile Source Air Toxics Emissions [MSAT]: A Step-By-Step Project Analysis Methodology (2006). This spreadsheet application was designed to generate the total amount of the above six pollutants of concern based on total organic gases emission factors and diesel particulate emission factors from EMFAC2017. The UC Davis-Caltrans spreadsheet contained speciation factors from CARB, and the USEPA's Motor Vehicle Emission Simulator (MOVES) was used to supplement missing values for acrolein (USEPA 2014). These emission and speciation factors are then multiplied against traffic volumes for the mainline of SR-1 within one-half mile north and south of the project site. The mainline was divided into 10 segments in each direction (north and south). Segments were sized not to exceed ten times the width of the roadway pursuant to SCAQMD AB 2588 and Rule 1402 Supplemental Guidelines (SCAQMD 2018). Emission factors for this study were based on grams per mile.[2] Spreadsheet outputs adapted from the UC Davis-Caltrans MSAT model and composite emission rates are contained in Appendix HRA-1.

The speed limit on SR-1 in the project vicinity is 35 miles per hour; therefore, emission factors were reviewed for speeds between 25 and 35 miles per hour (mph). The worst case speed for diesel PM emissions (i.e., highest emission levels) was 25 mph for heavy duty trucks and light duty trucks. For total organic gases emissions, the worst reasonable speed was 25 mph for heavy duty trucks, light duty trucks, and gasoline cars.

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[1] 2007 local traffic counts are the most recently conducted counts by the City. While traffic volumes may have changed slightly in the years since the last count, the City's traffic count for SR-1 indicated at AADT of 40,000, which aligns with the 2018 traffic counts from Caltrans for SR-1 in the project vicinity (Redondo Beach 2008; Caltrans 2018b). Therefore, there is evidence that the City's 2007 counts may still reflect current conditions.

[2] Initial lateral dimension (SYINIT) for roadway emissions sources is equal to the length of the segment divided by 4.3, consistent with AERMOD guidance (USEPA 2018). Initial vertical dimension (SZINIT) for all circulation sources is based on CALINE 4 methodology where SZINIT is equal to the residence time divided by 10, plus 1.5.

Traffic volumes on SR-1 in the vicinity of the project site were obtained from Caltrans 2018 Traffic Volumes on California State Highways, the most recently available traffic count information (Caltrans 2018a). According to the Caltrans traffic data, the AADT along SR-1 in the project area is 39,500 vehicles. Based on Caltrans 2018 Annual Average Daily Truck Traffic on the California State Highway System, truck traffic comprises approximately 3.33 percent of AADT on SR-1 (Caltrans 2018b). Fifteen representative sensitive receptor locations throughout the project site were chosen. Sensitive receptors were located at both proposed townhome and apartment building locations to characterize potential health risks. At each receptor location, additional receptors were placed at the receptor location at three and six meters higher elevation to reflect second and third floor residential exposure, respectively. A 13-by-19 point receptor grid with 10-meter spacing was used to evaluate whether sensitive receptor locations reflected the pattern of exposure on the project site. Figure 3 depicts the sources, receptor grid, and sensitive receptors.

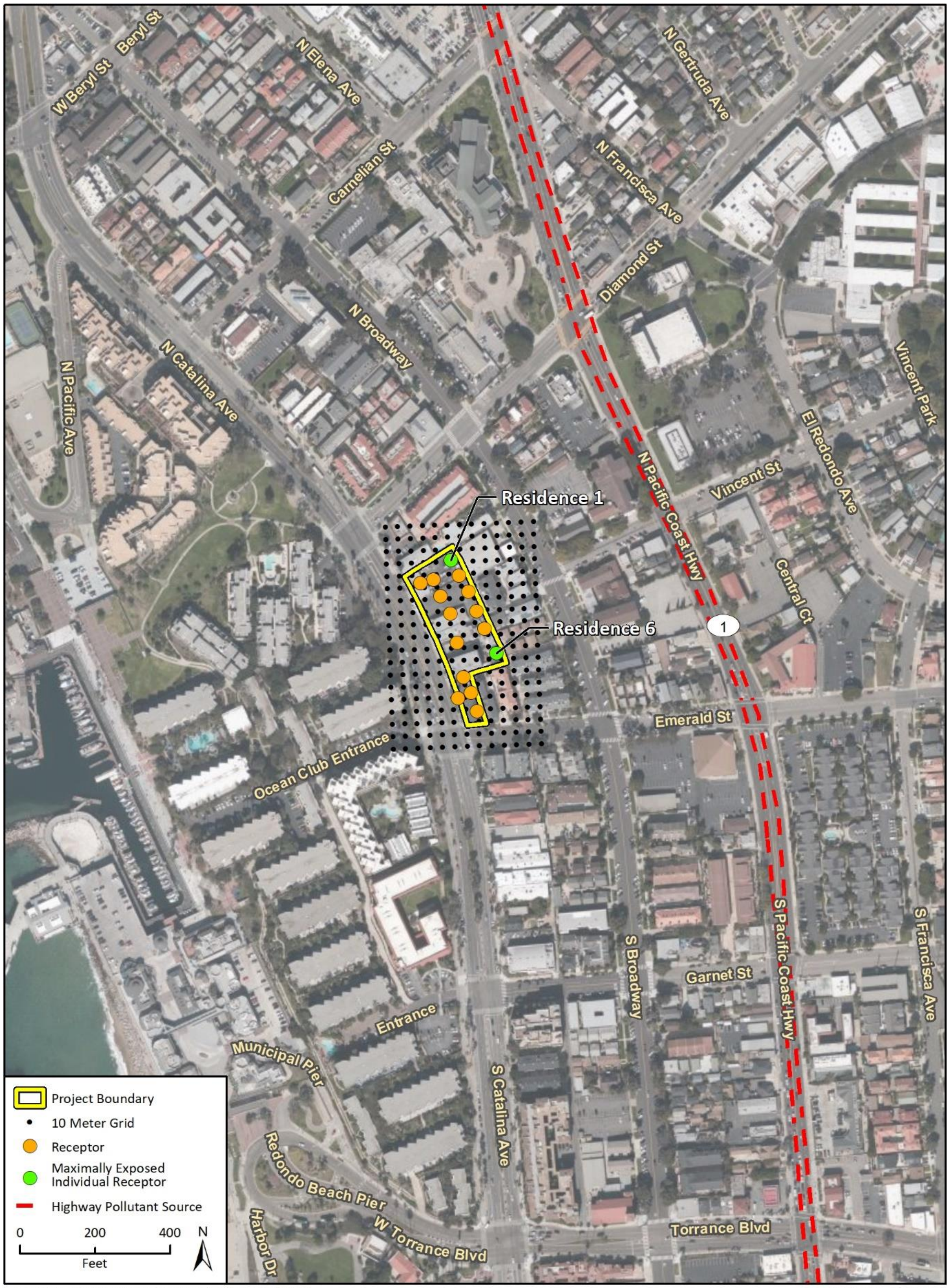
The American Meteorological Society/USEPA air dispersion model, AERMOD, was used to calculate the concentrations of source emissions at the project site. AERMOD is a steady-state, multiple-source, Gaussian dispersion model designed for use with emission sources situated in terrain where ground elevations can exceed the stack heights of the emission sources. The AERMOD model requires hourly meteorological data consisting of wind vector, wind speed, temperature, stability class, and mixing height. Specific meteorology and terrain for the site were input to the model using SCAQMD's nearest available meteorological data set, Hawthorne Municipal Airport (approximately 6.5 miles northeast of the project site), and United States Geological Survey (USGS) Digital Elevation Model (DEM) data for the Redondo Beach Quadrangle. The project site's elevation is 20 meters above mean sea level (amsl). SR-1 varies in elevation between approximately 16 and 24 meters amsl along the length of the approximately one-mile segment modeled. The dispersion model considers these differences in topography. The presence of buildings and other structures disturbs downwind air flow. However, building downwash is only calculated for point sources and not appropriate to include in AERMOD for this HRA, which includes only volume sources. AERMOD provides X/Q (CHI/Q = chi/q = χ/q) values, the concentration estimated by the air quality model based on an emission rate of one gram per second.

Version 19121 of CARB HARP 2 was used to calculate the potential risk values associated with the worst case one-hour and average annual toxic emission concentrations at surrounding receptors. Risk was assessed by including all mandatory minimum pathways in the risk analysis and calculated using the OEHHA Derived Method. Carcinogenic health risks are based on the SCAQMD-recommended lifetime residency period of 30 years. A 73 percent fraction of time at home was applied for residents 16 years of age or older, consistent with SCAQMD's procedures (SCAQMD 2017).

3.2 Significance Thresholds

The USEPA considers for risk management those pollutants that could cause cancer risks between one in 10,000 (1.0×10^{-4}) and one in one million (1.0×10^{-6}). Passage of Proposition 65 (California Health and Safety Code Section 25249.6) in 1986 prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning. For a chemical that is listed as a carcinogen, the "no significant risk" level under Proposition 65 is defined as the level that is calculated to result in not more than one excess case of cancer in 100,000 individuals (1.0×10^{-5}). The SCAQMD recommends the use of this risk level (also

Figure 3 Sources and Receptors



Imagery provided by Microsoft Bing and its licensors © 2020.

Fig 1 Sources and Receptors

reportable as 10 in one million) as the significance threshold for toxic air contaminants (SCAQMD 2015).

To provide a perspective on risk, the American Cancer Society (2018) reports that in the United States, men have about a 40 in 100 chance (0.40 probability) and women about a 38 in 100 chance (0.38) of developing cancer during a lifetime. Based on this background cancer risk level in the general population, application of a 1.0×10^{-5} excess risk limit means that the contribution from a toxic hazard should not cause the resultant cancer risk for the exposed population to exceed 0.40001 for men or 0.38001 for women.

The SCAQMD also recommends that the non-carcinogenic hazards of toxic air contaminants should not exceed a hazard index (the summation of the hazard quotients for all chemicals to which an individual would be exposed) of 1.0 for either chronic or acute effects (SCAQMD 2015).

3.3 Results

Health risks for fifteen sensitive receptor locations distributed throughout the project site were modeled. Each of these receptors represents a proposed location of residential structures and includes first, second, and third floor elevations. A receptor grid was used to confirm that these sensitive receptor locations reflected the overall pattern of exposure on the project site.

Cancer, acute, and chronic risks were determined for a 30-year residency scenario at all receptor locations. Risk levels for the MEIR are shown in Table 3. Figure 3 shows the location of the MEIR for cancer, chronic, and acute risk. Refer to the appendix for more detailed accounting of health risks at each receptor per pollutant of concern.

As shown in Table 3, the MEIR would be exposed to a high end (95th percentile), 30-year excess cancer risk of approximately 1.1 in one million, which does not exceed SCAQMD's recommended health risk criteria of ten excess cases of cancer in one million individuals (1.0×10^{-5}) (SCAQMD 2015). This analysis is based on outdoor air concentrations and conservatively assumes that interior concentrations would be the same. As shown in Table 3, potential chronic and acute (such as lung inflammation, immune suppression, and immune sensitization) hazard indices were approximately 0.002 and 0.001, respectively, which are also less than SCAQMD's health risk criteria of one (SCAQMD 2015).

3.4 Significance Thresholds

The USEPA considers for risk management those pollutants that could cause cancer risks between one in 10,000 (1.0×10^{-4}) and one in one million (1.0×10^{-6}). Passage of Proposition 65 (California Health and Safety Code Section 25249.6) in 1986 prohibits a person in the course of doing business from knowingly and intentionally exposing any individual to a chemical that has been listed as known to the state to cause cancer or reproductive toxicity without first giving clear and reasonable warning. For a chemical that is listed as a carcinogen, the "no significant risk" level under Proposition 65 is defined as the level that is calculated to result in not more than one excess case of cancer in 100,000 individuals (1.0×10^{-5}). The SCAQMD recommends the use of this risk level (also

Table 3 Potential Health Risks at the MEIR

Maximum Exposed Individual Resident (MEIR)[1]	
Cancer Risk	
Incremental Excess Cancer Risk[2]	1.1 in one million
Threshold	10 in one million
Threshold Exceeded?	**No**
Chronic Risk	
Chronic Hazard Index[2]	0.002
Threshold	1.0
Threshold Exceeded?	**No**
Acute Risk	
Acute Hazard Index[3]	0.001
Threshold	1.0
Threshold Exceeded?	**No**

[1] Based on 30-year resident exposure.

[2] The MEIR for cancer and chronic risk is the second floor of the townhome (“Residence 6”) located at the southeastern corner of the project site.

[3] For acute risk, the MEIR is the third floor of the townhome (“Residence 1”) located at the northeastern corner of the project site.

See Appendix HRA-1 for model outputs.

4 Conclusions

The proposed residential use of the site would not expose on-site residents to significant excess cancer risks associated with vehicle emissions based on SCAQMD health risk guidelines and existing vehicle travel on SR-1. The calculated risk using air dispersion modeling is based on constant exposure to outdoor air during time spent at the project site, but the USEPA *Exposure Factors Handbook* indicates that the recommended daily activity pattern includes 16.6 hours per day spent inside and 2.3 hours per day outside (USEPA 2011). As a conservative simplifying assumption, this analysis presumes that residents would have the windows open sufficiently to equalize the concentration of pollutants between the indoor and outdoor environment. In particular, a likely mitigating factor is that the diesel particulates would settle out to some unknown extent on window screens and other surfaces as outdoor air enters into the indoor air environment, though at least a portion of this settled material would become re-suspended during cleaning and other activities.

In addition, the proposed project would be required to include MERV 13 filters in the building ventilation systems, pursuant to the 2019 California Energy Code Subchapter 7, Section 150(m). The analysis in this report does not account for the inclusion of MERV 13 filters, which remove approximately 90 percent of DPM from the intake air (Singer *et al*. 2016). Therefore, the simplifying assumption that outdoor air pollutant concentrations would be equal to indoor air concentrations and by excluding the use of MERV 13 filters in the model, the calculated risk presented in this analysis is likely to be nearly an order of magnitude higher than actual indoor risk. Subsequently, the model provides a conservative estimate of health risk for future residents at the project site.

Furthermore, current regulatory action by CARB is intended to reduce the amount of diesel exhaust particulates associated with on-road diesel trucks in the future. This analysis is based on 2024 emissions factors to characterize emissions anticipated in the earliest opening year of the proposed residences.[3] Emissions would be expected to continue decreasing over the 30-year exposure duration as vehicles become cleaner. Vehicle emissions estimates are based on 2018 traffic counts; truck traffic growth that may occur in the future along this portion of SR-1 may result in increased emissions on a per mile basis, but such increases in truck traffic will be offset to some degree by changes in both the truck and non-diesel vehicle fleets as newer, less polluting vehicles enter the fleet population. Nonetheless, this analysis determines that residents at the site would not be exposed to significant carcinogenic, chronic, or acute health risks associated with vehicle traffic on SR-1.

Although not included in the scope of this analysis, other potential risks to health and safety of on-site residents include those related to the geologic and soil contamination conditions at the project site. These impacts are analyzed in detail in the Draft Environmental Impact Report (EIR) prepared for the project by Rincon Consultants, Inc. in November 2021 and are summarized herein.

As discussed in Section 4.4, *Geology and Soils*, of the Draft EIR, the project site contains moderately compressible soils which could pose direct or indirect risks to on-site residents and structures. However, the Geotechnical Engineering Investigation prepared by Geotechnologies Inc. in April 2019 for the project (included as Appendix H to the Draft EIR) identifies measures for reinforcement of

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[3] Emissions factors conservatively modeled assuming project construction would commence at the earliest possible date of September 2021 and that the project opening year would be 2024, the earliest possible opening year. If project construction and opening year commence at a later date, the project occupants exposure to air pollutants would be lower than those estimated herein because vehicles are becoming increasingly more efficient and less polluting over time due to the phase-in of more stringent regulatory standards.

building foundations and floor slab design to reduce potential impacts, which are included as Mitigation Measure GEO-1 in the Draft EIR. Implementation of Mitigation Measure GEO-1 would reduce impacts to a less than significant level by implementing foundation and floor slab design recommendations, which would limit the shrinking and swelling behavior caused by clay soil and preventing damage to building formations. Furthermore, the proposed project would be required to comply with all applicable regulations set forth by the CBC, Division of the State Architect (DSA), and the California Geologic Survey (CGS), which would minimize risks to life and property in relation to expanding soils.

As discussed in Section 4.5, *Hazards and Hazardous Materials*, of the Draft EIR, the project site contains contaminated soil and soil vapor. However, a Soil Vapor Extraction and Soil Treatment Workplan and Addendum to the Soil Vapor Extraction and Soil Treatment Workplan (included as Appendix I to the Draft EIR) have been developed and approved by the Los Angeles County Fire Department on October 2, 2020 to address contamination in shallow soil and soil vapor at the project site. The Draft EIR also includes mitigation measures HAZ-1a through HAZ-1d, which identify measures for shallow soil remediation, soil and soil vapor, operation maintenance and monitoring, and lead and asbestos to further address potential impacts from on-site hazards. Implementation of the proposed Soil Vapor Extraction and Soil Treatment Workplan, as well as implementation of identified mitigation measures, would reduce potential impacts related to contaminated soils and soil vapor to a less than significant level.

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Appendix HRA-1

Emissions Estimates and HARP Risk Results

Emissions Calculations - Pacific Coast Highway (SR-1)

AADT	AADT per direction	Caltrans Truck %	Number daily trucks	Diesel Truck *	Gas Truck *	LD Vehicles	LD Diesel **	All Gas
39,500	19,750	3.33%	658	170	488	19,092	143	19,437

Source: Caltrans Traffic Data Branch, 2018 AADT and Truck Traffic 2018

* "Translation Factors" (the fractions below identify % of trucks that are diesel-powered; they translate Caltrans truck data into an estimate of diesel vehicles)

Diesel Proportion:	25.8%
Non-Diesel Proportion:	74.2%

Translation Factors Source: UC Davis-Caltrans Air Quality Project, Project-Level Mobile Source Air Toxics Analysis

** Light Duty Diesel proportion based on vehicle miles traveled for LDA, LDT1, and LDT2 for Year 2024, South Coast AQMD, EMFAC2017.

	Truck Diesel Vehicles		Light Duty Diesel Vehicles		All Gas Vehicles
Speed (miles/hour)	**hot stabilized exhaust PM (grams/mile)**	**hot stabilized exhaust TOG (grams/mile)**	**hot stabilized exhaust PM (grams/mile)**	**hot stabilized exhaust TOG (grams/mile)**	**hot stabilized exhaust TOG (grams/mile)**
25 mph for all vehicles	0.0086	0.1010	0.0074	0.0215	0.0419

Source: EMFAC2017 Emissions Database

Mobile Source Air Toxics (MSAT) Speciation Factors Based on Proportion In TOG

Analysis Year	**Diesel**					**Non-Diesel**				
	Hot Stabilized Exhaust					**Hot Stabilized Exhaust**				
	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde	benzene	1,3-butadiene	Acetaldehyde	Acrolein	Formaldehyde
2024	0.007320	0.002292	0.034383	0.006088	0.082668	0.034539	0.002295	0.009056	0.000602	0.014238
Total Daily Emissions, g/mi	0.15	0.05	0.70	0.00	1.67	28.11	1.87	7.37	0.49	11.59

Speciation Source: U.S. Environmental Protection Agency Motor Vehicle Emission Simulator (MOVES2014a).

Derivation of Emission Rates for PCH Sources

Freeway width, one way	64.0 feet	19.5 m	2 lanes
Each direction segment at	639.8 feet long	195 m	

	Emissions					
	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	2.5	28.26	1.91	8.07	0.49	13.26
lbs/hour/segment	0.000028	0.000314	0.000021	0.000090	0.000005	0.000148
lbs/day/segment	0.000672	0.007548	0.000511	0.002155	0.0001309	0.003542
lbs/year/segment ***	0.245209	2.754948	0.186618	0.786501	0.047775	1.292986

Freeway width, one way	64.0 feet	19.5 m	2 lanes
Each direction segment at	142.7 feet long	43.5 m	

	Emissions					
	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	2.5	28.26	1.91	8.07	0.49	13.26
lbs/hour/segment	0.000006	0.00007	0.000005	0.00002	0.000001	0.00003
lbs/day/segment	0.0001	0.0017	0.0001	0.0005	0.0000	0.0008
lbs/year/segment ***	0.054701	0.614565	0.041630	0.175450	0.010658	0.288435

Freeway width, one way	64 feet	19.5 m	2 lanes
Each direction segment at	132 feet long	43.3 m	

	Emissions					
	Diesel PM	Benzene	1,3-Butadiene	Acetaldehyde	Acrolein	Formaldehyde
grams/mi/day **	2.5	28.26	1.91	8.1	0.49	13.26
lbs/hour/segment	0.000006	0.000065	0.000004	0.000019	0.000001	0.000030
lbs/day/segment	0.000138	0.001556	0.0001	0.0004	0.0000	0.0007
lbs/year/segment ***	0.050551	0.567943	0.038472	0.162140	0.009849	0.266554

** Total emissions per mile calculated using the above speciation factors.

*** Based on 365 day/year

```
HARP2 - HRACalc (dated 19044) 5/8/2020 12:05:32 PM - Output Log

GLCs loaded successfully
Pollutants loaded successfully
Pathway receptors loaded successfully
**********************************
RISK SCENARIO SETTINGS

Receptor Type: Resident
Scenario: All
Calculation Method: Derived

**********************************
EXPOSURE DURATION PARAMETERS FOR CANCER

Start Age: -0.25
Total Exposure Duration: 30

Exposure Duration Bin Distribution
3rd Trimester Bin: 0.25
0<2 Years Bin: 2
2<9 Years Bin: 0
2<16 Years Bin: 14
16<30 Years Bin: 14
16 to 70 Years Bin: 0

**********************************
PATHWAYS ENABLED

NOTE: Inhalation is always enabled and used for all assessments.  The remaining
pathways are only used for cancer and noncancer chronic assessments.

Inhalation: True
Soil: True
Dermal: True
Mother's milk: True
Water: False
Fish: False
Homegrown crops: False
Beef: False
Dairy: False
Pig: False
Chicken: False
Egg: False

**********************************
INHALATION

Daily breathing rate: LongTerm24HR
```

```
**Worker Adjustment Factors**
Worker adjustment factors enabled: NO

**Fraction at time at home**
3rd Trimester to 16 years: OFF
16 years to 70 years: ON

**********************************
SOIL & DERMAL PATHWAY SETTINGS

Deposition rate (m/s): 0.05
Soil mixing depth (m): 0.01
Dermal climate: Warm

**********************************
TIER 2 SETTINGS
Tier2 not used.

**********************************

Calculating cancer risk
Cancer risk breakdown by pollutant and receptor saved to:
C:\Users\emarino\Desktop\Catalina Ave\CATALINA AVE\hra\CChAc_30yrResCancerRisk.csv
Cancer risk total by receptor saved to: C:\Users\emarino\Desktop\Catalina
Ave\CATALINA AVE\hra\CChAc_30yrResCancerRiskSumByRec.csv
Calculating chronic risk
Chronic risk breakdown by pollutant and receptor saved to:
C:\Users\emarino\Desktop\Catalina Ave\CATALINA
AVE\hra\CChAc_30yrResNCChronicRisk.csv
Chronic risk total by receptor saved to: C:\Users\emarino\Desktop\Catalina
Ave\CATALINA AVE\hra\CChAc_30yrResNCChronicRiskSumByRec.csv
Calculating acute risk
Acute risk breakdown by pollutant and receptor saved to:
C:\Users\emarino\Desktop\Catalina Ave\CATALINA AVE\hra\CChAc_30yrResNCAcuteRisk.csv
Acute risk total by receptor saved to: C:\Users\emarino\Desktop\Catalina
Ave\CATALINA AVE\hra\CChAc_30yrResNCAcuteRiskSumByRec.csv
HRA ran successfully
```

*HARP - HRACalc v19044 5/7/2020 7:35:00 PM - Cancer Risk - Input File: C:\Users\emarino\Desktop\C

REC	GRP	NETID	X	Y	RISK_SUM	SCENARIO	INH_RISK	SOIL_RISK
1	CARTGRID	GRID01	371490.9	3745490	7.01E-07	30YrCance	7.01E-07	0.00E+00
2	CARTGRID	GRID01	371500.9	3745490	7.25E-07	30YrCance	7.25E-07	0.00E+00
3	CARTGRID	GRID01	371510.9	3745490	7.51E-07	30YrCance	7.51E-07	0.00E+00
4	CARTGRID	GRID01	371520.9	3745490	7.78E-07	30YrCance	7.78E-07	0.00E+00
5	CARTGRID	GRID01	371530.9	3745490	8.07E-07	30YrCance	8.07E-07	0.00E+00
6	CARTGRID	GRID01	371540.9	3745490	8.38E-07	30YrCance	8.38E-07	0.00E+00
7	CARTGRID	GRID01	371550.9	3745490	8.70E-07	30YrCance	8.70E-07	0.00E+00
8	CARTGRID	GRID01	371560.9	3745490	9.03E-07	30YrCance	9.03E-07	0.00E+00
9	CARTGRID	GRID01	371570.9	3745490	9.42E-07	30YrCance	9.42E-07	0.00E+00
10	CARTGRID	GRID01	371580.9	3745490	9.82E-07	30YrCance	9.82E-07	0.00E+00
11	CARTGRID	GRID01	371590.9	3745490	1.03E-06	30YrCance	1.03E-06	0.00E+00
12	CARTGRID	GRID01	371600.9	3745490	1.07E-06	30YrCance	1.07E-06	0.00E+00
13	CARTGRID	GRID01	371610.9	3745490	1.13E-06	30YrCance	1.13E-06	0.00E+00
14	CARTGRID	GRID01	371490.9	3745500	7.06E-07	30YrCance	7.06E-07	0.00E+00
15	CARTGRID	GRID01	371500.9	3745500	7.31E-07	30YrCance	7.31E-07	0.00E+00
16	CARTGRID	GRID01	371510.9	3745500	7.57E-07	30YrCance	7.57E-07	0.00E+00
17	CARTGRID	GRID01	371520.9	3745500	7.85E-07	30YrCance	7.85E-07	0.00E+00
18	CARTGRID	GRID01	371530.9	3745500	8.14E-07	30YrCance	8.14E-07	0.00E+00
19	CARTGRID	GRID01	371540.9	3745500	8.46E-07	30YrCance	8.46E-07	0.00E+00
20	CARTGRID	GRID01	371550.9	3745500	8.78E-07	30YrCance	8.78E-07	0.00E+00
21	CARTGRID	GRID01	371560.9	3745500	9.13E-07	30YrCance	9.13E-07	0.00E+00
22	CARTGRID	GRID01	371570.9	3745500	9.52E-07	30YrCance	9.52E-07	0.00E+00
23	CARTGRID	GRID01	371580.9	3745500	9.94E-07	30YrCance	9.94E-07	0.00E+00
24	CARTGRID	GRID01	371590.9	3745500	1.04E-06	30YrCance	1.04E-06	0.00E+00
25	CARTGRID	GRID01	371600.9	3745500	1.09E-06	30YrCance	1.09E-06	0.00E+00
26	CARTGRID	GRID01	371610.9	3745500	1.14E-06	30YrCance	1.14E-06	0.00E+00
27	CARTGRID	GRID01	371490.9	3745510	7.12E-07	30YrCance	7.12E-07	0.00E+00
28	CARTGRID	GRID01	371500.9	3745510	7.37E-07	30YrCance	7.37E-07	0.00E+00
29	CARTGRID	GRID01	371510.9	3745510	7.64E-07	30YrCance	7.64E-07	0.00E+00
30	CARTGRID	GRID01	371520.9	3745510	7.92E-07	30YrCance	7.92E-07	0.00E+00
31	CARTGRID	GRID01	371530.9	3745510	8.22E-07	30YrCance	8.22E-07	0.00E+00
32	CARTGRID	GRID01	371540.9	3745510	8.54E-07	30YrCance	8.54E-07	0.00E+00
33	CARTGRID	GRID01	371550.9	3745510	8.88E-07	30YrCance	8.88E-07	0.00E+00
34	CARTGRID	GRID01	371560.9	3745510	9.24E-07	30YrCance	9.24E-07	0.00E+00
35	CARTGRID	GRID01	371570.9	3745510	9.64E-07	30YrCance	9.64E-07	0.00E+00
36	CARTGRID	GRID01	371580.9	3745510	1.01E-06	30YrCance	1.01E-06	0.00E+00
37	CARTGRID	GRID01	371590.9	3745510	1.05E-06	30YrCance	1.05E-06	0.00E+00
38	CARTGRID	GRID01	371600.9	3745510	1.10E-06	30YrCance	1.10E-06	0.00E+00
39	CARTGRID	GRID01	371610.9	3745510	1.16E-06	30YrCance	1.16E-06	0.00E+00
40	CARTGRID	GRID01	371490.9	3745520	7.19E-07	30YrCance	7.19E-07	0.00E+00
41	CARTGRID	GRID01	371500.9	3745520	7.44E-07	30YrCance	7.44E-07	0.00E+00
42	CARTGRID	GRID01	371510.9	3745520	7.71E-07	30YrCance	7.71E-07	0.00E+00
43	CARTGRID	GRID01	371520.9	3745520	8.00E-07	30YrCance	8.00E-07	0.00E+00
44	CARTGRID	GRID01	371530.9	3745520	8.31E-07	30YrCance	8.31E-07	0.00E+00
45	CARTGRID	GRID01	371540.9	3745520	8.62E-07	30YrCance	8.62E-07	0.00E+00

46	CARTGRID	GRID01	371550.9	3745520	8.97E-07	30YrCance	8.97E-07	0.00E+00
47	CARTGRID	GRID01	371560.9	3745520	9.36E-07	30YrCance	9.36E-07	0.00E+00
48	CARTGRID	GRID01	371570.9	3745520	9.76E-07	30YrCance	9.76E-07	0.00E+00
49	CARTGRID	GRID01	371580.9	3745520	1.02E-06	30YrCance	1.02E-06	0.00E+00
50	CARTGRID	GRID01	371590.9	3745520	1.07E-06	30YrCance	1.07E-06	0.00E+00
51	CARTGRID	GRID01	371600.9	3745520	1.12E-06	30YrCance	1.12E-06	0.00E+00
52	CARTGRID	GRID01	371610.9	3745520	1.18E-06	30YrCance	1.18E-06	0.00E+00
53	CARTGRID	GRID01	371490.9	3745530	7.26E-07	30YrCance	7.26E-07	0.00E+00
54	CARTGRID	GRID01	371500.9	3745530	7.52E-07	30YrCance	7.52E-07	0.00E+00
55	CARTGRID	GRID01	371510.9	3745530	7.79E-07	30YrCance	7.79E-07	0.00E+00
56	CARTGRID	GRID01	371520.9	3745530	8.08E-07	30YrCance	8.08E-07	0.00E+00
57	CARTGRID	GRID01	371530.9	3745530	8.40E-07	30YrCance	8.40E-07	0.00E+00
58	CARTGRID	GRID01	371540.9	3745530	8.73E-07	30YrCance	8.73E-07	0.00E+00
59	CARTGRID	GRID01	371550.9	3745530	9.09E-07	30YrCance	9.09E-07	0.00E+00
60	CARTGRID	GRID01	371560.9	3745530	9.48E-07	30YrCance	9.48E-07	0.00E+00
61	CARTGRID	GRID01	371570.9	3745530	9.90E-07	30YrCance	9.90E-07	0.00E+00
62	CARTGRID	GRID01	371580.9	3745530	1.04E-06	30YrCance	1.04E-06	0.00E+00
63	CARTGRID	GRID01	371590.9	3745530	1.09E-06	30YrCance	1.09E-06	0.00E+00
64	CARTGRID	GRID01	371600.9	3745530	1.14E-06	30YrCance	1.14E-06	0.00E+00
65	CARTGRID	GRID01	371610.9	3745530	1.20E-06	30YrCance	1.20E-06	0.00E+00
66	CARTGRID	GRID01	371490.9	3745540	7.33E-07	30YrCance	7.33E-07	0.00E+00
67	CARTGRID	GRID01	371500.9	3745540	7.59E-07	30YrCance	7.59E-07	0.00E+00
68	CARTGRID	GRID01	371510.9	3745540	7.88E-07	30YrCance	7.88E-07	0.00E+00
69	CARTGRID	GRID01	371520.9	3745540	8.18E-07	30YrCance	8.18E-07	0.00E+00
70	CARTGRID	GRID01	371530.9	3745540	8.50E-07	30YrCance	8.50E-07	0.00E+00
71	CARTGRID	GRID01	371540.9	3745540	8.84E-07	30YrCance	8.84E-07	0.00E+00
72	CARTGRID	GRID01	371550.9	3745540	9.21E-07	30YrCance	9.21E-07	0.00E+00
73	CARTGRID	GRID01	371560.9	3745540	9.62E-07	30YrCance	9.62E-07	0.00E+00
74	CARTGRID	GRID01	371570.9	3745540	1.00E-06	30YrCance	1.00E-06	0.00E+00
75	CARTGRID	GRID01	371580.9	3745540	1.05E-06	30YrCance	1.05E-06	0.00E+00
76	CARTGRID	GRID01	371590.9	3745540	1.10E-06	30YrCance	1.10E-06	0.00E+00
77	CARTGRID	GRID01	371600.9	3745540	1.16E-06	30YrCance	1.16E-06	0.00E+00
78	CARTGRID	GRID01	371610.9	3745540	1.22E-06	30YrCance	1.22E-06	0.00E+00
79	CARTGRID	GRID01	371490.9	3745550	7.41E-07	30YrCance	7.41E-07	0.00E+00
80	CARTGRID	GRID01	371500.9	3745550	7.68E-07	30YrCance	7.68E-07	0.00E+00
81	CARTGRID	GRID01	371510.9	3745550	7.96E-07	30YrCance	7.96E-07	0.00E+00
82	CARTGRID	GRID01	371520.9	3745550	8.27E-07	30YrCance	8.27E-07	0.00E+00
83	CARTGRID	GRID01	371530.9	3745550	8.60E-07	30YrCance	8.60E-07	0.00E+00
84	CARTGRID	GRID01	371540.9	3745550	8.95E-07	30YrCance	8.95E-07	0.00E+00
85	CARTGRID	GRID01	371550.9	3745550	9.34E-07	30YrCance	9.34E-07	0.00E+00
86	CARTGRID	GRID01	371560.9	3745550	9.76E-07	30YrCance	9.76E-07	0.00E+00
87	CARTGRID	GRID01	371570.9	3745550	1.02E-06	30YrCance	1.02E-06	0.00E+00
88	CARTGRID	GRID01	371580.9	3745550	1.07E-06	30YrCance	1.07E-06	0.00E+00
89	CARTGRID	GRID01	371590.9	3745550	1.12E-06	30YrCance	1.12E-06	0.00E+00
90	CARTGRID	GRID01	371600.9	3745550	1.18E-06	30YrCance	1.18E-06	0.00E+00
91	CARTGRID	GRID01	371610.9	3745550	1.25E-06	30YrCance	1.25E-06	0.00E+00
92	CARTGRID	GRID01	371490.9	3745560	7.49E-07	30YrCance	7.49E-07	0.00E+00

93	CARTGRID	GRID01	371500.9	3745560	7.77E-07	30YrCance	7.77E-07	0.00E+00
94	CARTGRID	GRID01	371510.9	3745560	8.06E-07	30YrCance	8.06E-07	0.00E+00
95	CARTGRID	GRID01	371520.9	3745560	8.37E-07	30YrCance	8.37E-07	0.00E+00
96	CARTGRID	GRID01	371530.9	3745560	8.71E-07	30YrCance	8.71E-07	0.00E+00
97	CARTGRID	GRID01	371540.9	3745560	9.07E-07	30YrCance	9.07E-07	0.00E+00
98	CARTGRID	GRID01	371550.9	3745560	9.47E-07	30YrCance	9.47E-07	0.00E+00
99	CARTGRID	GRID01	371560.9	3745560	9.90E-07	30YrCance	9.90E-07	0.00E+00
100	CARTGRID	GRID01	371570.9	3745560	1.04E-06	30YrCance	1.04E-06	0.00E+00
101	CARTGRID	GRID01	371580.9	3745560	1.09E-06	30YrCance	1.09E-06	0.00E+00
102	CARTGRID	GRID01	371590.9	3745560	1.15E-06	30YrCance	1.15E-06	0.00E+00
103	CARTGRID	GRID01	371600.9	3745560	1.21E-06	30YrCance	1.21E-06	0.00E+00
104	CARTGRID	GRID01	371610.9	3745560	1.28E-06	30YrCance	1.28E-06	0.00E+00
105	CARTGRID	GRID01	371490.9	3745570	7.58E-07	30YrCance	7.58E-07	0.00E+00
106	CARTGRID	GRID01	371500.9	3745570	7.86E-07	30YrCance	7.86E-07	0.00E+00
107	CARTGRID	GRID01	371510.9	3745570	8.15E-07	30YrCance	8.15E-07	0.00E+00
108	CARTGRID	GRID01	371520.9	3745570	8.48E-07	30YrCance	8.48E-07	0.00E+00
109	CARTGRID	GRID01	371530.9	3745570	8.83E-07	30YrCance	8.83E-07	0.00E+00
110	CARTGRID	GRID01	371540.9	3745570	9.20E-07	30YrCance	9.20E-07	0.00E+00
111	CARTGRID	GRID01	371550.9	3745570	9.61E-07	30YrCance	9.61E-07	0.00E+00
112	CARTGRID	GRID01	371560.9	3745570	1.01E-06	30YrCance	1.01E-06	0.00E+00
113	CARTGRID	GRID01	371570.9	3745570	1.05E-06	30YrCance	1.05E-06	0.00E+00
114	CARTGRID	GRID01	371580.9	3745570	1.11E-06	30YrCance	1.11E-06	0.00E+00
115	CARTGRID	GRID01	371590.9	3745570	1.17E-06	30YrCance	1.17E-06	0.00E+00
116	CARTGRID	GRID01	371600.9	3745570	1.23E-06	30YrCance	1.23E-06	0.00E+00
117	CARTGRID	GRID01	371610.9	3745570	1.31E-06	30YrCance	1.31E-06	0.00E+00
118	CARTGRID	GRID01	371490.9	3745580	7.66E-07	30YrCance	7.66E-07	0.00E+00
119	CARTGRID	GRID01	371500.9	3745580	7.95E-07	30YrCance	7.95E-07	0.00E+00
120	CARTGRID	GRID01	371510.9	3745580	8.26E-07	30YrCance	8.26E-07	0.00E+00
121	CARTGRID	GRID01	371520.9	3745580	8.59E-07	30YrCance	8.59E-07	0.00E+00
122	CARTGRID	GRID01	371530.9	3745580	8.95E-07	30YrCance	8.95E-07	0.00E+00
123	CARTGRID	GRID01	371540.9	3745580	9.33E-07	30YrCance	9.33E-07	0.00E+00
124	CARTGRID	GRID01	371550.9	3745580	9.75E-07	30YrCance	9.75E-07	0.00E+00
125	CARTGRID	GRID01	371560.9	3745580	1.02E-06	30YrCance	1.02E-06	0.00E+00
126	CARTGRID	GRID01	371570.9	3745580	1.07E-06	30YrCance	1.07E-06	0.00E+00
127	CARTGRID	GRID01	371580.9	3745580	1.13E-06	30YrCance	1.13E-06	0.00E+00
128	CARTGRID	GRID01	371590.9	3745580	1.19E-06	30YrCance	1.19E-06	0.00E+00
129	CARTGRID	GRID01	371600.9	3745580	1.26E-06	30YrCance	1.26E-06	0.00E+00
130	CARTGRID	GRID01	371610.9	3745580	1.34E-06	30YrCance	1.34E-06	0.00E+00
131	CARTGRID	GRID01	371490.9	3745590	7.75E-07	30YrCance	7.75E-07	0.00E+00
132	CARTGRID	GRID01	371500.9	3745590	8.05E-07	30YrCance	8.05E-07	0.00E+00
133	CARTGRID	GRID01	371510.9	3745590	8.36E-07	30YrCance	8.36E-07	0.00E+00
134	CARTGRID	GRID01	371520.9	3745590	8.71E-07	30YrCance	8.71E-07	0.00E+00
135	CARTGRID	GRID01	371530.9	3745590	9.07E-07	30YrCance	9.07E-07	0.00E+00
136	CARTGRID	GRID01	371540.9	3745590	9.47E-07	30YrCance	9.47E-07	0.00E+00
137	CARTGRID	GRID01	371550.9	3745590	9.90E-07	30YrCance	9.90E-07	0.00E+00
138	CARTGRID	GRID01	371560.9	3745590	1.04E-06	30YrCance	1.04E-06	0.00E+00
139	CARTGRID	GRID01	371570.9	3745590	1.09E-06	30YrCance	1.09E-06	0.00E+00

140	CARTGRID	GRID01	371580.9	3745590	1.15E-06	30YrCancer	1.15E-06	0.00E+00
141	CARTGRID	GRID01	371590.9	3745590	1.21E-06	30YrCancer	1.21E-06	0.00E+00
142	CARTGRID	GRID01	371600.9	3745590	1.29E-06	30YrCancer	1.29E-06	0.00E+00
143	CARTGRID	GRID01	371610.9	3745590	1.37E-06	30YrCancer	1.37E-06	0.00E+00
144	CARTGRID	GRID01	371490.9	3745600	7.85E-07	30YrCancer	7.85E-07	0.00E+00
145	CARTGRID	GRID01	371500.9	3745600	8.15E-07	30YrCancer	8.15E-07	0.00E+00
146	CARTGRID	GRID01	371510.9	3745600	8.47E-07	30YrCancer	8.47E-07	0.00E+00
147	CARTGRID	GRID01	371520.9	3745600	8.83E-07	30YrCancer	8.83E-07	0.00E+00
148	CARTGRID	GRID01	371530.9	3745600	9.20E-07	30YrCancer	9.20E-07	0.00E+00
149	CARTGRID	GRID01	371540.9	3745600	9.61E-07	30YrCancer	9.61E-07	0.00E+00
150	CARTGRID	GRID01	371550.9	3745600	1.01E-06	30YrCancer	1.01E-06	0.00E+00
151	CARTGRID	GRID01	371560.9	3745600	1.05E-06	30YrCancer	1.05E-06	0.00E+00
152	CARTGRID	GRID01	371570.9	3745600	1.11E-06	30YrCancer	1.11E-06	0.00E+00
153	CARTGRID	GRID01	371580.9	3745600	1.17E-06	30YrCancer	1.17E-06	0.00E+00
154	CARTGRID	GRID01	371590.9	3745600	1.24E-06	30YrCancer	1.24E-06	0.00E+00
155	CARTGRID	GRID01	371600.9	3745600	1.31E-06	30YrCancer	1.31E-06	0.00E+00
156	CARTGRID	GRID01	371610.9	3745600	1.40E-06	30YrCancer	1.40E-06	0.00E+00
157	CARTGRID	GRID01	371490.9	3745610	7.94E-07	30YrCancer	7.94E-07	0.00E+00
158	CARTGRID	GRID01	371500.9	3745610	8.25E-07	30YrCancer	8.25E-07	0.00E+00
159	CARTGRID	GRID01	371510.9	3745610	8.58E-07	30YrCancer	8.58E-07	0.00E+00
160	CARTGRID	GRID01	371520.9	3745610	8.95E-07	30YrCancer	8.95E-07	0.00E+00
161	CARTGRID	GRID01	371530.9	3745610	9.33E-07	30YrCancer	9.33E-07	0.00E+00
162	CARTGRID	GRID01	371540.9	3745610	9.75E-07	30YrCancer	9.75E-07	0.00E+00
163	CARTGRID	GRID01	371550.9	3745610	1.02E-06	30YrCancer	1.02E-06	0.00E+00
164	CARTGRID	GRID01	371560.9	3745610	1.07E-06	30YrCancer	1.07E-06	0.00E+00
165	CARTGRID	GRID01	371570.9	3745610	1.13E-06	30YrCancer	1.13E-06	0.00E+00
166	CARTGRID	GRID01	371580.9	3745610	1.19E-06	30YrCancer	1.19E-06	0.00E+00
167	CARTGRID	GRID01	371590.9	3745610	1.26E-06	30YrCancer	1.26E-06	0.00E+00
168	CARTGRID	GRID01	371600.9	3745610	1.34E-06	30YrCancer	1.34E-06	0.00E+00
169	CARTGRID	GRID01	371610.9	3745610	1.44E-06	30YrCancer	1.44E-06	0.00E+00
170	CARTGRID	GRID01	371490.9	3745620	8.04E-07	30YrCancer	8.04E-07	0.00E+00
171	CARTGRID	GRID01	371500.9	3745620	8.36E-07	30YrCancer	8.36E-07	0.00E+00
172	CARTGRID	GRID01	371510.9	3745620	8.71E-07	30YrCancer	8.71E-07	0.00E+00
173	CARTGRID	GRID01	371520.9	3745620	9.07E-07	30YrCancer	9.07E-07	0.00E+00
174	CARTGRID	GRID01	371530.9	3745620	9.47E-07	30YrCancer	9.47E-07	0.00E+00
175	CARTGRID	GRID01	371540.9	3745620	9.91E-07	30YrCancer	9.91E-07	0.00E+00
176	CARTGRID	GRID01	371550.9	3745620	1.04E-06	30YrCancer	1.04E-06	0.00E+00
177	CARTGRID	GRID01	371560.9	3745620	1.09E-06	30YrCancer	1.09E-06	0.00E+00
178	CARTGRID	GRID01	371570.9	3745620	1.15E-06	30YrCancer	1.15E-06	0.00E+00
179	CARTGRID	GRID01	371580.9	3745620	1.21E-06	30YrCancer	1.21E-06	0.00E+00
180	CARTGRID	GRID01	371590.9	3745620	1.29E-06	30YrCancer	1.29E-06	0.00E+00
181	CARTGRID	GRID01	371600.9	3745620	1.37E-06	30YrCancer	1.37E-06	0.00E+00
182	CARTGRID	GRID01	371610.9	3745620	1.47E-06	30YrCancer	1.47E-06	0.00E+00
183	CARTGRID	GRID01	371490.9	3745630	8.14E-07	30YrCancer	8.14E-07	0.00E+00
184	CARTGRID	GRID01	371500.9	3745630	8.47E-07	30YrCancer	8.47E-07	0.00E+00
185	CARTGRID	GRID01	371510.9	3745630	8.82E-07	30YrCancer	8.82E-07	0.00E+00
186	CARTGRID	GRID01	371520.9	3745630	9.20E-07	30YrCancer	9.20E-07	0.00E+00

187	CARTGRID	GRID01	371530.9	3745630	9.62E-07	30YrCancer	9.62E-07	0.00E+00
188	CARTGRID	GRID01	371540.9	3745630	1.01E-06	30YrCancer	1.01E-06	0.00E+00
189	CARTGRID	GRID01	371550.9	3745630	1.05E-06	30YrCancer	1.05E-06	0.00E+00
190	CARTGRID	GRID01	371560.9	3745630	1.11E-06	30YrCancer	1.11E-06	0.00E+00
191	CARTGRID	GRID01	371570.9	3745630	1.17E-06	30YrCancer	1.17E-06	0.00E+00
192	CARTGRID	GRID01	371580.9	3745630	1.23E-06	30YrCancer	1.23E-06	0.00E+00
193	CARTGRID	GRID01	371590.9	3745630	1.31E-06	30YrCancer	1.31E-06	0.00E+00
194	CARTGRID	GRID01	371600.9	3745630	1.40E-06	30YrCancer	1.40E-06	0.00E+00
195	CARTGRID	GRID01	371610.9	3745630	1.50E-06	30YrCancer	1.50E-06	0.00E+00
196	CARTGRID	GRID01	371490.9	3745640	8.25E-07	30YrCancer	8.25E-07	0.00E+00
197	CARTGRID	GRID01	371500.9	3745640	8.59E-07	30YrCancer	8.59E-07	0.00E+00
198	CARTGRID	GRID01	371510.9	3745640	8.95E-07	30YrCancer	8.95E-07	0.00E+00
199	CARTGRID	GRID01	371520.9	3745640	9.34E-07	30YrCancer	9.34E-07	0.00E+00
200	CARTGRID	GRID01	371530.9	3745640	9.77E-07	30YrCancer	9.77E-07	0.00E+00
201	CARTGRID	GRID01	371540.9	3745640	1.02E-06	30YrCancer	1.02E-06	0.00E+00
202	CARTGRID	GRID01	371550.9	3745640	1.07E-06	30YrCancer	1.07E-06	0.00E+00
203	CARTGRID	GRID01	371560.9	3745640	1.13E-06	30YrCancer	1.13E-06	0.00E+00
204	CARTGRID	GRID01	371570.9	3745640	1.19E-06	30YrCancer	1.19E-06	0.00E+00
205	CARTGRID	GRID01	371580.9	3745640	1.26E-06	30YrCancer	1.26E-06	0.00E+00
206	CARTGRID	GRID01	371590.9	3745640	1.33E-06	30YrCancer	1.33E-06	0.00E+00
207	CARTGRID	GRID01	371600.9	3745640	1.42E-06	30YrCancer	1.42E-06	0.00E+00
208	CARTGRID	GRID01	371610.9	3745640	1.53E-06	30YrCancer	1.53E-06	0.00E+00
209	CARTGRID	GRID01	371490.9	3745650	8.36E-07	30YrCancer	8.36E-07	0.00E+00
210	CARTGRID	GRID01	371500.9	3745650	8.71E-07	30YrCancer	8.71E-07	0.00E+00
211	CARTGRID	GRID01	371510.9	3745650	9.08E-07	30YrCancer	9.08E-07	0.00E+00
212	CARTGRID	GRID01	371520.9	3745650	9.48E-07	30YrCancer	9.48E-07	0.00E+00
213	CARTGRID	GRID01	371530.9	3745650	9.92E-07	30YrCancer	9.92E-07	0.00E+00
214	CARTGRID	GRID01	371540.9	3745650	1.04E-06	30YrCancer	1.04E-06	0.00E+00
215	CARTGRID	GRID01	371550.9	3745650	1.09E-06	30YrCancer	1.09E-06	0.00E+00
216	CARTGRID	GRID01	371560.9	3745650	1.15E-06	30YrCancer	1.15E-06	0.00E+00
217	CARTGRID	GRID01	371570.9	3745650	1.21E-06	30YrCancer	1.21E-06	0.00E+00
218	CARTGRID	GRID01	371580.9	3745650	1.28E-06	30YrCancer	1.28E-06	0.00E+00
219	CARTGRID	GRID01	371590.9	3745650	1.36E-06	30YrCancer	1.36E-06	0.00E+00
220	CARTGRID	GRID01	371600.9	3745650	1.45E-06	30YrCancer	1.45E-06	0.00E+00
221	CARTGRID	GRID01	371610.9	3745650	1.55E-06	30YrCancer	1.55E-06	0.00E+00
222	CARTGRID	GRID01	371490.9	3745660	8.48E-07	30YrCancer	8.48E-07	0.00E+00
223	CARTGRID	GRID01	371500.9	3745660	8.83E-07	30YrCancer	8.83E-07	0.00E+00
224	CARTGRID	GRID01	371510.9	3745660	9.22E-07	30YrCancer	9.22E-07	0.00E+00
225	CARTGRID	GRID01	371520.9	3745660	9.64E-07	30YrCancer	9.64E-07	0.00E+00
226	CARTGRID	GRID01	371530.9	3745660	1.01E-06	30YrCancer	1.01E-06	0.00E+00
227	CARTGRID	GRID01	371540.9	3745660	1.06E-06	30YrCancer	1.06E-06	0.00E+00
228	CARTGRID	GRID01	371550.9	3745660	1.11E-06	30YrCancer	1.11E-06	0.00E+00
229	CARTGRID	GRID01	371560.9	3745660	1.17E-06	30YrCancer	1.17E-06	0.00E+00
230	CARTGRID	GRID01	371570.9	3745660	1.23E-06	30YrCancer	1.23E-06	0.00E+00
231	CARTGRID	GRID01	371580.9	3745660	1.31E-06	30YrCancer	1.31E-06	0.00E+00
232	CARTGRID	GRID01	371590.9	3745660	1.38E-06	30YrCancer	1.38E-06	0.00E+00
233	CARTGRID	GRID01	371600.9	3745660	1.48E-06	30YrCancer	1.48E-06	0.00E+00

234	CARTGRID	GRID01	371610.9	3745660	1.58E-06	30YrCance	1.58E-06	0.00E+00
235	CARTGRID	GRID01	371490.9	3745670	8.60E-07	30YrCance	8.60E-07	0.00E+00
236	CARTGRID	GRID01	371500.9	3745670	8.96E-07	30YrCance	8.96E-07	0.00E+00
237	CARTGRID	GRID01	371510.9	3745670	9.36E-07	30YrCance	9.36E-07	0.00E+00
238	CARTGRID	GRID01	371520.9	3745670	9.79E-07	30YrCance	9.79E-07	0.00E+00
239	CARTGRID	GRID01	371530.9	3745670	1.03E-06	30YrCance	1.03E-06	0.00E+00
240	CARTGRID	GRID01	371540.9	3745670	1.08E-06	30YrCance	1.08E-06	0.00E+00
241	CARTGRID	GRID01	371550.9	3745670	1.13E-06	30YrCance	1.13E-06	0.00E+00
242	CARTGRID	GRID01	371560.9	3745670	1.19E-06	30YrCance	1.19E-06	0.00E+00
243	CARTGRID	GRID01	371570.9	3745670	1.26E-06	30YrCance	1.26E-06	0.00E+00
244	CARTGRID	GRID01	371580.9	3745670	1.33E-06	30YrCance	1.33E-06	0.00E+00
245	CARTGRID	GRID01	371590.9	3745670	1.41E-06	30YrCance	1.41E-06	0.00E+00
246	CARTGRID	GRID01	371600.9	3745670	1.51E-06	30YrCance	1.51E-06	0.00E+00
247	CARTGRID	GRID01	371610.9	3745670	1.61E-06	30YrCance	1.61E-06	0.00E+00
248	SENSITIV	1st floo	371542.5	3745641	1.04E-06	30YrCance	1.04E-06	0.00E+00
249	SENSITIV	2nd floo	371542.5	3745641	1.04E-06	30YrCance	1.04E-06	0.00E+00
250	SENSITIV	3rd floo	371542.5	3745641	1.01E-06	30YrCance	1.01E-06	0.00E+00
251	SENSITIV	1st floo	371548.3	3745629	1.05E-06	30YrCance	1.05E-06	0.00E+00
252	SENSITIV	2nd floo	371548.3	3745629	1.05E-06	30YrCance	1.05E-06	0.00E+00
253	SENSITIV	3rd floo	371548.3	3745629	1.02E-06	30YrCance	1.02E-06	0.00E+00
254	SENSITIV	1st floo	371555.8	3745615	1.06E-06	30YrCance	1.06E-06	0.00E+00
255	SENSITIV	2nd floo	371555.8	3745615	1.07E-06	30YrCance	1.07E-06	0.00E+00
256	SENSITIV	3rd floo	371555.8	3745615	1.04E-06	30YrCance	1.04E-06	0.00E+00
257	SENSITIV	1st floo	371561.6	3745599	1.06E-06	30YrCance	1.06E-06	0.00E+00
258	SENSITIV	2nd floo	371561.6	3745599	1.07E-06	30YrCance	1.07E-06	0.00E+00
259	SENSITIV	3rd floo	371561.6	3745599	1.05E-06	30YrCance	1.05E-06	0.00E+00
260	SENSITIV	1st floo	371567.7	3745585	1.07E-06	30YrCance	1.07E-06	0.00E+00
261	SENSITIV	2nd floo	371567.7	3745585	1.08E-06	30YrCance	1.08E-06	0.00E+00
262	SENSITIV	3rd floo	371567.7	3745585	1.05E-06	30YrCance	1.05E-06	0.00E+00
263	SENSITIV	1st floo	371576.7	3745565	1.08E-06	30YrCance	1.08E-06	0.00E+00
264	SENSITIV	2nd floo	371576.7	3745565	1.09E-06	30YrCance	1.09E-06	0.00E+00
265	SENSITIV	3rd floo	371576.7	3745565	1.07E-06	30YrCance	1.07E-06	0.00E+00
266	SENSITIV	1st floo	371549	3745546	9.27E-07	30YrCance	9.27E-07	0.00E+00
267	SENSITIV	2nd floo	371549	3745546	9.32E-07	30YrCance	9.32E-07	0.00E+00
268	SENSITIV	3rd floo	371549	3745546	9.13E-07	30YrCance	9.13E-07	0.00E+00
269	SENSITIV	1st floo	371554.8	3745533	9.37E-07	30YrCance	9.37E-07	0.00E+00
270	SENSITIV	2nd floo	371554.8	3745533	9.33E-07	30YrCance	9.33E-07	0.00E+00
271	SENSITIV	3rd floo	371554.8	3745533	9.07E-07	30YrCance	9.07E-07	0.00E+00
272	SENSITIV	1st floo	371559.1	3745518	9.35E-07	30YrCance	9.35E-07	0.00E+00
273	SENSITIV	2nd floo	371559.1	3745518	9.32E-07	30YrCance	9.32E-07	0.00E+00
274	SENSITIV	3rd floo	371559.1	3745518	9.06E-07	30YrCance	9.06E-07	0.00E+00
275	SENSITIV	1st floo	371544	3745529	8.92E-07	30YrCance	8.92E-07	0.00E+00
276	SENSITIV	2nd floo	371544	3745529	8.87E-07	30YrCance	8.87E-07	0.00E+00
277	SENSITIV	3rd floo	371544	3745529	8.63E-07	30YrCance	8.63E-07	0.00E+00
278	SENSITIV	1st floo	371545.1	3745574	9.49E-07	30YrCance	9.49E-07	0.00E+00
279	SENSITIV	2nd floo	371545.1	3745574	9.53E-07	30YrCance	9.53E-07	0.00E+00
280	SENSITIV	3rd floo	371545.1	3745574	9.32E-07	30YrCance	9.32E-07	0.00E+00

281	SENSITIV	1st floo	371540.3	3745598	9.62E-07	30YrCance	9.62E-07	0.00E+00
282	SENSITIV	2nd floo	371540.3	3745598	9.66E-07	30YrCance	9.66E-07	0.00E+00
283	SENSITIV	3rd floo	371540.3	3745598	9.43E-07	30YrCance	9.43E-07	0.00E+00
284	SENSITIV	1st floo	371532.7	3745613	9.51E-07	30YrCance	9.51E-07	0.00E+00
285	SENSITIV	2nd floo	371532.7	3745613	9.54E-07	30YrCance	9.54E-07	0.00E+00
286	SENSITIV	3rd floo	371532.7	3745613	9.31E-07	30YrCance	9.31E-07	0.00E+00
287	SENSITIV	1st floo	371527.6	3745626	9.48E-07	30YrCance	9.48E-07	0.00E+00
288	SENSITIV	2nd floo	371527.6	3745626	9.51E-07	30YrCance	9.51E-07	0.00E+00
289	SENSITIV	3rd floo	371527.6	3745626	9.26E-07	30YrCance	9.26E-07	0.00E+00
290	SENSITIV	1st floo	371516.9	3745623	9.02E-07	30YrCance	9.02E-07	0.00E+00
291	SENSITIV	2nd floo	371516.9	3745623	9.04E-07	30YrCance	9.04E-07	0.00E+00
292	SENSITIV	3rd floo	371516.9	3745623	8.80E-07	30YrCance	8.80E-07	0.00E+00
293	PROPERTY		371541.9	3745649	1.04E-06	30YrCance	1.04E-06	0.00E+00
294	PROPERTY		371544.4	3745644	1.05E-06	30YrCance	1.05E-06	0.00E+00
295	PROPERTY		371546.9	3745639	1.05E-06	30YrCance	1.05E-06	0.00E+00
296	PROPERTY		371549.4	3745633	1.05E-06	30YrCance	1.05E-06	0.00E+00
297	PROPERTY		371552	3745628	1.06E-06	30YrCance	1.06E-06	0.00E+00
298	PROPERTY		371554.5	3745622	1.06E-06	30YrCance	1.06E-06	0.00E+00
299	PROPERTY		371557	3745617	1.06E-06	30YrCance	1.06E-06	0.00E+00
300	PROPERTY		371559.5	3745611	1.07E-06	30YrCance	1.07E-06	0.00E+00
301	PROPERTY		371562.1	3745606	1.07E-06	30YrCance	1.07E-06	0.00E+00
302	PROPERTY		371564.6	3745600	1.07E-06	30YrCance	1.07E-06	0.00E+00
303	PROPERTY		371567.1	3745595	1.08E-06	30YrCance	1.08E-06	0.00E+00
304	PROPERTY		371569.6	3745590	1.08E-06	30YrCance	1.08E-06	0.00E+00
305	PROPERTY		371572.2	3745584	1.09E-06	30YrCance	1.09E-06	0.00E+00
306	PROPERTY		371574.7	3745579	1.09E-06	30YrCance	1.09E-06	0.00E+00
307	PROPERTY		371577.2	3745573	1.09E-06	30YrCance	1.09E-06	0.00E+00
308	PROPERTY		371579.8	3745568	1.10E-06	30YrCance	1.10E-06	0.00E+00
309	PROPERTY		371582.3	3745562	1.10E-06	30YrCance	1.10E-06	0.00E+00
310	PROPERTY		371584.1	3745559	1.10E-06	30YrCance	1.10E-06	0.00E+00
311	PROPERTY		371578.7	3745556	1.07E-06	30YrCance	1.07E-06	0.00E+00
312	PROPERTY		371573.3	3745553	1.04E-06	30YrCance	1.04E-06	0.00E+00
313	PROPERTY		371567.9	3745551	1.01E-06	30YrCance	1.01E-06	0.00E+00
314	PROPERTY		371562.6	3745548	9.80E-07	30YrCance	9.80E-07	0.00E+00
315	PROPERTY		371557.2	3745545	9.53E-07	30YrCance	9.53E-07	0.00E+00
316	PROPERTY		371556.2	3745545	9.49E-07	30YrCance	9.49E-07	0.00E+00
317	PROPERTY		371557.8	3745539	9.48E-07	30YrCance	9.48E-07	0.00E+00
318	PROPERTY		371559.5	3745533	9.47E-07	30YrCance	9.47E-07	0.00E+00
319	PROPERTY		371561.1	3745527	9.45E-07	30YrCance	9.45E-07	0.00E+00
320	PROPERTY		371562.7	3745522	9.45E-07	30YrCance	9.45E-07	0.00E+00
321	PROPERTY		371564.4	3745516	9.44E-07	30YrCance	9.44E-07	0.00E+00
322	PROPERTY		371566	3745510	9.43E-07	30YrCance	9.43E-07	0.00E+00
323	PROPERTY		371567.3	3745506	9.44E-07	30YrCance	9.44E-07	0.00E+00
324	PROPERTY		371561.3	3745505	9.20E-07	30YrCance	9.20E-07	0.00E+00
325	PROPERTY		371555.3	3745505	8.98E-07	30YrCance	8.98E-07	0.00E+00
326	PROPERTY		371550.6	3745504	8.81E-07	30YrCance	8.81E-07	0.00E+00
327	PROPERTY		371548.4	3745510	8.79E-07	30YrCance	8.79E-07	0.00E+00

328	PROPERTY	371546.2	3745516	8.76E-07	30YrCance	8.76E-07	0.00E+00
329	PROPERTY	371544	3745521	8.74E-07	30YrCance	8.74E-07	0.00E+00
330	PROPERTY	371541.8	3745527	8.73E-07	30YrCance	8.73E-07	0.00E+00
331	PROPERTY	371539.6	3745532	8.70E-07	30YrCance	8.70E-07	0.00E+00
332	PROPERTY	371537.4	3745538	8.69E-07	30YrCance	8.69E-07	0.00E+00
333	PROPERTY	371535.3	3745544	8.69E-07	30YrCance	8.69E-07	0.00E+00
334	PROPERTY	371533.1	3745549	8.67E-07	30YrCance	8.67E-07	0.00E+00
335	PROPERTY	371530.9	3745555	8.66E-07	30YrCance	8.66E-07	0.00E+00
336	PROPERTY	371528.7	3745560	8.64E-07	30YrCance	8.64E-07	0.00E+00
337	PROPERTY	371526.5	3745566	8.63E-07	30YrCance	8.63E-07	0.00E+00
338	PROPERTY	371524.3	3745572	8.62E-07	30YrCance	8.62E-07	0.00E+00
339	PROPERTY	371522.2	3745577	8.61E-07	30YrCance	8.61E-07	0.00E+00
340	PROPERTY	371520	3745583	8.60E-07	30YrCance	8.60E-07	0.00E+00
341	PROPERTY	371517.8	3745588	8.58E-07	30YrCance	8.58E-07	0.00E+00
342	PROPERTY	371515.6	3745594	8.57E-07	30YrCance	8.57E-07	0.00E+00
343	PROPERTY	371513.4	3745599	8.55E-07	30YrCance	8.55E-07	0.00E+00
344	PROPERTY	371511.3	3745605	8.54E-07	30YrCance	8.54E-07	0.00E+00
345	PROPERTY	371509.1	3745611	8.53E-07	30YrCance	8.53E-07	0.00E+00
346	PROPERTY	371506.9	3745616	8.52E-07	30YrCance	8.52E-07	0.00E+00
347	PROPERTY	371504.7	3745622	8.51E-07	30YrCance	8.51E-07	0.00E+00
348	PROPERTY	371503.1	3745626	8.50E-07	30YrCance	8.50E-07	0.00E+00
349	PROPERTY	371508.2	3745629	8.72E-07	30YrCance	8.72E-07	0.00E+00
350	PROPERTY	371513.3	3745632	8.94E-07	30YrCance	8.94E-07	0.00E+00
351	PROPERTY	371518.5	3745635	9.17E-07	30YrCance	9.17E-07	0.00E+00
352	PROPERTY	371523.6	3745638	9.42E-07	30YrCance	9.42E-07	0.00E+00
353	PROPERTY	371528.8	3745642	9.71E-07	30YrCance	9.71E-07	0.00E+00
354	PROPERTY	371533.9	3745645	9.98E-07	30YrCance	9.98E-07	0.00E+00
355	PROPERTY	371539	3745648	1.03E-06	30YrCance	1.03E-06	0.00E+00

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DERMAL_R	MMILK_RIS	WATER_RIS	FISH_RISK	CROP_RISK	BEEF_RISK	DAIRY_RIS	PIG_RISK	CHICKEN_R
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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*HARP - HRACalc v19044 5/7/2020 7:35:00 PM - Chronic Risk - Input File: C:\Users\emarino\Desktop\C

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN
1	CARTGRID	GRID01	371490.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
2	CARTGRID	GRID01	371500.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
3	CARTGRID	GRID01	371510.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
4	CARTGRID	GRID01	371520.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
5	CARTGRID	GRID01	371530.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
6	CARTGRID	GRID01	371540.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
7	CARTGRID	GRID01	371550.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
8	CARTGRID	GRID01	371560.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
9	CARTGRID	GRID01	371570.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
10	CARTGRID	GRID01	371580.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
11	CARTGRID	GRID01	371590.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
12	CARTGRID	GRID01	371600.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
13	CARTGRID	GRID01	371610.9	3745490	NonCancer	0.00E+00	0.00E+00	0.00E+00
14	CARTGRID	GRID01	371490.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
15	CARTGRID	GRID01	371500.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
16	CARTGRID	GRID01	371510.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
17	CARTGRID	GRID01	371520.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
18	CARTGRID	GRID01	371530.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
19	CARTGRID	GRID01	371540.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
20	CARTGRID	GRID01	371550.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
21	CARTGRID	GRID01	371560.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
22	CARTGRID	GRID01	371570.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
23	CARTGRID	GRID01	371580.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
24	CARTGRID	GRID01	371590.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
25	CARTGRID	GRID01	371600.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
26	CARTGRID	GRID01	371610.9	3745500	NonCancer	0.00E+00	0.00E+00	0.00E+00
27	CARTGRID	GRID01	371490.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
28	CARTGRID	GRID01	371500.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
29	CARTGRID	GRID01	371510.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
30	CARTGRID	GRID01	371520.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
31	CARTGRID	GRID01	371530.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
32	CARTGRID	GRID01	371540.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
33	CARTGRID	GRID01	371550.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
34	CARTGRID	GRID01	371560.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
35	CARTGRID	GRID01	371570.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
36	CARTGRID	GRID01	371580.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
37	CARTGRID	GRID01	371590.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
38	CARTGRID	GRID01	371600.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
39	CARTGRID	GRID01	371610.9	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
40	CARTGRID	GRID01	371490.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
41	CARTGRID	GRID01	371500.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
42	CARTGRID	GRID01	371510.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
43	CARTGRID	GRID01	371520.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
44	CARTGRID	GRID01	371530.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
45	CARTGRID	GRID01	371540.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00

46	CARTGRID	GRID01	371550.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
47	CARTGRID	GRID01	371560.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
48	CARTGRID	GRID01	371570.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
49	CARTGRID	GRID01	371580.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
50	CARTGRID	GRID01	371590.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
51	CARTGRID	GRID01	371600.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
52	CARTGRID	GRID01	371610.9	3745520	NonCancer	0.00E+00	0.00E+00	0.00E+00
53	CARTGRID	GRID01	371490.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
54	CARTGRID	GRID01	371500.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
55	CARTGRID	GRID01	371510.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
56	CARTGRID	GRID01	371520.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
57	CARTGRID	GRID01	371530.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
58	CARTGRID	GRID01	371540.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
59	CARTGRID	GRID01	371550.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
60	CARTGRID	GRID01	371560.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
61	CARTGRID	GRID01	371570.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
62	CARTGRID	GRID01	371580.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
63	CARTGRID	GRID01	371590.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
64	CARTGRID	GRID01	371600.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
65	CARTGRID	GRID01	371610.9	3745530	NonCancer	0.00E+00	0.00E+00	0.00E+00
66	CARTGRID	GRID01	371490.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
67	CARTGRID	GRID01	371500.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
68	CARTGRID	GRID01	371510.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
69	CARTGRID	GRID01	371520.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
70	CARTGRID	GRID01	371530.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
71	CARTGRID	GRID01	371540.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
72	CARTGRID	GRID01	371550.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
73	CARTGRID	GRID01	371560.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
74	CARTGRID	GRID01	371570.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
75	CARTGRID	GRID01	371580.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
76	CARTGRID	GRID01	371590.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
77	CARTGRID	GRID01	371600.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
78	CARTGRID	GRID01	371610.9	3745540	NonCancer	0.00E+00	0.00E+00	0.00E+00
79	CARTGRID	GRID01	371490.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
80	CARTGRID	GRID01	371500.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
81	CARTGRID	GRID01	371510.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
82	CARTGRID	GRID01	371520.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
83	CARTGRID	GRID01	371530.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
84	CARTGRID	GRID01	371540.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
85	CARTGRID	GRID01	371550.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
86	CARTGRID	GRID01	371560.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
87	CARTGRID	GRID01	371570.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
88	CARTGRID	GRID01	371580.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
89	CARTGRID	GRID01	371590.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
90	CARTGRID	GRID01	371600.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
91	CARTGRID	GRID01	371610.9	3745550	NonCancer	0.00E+00	0.00E+00	0.00E+00
92	CARTGRID	GRID01	371490.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00

93	CARTGRID	GRID01	371500.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
94	CARTGRID	GRID01	371510.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
95	CARTGRID	GRID01	371520.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
96	CARTGRID	GRID01	371530.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
97	CARTGRID	GRID01	371540.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
98	CARTGRID	GRID01	371550.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
99	CARTGRID	GRID01	371560.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
100	CARTGRID	GRID01	371570.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
101	CARTGRID	GRID01	371580.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
102	CARTGRID	GRID01	371590.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
103	CARTGRID	GRID01	371600.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
104	CARTGRID	GRID01	371610.9	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
105	CARTGRID	GRID01	371490.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
106	CARTGRID	GRID01	371500.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
107	CARTGRID	GRID01	371510.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
108	CARTGRID	GRID01	371520.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
109	CARTGRID	GRID01	371530.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
110	CARTGRID	GRID01	371540.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
111	CARTGRID	GRID01	371550.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
112	CARTGRID	GRID01	371560.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
113	CARTGRID	GRID01	371570.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
114	CARTGRID	GRID01	371580.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
115	CARTGRID	GRID01	371590.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
116	CARTGRID	GRID01	371600.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
117	CARTGRID	GRID01	371610.9	3745570	NonCancer	0.00E+00	0.00E+00	0.00E+00
118	CARTGRID	GRID01	371490.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
119	CARTGRID	GRID01	371500.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
120	CARTGRID	GRID01	371510.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
121	CARTGRID	GRID01	371520.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
122	CARTGRID	GRID01	371530.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
123	CARTGRID	GRID01	371540.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
124	CARTGRID	GRID01	371550.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
125	CARTGRID	GRID01	371560.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
126	CARTGRID	GRID01	371570.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
127	CARTGRID	GRID01	371580.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
128	CARTGRID	GRID01	371590.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
129	CARTGRID	GRID01	371600.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
130	CARTGRID	GRID01	371610.9	3745580	NonCancer	0.00E+00	0.00E+00	0.00E+00
131	CARTGRID	GRID01	371490.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
132	CARTGRID	GRID01	371500.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
133	CARTGRID	GRID01	371510.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
134	CARTGRID	GRID01	371520.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
135	CARTGRID	GRID01	371530.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
136	CARTGRID	GRID01	371540.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
137	CARTGRID	GRID01	371550.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
138	CARTGRID	GRID01	371560.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
139	CARTGRID	GRID01	371570.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00

140	CARTGRID	GRID01	371580.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
141	CARTGRID	GRID01	371590.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
142	CARTGRID	GRID01	371600.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
143	CARTGRID	GRID01	371610.9	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
144	CARTGRID	GRID01	371490.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
145	CARTGRID	GRID01	371500.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
146	CARTGRID	GRID01	371510.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
147	CARTGRID	GRID01	371520.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
148	CARTGRID	GRID01	371530.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
149	CARTGRID	GRID01	371540.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
150	CARTGRID	GRID01	371550.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
151	CARTGRID	GRID01	371560.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
152	CARTGRID	GRID01	371570.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
153	CARTGRID	GRID01	371580.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
154	CARTGRID	GRID01	371590.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
155	CARTGRID	GRID01	371600.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
156	CARTGRID	GRID01	371610.9	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
157	CARTGRID	GRID01	371490.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
158	CARTGRID	GRID01	371500.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
159	CARTGRID	GRID01	371510.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
160	CARTGRID	GRID01	371520.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
161	CARTGRID	GRID01	371530.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
162	CARTGRID	GRID01	371540.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
163	CARTGRID	GRID01	371550.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
164	CARTGRID	GRID01	371560.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
165	CARTGRID	GRID01	371570.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
166	CARTGRID	GRID01	371580.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
167	CARTGRID	GRID01	371590.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
168	CARTGRID	GRID01	371600.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
169	CARTGRID	GRID01	371610.9	3745610	NonCancer	0.00E+00	0.00E+00	0.00E+00
170	CARTGRID	GRID01	371490.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
171	CARTGRID	GRID01	371500.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
172	CARTGRID	GRID01	371510.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
173	CARTGRID	GRID01	371520.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
174	CARTGRID	GRID01	371530.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
175	CARTGRID	GRID01	371540.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
176	CARTGRID	GRID01	371550.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
177	CARTGRID	GRID01	371560.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
178	CARTGRID	GRID01	371570.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
179	CARTGRID	GRID01	371580.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
180	CARTGRID	GRID01	371590.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
181	CARTGRID	GRID01	371600.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
182	CARTGRID	GRID01	371610.9	3745620	NonCancer	0.00E+00	0.00E+00	0.00E+00
183	CARTGRID	GRID01	371490.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
184	CARTGRID	GRID01	371500.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
185	CARTGRID	GRID01	371510.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
186	CARTGRID	GRID01	371520.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00

187	CARTGRID	GRID01	371530.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
188	CARTGRID	GRID01	371540.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
189	CARTGRID	GRID01	371550.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
190	CARTGRID	GRID01	371560.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
191	CARTGRID	GRID01	371570.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
192	CARTGRID	GRID01	371580.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
193	CARTGRID	GRID01	371590.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
194	CARTGRID	GRID01	371600.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
195	CARTGRID	GRID01	371610.9	3745630	NonCancer	0.00E+00	0.00E+00	0.00E+00
196	CARTGRID	GRID01	371490.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
197	CARTGRID	GRID01	371500.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
198	CARTGRID	GRID01	371510.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
199	CARTGRID	GRID01	371520.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
200	CARTGRID	GRID01	371530.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
201	CARTGRID	GRID01	371540.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
202	CARTGRID	GRID01	371550.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
203	CARTGRID	GRID01	371560.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
204	CARTGRID	GRID01	371570.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
205	CARTGRID	GRID01	371580.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
206	CARTGRID	GRID01	371590.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
207	CARTGRID	GRID01	371600.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
208	CARTGRID	GRID01	371610.9	3745640	NonCancer	0.00E+00	0.00E+00	0.00E+00
209	CARTGRID	GRID01	371490.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
210	CARTGRID	GRID01	371500.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
211	CARTGRID	GRID01	371510.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
212	CARTGRID	GRID01	371520.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
213	CARTGRID	GRID01	371530.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
214	CARTGRID	GRID01	371540.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
215	CARTGRID	GRID01	371550.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
216	CARTGRID	GRID01	371560.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
217	CARTGRID	GRID01	371570.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
218	CARTGRID	GRID01	371580.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
219	CARTGRID	GRID01	371590.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
220	CARTGRID	GRID01	371600.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
221	CARTGRID	GRID01	371610.9	3745650	NonCancer	0.00E+00	0.00E+00	0.00E+00
222	CARTGRID	GRID01	371490.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
223	CARTGRID	GRID01	371500.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
224	CARTGRID	GRID01	371510.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
225	CARTGRID	GRID01	371520.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
226	CARTGRID	GRID01	371530.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
227	CARTGRID	GRID01	371540.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
228	CARTGRID	GRID01	371550.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
229	CARTGRID	GRID01	371560.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
230	CARTGRID	GRID01	371570.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
231	CARTGRID	GRID01	371580.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
232	CARTGRID	GRID01	371590.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
233	CARTGRID	GRID01	371600.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00

234	CARTGRID	GRID01	371610.9	3745660	NonCancer	0.00E+00	0.00E+00	0.00E+00
235	CARTGRID	GRID01	371490.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
236	CARTGRID	GRID01	371500.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
237	CARTGRID	GRID01	371510.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
238	CARTGRID	GRID01	371520.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
239	CARTGRID	GRID01	371530.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
240	CARTGRID	GRID01	371540.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
241	CARTGRID	GRID01	371550.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
242	CARTGRID	GRID01	371560.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
243	CARTGRID	GRID01	371570.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
244	CARTGRID	GRID01	371580.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
245	CARTGRID	GRID01	371590.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
246	CARTGRID	GRID01	371600.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
247	CARTGRID	GRID01	371610.9	3745670	NonCancer	0.00E+00	0.00E+00	0.00E+00
248	SENSITIV	1st floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	0.00E+00
249	SENSITIV	2nd floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	0.00E+00
250	SENSITIV	3rd floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	0.00E+00
251	SENSITIV	1st floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	0.00E+00
252	SENSITIV	2nd floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	0.00E+00
253	SENSITIV	3rd floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	0.00E+00
254	SENSITIV	1st floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	0.00E+00
255	SENSITIV	2nd floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	0.00E+00
256	SENSITIV	3rd floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	0.00E+00
257	SENSITIV	1st floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	0.00E+00
258	SENSITIV	2nd floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	0.00E+00
259	SENSITIV	3rd floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	0.00E+00
260	SENSITIV	1st floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	0.00E+00
261	SENSITIV	2nd floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	0.00E+00
262	SENSITIV	3rd floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	0.00E+00
263	SENSITIV	1st floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	0.00E+00
264	SENSITIV	2nd floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	0.00E+00
265	SENSITIV	3rd floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	0.00E+00
266	SENSITIV	1st floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	0.00E+00
267	SENSITIV	2nd floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	0.00E+00
268	SENSITIV	3rd floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	0.00E+00
269	SENSITIV	1st floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	0.00E+00
270	SENSITIV	2nd floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	0.00E+00
271	SENSITIV	3rd floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	0.00E+00
272	SENSITIV	1st floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	0.00E+00
273	SENSITIV	2nd floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	0.00E+00
274	SENSITIV	3rd floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	0.00E+00
275	SENSITIV	1st floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	0.00E+00
276	SENSITIV	2nd floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	0.00E+00
277	SENSITIV	3rd floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	0.00E+00
278	SENSITIV	1st floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	0.00E+00
279	SENSITIV	2nd floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	0.00E+00
280	SENSITIV	3rd floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	0.00E+00

281	SENSITIV	1st floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	0.00E+00
282	SENSITIV	2nd floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	0.00E+00
283	SENSITIV	3rd floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	0.00E+00
284	SENSITIV	1st floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	0.00E+00
285	SENSITIV	2nd floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	0.00E+00
286	SENSITIV	3rd floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	0.00E+00
287	SENSITIV	1st floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	0.00E+00
288	SENSITIV	2nd floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	0.00E+00
289	SENSITIV	3rd floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	0.00E+00
290	SENSITIV	1st floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	0.00E+00
291	SENSITIV	2nd floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	0.00E+00
292	SENSITIV	3rd floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	0.00E+00
293	PROPERTY		371541.9	3745649	NonCancer	0.00E+00	0.00E+00	0.00E+00
294	PROPERTY		371544.4	3745644	NonCancer	0.00E+00	0.00E+00	0.00E+00
295	PROPERTY		371546.9	3745639	NonCancer	0.00E+00	0.00E+00	0.00E+00
296	PROPERTY		371549.4	3745633	NonCancer	0.00E+00	0.00E+00	0.00E+00
297	PROPERTY		371552	3745628	NonCancer	0.00E+00	0.00E+00	0.00E+00
298	PROPERTY		371554.5	3745622	NonCancer	0.00E+00	0.00E+00	0.00E+00
299	PROPERTY		371557	3745617	NonCancer	0.00E+00	0.00E+00	0.00E+00
300	PROPERTY		371559.5	3745611	NonCancer	0.00E+00	0.00E+00	0.00E+00
301	PROPERTY		371562.1	3745606	NonCancer	0.00E+00	0.00E+00	0.00E+00
302	PROPERTY		371564.6	3745600	NonCancer	0.00E+00	0.00E+00	0.00E+00
303	PROPERTY		371567.1	3745595	NonCancer	0.00E+00	0.00E+00	0.00E+00
304	PROPERTY		371569.6	3745590	NonCancer	0.00E+00	0.00E+00	0.00E+00
305	PROPERTY		371572.2	3745584	NonCancer	0.00E+00	0.00E+00	0.00E+00
306	PROPERTY		371574.7	3745579	NonCancer	0.00E+00	0.00E+00	0.00E+00
307	PROPERTY		371577.2	3745573	NonCancer	0.00E+00	0.00E+00	0.00E+00
308	PROPERTY		371579.8	3745568	NonCancer	0.00E+00	0.00E+00	0.00E+00
309	PROPERTY		371582.3	3745562	NonCancer	0.00E+00	0.00E+00	0.00E+00
310	PROPERTY		371584.1	3745559	NonCancer	0.00E+00	0.00E+00	0.00E+00
311	PROPERTY		371578.7	3745556	NonCancer	0.00E+00	0.00E+00	0.00E+00
312	PROPERTY		371573.3	3745553	NonCancer	0.00E+00	0.00E+00	0.00E+00
313	PROPERTY		371567.9	3745551	NonCancer	0.00E+00	0.00E+00	0.00E+00
314	PROPERTY		371562.6	3745548	NonCancer	0.00E+00	0.00E+00	0.00E+00
315	PROPERTY		371557.2	3745545	NonCancer	0.00E+00	0.00E+00	0.00E+00
316	PROPERTY		371556.2	3745545	NonCancer	0.00E+00	0.00E+00	0.00E+00
317	PROPERTY		371557.8	3745539	NonCancer	0.00E+00	0.00E+00	0.00E+00
318	PROPERTY		371559.5	3745533	NonCancer	0.00E+00	0.00E+00	0.00E+00
319	PROPERTY		371561.1	3745527	NonCancer	0.00E+00	0.00E+00	0.00E+00
320	PROPERTY		371562.7	3745522	NonCancer	0.00E+00	0.00E+00	0.00E+00
321	PROPERTY		371564.4	3745516	NonCancer	0.00E+00	0.00E+00	0.00E+00
322	PROPERTY		371566	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00
323	PROPERTY		371567.3	3745506	NonCancer	0.00E+00	0.00E+00	0.00E+00
324	PROPERTY		371561.3	3745505	NonCancer	0.00E+00	0.00E+00	0.00E+00
325	PROPERTY		371555.3	3745505	NonCancer	0.00E+00	0.00E+00	0.00E+00
326	PROPERTY		371550.6	3745504	NonCancer	0.00E+00	0.00E+00	0.00E+00
327	PROPERTY		371548.4	3745510	NonCancer	0.00E+00	0.00E+00	0.00E+00

328	PROPERTY	371546.2	3745516	NonCancer	0.00E+00	0.00E+00	0.00E+00
329	PROPERTY	371544	3745521	NonCancer	0.00E+00	0.00E+00	0.00E+00
330	PROPERTY	371541.8	3745527	NonCancer	0.00E+00	0.00E+00	0.00E+00
331	PROPERTY	371539.6	3745532	NonCancer	0.00E+00	0.00E+00	0.00E+00
332	PROPERTY	371537.4	3745538	NonCancer	0.00E+00	0.00E+00	0.00E+00
333	PROPERTY	371535.3	3745544	NonCancer	0.00E+00	0.00E+00	0.00E+00
334	PROPERTY	371533.1	3745549	NonCancer	0.00E+00	0.00E+00	0.00E+00
335	PROPERTY	371530.9	3745555	NonCancer	0.00E+00	0.00E+00	0.00E+00
336	PROPERTY	371528.7	3745560	NonCancer	0.00E+00	0.00E+00	0.00E+00
337	PROPERTY	371526.5	3745566	NonCancer	0.00E+00	0.00E+00	0.00E+00
338	PROPERTY	371524.3	3745572	NonCancer	0.00E+00	0.00E+00	0.00E+00
339	PROPERTY	371522.2	3745577	NonCancer	0.00E+00	0.00E+00	0.00E+00
340	PROPERTY	371520	3745583	NonCancer	0.00E+00	0.00E+00	0.00E+00
341	PROPERTY	371517.8	3745588	NonCancer	0.00E+00	0.00E+00	0.00E+00
342	PROPERTY	371515.6	3745594	NonCancer	0.00E+00	0.00E+00	0.00E+00
343	PROPERTY	371513.4	3745599	NonCancer	0.00E+00	0.00E+00	0.00E+00
344	PROPERTY	371511.3	3745605	NonCancer	0.00E+00	0.00E+00	0.00E+00
345	PROPERTY	371509.1	3745611	NonCancer	0.00E+00	0.00E+00	0.00E+00
346	PROPERTY	371506.9	3745616	NonCancer	0.00E+00	0.00E+00	0.00E+00
347	PROPERTY	371504.7	3745622	NonCancer	0.00E+00	0.00E+00	0.00E+00
348	PROPERTY	371503.1	3745626	NonCancer	0.00E+00	0.00E+00	0.00E+00
349	PROPERTY	371508.2	3745629	NonCancer	0.00E+00	0.00E+00	0.00E+00
350	PROPERTY	371513.3	3745632	NonCancer	0.00E+00	0.00E+00	0.00E+00
351	PROPERTY	371518.5	3745635	NonCancer	0.00E+00	0.00E+00	0.00E+00
352	PROPERTY	371523.6	3745638	NonCancer	0.00E+00	0.00E+00	0.00E+00
353	PROPERTY	371528.8	3745642	NonCancer	0.00E+00	0.00E+00	0.00E+00
354	PROPERTY	371533.9	3745645	NonCancer	0.00E+00	0.00E+00	0.00E+00
355	PROPERTY	371539	3745648	NonCancer	0.00E+00	0.00E+00	0.00E+00

atalina Ave\CATALINA AVE\hra\CChAc_30yrResHRAInput.hra

KIDNEY	GILV	REPRO/DEV	RESP	SKIN	EYE	BONE/TEET	ENDO	BLOOD
0.00E+00	0.00E+00	1.20E-04	4.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-03
0.00E+00	0.00E+00	1.24E-04	4.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	1.29E-04	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-03
0.00E+00	0.00E+00	1.33E-04	4.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.38E-04	4.96E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.44E-04	5.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.49E-04	5.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.55E-04	5.55E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.61E-04	5.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.68E-04	6.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-03
0.00E+00	0.00E+00	1.76E-04	6.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.84E-04	6.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.93E-04	6.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	1.21E-04	4.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-03
0.00E+00	0.00E+00	1.25E-04	4.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-03
0.00E+00	0.00E+00	1.30E-04	4.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.35E-04	4.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-03
0.00E+00	0.00E+00	1.40E-04	5.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.45E-04	5.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.56E-04	5.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-03
0.00E+00	0.00E+00	1.63E-04	5.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.70E-04	6.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-03
0.00E+00	0.00E+00	1.78E-04	6.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.86E-04	6.69E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.96E-04	7.02E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-03
0.00E+00	0.00E+00	1.22E-04	4.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-03
0.00E+00	0.00E+00	1.26E-04	4.53E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-03
0.00E+00	0.00E+00	1.31E-04	4.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-03
0.00E+00	0.00E+00	1.36E-04	4.87E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.41E-04	5.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.46E-04	5.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.52E-04	5.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.58E-04	5.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.65E-04	5.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.73E-04	6.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.80E-04	6.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.89E-04	6.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.99E-04	7.13E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-03
0.00E+00	0.00E+00	1.23E-04	4.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.21E-03
0.00E+00	0.00E+00	1.28E-04	4.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-03
0.00E+00	0.00E+00	1.32E-04	4.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-03
0.00E+00	0.00E+00	1.37E-04	4.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.35E-03
0.00E+00	0.00E+00	1.42E-04	5.11E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-03
0.00E+00	0.00E+00	1.48E-04	5.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03

0.00E+00	0.00E+00	1.54E-04	5.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.67E-04	6.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.75E-04	6.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.83E-04	6.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.92E-04	6.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.89E-03
0.00E+00	0.00E+00	2.02E-04	7.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.99E-03
0.00E+00	0.00E+00	1.24E-04	4.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	1.29E-04	4.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.27E-03
0.00E+00	0.00E+00	1.34E-04	4.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.39E-04	4.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.44E-04	5.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-03
0.00E+00	0.00E+00	1.50E-04	5.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.56E-04	5.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.63E-04	5.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.70E-04	6.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.77E-04	6.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.86E-04	6.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.95E-04	7.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-03
0.00E+00	0.00E+00	2.05E-04	7.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-03
0.00E+00	0.00E+00	1.26E-04	4.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.24E-03
0.00E+00	0.00E+00	1.30E-04	4.67E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.35E-04	4.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-03
0.00E+00	0.00E+00	1.40E-04	5.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-03
0.00E+00	0.00E+00	1.46E-04	5.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.58E-04	5.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.65E-04	5.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.72E-04	6.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.69E-03
0.00E+00	0.00E+00	1.80E-04	6.47E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.89E-04	6.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.99E-04	7.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-03
0.00E+00	0.00E+00	2.10E-04	7.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.06E-03
0.00E+00	0.00E+00	1.27E-04	4.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-03
0.00E+00	0.00E+00	1.32E-04	4.72E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-03
0.00E+00	0.00E+00	1.36E-04	4.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.42E-04	5.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-03
0.00E+00	0.00E+00	1.47E-04	5.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.53E-04	5.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.67E-04	6.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.75E-04	6.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.83E-04	6.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.93E-04	6.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.03E-04	7.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-03
0.00E+00	0.00E+00	2.14E-04	7.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.11E-03
0.00E+00	0.00E+00	1.28E-04	4.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-03

0.00E+00	0.00E+00	1.33E-04	4.78E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.38E-04	4.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.43E-04	5.15E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.49E-04	5.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.56E-04	5.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.62E-04	5.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.70E-04	6.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.78E-04	6.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.87E-04	6.69E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.96E-04	7.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-03
0.00E+00	0.00E+00	2.07E-04	7.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-03
0.00E+00	0.00E+00	2.19E-04	7.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-03
0.00E+00	0.00E+00	1.30E-04	4.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.35E-04	4.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-03
0.00E+00	0.00E+00	1.40E-04	5.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-03
0.00E+00	0.00E+00	1.45E-04	5.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.58E-04	5.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.65E-04	5.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.72E-04	6.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.81E-04	6.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.90E-04	6.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	2.00E-04	7.18E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.11E-04	7.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.24E-04	8.04E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-03
0.00E+00	0.00E+00	1.31E-04	4.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.29E-03
0.00E+00	0.00E+00	1.36E-04	4.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.42E-04	5.08E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.47E-04	5.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.53E-04	5.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.67E-04	6.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-03
0.00E+00	0.00E+00	1.75E-04	6.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.84E-04	6.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.93E-04	6.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.04E-04	7.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.16E-04	7.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.29E-04	8.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E-03
0.00E+00	0.00E+00	1.33E-04	4.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.38E-04	4.95E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.43E-04	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.49E-04	5.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.55E-04	5.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.62E-04	5.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.70E-04	6.09E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.78E-04	6.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.87E-04	6.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03

0.00E+00	0.00E+00	1.97E-04	7.07E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.08E-04	7.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-03
0.00E+00	0.00E+00	2.20E-04	7.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-03
0.00E+00	0.00E+00	2.35E-04	8.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-03
0.00E+00	0.00E+00	1.34E-04	4.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.32E-03
0.00E+00	0.00E+00	1.40E-04	5.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.45E-04	5.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.58E-04	5.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.65E-04	5.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.72E-04	6.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.81E-04	6.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.90E-04	6.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	2.01E-04	7.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.12E-04	7.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-03
0.00E+00	0.00E+00	2.25E-04	8.08E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-03
0.00E+00	0.00E+00	2.41E-04	8.63E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E-03
0.00E+00	0.00E+00	1.36E-04	4.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.41E-04	5.07E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.47E-04	5.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.53E-04	5.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.67E-04	6.00E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.75E-04	6.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.84E-04	6.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.94E-04	6.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.04E-04	7.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.16E-04	7.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-03
0.00E+00	0.00E+00	2.30E-04	8.26E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E-03
0.00E+00	0.00E+00	2.46E-04	8.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.42E-03
0.00E+00	0.00E+00	1.38E-04	4.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.43E-04	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.49E-04	5.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.55E-04	5.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.62E-04	5.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.70E-04	6.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.78E-04	6.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.87E-04	6.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.97E-04	7.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.08E-04	7.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-03
0.00E+00	0.00E+00	2.20E-04	7.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.17E-03
0.00E+00	0.00E+00	2.35E-04	8.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.31E-03
0.00E+00	0.00E+00	2.52E-04	9.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E-03
0.00E+00	0.00E+00	1.40E-04	5.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.45E-04	5.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.58E-04	5.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03

0.00E+00	0.00E+00	1.65E-04	5.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.72E-04	6.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.81E-04	6.49E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.90E-04	6.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	2.00E-04	7.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.12E-04	7.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.25E-04	8.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-03
0.00E+00	0.00E+00	2.40E-04	8.60E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.36E-03
0.00E+00	0.00E+00	2.57E-04	9.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.53E-03
0.00E+00	0.00E+00	1.41E-04	5.07E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.47E-04	5.28E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.53E-04	5.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.67E-04	6.01E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.75E-04	6.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.84E-04	6.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.93E-04	6.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.04E-04	7.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.15E-04	7.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.29E-04	8.21E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-03
0.00E+00	0.00E+00	2.44E-04	8.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.40E-03
0.00E+00	0.00E+00	2.61E-04	9.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.57E-03
0.00E+00	0.00E+00	1.43E-04	5.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.49E-04	5.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.56E-04	5.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.62E-04	5.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.70E-04	6.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.78E-04	6.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.87E-04	6.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.97E-04	7.06E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.07E-04	7.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-03
0.00E+00	0.00E+00	2.20E-04	7.88E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-03
0.00E+00	0.00E+00	2.33E-04	8.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-03
0.00E+00	0.00E+00	2.48E-04	8.91E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.44E-03
0.00E+00	0.00E+00	2.66E-04	9.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.62E-03
0.00E+00	0.00E+00	1.45E-04	5.22E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.51E-04	5.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.58E-04	5.67E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.65E-04	5.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.73E-04	6.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.81E-04	6.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.90E-04	6.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	2.00E-04	7.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.11E-04	7.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.24E-04	8.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-03
0.00E+00	0.00E+00	2.37E-04	8.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.34E-03
0.00E+00	0.00E+00	2.53E-04	9.08E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.49E-03

0.00E+00	0.00E+00	2.71E-04	9.72E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.67E-03
0.00E+00	0.00E+00	1.47E-04	5.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.54E-04	5.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.60E-04	5.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.68E-04	6.02E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.76E-04	6.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.84E-04	6.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.94E-04	6.96E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-03
0.00E+00	0.00E+00	2.04E-04	7.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.16E-04	7.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.28E-04	8.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.25E-03
0.00E+00	0.00E+00	2.42E-04	8.69E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.38E-03
0.00E+00	0.00E+00	2.58E-04	9.26E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.54E-03
0.00E+00	0.00E+00	2.76E-04	9.89E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-03
0.00E+00	0.00E+00	1.78E-04	6.38E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.79E-04	6.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.74E-04	6.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.71E-03
0.00E+00	0.00E+00	1.79E-04	6.44E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.80E-04	6.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.76E-04	6.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.82E-04	6.53E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.83E-04	6.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.78E-04	6.40E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.82E-04	6.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.83E-04	6.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.79E-04	6.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.84E-04	6.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.85E-04	6.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.81E-04	6.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.85E-04	6.65E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.87E-04	6.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.83E-04	6.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.59E-04	5.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.60E-04	5.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.57E-04	5.62E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E-03
0.00E+00	0.00E+00	1.61E-04	5.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.60E-04	5.74E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.55E-04	5.58E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-04	5.75E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.60E-04	5.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.55E-04	5.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.53E-04	5.48E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.52E-04	5.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.48E-04	5.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.63E-04	5.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.63E-04	5.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.60E-04	5.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03

0.00E+00	0.00E+00	1.65E-04	5.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.66E-04	5.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.62E-04	5.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.63E-04	5.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.64E-04	5.87E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.60E-04	5.72E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.62E-04	5.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.63E-04	5.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.59E-04	5.70E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.55E-04	5.55E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.55E-04	5.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.51E-04	5.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.79E-04	6.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.79E-04	6.43E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.80E-04	6.46E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.80E-04	6.47E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.81E-04	6.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.82E-04	6.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.82E-04	6.54E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.83E-04	6.56E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.84E-04	6.59E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.84E-04	6.61E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.85E-04	6.63E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.86E-04	6.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.86E-04	6.68E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.87E-04	6.71E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.87E-04	6.73E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-03
0.00E+00	0.00E+00	1.88E-04	6.76E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-03
0.00E+00	0.00E+00	1.89E-04	6.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.89E-04	6.79E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.83E-04	6.57E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.78E-04	6.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.73E-04	6.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.68E-04	6.03E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.63E-04	5.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.63E-04	5.84E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.62E-04	5.83E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.62E-04	5.82E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.62E-04	5.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.62E-04	5.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.62E-04	5.81E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.62E-04	5.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.62E-04	5.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.58E-04	5.66E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.54E-04	5.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.51E-04	5.42E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.51E-04	5.41E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-03

0.00E+00	0.00E+00	1.50E-04	5.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.50E-04	5.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.50E-04	5.37E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.49E-04	5.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.49E-04	5.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.49E-04	5.34E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.49E-04	5.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.48E-04	5.33E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.48E-04	5.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.48E-04	5.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.48E-04	5.30E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.48E-04	5.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.47E-04	5.29E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.47E-04	5.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.47E-04	5.27E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.46E-04	5.26E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.46E-04	5.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.46E-04	5.25E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.46E-04	5.24E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.46E-04	5.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.46E-04	5.23E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-04	5.36E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-04	5.50E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.57E-04	5.64E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.62E-04	5.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.66E-04	5.97E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.64E-03
0.00E+00	0.00E+00	1.71E-04	6.14E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-03
0.00E+00	0.00E+00	1.76E-04	6.31E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-03

ODOR	GENERAL	MAXHI
0.00E+00	0.00E+00	1.18E-03
0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	1.27E-03
0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.66E-03
0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	1.19E-03
0.00E+00	0.00E+00	1.23E-03
0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.32E-03
0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.54E-03
0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.68E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.93E-03
0.00E+00	0.00E+00	1.20E-03
0.00E+00	0.00E+00	1.24E-03
0.00E+00	0.00E+00	1.29E-03
0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.96E-03
0.00E+00	0.00E+00	1.21E-03
0.00E+00	0.00E+00	1.26E-03
0.00E+00	0.00E+00	1.30E-03
0.00E+00	0.00E+00	1.35E-03
0.00E+00	0.00E+00	1.40E-03
0.00E+00	0.00E+00	1.45E-03

0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.89E-03
0.00E+00	0.00E+00	1.99E-03
0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	1.27E-03
0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.42E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.92E-03
0.00E+00	0.00E+00	2.02E-03
0.00E+00	0.00E+00	1.24E-03
0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.33E-03
0.00E+00	0.00E+00	1.38E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.69E-03
0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.96E-03
0.00E+00	0.00E+00	2.06E-03
0.00E+00	0.00E+00	1.25E-03
0.00E+00	0.00E+00	1.30E-03
0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.40E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.00E-03
0.00E+00	0.00E+00	2.11E-03
0.00E+00	0.00E+00	1.26E-03

0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.93E-03
0.00E+00	0.00E+00	2.04E-03
0.00E+00	0.00E+00	2.16E-03
0.00E+00	0.00E+00	1.28E-03
0.00E+00	0.00E+00	1.33E-03
0.00E+00	0.00E+00	1.38E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.20E-03
0.00E+00	0.00E+00	1.29E-03
0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.64E-03
0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.26E-03
0.00E+00	0.00E+00	1.31E-03
0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.84E-03

0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.05E-03
0.00E+00	0.00E+00	2.17E-03
0.00E+00	0.00E+00	2.31E-03
0.00E+00	0.00E+00	1.32E-03
0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.09E-03
0.00E+00	0.00E+00	2.22E-03
0.00E+00	0.00E+00	2.37E-03
0.00E+00	0.00E+00	1.34E-03
0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.13E-03
0.00E+00	0.00E+00	2.26E-03
0.00E+00	0.00E+00	2.42E-03
0.00E+00	0.00E+00	1.36E-03
0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.05E-03
0.00E+00	0.00E+00	2.17E-03
0.00E+00	0.00E+00	2.31E-03
0.00E+00	0.00E+00	2.48E-03
0.00E+00	0.00E+00	1.37E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.55E-03

0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.21E-03
0.00E+00	0.00E+00	2.36E-03
0.00E+00	0.00E+00	2.53E-03
0.00E+00	0.00E+00	1.39E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.72E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.90E-03
0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.25E-03
0.00E+00	0.00E+00	2.40E-03
0.00E+00	0.00E+00	2.57E-03
0.00E+00	0.00E+00	1.41E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.67E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.94E-03
0.00E+00	0.00E+00	2.04E-03
0.00E+00	0.00E+00	2.16E-03
0.00E+00	0.00E+00	2.29E-03
0.00E+00	0.00E+00	2.44E-03
0.00E+00	0.00E+00	2.62E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.87E-03
0.00E+00	0.00E+00	1.97E-03
0.00E+00	0.00E+00	2.08E-03
0.00E+00	0.00E+00	2.20E-03
0.00E+00	0.00E+00	2.34E-03
0.00E+00	0.00E+00	2.49E-03

0.00E+00	0.00E+00	2.67E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.91E-03
0.00E+00	0.00E+00	2.01E-03
0.00E+00	0.00E+00	2.12E-03
0.00E+00	0.00E+00	2.25E-03
0.00E+00	0.00E+00	2.38E-03
0.00E+00	0.00E+00	2.54E-03
0.00E+00	0.00E+00	2.71E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.71E-03
0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.73E-03
0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.54E-03
0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.58E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.53E-03
0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.50E-03
0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.57E-03

0.00E+00	0.00E+00	1.62E-03
0.00E+00	0.00E+00	1.63E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.57E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.56E-03
0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.52E-03
0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.76E-03
0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.77E-03
0.00E+00	0.00E+00	1.78E-03
0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.79E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.81E-03
0.00E+00	0.00E+00	1.82E-03
0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.83E-03
0.00E+00	0.00E+00	1.84E-03
0.00E+00	0.00E+00	1.85E-03
0.00E+00	0.00E+00	1.85E-03
0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.86E-03
0.00E+00	0.00E+00	1.80E-03
0.00E+00	0.00E+00	1.75E-03
0.00E+00	0.00E+00	1.70E-03
0.00E+00	0.00E+00	1.65E-03
0.00E+00	0.00E+00	1.61E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.60E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.49E-03
0.00E+00	0.00E+00	1.48E-03

0.00E+00	0.00E+00	1.48E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.46E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.45E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.44E-03
0.00E+00	0.00E+00	1.43E-03
0.00E+00	0.00E+00	1.47E-03
0.00E+00	0.00E+00	1.51E-03
0.00E+00	0.00E+00	1.55E-03
0.00E+00	0.00E+00	1.59E-03
0.00E+00	0.00E+00	1.64E-03
0.00E+00	0.00E+00	1.68E-03
0.00E+00	0.00E+00	1.73E-03

*HARP - HRACalc v19044 5/7/2020 7:35:00 PM - Acute Risk - Input File: C:\Users\emarino\Desktop\Cat

REC	GRP	NETID	X	Y	SCENARIO	CV	CNS	IMMUN
1	CARTGRID	GRID01	371490.9	3745490	NonCancer	0.00E+00	0.00E+00	6.36E-04
2	CARTGRID	GRID01	371500.9	3745490	NonCancer	0.00E+00	0.00E+00	6.54E-04
3	CARTGRID	GRID01	371510.9	3745490	NonCancer	0.00E+00	0.00E+00	6.74E-04
4	CARTGRID	GRID01	371520.9	3745490	NonCancer	0.00E+00	0.00E+00	6.96E-04
5	CARTGRID	GRID01	371530.9	3745490	NonCancer	0.00E+00	0.00E+00	7.19E-04
6	CARTGRID	GRID01	371540.9	3745490	NonCancer	0.00E+00	0.00E+00	7.42E-04
7	CARTGRID	GRID01	371550.9	3745490	NonCancer	0.00E+00	0.00E+00	7.72E-04
8	CARTGRID	GRID01	371560.9	3745490	NonCancer	0.00E+00	0.00E+00	8.11E-04
9	CARTGRID	GRID01	371570.9	3745490	NonCancer	0.00E+00	0.00E+00	8.50E-04
10	CARTGRID	GRID01	371580.9	3745490	NonCancer	0.00E+00	0.00E+00	8.90E-04
11	CARTGRID	GRID01	371590.9	3745490	NonCancer	0.00E+00	0.00E+00	9.29E-04
12	CARTGRID	GRID01	371600.9	3745490	NonCancer	0.00E+00	0.00E+00	9.75E-04
13	CARTGRID	GRID01	371610.9	3745490	NonCancer	0.00E+00	0.00E+00	1.02E-03
14	CARTGRID	GRID01	371490.9	3745500	NonCancer	0.00E+00	0.00E+00	6.49E-04
15	CARTGRID	GRID01	371500.9	3745500	NonCancer	0.00E+00	0.00E+00	6.65E-04
16	CARTGRID	GRID01	371510.9	3745500	NonCancer	0.00E+00	0.00E+00	6.85E-04
17	CARTGRID	GRID01	371520.9	3745500	NonCancer	0.00E+00	0.00E+00	7.05E-04
18	CARTGRID	GRID01	371530.9	3745500	NonCancer	0.00E+00	0.00E+00	7.25E-04
19	CARTGRID	GRID01	371540.9	3745500	NonCancer	0.00E+00	0.00E+00	7.48E-04
20	CARTGRID	GRID01	371550.9	3745500	NonCancer	0.00E+00	0.00E+00	7.73E-04
21	CARTGRID	GRID01	371560.9	3745500	NonCancer	0.00E+00	0.00E+00	8.05E-04
22	CARTGRID	GRID01	371570.9	3745500	NonCancer	0.00E+00	0.00E+00	8.46E-04
23	CARTGRID	GRID01	371580.9	3745500	NonCancer	0.00E+00	0.00E+00	8.87E-04
24	CARTGRID	GRID01	371590.9	3745500	NonCancer	0.00E+00	0.00E+00	9.28E-04
25	CARTGRID	GRID01	371600.9	3745500	NonCancer	0.00E+00	0.00E+00	9.72E-04
26	CARTGRID	GRID01	371610.9	3745500	NonCancer	0.00E+00	0.00E+00	1.02E-03
27	CARTGRID	GRID01	371490.9	3745510	NonCancer	0.00E+00	0.00E+00	6.63E-04
28	CARTGRID	GRID01	371500.9	3745510	NonCancer	0.00E+00	0.00E+00	6.76E-04
29	CARTGRID	GRID01	371510.9	3745510	NonCancer	0.00E+00	0.00E+00	6.94E-04
30	CARTGRID	GRID01	371520.9	3745510	NonCancer	0.00E+00	0.00E+00	7.15E-04
31	CARTGRID	GRID01	371530.9	3745510	NonCancer	0.00E+00	0.00E+00	7.35E-04
32	CARTGRID	GRID01	371540.9	3745510	NonCancer	0.00E+00	0.00E+00	7.56E-04
33	CARTGRID	GRID01	371550.9	3745510	NonCancer	0.00E+00	0.00E+00	7.77E-04
34	CARTGRID	GRID01	371560.9	3745510	NonCancer	0.00E+00	0.00E+00	8.03E-04
35	CARTGRID	GRID01	371570.9	3745510	NonCancer	0.00E+00	0.00E+00	8.38E-04
36	CARTGRID	GRID01	371580.9	3745510	NonCancer	0.00E+00	0.00E+00	8.79E-04
37	CARTGRID	GRID01	371590.9	3745510	NonCancer	0.00E+00	0.00E+00	9.22E-04
38	CARTGRID	GRID01	371600.9	3745510	NonCancer	0.00E+00	0.00E+00	9.65E-04
39	CARTGRID	GRID01	371610.9	3745510	NonCancer	0.00E+00	0.00E+00	1.02E-03
40	CARTGRID	GRID01	371490.9	3745520	NonCancer	0.00E+00	0.00E+00	6.76E-04
41	CARTGRID	GRID01	371500.9	3745520	NonCancer	0.00E+00	0.00E+00	6.91E-04
42	CARTGRID	GRID01	371510.9	3745520	NonCancer	0.00E+00	0.00E+00	7.04E-04
43	CARTGRID	GRID01	371520.9	3745520	NonCancer	0.00E+00	0.00E+00	7.22E-04
44	CARTGRID	GRID01	371530.9	3745520	NonCancer	0.00E+00	0.00E+00	7.42E-04
45	CARTGRID	GRID01	371540.9	3745520	NonCancer	0.00E+00	0.00E+00	7.63E-04

46	CARTGRID	GRID01	371550.9	3745520	NonCancer	0.00E+00	0.00E+00	7.83E-04
47	CARTGRID	GRID01	371560.9	3745520	NonCancer	0.00E+00	0.00E+00	8.05E-04
48	CARTGRID	GRID01	371570.9	3745520	NonCancer	0.00E+00	0.00E+00	8.32E-04
49	CARTGRID	GRID01	371580.9	3745520	NonCancer	0.00E+00	0.00E+00	8.67E-04
50	CARTGRID	GRID01	371590.9	3745520	NonCancer	0.00E+00	0.00E+00	9.11E-04
51	CARTGRID	GRID01	371600.9	3745520	NonCancer	0.00E+00	0.00E+00	9.63E-04
52	CARTGRID	GRID01	371610.9	3745520	NonCancer	0.00E+00	0.00E+00	1.03E-03
53	CARTGRID	GRID01	371490.9	3745530	NonCancer	0.00E+00	0.00E+00	6.86E-04
54	CARTGRID	GRID01	371500.9	3745530	NonCancer	0.00E+00	0.00E+00	7.02E-04
55	CARTGRID	GRID01	371510.9	3745530	NonCancer	0.00E+00	0.00E+00	7.16E-04
56	CARTGRID	GRID01	371520.9	3745530	NonCancer	0.00E+00	0.00E+00	7.28E-04
57	CARTGRID	GRID01	371530.9	3745530	NonCancer	0.00E+00	0.00E+00	7.46E-04
58	CARTGRID	GRID01	371540.9	3745530	NonCancer	0.00E+00	0.00E+00	7.67E-04
59	CARTGRID	GRID01	371550.9	3745530	NonCancer	0.00E+00	0.00E+00	7.87E-04
60	CARTGRID	GRID01	371560.9	3745530	NonCancer	0.00E+00	0.00E+00	8.08E-04
61	CARTGRID	GRID01	371570.9	3745530	NonCancer	0.00E+00	0.00E+00	8.32E-04
62	CARTGRID	GRID01	371580.9	3745530	NonCancer	0.00E+00	0.00E+00	8.64E-04
63	CARTGRID	GRID01	371590.9	3745530	NonCancer	0.00E+00	0.00E+00	9.07E-04
64	CARTGRID	GRID01	371600.9	3745530	NonCancer	0.00E+00	0.00E+00	9.65E-04
65	CARTGRID	GRID01	371610.9	3745530	NonCancer	0.00E+00	0.00E+00	1.03E-03
66	CARTGRID	GRID01	371490.9	3745540	NonCancer	0.00E+00	0.00E+00	6.98E-04
67	CARTGRID	GRID01	371500.9	3745540	NonCancer	0.00E+00	0.00E+00	7.12E-04
68	CARTGRID	GRID01	371510.9	3745540	NonCancer	0.00E+00	0.00E+00	7.25E-04
69	CARTGRID	GRID01	371520.9	3745540	NonCancer	0.00E+00	0.00E+00	7.37E-04
70	CARTGRID	GRID01	371530.9	3745540	NonCancer	0.00E+00	0.00E+00	7.48E-04
71	CARTGRID	GRID01	371540.9	3745540	NonCancer	0.00E+00	0.00E+00	7.68E-04
72	CARTGRID	GRID01	371550.9	3745540	NonCancer	0.00E+00	0.00E+00	7.89E-04
73	CARTGRID	GRID01	371560.9	3745540	NonCancer	0.00E+00	0.00E+00	8.12E-04
74	CARTGRID	GRID01	371570.9	3745540	NonCancer	0.00E+00	0.00E+00	8.38E-04
75	CARTGRID	GRID01	371580.9	3745540	NonCancer	0.00E+00	0.00E+00	8.73E-04
76	CARTGRID	GRID01	371590.9	3745540	NonCancer	0.00E+00	0.00E+00	9.13E-04
77	CARTGRID	GRID01	371600.9	3745540	NonCancer	0.00E+00	0.00E+00	9.64E-04
78	CARTGRID	GRID01	371610.9	3745540	NonCancer	0.00E+00	0.00E+00	1.03E-03
79	CARTGRID	GRID01	371490.9	3745550	NonCancer	0.00E+00	0.00E+00	7.08E-04
80	CARTGRID	GRID01	371500.9	3745550	NonCancer	0.00E+00	0.00E+00	7.24E-04
81	CARTGRID	GRID01	371510.9	3745550	NonCancer	0.00E+00	0.00E+00	7.37E-04
82	CARTGRID	GRID01	371520.9	3745550	NonCancer	0.00E+00	0.00E+00	7.49E-04
83	CARTGRID	GRID01	371530.9	3745550	NonCancer	0.00E+00	0.00E+00	7.58E-04
84	CARTGRID	GRID01	371540.9	3745550	NonCancer	0.00E+00	0.00E+00	7.70E-04
85	CARTGRID	GRID01	371550.9	3745550	NonCancer	0.00E+00	0.00E+00	7.94E-04
86	CARTGRID	GRID01	371560.9	3745550	NonCancer	0.00E+00	0.00E+00	8.19E-04
87	CARTGRID	GRID01	371570.9	3745550	NonCancer	0.00E+00	0.00E+00	8.46E-04
88	CARTGRID	GRID01	371580.9	3745550	NonCancer	0.00E+00	0.00E+00	8.81E-04
89	CARTGRID	GRID01	371590.9	3745550	NonCancer	0.00E+00	0.00E+00	9.24E-04
90	CARTGRID	GRID01	371600.9	3745550	NonCancer	0.00E+00	0.00E+00	9.75E-04
91	CARTGRID	GRID01	371610.9	3745550	NonCancer	0.00E+00	0.00E+00	1.04E-03
92	CARTGRID	GRID01	371490.9	3745560	NonCancer	0.00E+00	0.00E+00	7.15E-04

93	CARTGRID	GRID01	371500.9	3745560	NonCancer	0.00E+00	0.00E+00	7.33E-04
94	CARTGRID	GRID01	371510.9	3745560	NonCancer	0.00E+00	0.00E+00	7.48E-04
95	CARTGRID	GRID01	371520.9	3745560	NonCancer	0.00E+00	0.00E+00	7.61E-04
96	CARTGRID	GRID01	371530.9	3745560	NonCancer	0.00E+00	0.00E+00	7.75E-04
97	CARTGRID	GRID01	371540.9	3745560	NonCancer	0.00E+00	0.00E+00	7.86E-04
98	CARTGRID	GRID01	371550.9	3745560	NonCancer	0.00E+00	0.00E+00	7.98E-04
99	CARTGRID	GRID01	371560.9	3745560	NonCancer	0.00E+00	0.00E+00	8.23E-04
100	CARTGRID	GRID01	371570.9	3745560	NonCancer	0.00E+00	0.00E+00	8.52E-04
101	CARTGRID	GRID01	371580.9	3745560	NonCancer	0.00E+00	0.00E+00	8.87E-04
102	CARTGRID	GRID01	371590.9	3745560	NonCancer	0.00E+00	0.00E+00	9.38E-04
103	CARTGRID	GRID01	371600.9	3745560	NonCancer	0.00E+00	0.00E+00	9.97E-04
104	CARTGRID	GRID01	371610.9	3745560	NonCancer	0.00E+00	0.00E+00	1.06E-03
105	CARTGRID	GRID01	371490.9	3745570	NonCancer	0.00E+00	0.00E+00	7.18E-04
106	CARTGRID	GRID01	371500.9	3745570	NonCancer	0.00E+00	0.00E+00	7.38E-04
107	CARTGRID	GRID01	371510.9	3745570	NonCancer	0.00E+00	0.00E+00	7.57E-04
108	CARTGRID	GRID01	371520.9	3745570	NonCancer	0.00E+00	0.00E+00	7.75E-04
109	CARTGRID	GRID01	371530.9	3745570	NonCancer	0.00E+00	0.00E+00	7.91E-04
110	CARTGRID	GRID01	371540.9	3745570	NonCancer	0.00E+00	0.00E+00	8.03E-04
111	CARTGRID	GRID01	371550.9	3745570	NonCancer	0.00E+00	0.00E+00	8.14E-04
112	CARTGRID	GRID01	371560.9	3745570	NonCancer	0.00E+00	0.00E+00	8.26E-04
113	CARTGRID	GRID01	371570.9	3745570	NonCancer	0.00E+00	0.00E+00	8.61E-04
114	CARTGRID	GRID01	371580.9	3745570	NonCancer	0.00E+00	0.00E+00	9.01E-04
115	CARTGRID	GRID01	371590.9	3745570	NonCancer	0.00E+00	0.00E+00	9.51E-04
116	CARTGRID	GRID01	371600.9	3745570	NonCancer	0.00E+00	0.00E+00	1.01E-03
117	CARTGRID	GRID01	371610.9	3745570	NonCancer	0.00E+00	0.00E+00	1.08E-03
118	CARTGRID	GRID01	371490.9	3745580	NonCancer	0.00E+00	0.00E+00	7.20E-04
119	CARTGRID	GRID01	371500.9	3745580	NonCancer	0.00E+00	0.00E+00	7.44E-04
120	CARTGRID	GRID01	371510.9	3745580	NonCancer	0.00E+00	0.00E+00	7.67E-04
121	CARTGRID	GRID01	371520.9	3745580	NonCancer	0.00E+00	0.00E+00	7.86E-04
122	CARTGRID	GRID01	371530.9	3745580	NonCancer	0.00E+00	0.00E+00	8.03E-04
123	CARTGRID	GRID01	371540.9	3745580	NonCancer	0.00E+00	0.00E+00	8.17E-04
124	CARTGRID	GRID01	371550.9	3745580	NonCancer	0.00E+00	0.00E+00	8.33E-04
125	CARTGRID	GRID01	371560.9	3745580	NonCancer	0.00E+00	0.00E+00	8.52E-04
126	CARTGRID	GRID01	371570.9	3745580	NonCancer	0.00E+00	0.00E+00	8.71E-04
127	CARTGRID	GRID01	371580.9	3745580	NonCancer	0.00E+00	0.00E+00	9.14E-04
128	CARTGRID	GRID01	371590.9	3745580	NonCancer	0.00E+00	0.00E+00	9.62E-04
129	CARTGRID	GRID01	371600.9	3745580	NonCancer	0.00E+00	0.00E+00	1.02E-03
130	CARTGRID	GRID01	371610.9	3745580	NonCancer	0.00E+00	0.00E+00	1.09E-03
131	CARTGRID	GRID01	371490.9	3745590	NonCancer	0.00E+00	0.00E+00	7.26E-04
132	CARTGRID	GRID01	371500.9	3745590	NonCancer	0.00E+00	0.00E+00	7.50E-04
133	CARTGRID	GRID01	371510.9	3745590	NonCancer	0.00E+00	0.00E+00	7.73E-04
134	CARTGRID	GRID01	371520.9	3745590	NonCancer	0.00E+00	0.00E+00	7.94E-04
135	CARTGRID	GRID01	371530.9	3745590	NonCancer	0.00E+00	0.00E+00	8.15E-04
136	CARTGRID	GRID01	371540.9	3745590	NonCancer	0.00E+00	0.00E+00	8.35E-04
137	CARTGRID	GRID01	371550.9	3745590	NonCancer	0.00E+00	0.00E+00	8.56E-04
138	CARTGRID	GRID01	371560.9	3745590	NonCancer	0.00E+00	0.00E+00	8.76E-04
139	CARTGRID	GRID01	371570.9	3745590	NonCancer	0.00E+00	0.00E+00	8.97E-04

140	CARTGRID	GRID01	371580.9	3745590	NonCancer	0.00E+00	0.00E+00	9.23E-04
141	CARTGRID	GRID01	371590.9	3745590	NonCancer	0.00E+00	0.00E+00	9.70E-04
142	CARTGRID	GRID01	371600.9	3745590	NonCancer	0.00E+00	0.00E+00	1.02E-03
143	CARTGRID	GRID01	371610.9	3745590	NonCancer	0.00E+00	0.00E+00	1.09E-03
144	CARTGRID	GRID01	371490.9	3745600	NonCancer	0.00E+00	0.00E+00	7.31E-04
145	CARTGRID	GRID01	371500.9	3745600	NonCancer	0.00E+00	0.00E+00	7.57E-04
146	CARTGRID	GRID01	371510.9	3745600	NonCancer	0.00E+00	0.00E+00	7.84E-04
147	CARTGRID	GRID01	371520.9	3745600	NonCancer	0.00E+00	0.00E+00	8.09E-04
148	CARTGRID	GRID01	371530.9	3745600	NonCancer	0.00E+00	0.00E+00	8.32E-04
149	CARTGRID	GRID01	371540.9	3745600	NonCancer	0.00E+00	0.00E+00	8.55E-04
150	CARTGRID	GRID01	371550.9	3745600	NonCancer	0.00E+00	0.00E+00	8.78E-04
151	CARTGRID	GRID01	371560.9	3745600	NonCancer	0.00E+00	0.00E+00	9.00E-04
152	CARTGRID	GRID01	371570.9	3745600	NonCancer	0.00E+00	0.00E+00	9.23E-04
153	CARTGRID	GRID01	371580.9	3745600	NonCancer	0.00E+00	0.00E+00	9.46E-04
154	CARTGRID	GRID01	371590.9	3745600	NonCancer	0.00E+00	0.00E+00	9.74E-04
155	CARTGRID	GRID01	371600.9	3745600	NonCancer	0.00E+00	0.00E+00	1.02E-03
156	CARTGRID	GRID01	371610.9	3745600	NonCancer	0.00E+00	0.00E+00	1.09E-03
157	CARTGRID	GRID01	371490.9	3745610	NonCancer	0.00E+00	0.00E+00	7.35E-04
158	CARTGRID	GRID01	371500.9	3745610	NonCancer	0.00E+00	0.00E+00	7.65E-04
159	CARTGRID	GRID01	371510.9	3745610	NonCancer	0.00E+00	0.00E+00	7.97E-04
160	CARTGRID	GRID01	371520.9	3745610	NonCancer	0.00E+00	0.00E+00	8.27E-04
161	CARTGRID	GRID01	371530.9	3745610	NonCancer	0.00E+00	0.00E+00	8.55E-04
162	CARTGRID	GRID01	371540.9	3745610	NonCancer	0.00E+00	0.00E+00	8.82E-04
163	CARTGRID	GRID01	371550.9	3745610	NonCancer	0.00E+00	0.00E+00	9.09E-04
164	CARTGRID	GRID01	371560.9	3745610	NonCancer	0.00E+00	0.00E+00	9.36E-04
165	CARTGRID	GRID01	371570.9	3745610	NonCancer	0.00E+00	0.00E+00	9.61E-04
166	CARTGRID	GRID01	371580.9	3745610	NonCancer	0.00E+00	0.00E+00	9.85E-04
167	CARTGRID	GRID01	371590.9	3745610	NonCancer	0.00E+00	0.00E+00	1.01E-03
168	CARTGRID	GRID01	371600.9	3745610	NonCancer	0.00E+00	0.00E+00	1.04E-03
169	CARTGRID	GRID01	371610.9	3745610	NonCancer	0.00E+00	0.00E+00	1.10E-03
170	CARTGRID	GRID01	371490.9	3745620	NonCancer	0.00E+00	0.00E+00	7.44E-04
171	CARTGRID	GRID01	371500.9	3745620	NonCancer	0.00E+00	0.00E+00	7.76E-04
172	CARTGRID	GRID01	371510.9	3745620	NonCancer	0.00E+00	0.00E+00	8.09E-04
173	CARTGRID	GRID01	371520.9	3745620	NonCancer	0.00E+00	0.00E+00	8.43E-04
174	CARTGRID	GRID01	371530.9	3745620	NonCancer	0.00E+00	0.00E+00	8.75E-04
175	CARTGRID	GRID01	371540.9	3745620	NonCancer	0.00E+00	0.00E+00	9.06E-04
176	CARTGRID	GRID01	371550.9	3745620	NonCancer	0.00E+00	0.00E+00	9.38E-04
177	CARTGRID	GRID01	371560.9	3745620	NonCancer	0.00E+00	0.00E+00	9.67E-04
178	CARTGRID	GRID01	371570.9	3745620	NonCancer	0.00E+00	0.00E+00	9.94E-04
179	CARTGRID	GRID01	371580.9	3745620	NonCancer	0.00E+00	0.00E+00	1.02E-03
180	CARTGRID	GRID01	371590.9	3745620	NonCancer	0.00E+00	0.00E+00	1.04E-03
181	CARTGRID	GRID01	371600.9	3745620	NonCancer	0.00E+00	0.00E+00	1.06E-03
182	CARTGRID	GRID01	371610.9	3745620	NonCancer	0.00E+00	0.00E+00	1.11E-03
183	CARTGRID	GRID01	371490.9	3745630	NonCancer	0.00E+00	0.00E+00	7.52E-04
184	CARTGRID	GRID01	371500.9	3745630	NonCancer	0.00E+00	0.00E+00	7.84E-04
185	CARTGRID	GRID01	371510.9	3745630	NonCancer	0.00E+00	0.00E+00	8.18E-04
186	CARTGRID	GRID01	371520.9	3745630	NonCancer	0.00E+00	0.00E+00	8.55E-04

187	CARTGRID	GRID01	371530.9	3745630	NonCancer	0.00E+00	0.00E+00	8.92E-04
188	CARTGRID	GRID01	371540.9	3745630	NonCancer	0.00E+00	0.00E+00	9.27E-04
189	CARTGRID	GRID01	371550.9	3745630	NonCancer	0.00E+00	0.00E+00	9.62E-04
190	CARTGRID	GRID01	371560.9	3745630	NonCancer	0.00E+00	0.00E+00	9.94E-04
191	CARTGRID	GRID01	371570.9	3745630	NonCancer	0.00E+00	0.00E+00	1.02E-03
192	CARTGRID	GRID01	371580.9	3745630	NonCancer	0.00E+00	0.00E+00	1.05E-03
193	CARTGRID	GRID01	371590.9	3745630	NonCancer	0.00E+00	0.00E+00	1.07E-03
194	CARTGRID	GRID01	371600.9	3745630	NonCancer	0.00E+00	0.00E+00	1.09E-03
195	CARTGRID	GRID01	371610.9	3745630	NonCancer	0.00E+00	0.00E+00	1.12E-03
196	CARTGRID	GRID01	371490.9	3745640	NonCancer	0.00E+00	0.00E+00	7.62E-04
197	CARTGRID	GRID01	371500.9	3745640	NonCancer	0.00E+00	0.00E+00	7.97E-04
198	CARTGRID	GRID01	371510.9	3745640	NonCancer	0.00E+00	0.00E+00	8.30E-04
199	CARTGRID	GRID01	371520.9	3745640	NonCancer	0.00E+00	0.00E+00	8.68E-04
200	CARTGRID	GRID01	371530.9	3745640	NonCancer	0.00E+00	0.00E+00	9.08E-04
201	CARTGRID	GRID01	371540.9	3745640	NonCancer	0.00E+00	0.00E+00	9.47E-04
202	CARTGRID	GRID01	371550.9	3745640	NonCancer	0.00E+00	0.00E+00	9.83E-04
203	CARTGRID	GRID01	371560.9	3745640	NonCancer	0.00E+00	0.00E+00	1.02E-03
204	CARTGRID	GRID01	371570.9	3745640	NonCancer	0.00E+00	0.00E+00	1.05E-03
205	CARTGRID	GRID01	371580.9	3745640	NonCancer	0.00E+00	0.00E+00	1.07E-03
206	CARTGRID	GRID01	371590.9	3745640	NonCancer	0.00E+00	0.00E+00	1.10E-03
207	CARTGRID	GRID01	371600.9	3745640	NonCancer	0.00E+00	0.00E+00	1.12E-03
208	CARTGRID	GRID01	371610.9	3745640	NonCancer	0.00E+00	0.00E+00	1.14E-03
209	CARTGRID	GRID01	371490.9	3745650	NonCancer	0.00E+00	0.00E+00	7.72E-04
210	CARTGRID	GRID01	371500.9	3745650	NonCancer	0.00E+00	0.00E+00	8.10E-04
211	CARTGRID	GRID01	371510.9	3745650	NonCancer	0.00E+00	0.00E+00	8.48E-04
212	CARTGRID	GRID01	371520.9	3745650	NonCancer	0.00E+00	0.00E+00	8.88E-04
213	CARTGRID	GRID01	371530.9	3745650	NonCancer	0.00E+00	0.00E+00	9.33E-04
214	CARTGRID	GRID01	371540.9	3745650	NonCancer	0.00E+00	0.00E+00	9.75E-04
215	CARTGRID	GRID01	371550.9	3745650	NonCancer	0.00E+00	0.00E+00	1.02E-03
216	CARTGRID	GRID01	371560.9	3745650	NonCancer	0.00E+00	0.00E+00	1.05E-03
217	CARTGRID	GRID01	371570.9	3745650	NonCancer	0.00E+00	0.00E+00	1.09E-03
218	CARTGRID	GRID01	371580.9	3745650	NonCancer	0.00E+00	0.00E+00	1.12E-03
219	CARTGRID	GRID01	371590.9	3745650	NonCancer	0.00E+00	0.00E+00	1.14E-03
220	CARTGRID	GRID01	371600.9	3745650	NonCancer	0.00E+00	0.00E+00	1.16E-03
221	CARTGRID	GRID01	371610.9	3745650	NonCancer	0.00E+00	0.00E+00	1.18E-03
222	CARTGRID	GRID01	371490.9	3745660	NonCancer	0.00E+00	0.00E+00	7.81E-04
223	CARTGRID	GRID01	371500.9	3745660	NonCancer	0.00E+00	0.00E+00	8.21E-04
224	CARTGRID	GRID01	371510.9	3745660	NonCancer	0.00E+00	0.00E+00	8.63E-04
225	CARTGRID	GRID01	371520.9	3745660	NonCancer	0.00E+00	0.00E+00	9.07E-04
226	CARTGRID	GRID01	371530.9	3745660	NonCancer	0.00E+00	0.00E+00	9.52E-04
227	CARTGRID	GRID01	371540.9	3745660	NonCancer	0.00E+00	0.00E+00	9.99E-04
228	CARTGRID	GRID01	371550.9	3745660	NonCancer	0.00E+00	0.00E+00	1.04E-03
229	CARTGRID	GRID01	371560.9	3745660	NonCancer	0.00E+00	0.00E+00	1.09E-03
230	CARTGRID	GRID01	371570.9	3745660	NonCancer	0.00E+00	0.00E+00	1.12E-03
231	CARTGRID	GRID01	371580.9	3745660	NonCancer	0.00E+00	0.00E+00	1.15E-03
232	CARTGRID	GRID01	371590.9	3745660	NonCancer	0.00E+00	0.00E+00	1.18E-03
233	CARTGRID	GRID01	371600.9	3745660	NonCancer	0.00E+00	0.00E+00	1.20E-03

234	CARTGRID	GRID01	371610.9	3745660	NonCancer	0.00E+00	0.00E+00	1.22E-03
235	CARTGRID	GRID01	371490.9	3745670	NonCancer	0.00E+00	0.00E+00	7.85E-04
236	CARTGRID	GRID01	371500.9	3745670	NonCancer	0.00E+00	0.00E+00	8.29E-04
237	CARTGRID	GRID01	371510.9	3745670	NonCancer	0.00E+00	0.00E+00	8.74E-04
238	CARTGRID	GRID01	371520.9	3745670	NonCancer	0.00E+00	0.00E+00	9.20E-04
239	CARTGRID	GRID01	371530.9	3745670	NonCancer	0.00E+00	0.00E+00	9.66E-04
240	CARTGRID	GRID01	371540.9	3745670	NonCancer	0.00E+00	0.00E+00	1.02E-03
241	CARTGRID	GRID01	371550.9	3745670	NonCancer	0.00E+00	0.00E+00	1.07E-03
242	CARTGRID	GRID01	371560.9	3745670	NonCancer	0.00E+00	0.00E+00	1.11E-03
243	CARTGRID	GRID01	371570.9	3745670	NonCancer	0.00E+00	0.00E+00	1.15E-03
244	CARTGRID	GRID01	371580.9	3745670	NonCancer	0.00E+00	0.00E+00	1.19E-03
245	CARTGRID	GRID01	371590.9	3745670	NonCancer	0.00E+00	0.00E+00	1.22E-03
246	CARTGRID	GRID01	371600.9	3745670	NonCancer	0.00E+00	0.00E+00	1.25E-03
247	CARTGRID	GRID01	371610.9	3745670	NonCancer	0.00E+00	0.00E+00	1.27E-03
248	SENSITIV	1st floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	9.58E-04
249	SENSITIV	2nd floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	9.90E-04
250	SENSITIV	3rd floo	371542.5	3745641	NonCancer	0.00E+00	0.00E+00	1.16E-03
251	SENSITIV	1st floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	9.53E-04
252	SENSITIV	2nd floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	9.86E-04
253	SENSITIV	3rd floo	371548.3	3745629	NonCancer	0.00E+00	0.00E+00	1.16E-03
254	SENSITIV	1st floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	9.40E-04
255	SENSITIV	2nd floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	9.72E-04
256	SENSITIV	3rd floo	371555.8	3745615	NonCancer	0.00E+00	0.00E+00	1.14E-03
257	SENSITIV	1st floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	9.00E-04
258	SENSITIV	2nd floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	9.34E-04
259	SENSITIV	3rd floo	371561.6	3745599	NonCancer	0.00E+00	0.00E+00	1.09E-03
260	SENSITIV	1st floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	8.79E-04
261	SENSITIV	2nd floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	9.10E-04
262	SENSITIV	3rd floo	371567.7	3745585	NonCancer	0.00E+00	0.00E+00	1.06E-03
263	SENSITIV	1st floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	8.80E-04
264	SENSITIV	2nd floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	9.08E-04
265	SENSITIV	3rd floo	371576.7	3745565	NonCancer	0.00E+00	0.00E+00	1.04E-03
266	SENSITIV	1st floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	7.89E-04
267	SENSITIV	2nd floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	8.15E-04
268	SENSITIV	3rd floo	371549	3745546	NonCancer	0.00E+00	0.00E+00	9.43E-04
269	SENSITIV	1st floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	7.97E-04
270	SENSITIV	2nd floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	8.69E-04
271	SENSITIV	3rd floo	371554.8	3745533	NonCancer	0.00E+00	0.00E+00	9.65E-04
272	SENSITIV	1st floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	8.02E-04
273	SENSITIV	2nd floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	8.74E-04
274	SENSITIV	3rd floo	371559.1	3745518	NonCancer	0.00E+00	0.00E+00	9.70E-04
275	SENSITIV	1st floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	7.74E-04
276	SENSITIV	2nd floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	8.45E-04
277	SENSITIV	3rd floo	371544	3745529	NonCancer	0.00E+00	0.00E+00	9.49E-04
278	SENSITIV	1st floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	8.16E-04
279	SENSITIV	2nd floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	8.46E-04
280	SENSITIV	3rd floo	371545.1	3745574	NonCancer	0.00E+00	0.00E+00	9.91E-04

281	SENSITIV	1st floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	8.52E-04
282	SENSITIV	2nd floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	8.87E-04
283	SENSITIV	3rd floo	371540.3	3745598	NonCancer	0.00E+00	0.00E+00	1.04E-03
284	SENSITIV	1st floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	8.69E-04
285	SENSITIV	2nd floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	9.01E-04
286	SENSITIV	3rd floo	371532.7	3745613	NonCancer	0.00E+00	0.00E+00	1.06E-03
287	SENSITIV	1st floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	8.76E-04
288	SENSITIV	2nd floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	9.09E-04
289	SENSITIV	3rd floo	371527.6	3745626	NonCancer	0.00E+00	0.00E+00	1.07E-03
290	SENSITIV	1st floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	8.35E-04
291	SENSITIV	2nd floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	8.68E-04
292	SENSITIV	3rd floo	371516.9	3745623	NonCancer	0.00E+00	0.00E+00	1.03E-03
293	PROPERTY		371541.9	3745649	NonCancer	0.00E+00	0.00E+00	9.77E-04
294	PROPERTY		371544.4	3745644	NonCancer	0.00E+00	0.00E+00	9.72E-04
295	PROPERTY		371546.9	3745639	NonCancer	0.00E+00	0.00E+00	9.65E-04
296	PROPERTY		371549.4	3745633	NonCancer	0.00E+00	0.00E+00	9.63E-04
297	PROPERTY		371552	3745628	NonCancer	0.00E+00	0.00E+00	9.61E-04
298	PROPERTY		371554.5	3745622	NonCancer	0.00E+00	0.00E+00	9.54E-04
299	PROPERTY		371557	3745617	NonCancer	0.00E+00	0.00E+00	9.47E-04
300	PROPERTY		371559.5	3745611	NonCancer	0.00E+00	0.00E+00	9.35E-04
301	PROPERTY		371562.1	3745606	NonCancer	0.00E+00	0.00E+00	9.25E-04
302	PROPERTY		371564.6	3745600	NonCancer	0.00E+00	0.00E+00	9.08E-04
303	PROPERTY		371567.1	3745595	NonCancer	0.00E+00	0.00E+00	9.01E-04
304	PROPERTY		371569.6	3745590	NonCancer	0.00E+00	0.00E+00	8.94E-04
305	PROPERTY		371572.2	3745584	NonCancer	0.00E+00	0.00E+00	8.83E-04
306	PROPERTY		371574.7	3745579	NonCancer	0.00E+00	0.00E+00	8.85E-04
307	PROPERTY		371577.2	3745573	NonCancer	0.00E+00	0.00E+00	8.89E-04
308	PROPERTY		371579.8	3745568	NonCancer	0.00E+00	0.00E+00	8.94E-04
309	PROPERTY		371582.3	3745562	NonCancer	0.00E+00	0.00E+00	8.96E-04
310	PROPERTY		371584.1	3745559	NonCancer	0.00E+00	0.00E+00	9.01E-04
311	PROPERTY		371578.7	3745556	NonCancer	0.00E+00	0.00E+00	8.75E-04
312	PROPERTY		371573.3	3745553	NonCancer	0.00E+00	0.00E+00	8.55E-04
313	PROPERTY		371567.9	3745551	NonCancer	0.00E+00	0.00E+00	8.38E-04
314	PROPERTY		371562.6	3745548	NonCancer	0.00E+00	0.00E+00	8.22E-04
315	PROPERTY		371557.2	3745545	NonCancer	0.00E+00	0.00E+00	8.07E-04
316	PROPERTY		371556.2	3745545	NonCancer	0.00E+00	0.00E+00	8.04E-04
317	PROPERTY		371557.8	3745539	NonCancer	0.00E+00	0.00E+00	8.03E-04
318	PROPERTY		371559.5	3745533	NonCancer	0.00E+00	0.00E+00	8.05E-04
319	PROPERTY		371561.1	3745527	NonCancer	0.00E+00	0.00E+00	8.07E-04
320	PROPERTY		371562.7	3745522	NonCancer	0.00E+00	0.00E+00	8.10E-04
321	PROPERTY		371564.4	3745516	NonCancer	0.00E+00	0.00E+00	8.13E-04
322	PROPERTY		371566	3745510	NonCancer	0.00E+00	0.00E+00	8.18E-04
323	PROPERTY		371567.3	3745506	NonCancer	0.00E+00	0.00E+00	8.27E-04
324	PROPERTY		371561.3	3745505	NonCancer	0.00E+00	0.00E+00	8.04E-04
325	PROPERTY		371555.3	3745505	NonCancer	0.00E+00	0.00E+00	7.87E-04
326	PROPERTY		371550.6	3745504	NonCancer	0.00E+00	0.00E+00	7.73E-04
327	PROPERTY		371548.4	3745510	NonCancer	0.00E+00	0.00E+00	7.72E-04

328	PROPERTY	371546.2	3745516	NonCancer	0.00E+00	0.00E+00	7.71E-04
329	PROPERTY	371544	3745521	NonCancer	0.00E+00	0.00E+00	7.70E-04
330	PROPERTY	371541.8	3745527	NonCancer	0.00E+00	0.00E+00	7.68E-04
331	PROPERTY	371539.6	3745532	NonCancer	0.00E+00	0.00E+00	7.64E-04
332	PROPERTY	371537.4	3745538	NonCancer	0.00E+00	0.00E+00	7.61E-04
333	PROPERTY	371535.3	3745544	NonCancer	0.00E+00	0.00E+00	7.57E-04
334	PROPERTY	371533.1	3745549	NonCancer	0.00E+00	0.00E+00	7.59E-04
335	PROPERTY	371530.9	3745555	NonCancer	0.00E+00	0.00E+00	7.65E-04
336	PROPERTY	371528.7	3745560	NonCancer	0.00E+00	0.00E+00	7.72E-04
337	PROPERTY	371526.5	3745566	NonCancer	0.00E+00	0.00E+00	7.79E-04
338	PROPERTY	371524.3	3745572	NonCancer	0.00E+00	0.00E+00	7.84E-04
339	PROPERTY	371522.2	3745577	NonCancer	0.00E+00	0.00E+00	7.86E-04
340	PROPERTY	371520	3745583	NonCancer	0.00E+00	0.00E+00	7.87E-04
341	PROPERTY	371517.8	3745588	NonCancer	0.00E+00	0.00E+00	7.86E-04
342	PROPERTY	371515.6	3745594	NonCancer	0.00E+00	0.00E+00	7.87E-04
343	PROPERTY	371513.4	3745599	NonCancer	0.00E+00	0.00E+00	7.89E-04
344	PROPERTY	371511.3	3745605	NonCancer	0.00E+00	0.00E+00	7.91E-04
345	PROPERTY	371509.1	3745611	NonCancer	0.00E+00	0.00E+00	7.92E-04
346	PROPERTY	371506.9	3745616	NonCancer	0.00E+00	0.00E+00	7.91E-04
347	PROPERTY	371504.7	3745622	NonCancer	0.00E+00	0.00E+00	7.89E-04
348	PROPERTY	371503.1	3745626	NonCancer	0.00E+00	0.00E+00	7.88E-04
349	PROPERTY	371508.2	3745629	NonCancer	0.00E+00	0.00E+00	8.08E-04
350	PROPERTY	371513.3	3745632	NonCancer	0.00E+00	0.00E+00	8.29E-04
351	PROPERTY	371518.5	3745635	NonCancer	0.00E+00	0.00E+00	8.50E-04
352	PROPERTY	371523.6	3745638	NonCancer	0.00E+00	0.00E+00	8.74E-04
353	PROPERTY	371528.8	3745642	NonCancer	0.00E+00	0.00E+00	9.05E-04
354	PROPERTY	371533.9	3745645	NonCancer	0.00E+00	0.00E+00	9.34E-04
355	PROPERTY	371539	3745648	NonCancer	0.00E+00	0.00E+00	9.62E-04

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KIDNEY	GILV	REPRO/DE	RESP	SKIN	EYE	BONE/TEET	ENDO	BLOOD
0.00E+00	0.00E+00	6.37E-04	1.20E-04	0.00E+00	2.67E-04	0.00E+00	0.00E+00	6.36E-04
0.00E+00	0.00E+00	6.56E-04	1.23E-04	0.00E+00	2.74E-04	0.00E+00	0.00E+00	6.54E-04
0.00E+00	0.00E+00	6.75E-04	1.27E-04	0.00E+00	2.83E-04	0.00E+00	0.00E+00	6.74E-04
0.00E+00	0.00E+00	6.98E-04	1.31E-04	0.00E+00	2.92E-04	0.00E+00	0.00E+00	6.96E-04
0.00E+00	0.00E+00	7.21E-04	1.35E-04	0.00E+00	3.02E-04	0.00E+00	0.00E+00	7.19E-04
0.00E+00	0.00E+00	7.44E-04	1.40E-04	0.00E+00	3.12E-04	0.00E+00	0.00E+00	7.42E-04
0.00E+00	0.00E+00	7.74E-04	1.45E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.72E-04
0.00E+00	0.00E+00	8.13E-04	1.53E-04	0.00E+00	3.40E-04	0.00E+00	0.00E+00	8.11E-04
0.00E+00	0.00E+00	8.53E-04	1.60E-04	0.00E+00	3.57E-04	0.00E+00	0.00E+00	8.50E-04
0.00E+00	0.00E+00	8.93E-04	1.68E-04	0.00E+00	3.74E-04	0.00E+00	0.00E+00	8.90E-04
0.00E+00	0.00E+00	9.32E-04	1.75E-04	0.00E+00	3.90E-04	0.00E+00	0.00E+00	9.29E-04
0.00E+00	0.00E+00	9.78E-04	1.84E-04	0.00E+00	4.09E-04	0.00E+00	0.00E+00	9.75E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.28E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.50E-04	1.22E-04	0.00E+00	2.72E-04	0.00E+00	0.00E+00	6.49E-04
0.00E+00	0.00E+00	6.66E-04	1.25E-04	0.00E+00	2.79E-04	0.00E+00	0.00E+00	6.65E-04
0.00E+00	0.00E+00	6.87E-04	1.29E-04	0.00E+00	2.87E-04	0.00E+00	0.00E+00	6.85E-04
0.00E+00	0.00E+00	7.07E-04	1.33E-04	0.00E+00	2.96E-04	0.00E+00	0.00E+00	7.05E-04
0.00E+00	0.00E+00	7.27E-04	1.37E-04	0.00E+00	3.04E-04	0.00E+00	0.00E+00	7.25E-04
0.00E+00	0.00E+00	7.50E-04	1.41E-04	0.00E+00	3.14E-04	0.00E+00	0.00E+00	7.48E-04
0.00E+00	0.00E+00	7.75E-04	1.46E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.73E-04
0.00E+00	0.00E+00	8.08E-04	1.52E-04	0.00E+00	3.38E-04	0.00E+00	0.00E+00	8.05E-04
0.00E+00	0.00E+00	8.48E-04	1.59E-04	0.00E+00	3.55E-04	0.00E+00	0.00E+00	8.46E-04
0.00E+00	0.00E+00	8.89E-04	1.67E-04	0.00E+00	3.72E-04	0.00E+00	0.00E+00	8.87E-04
0.00E+00	0.00E+00	9.30E-04	1.75E-04	0.00E+00	3.89E-04	0.00E+00	0.00E+00	9.28E-04
0.00E+00	0.00E+00	9.75E-04	1.83E-04	0.00E+00	4.08E-04	0.00E+00	0.00E+00	9.72E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.29E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.65E-04	1.25E-04	0.00E+00	2.78E-04	0.00E+00	0.00E+00	6.63E-04
0.00E+00	0.00E+00	6.78E-04	1.27E-04	0.00E+00	2.84E-04	0.00E+00	0.00E+00	6.76E-04
0.00E+00	0.00E+00	6.96E-04	1.31E-04	0.00E+00	2.91E-04	0.00E+00	0.00E+00	6.94E-04
0.00E+00	0.00E+00	7.16E-04	1.35E-04	0.00E+00	3.00E-04	0.00E+00	0.00E+00	7.15E-04
0.00E+00	0.00E+00	7.37E-04	1.38E-04	0.00E+00	3.08E-04	0.00E+00	0.00E+00	7.35E-04
0.00E+00	0.00E+00	7.58E-04	1.42E-04	0.00E+00	3.17E-04	0.00E+00	0.00E+00	7.56E-04
0.00E+00	0.00E+00	7.79E-04	1.46E-04	0.00E+00	3.26E-04	0.00E+00	0.00E+00	7.77E-04
0.00E+00	0.00E+00	8.05E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.03E-04
0.00E+00	0.00E+00	8.40E-04	1.58E-04	0.00E+00	3.51E-04	0.00E+00	0.00E+00	8.38E-04
0.00E+00	0.00E+00	8.81E-04	1.66E-04	0.00E+00	3.69E-04	0.00E+00	0.00E+00	8.79E-04
0.00E+00	0.00E+00	9.24E-04	1.74E-04	0.00E+00	3.87E-04	0.00E+00	0.00E+00	9.22E-04
0.00E+00	0.00E+00	9.68E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.65E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.29E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.77E-04	1.27E-04	0.00E+00	2.84E-04	0.00E+00	0.00E+00	6.76E-04
0.00E+00	0.00E+00	6.93E-04	1.30E-04	0.00E+00	2.90E-04	0.00E+00	0.00E+00	6.91E-04
0.00E+00	0.00E+00	7.06E-04	1.33E-04	0.00E+00	2.95E-04	0.00E+00	0.00E+00	7.04E-04
0.00E+00	0.00E+00	7.24E-04	1.36E-04	0.00E+00	3.03E-04	0.00E+00	0.00E+00	7.22E-04
0.00E+00	0.00E+00	7.44E-04	1.40E-04	0.00E+00	3.11E-04	0.00E+00	0.00E+00	7.42E-04
0.00E+00	0.00E+00	7.65E-04	1.44E-04	0.00E+00	3.20E-04	0.00E+00	0.00E+00	7.63E-04

0.00E+00	0.00E+00	7.85E-04	1.48E-04	0.00E+00	3.29E-04	0.00E+00	0.00E+00	7.83E-04
0.00E+00	0.00E+00	8.07E-04	1.52E-04	0.00E+00	3.38E-04	0.00E+00	0.00E+00	8.05E-04
0.00E+00	0.00E+00	8.34E-04	1.57E-04	0.00E+00	3.49E-04	0.00E+00	0.00E+00	8.32E-04
0.00E+00	0.00E+00	8.69E-04	1.63E-04	0.00E+00	3.64E-04	0.00E+00	0.00E+00	8.67E-04
0.00E+00	0.00E+00	9.13E-04	1.72E-04	0.00E+00	3.82E-04	0.00E+00	0.00E+00	9.11E-04
0.00E+00	0.00E+00	9.66E-04	1.82E-04	0.00E+00	4.04E-04	0.00E+00	0.00E+00	9.63E-04
0.00E+00	0.00E+00	1.03E-03	1.93E-04	0.00E+00	4.30E-04	0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	6.88E-04	1.29E-04	0.00E+00	2.88E-04	0.00E+00	0.00E+00	6.86E-04
0.00E+00	0.00E+00	7.04E-04	1.32E-04	0.00E+00	2.95E-04	0.00E+00	0.00E+00	7.02E-04
0.00E+00	0.00E+00	7.18E-04	1.35E-04	0.00E+00	3.01E-04	0.00E+00	0.00E+00	7.16E-04
0.00E+00	0.00E+00	7.30E-04	1.37E-04	0.00E+00	3.05E-04	0.00E+00	0.00E+00	7.28E-04
0.00E+00	0.00E+00	7.48E-04	1.41E-04	0.00E+00	3.13E-04	0.00E+00	0.00E+00	7.46E-04
0.00E+00	0.00E+00	7.69E-04	1.44E-04	0.00E+00	3.22E-04	0.00E+00	0.00E+00	7.67E-04
0.00E+00	0.00E+00	7.89E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.87E-04
0.00E+00	0.00E+00	8.10E-04	1.52E-04	0.00E+00	3.39E-04	0.00E+00	0.00E+00	8.08E-04
0.00E+00	0.00E+00	8.34E-04	1.57E-04	0.00E+00	3.49E-04	0.00E+00	0.00E+00	8.32E-04
0.00E+00	0.00E+00	8.66E-04	1.63E-04	0.00E+00	3.63E-04	0.00E+00	0.00E+00	8.64E-04
0.00E+00	0.00E+00	9.09E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.07E-04
0.00E+00	0.00E+00	9.68E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.65E-04
0.00E+00	0.00E+00	1.03E-03	1.94E-04	0.00E+00	4.32E-04	0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	7.00E-04	1.31E-04	0.00E+00	2.93E-04	0.00E+00	0.00E+00	6.98E-04
0.00E+00	0.00E+00	7.14E-04	1.34E-04	0.00E+00	2.99E-04	0.00E+00	0.00E+00	7.12E-04
0.00E+00	0.00E+00	7.27E-04	1.37E-04	0.00E+00	3.04E-04	0.00E+00	0.00E+00	7.25E-04
0.00E+00	0.00E+00	7.39E-04	1.39E-04	0.00E+00	3.09E-04	0.00E+00	0.00E+00	7.37E-04
0.00E+00	0.00E+00	7.51E-04	1.41E-04	0.00E+00	3.14E-04	0.00E+00	0.00E+00	7.48E-04
0.00E+00	0.00E+00	7.70E-04	1.45E-04	0.00E+00	3.22E-04	0.00E+00	0.00E+00	7.68E-04
0.00E+00	0.00E+00	7.91E-04	1.49E-04	0.00E+00	3.31E-04	0.00E+00	0.00E+00	7.89E-04
0.00E+00	0.00E+00	8.14E-04	1.53E-04	0.00E+00	3.41E-04	0.00E+00	0.00E+00	8.12E-04
0.00E+00	0.00E+00	8.41E-04	1.58E-04	0.00E+00	3.52E-04	0.00E+00	0.00E+00	8.38E-04
0.00E+00	0.00E+00	8.76E-04	1.65E-04	0.00E+00	3.66E-04	0.00E+00	0.00E+00	8.73E-04
0.00E+00	0.00E+00	9.16E-04	1.72E-04	0.00E+00	3.83E-04	0.00E+00	0.00E+00	9.13E-04
0.00E+00	0.00E+00	9.67E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.64E-04
0.00E+00	0.00E+00	1.04E-03	1.95E-04	0.00E+00	4.33E-04	0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	7.10E-04	1.33E-04	0.00E+00	2.97E-04	0.00E+00	0.00E+00	7.08E-04
0.00E+00	0.00E+00	7.26E-04	1.36E-04	0.00E+00	3.04E-04	0.00E+00	0.00E+00	7.24E-04
0.00E+00	0.00E+00	7.39E-04	1.39E-04	0.00E+00	3.09E-04	0.00E+00	0.00E+00	7.37E-04
0.00E+00	0.00E+00	7.51E-04	1.41E-04	0.00E+00	3.14E-04	0.00E+00	0.00E+00	7.49E-04
0.00E+00	0.00E+00	7.60E-04	1.43E-04	0.00E+00	3.18E-04	0.00E+00	0.00E+00	7.58E-04
0.00E+00	0.00E+00	7.72E-04	1.45E-04	0.00E+00	3.23E-04	0.00E+00	0.00E+00	7.70E-04
0.00E+00	0.00E+00	7.96E-04	1.50E-04	0.00E+00	3.33E-04	0.00E+00	0.00E+00	7.94E-04
0.00E+00	0.00E+00	8.21E-04	1.54E-04	0.00E+00	3.44E-04	0.00E+00	0.00E+00	8.19E-04
0.00E+00	0.00E+00	8.48E-04	1.59E-04	0.00E+00	3.55E-04	0.00E+00	0.00E+00	8.46E-04
0.00E+00	0.00E+00	8.83E-04	1.66E-04	0.00E+00	3.70E-04	0.00E+00	0.00E+00	8.81E-04
0.00E+00	0.00E+00	9.26E-04	1.74E-04	0.00E+00	3.88E-04	0.00E+00	0.00E+00	9.24E-04
0.00E+00	0.00E+00	9.77E-04	1.84E-04	0.00E+00	4.09E-04	0.00E+00	0.00E+00	9.75E-04
0.00E+00	0.00E+00	1.05E-03	1.97E-04	0.00E+00	4.38E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	7.17E-04	1.35E-04	0.00E+00	3.00E-04	0.00E+00	0.00E+00	7.15E-04

0.00E+00	0.00E+00	7.35E-04	1.38E-04	0.00E+00	3.07E-04	0.00E+00	0.00E+00	7.33E-04
0.00E+00	0.00E+00	7.50E-04	1.41E-04	0.00E+00	3.14E-04	0.00E+00	0.00E+00	7.48E-04
0.00E+00	0.00E+00	7.63E-04	1.43E-04	0.00E+00	3.19E-04	0.00E+00	0.00E+00	7.61E-04
0.00E+00	0.00E+00	7.77E-04	1.46E-04	0.00E+00	3.25E-04	0.00E+00	0.00E+00	7.75E-04
0.00E+00	0.00E+00	7.88E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.86E-04
0.00E+00	0.00E+00	8.00E-04	1.50E-04	0.00E+00	3.35E-04	0.00E+00	0.00E+00	7.98E-04
0.00E+00	0.00E+00	8.25E-04	1.55E-04	0.00E+00	3.45E-04	0.00E+00	0.00E+00	8.23E-04
0.00E+00	0.00E+00	8.54E-04	1.60E-04	0.00E+00	3.57E-04	0.00E+00	0.00E+00	8.52E-04
0.00E+00	0.00E+00	8.90E-04	1.67E-04	0.00E+00	3.72E-04	0.00E+00	0.00E+00	8.87E-04
0.00E+00	0.00E+00	9.41E-04	1.77E-04	0.00E+00	3.94E-04	0.00E+00	0.00E+00	9.38E-04
0.00E+00	0.00E+00	1.00E-03	1.88E-04	0.00E+00	4.18E-04	0.00E+00	0.00E+00	9.97E-04
0.00E+00	0.00E+00	1.06E-03	1.99E-04	0.00E+00	4.44E-04	0.00E+00	0.00E+00	1.06E-03
0.00E+00	0.00E+00	7.20E-04	1.35E-04	0.00E+00	3.02E-04	0.00E+00	0.00E+00	7.18E-04
0.00E+00	0.00E+00	7.40E-04	1.39E-04	0.00E+00	3.10E-04	0.00E+00	0.00E+00	7.38E-04
0.00E+00	0.00E+00	7.60E-04	1.43E-04	0.00E+00	3.18E-04	0.00E+00	0.00E+00	7.57E-04
0.00E+00	0.00E+00	7.77E-04	1.46E-04	0.00E+00	3.25E-04	0.00E+00	0.00E+00	7.75E-04
0.00E+00	0.00E+00	7.93E-04	1.49E-04	0.00E+00	3.32E-04	0.00E+00	0.00E+00	7.91E-04
0.00E+00	0.00E+00	8.05E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.03E-04
0.00E+00	0.00E+00	8.16E-04	1.53E-04	0.00E+00	3.42E-04	0.00E+00	0.00E+00	8.14E-04
0.00E+00	0.00E+00	8.28E-04	1.56E-04	0.00E+00	3.47E-04	0.00E+00	0.00E+00	8.26E-04
0.00E+00	0.00E+00	8.64E-04	1.62E-04	0.00E+00	3.62E-04	0.00E+00	0.00E+00	8.61E-04
0.00E+00	0.00E+00	9.03E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.01E-04
0.00E+00	0.00E+00	9.54E-04	1.79E-04	0.00E+00	3.99E-04	0.00E+00	0.00E+00	9.51E-04
0.00E+00	0.00E+00	1.01E-03	1.91E-04	0.00E+00	4.25E-04	0.00E+00	0.00E+00	1.01E-03
0.00E+00	0.00E+00	1.08E-03	2.03E-04	0.00E+00	4.51E-04	0.00E+00	0.00E+00	1.08E-03
0.00E+00	0.00E+00	7.22E-04	1.36E-04	0.00E+00	3.02E-04	0.00E+00	0.00E+00	7.20E-04
0.00E+00	0.00E+00	7.46E-04	1.40E-04	0.00E+00	3.12E-04	0.00E+00	0.00E+00	7.44E-04
0.00E+00	0.00E+00	7.69E-04	1.44E-04	0.00E+00	3.22E-04	0.00E+00	0.00E+00	7.67E-04
0.00E+00	0.00E+00	7.89E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.86E-04
0.00E+00	0.00E+00	8.05E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.03E-04
0.00E+00	0.00E+00	8.20E-04	1.54E-04	0.00E+00	3.43E-04	0.00E+00	0.00E+00	8.17E-04
0.00E+00	0.00E+00	8.36E-04	1.57E-04	0.00E+00	3.50E-04	0.00E+00	0.00E+00	8.33E-04
0.00E+00	0.00E+00	8.54E-04	1.61E-04	0.00E+00	3.58E-04	0.00E+00	0.00E+00	8.52E-04
0.00E+00	0.00E+00	8.73E-04	1.64E-04	0.00E+00	3.66E-04	0.00E+00	0.00E+00	8.71E-04
0.00E+00	0.00E+00	9.16E-04	1.72E-04	0.00E+00	3.83E-04	0.00E+00	0.00E+00	9.14E-04
0.00E+00	0.00E+00	9.64E-04	1.81E-04	0.00E+00	4.04E-04	0.00E+00	0.00E+00	9.62E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.28E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.09E-03	2.04E-04	0.00E+00	4.56E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	7.28E-04	1.37E-04	0.00E+00	3.05E-04	0.00E+00	0.00E+00	7.26E-04
0.00E+00	0.00E+00	7.52E-04	1.41E-04	0.00E+00	3.15E-04	0.00E+00	0.00E+00	7.50E-04
0.00E+00	0.00E+00	7.75E-04	1.46E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.73E-04
0.00E+00	0.00E+00	7.96E-04	1.49E-04	0.00E+00	3.33E-04	0.00E+00	0.00E+00	7.94E-04
0.00E+00	0.00E+00	8.17E-04	1.54E-04	0.00E+00	3.42E-04	0.00E+00	0.00E+00	8.15E-04
0.00E+00	0.00E+00	8.37E-04	1.57E-04	0.00E+00	3.50E-04	0.00E+00	0.00E+00	8.35E-04
0.00E+00	0.00E+00	8.58E-04	1.61E-04	0.00E+00	3.59E-04	0.00E+00	0.00E+00	8.56E-04
0.00E+00	0.00E+00	8.79E-04	1.65E-04	0.00E+00	3.68E-04	0.00E+00	0.00E+00	8.76E-04
0.00E+00	0.00E+00	9.00E-04	1.69E-04	0.00E+00	3.77E-04	0.00E+00	0.00E+00	8.97E-04

0.00E+00	0.00E+00	9.26E-04	1.74E-04	0.00E+00	3.88E-04	0.00E+00	0.00E+00	9.23E-04
0.00E+00	0.00E+00	9.72E-04	1.83E-04	0.00E+00	4.07E-04	0.00E+00	0.00E+00	9.70E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.29E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.09E-03	2.05E-04	0.00E+00	4.57E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	7.33E-04	1.38E-04	0.00E+00	3.07E-04	0.00E+00	0.00E+00	7.31E-04
0.00E+00	0.00E+00	7.59E-04	1.43E-04	0.00E+00	3.18E-04	0.00E+00	0.00E+00	7.57E-04
0.00E+00	0.00E+00	7.86E-04	1.48E-04	0.00E+00	3.29E-04	0.00E+00	0.00E+00	7.84E-04
0.00E+00	0.00E+00	8.12E-04	1.52E-04	0.00E+00	3.40E-04	0.00E+00	0.00E+00	8.09E-04
0.00E+00	0.00E+00	8.35E-04	1.57E-04	0.00E+00	3.49E-04	0.00E+00	0.00E+00	8.32E-04
0.00E+00	0.00E+00	8.57E-04	1.61E-04	0.00E+00	3.59E-04	0.00E+00	0.00E+00	8.55E-04
0.00E+00	0.00E+00	8.81E-04	1.65E-04	0.00E+00	3.69E-04	0.00E+00	0.00E+00	8.78E-04
0.00E+00	0.00E+00	9.02E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.00E-04
0.00E+00	0.00E+00	9.26E-04	1.74E-04	0.00E+00	3.88E-04	0.00E+00	0.00E+00	9.23E-04
0.00E+00	0.00E+00	9.49E-04	1.78E-04	0.00E+00	3.97E-04	0.00E+00	0.00E+00	9.46E-04
0.00E+00	0.00E+00	9.77E-04	1.84E-04	0.00E+00	4.09E-04	0.00E+00	0.00E+00	9.74E-04
0.00E+00	0.00E+00	1.03E-03	1.93E-04	0.00E+00	4.30E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.09E-03	2.05E-04	0.00E+00	4.56E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	7.37E-04	1.38E-04	0.00E+00	3.09E-04	0.00E+00	0.00E+00	7.35E-04
0.00E+00	0.00E+00	7.67E-04	1.44E-04	0.00E+00	3.21E-04	0.00E+00	0.00E+00	7.65E-04
0.00E+00	0.00E+00	7.99E-04	1.50E-04	0.00E+00	3.34E-04	0.00E+00	0.00E+00	7.97E-04
0.00E+00	0.00E+00	8.29E-04	1.56E-04	0.00E+00	3.47E-04	0.00E+00	0.00E+00	8.27E-04
0.00E+00	0.00E+00	8.57E-04	1.61E-04	0.00E+00	3.59E-04	0.00E+00	0.00E+00	8.55E-04
0.00E+00	0.00E+00	8.85E-04	1.66E-04	0.00E+00	3.70E-04	0.00E+00	0.00E+00	8.82E-04
0.00E+00	0.00E+00	9.11E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.09E-04
0.00E+00	0.00E+00	9.38E-04	1.76E-04	0.00E+00	3.93E-04	0.00E+00	0.00E+00	9.36E-04
0.00E+00	0.00E+00	9.64E-04	1.81E-04	0.00E+00	4.03E-04	0.00E+00	0.00E+00	9.61E-04
0.00E+00	0.00E+00	9.88E-04	1.86E-04	0.00E+00	4.13E-04	0.00E+00	0.00E+00	9.85E-04
0.00E+00	0.00E+00	1.01E-03	1.90E-04	0.00E+00	4.23E-04	0.00E+00	0.00E+00	1.01E-03
0.00E+00	0.00E+00	1.04E-03	1.96E-04	0.00E+00	4.37E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	1.10E-03	2.06E-04	0.00E+00	4.60E-04	0.00E+00	0.00E+00	1.10E-03
0.00E+00	0.00E+00	7.47E-04	1.40E-04	0.00E+00	3.12E-04	0.00E+00	0.00E+00	7.44E-04
0.00E+00	0.00E+00	7.78E-04	1.46E-04	0.00E+00	3.25E-04	0.00E+00	0.00E+00	7.76E-04
0.00E+00	0.00E+00	8.11E-04	1.52E-04	0.00E+00	3.40E-04	0.00E+00	0.00E+00	8.09E-04
0.00E+00	0.00E+00	8.45E-04	1.59E-04	0.00E+00	3.54E-04	0.00E+00	0.00E+00	8.43E-04
0.00E+00	0.00E+00	8.78E-04	1.65E-04	0.00E+00	3.67E-04	0.00E+00	0.00E+00	8.75E-04
0.00E+00	0.00E+00	9.09E-04	1.71E-04	0.00E+00	3.80E-04	0.00E+00	0.00E+00	9.06E-04
0.00E+00	0.00E+00	9.40E-04	1.77E-04	0.00E+00	3.93E-04	0.00E+00	0.00E+00	9.38E-04
0.00E+00	0.00E+00	9.69E-04	1.82E-04	0.00E+00	4.06E-04	0.00E+00	0.00E+00	9.67E-04
0.00E+00	0.00E+00	9.97E-04	1.87E-04	0.00E+00	4.17E-04	0.00E+00	0.00E+00	9.94E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.28E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.04E-03	1.96E-04	0.00E+00	4.37E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	1.07E-03	2.00E-04	0.00E+00	4.46E-04	0.00E+00	0.00E+00	1.06E-03
0.00E+00	0.00E+00	1.11E-03	2.09E-04	0.00E+00	4.66E-04	0.00E+00	0.00E+00	1.11E-03
0.00E+00	0.00E+00	7.54E-04	1.42E-04	0.00E+00	3.15E-04	0.00E+00	0.00E+00	7.52E-04
0.00E+00	0.00E+00	7.86E-04	1.48E-04	0.00E+00	3.29E-04	0.00E+00	0.00E+00	7.84E-04
0.00E+00	0.00E+00	8.20E-04	1.54E-04	0.00E+00	3.43E-04	0.00E+00	0.00E+00	8.18E-04
0.00E+00	0.00E+00	8.57E-04	1.61E-04	0.00E+00	3.59E-04	0.00E+00	0.00E+00	8.55E-04

0.00E+00	0.00E+00	8.94E-04	1.68E-04	0.00E+00	3.74E-04	0.00E+00	0.00E+00	8.92E-04
0.00E+00	0.00E+00	9.30E-04	1.75E-04	0.00E+00	3.89E-04	0.00E+00	0.00E+00	9.27E-04
0.00E+00	0.00E+00	9.64E-04	1.81E-04	0.00E+00	4.04E-04	0.00E+00	0.00E+00	9.62E-04
0.00E+00	0.00E+00	9.97E-04	1.87E-04	0.00E+00	4.17E-04	0.00E+00	0.00E+00	9.94E-04
0.00E+00	0.00E+00	1.03E-03	1.93E-04	0.00E+00	4.29E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.05E-03	1.98E-04	0.00E+00	4.40E-04	0.00E+00	0.00E+00	1.05E-03
0.00E+00	0.00E+00	1.08E-03	2.02E-04	0.00E+00	4.50E-04	0.00E+00	0.00E+00	1.07E-03
0.00E+00	0.00E+00	1.10E-03	2.06E-04	0.00E+00	4.59E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	1.13E-03	2.12E-04	0.00E+00	4.71E-04	0.00E+00	0.00E+00	1.12E-03
0.00E+00	0.00E+00	7.64E-04	1.44E-04	0.00E+00	3.20E-04	0.00E+00	0.00E+00	7.62E-04
0.00E+00	0.00E+00	7.99E-04	1.50E-04	0.00E+00	3.34E-04	0.00E+00	0.00E+00	7.97E-04
0.00E+00	0.00E+00	8.33E-04	1.56E-04	0.00E+00	3.49E-04	0.00E+00	0.00E+00	8.30E-04
0.00E+00	0.00E+00	8.70E-04	1.63E-04	0.00E+00	3.64E-04	0.00E+00	0.00E+00	8.68E-04
0.00E+00	0.00E+00	9.11E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.08E-04
0.00E+00	0.00E+00	9.49E-04	1.78E-04	0.00E+00	3.97E-04	0.00E+00	0.00E+00	9.47E-04
0.00E+00	0.00E+00	9.86E-04	1.85E-04	0.00E+00	4.13E-04	0.00E+00	0.00E+00	9.83E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.27E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.05E-03	1.97E-04	0.00E+00	4.40E-04	0.00E+00	0.00E+00	1.05E-03
0.00E+00	0.00E+00	1.08E-03	2.02E-04	0.00E+00	4.51E-04	0.00E+00	0.00E+00	1.07E-03
0.00E+00	0.00E+00	1.10E-03	2.07E-04	0.00E+00	4.61E-04	0.00E+00	0.00E+00	1.10E-03
0.00E+00	0.00E+00	1.12E-03	2.11E-04	0.00E+00	4.70E-04	0.00E+00	0.00E+00	1.12E-03
0.00E+00	0.00E+00	1.14E-03	2.14E-04	0.00E+00	4.77E-04	0.00E+00	0.00E+00	1.14E-03
0.00E+00	0.00E+00	7.74E-04	1.45E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.72E-04
0.00E+00	0.00E+00	8.13E-04	1.53E-04	0.00E+00	3.40E-04	0.00E+00	0.00E+00	8.10E-04
0.00E+00	0.00E+00	8.51E-04	1.60E-04	0.00E+00	3.56E-04	0.00E+00	0.00E+00	8.48E-04
0.00E+00	0.00E+00	8.90E-04	1.67E-04	0.00E+00	3.73E-04	0.00E+00	0.00E+00	8.88E-04
0.00E+00	0.00E+00	9.35E-04	1.76E-04	0.00E+00	3.91E-04	0.00E+00	0.00E+00	9.33E-04
0.00E+00	0.00E+00	9.78E-04	1.84E-04	0.00E+00	4.09E-04	0.00E+00	0.00E+00	9.75E-04
0.00E+00	0.00E+00	1.02E-03	1.91E-04	0.00E+00	4.27E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.06E-03	1.99E-04	0.00E+00	4.42E-04	0.00E+00	0.00E+00	1.05E-03
0.00E+00	0.00E+00	1.09E-03	2.05E-04	0.00E+00	4.56E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	1.12E-03	2.10E-04	0.00E+00	4.68E-04	0.00E+00	0.00E+00	1.12E-03
0.00E+00	0.00E+00	1.14E-03	2.15E-04	0.00E+00	4.79E-04	0.00E+00	0.00E+00	1.14E-03
0.00E+00	0.00E+00	1.16E-03	2.19E-04	0.00E+00	4.87E-04	0.00E+00	0.00E+00	1.16E-03
0.00E+00	0.00E+00	1.18E-03	2.22E-04	0.00E+00	4.94E-04	0.00E+00	0.00E+00	1.18E-03
0.00E+00	0.00E+00	7.83E-04	1.47E-04	0.00E+00	3.28E-04	0.00E+00	0.00E+00	7.81E-04
0.00E+00	0.00E+00	8.23E-04	1.55E-04	0.00E+00	3.45E-04	0.00E+00	0.00E+00	8.21E-04
0.00E+00	0.00E+00	8.66E-04	1.63E-04	0.00E+00	3.62E-04	0.00E+00	0.00E+00	8.63E-04
0.00E+00	0.00E+00	9.09E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.07E-04
0.00E+00	0.00E+00	9.54E-04	1.79E-04	0.00E+00	3.99E-04	0.00E+00	0.00E+00	9.52E-04
0.00E+00	0.00E+00	1.00E-03	1.88E-04	0.00E+00	4.19E-04	0.00E+00	0.00E+00	9.99E-04
0.00E+00	0.00E+00	1.05E-03	1.97E-04	0.00E+00	4.38E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	1.09E-03	2.05E-04	0.00E+00	4.56E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	1.13E-03	2.11E-04	0.00E+00	4.71E-04	0.00E+00	0.00E+00	1.12E-03
0.00E+00	0.00E+00	1.16E-03	2.17E-04	0.00E+00	4.84E-04	0.00E+00	0.00E+00	1.15E-03
0.00E+00	0.00E+00	1.18E-03	2.22E-04	0.00E+00	4.96E-04	0.00E+00	0.00E+00	1.18E-03
0.00E+00	0.00E+00	1.21E-03	2.26E-04	0.00E+00	5.05E-04	0.00E+00	0.00E+00	1.20E-03

0.00E+00	0.00E+00	1.22E-03	2.30E-04	0.00E+00	5.12E-04	0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	7.88E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.85E-04
0.00E+00	0.00E+00	8.31E-04	1.56E-04	0.00E+00	3.48E-04	0.00E+00	0.00E+00	8.29E-04
0.00E+00	0.00E+00	8.76E-04	1.65E-04	0.00E+00	3.67E-04	0.00E+00	0.00E+00	8.74E-04
0.00E+00	0.00E+00	9.23E-04	1.73E-04	0.00E+00	3.86E-04	0.00E+00	0.00E+00	9.20E-04
0.00E+00	0.00E+00	9.69E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.66E-04
0.00E+00	0.00E+00	1.02E-03	1.92E-04	0.00E+00	4.27E-04	0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	1.07E-03	2.01E-04	0.00E+00	4.48E-04	0.00E+00	0.00E+00	1.07E-03
0.00E+00	0.00E+00	1.11E-03	2.09E-04	0.00E+00	4.67E-04	0.00E+00	0.00E+00	1.11E-03
0.00E+00	0.00E+00	1.16E-03	2.17E-04	0.00E+00	4.84E-04	0.00E+00	0.00E+00	1.15E-03
0.00E+00	0.00E+00	1.19E-03	2.24E-04	0.00E+00	4.99E-04	0.00E+00	0.00E+00	1.19E-03
0.00E+00	0.00E+00	1.22E-03	2.30E-04	0.00E+00	5.12E-04	0.00E+00	0.00E+00	1.22E-03
0.00E+00	0.00E+00	1.25E-03	2.35E-04	0.00E+00	5.23E-04	0.00E+00	0.00E+00	1.25E-03
0.00E+00	0.00E+00	1.28E-03	2.40E-04	0.00E+00	5.34E-04	0.00E+00	0.00E+00	1.27E-03
0.00E+00	0.00E+00	9.60E-04	1.80E-04	0.00E+00	4.02E-04	0.00E+00	0.00E+00	9.58E-04
0.00E+00	0.00E+00	9.93E-04	1.87E-04	0.00E+00	4.16E-04	0.00E+00	0.00E+00	9.90E-04
0.00E+00	0.00E+00	1.17E-03	2.19E-04	0.00E+00	4.89E-04	0.00E+00	0.00E+00	1.16E-03
0.00E+00	0.00E+00	9.56E-04	1.80E-04	0.00E+00	4.00E-04	0.00E+00	0.00E+00	9.53E-04
0.00E+00	0.00E+00	9.89E-04	1.86E-04	0.00E+00	4.14E-04	0.00E+00	0.00E+00	9.86E-04
0.00E+00	0.00E+00	1.16E-03	2.18E-04	0.00E+00	4.85E-04	0.00E+00	0.00E+00	1.16E-03
0.00E+00	0.00E+00	9.42E-04	1.77E-04	0.00E+00	3.94E-04	0.00E+00	0.00E+00	9.40E-04
0.00E+00	0.00E+00	9.75E-04	1.83E-04	0.00E+00	4.08E-04	0.00E+00	0.00E+00	9.72E-04
0.00E+00	0.00E+00	1.14E-03	2.14E-04	0.00E+00	4.77E-04	0.00E+00	0.00E+00	1.14E-03
0.00E+00	0.00E+00	9.02E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.00E-04
0.00E+00	0.00E+00	9.36E-04	1.76E-04	0.00E+00	3.92E-04	0.00E+00	0.00E+00	9.34E-04
0.00E+00	0.00E+00	1.09E-03	2.05E-04	0.00E+00	4.57E-04	0.00E+00	0.00E+00	1.09E-03
0.00E+00	0.00E+00	8.82E-04	1.66E-04	0.00E+00	3.69E-04	0.00E+00	0.00E+00	8.79E-04
0.00E+00	0.00E+00	9.13E-04	1.72E-04	0.00E+00	3.82E-04	0.00E+00	0.00E+00	9.10E-04
0.00E+00	0.00E+00	1.06E-03	2.00E-04	0.00E+00	4.45E-04	0.00E+00	0.00E+00	1.06E-03
0.00E+00	0.00E+00	8.82E-04	1.66E-04	0.00E+00	3.69E-04	0.00E+00	0.00E+00	8.80E-04
0.00E+00	0.00E+00	9.10E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.08E-04
0.00E+00	0.00E+00	1.04E-03	1.96E-04	0.00E+00	4.37E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	7.91E-04	1.49E-04	0.00E+00	3.31E-04	0.00E+00	0.00E+00	7.89E-04
0.00E+00	0.00E+00	8.17E-04	1.53E-04	0.00E+00	3.42E-04	0.00E+00	0.00E+00	8.15E-04
0.00E+00	0.00E+00	9.46E-04	1.78E-04	0.00E+00	3.96E-04	0.00E+00	0.00E+00	9.43E-04
0.00E+00	0.00E+00	8.00E-04	1.50E-04	0.00E+00	3.35E-04	0.00E+00	0.00E+00	7.97E-04
0.00E+00	0.00E+00	8.71E-04	1.64E-04	0.00E+00	3.65E-04	0.00E+00	0.00E+00	8.69E-04
0.00E+00	0.00E+00	9.67E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.65E-04
0.00E+00	0.00E+00	8.05E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.02E-04
0.00E+00	0.00E+00	8.77E-04	1.65E-04	0.00E+00	3.67E-04	0.00E+00	0.00E+00	8.74E-04
0.00E+00	0.00E+00	9.73E-04	1.83E-04	0.00E+00	4.07E-04	0.00E+00	0.00E+00	9.70E-04
0.00E+00	0.00E+00	7.77E-04	1.46E-04	0.00E+00	3.25E-04	0.00E+00	0.00E+00	7.74E-04
0.00E+00	0.00E+00	8.48E-04	1.59E-04	0.00E+00	3.55E-04	0.00E+00	0.00E+00	8.45E-04
0.00E+00	0.00E+00	9.51E-04	1.79E-04	0.00E+00	3.98E-04	0.00E+00	0.00E+00	9.49E-04
0.00E+00	0.00E+00	8.19E-04	1.54E-04	0.00E+00	3.43E-04	0.00E+00	0.00E+00	8.16E-04
0.00E+00	0.00E+00	8.49E-04	1.59E-04	0.00E+00	3.55E-04	0.00E+00	0.00E+00	8.46E-04
0.00E+00	0.00E+00	9.94E-04	1.87E-04	0.00E+00	4.16E-04	0.00E+00	0.00E+00	9.91E-04

0.00E+00	0.00E+00	8.54E-04	1.61E-04	0.00E+00	3.58E-04	0.00E+00	0.00E+00	8.52E-04
0.00E+00	0.00E+00	8.89E-04	1.67E-04	0.00E+00	3.72E-04	0.00E+00	0.00E+00	8.87E-04
0.00E+00	0.00E+00	1.04E-03	1.96E-04	0.00E+00	4.37E-04	0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	8.71E-04	1.64E-04	0.00E+00	3.65E-04	0.00E+00	0.00E+00	8.69E-04
0.00E+00	0.00E+00	9.03E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.01E-04
0.00E+00	0.00E+00	1.06E-03	2.00E-04	0.00E+00	4.45E-04	0.00E+00	0.00E+00	1.06E-03
0.00E+00	0.00E+00	8.79E-04	1.65E-04	0.00E+00	3.68E-04	0.00E+00	0.00E+00	8.76E-04
0.00E+00	0.00E+00	9.11E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.09E-04
0.00E+00	0.00E+00	1.07E-03	2.02E-04	0.00E+00	4.50E-04	0.00E+00	0.00E+00	1.07E-03
0.00E+00	0.00E+00	8.38E-04	1.57E-04	0.00E+00	3.51E-04	0.00E+00	0.00E+00	8.35E-04
0.00E+00	0.00E+00	8.70E-04	1.63E-04	0.00E+00	3.64E-04	0.00E+00	0.00E+00	8.68E-04
0.00E+00	0.00E+00	1.03E-03	1.93E-04	0.00E+00	4.30E-04	0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	9.80E-04	1.84E-04	0.00E+00	4.10E-04	0.00E+00	0.00E+00	9.77E-04
0.00E+00	0.00E+00	9.75E-04	1.83E-04	0.00E+00	4.08E-04	0.00E+00	0.00E+00	9.72E-04
0.00E+00	0.00E+00	9.68E-04	1.82E-04	0.00E+00	4.05E-04	0.00E+00	0.00E+00	9.65E-04
0.00E+00	0.00E+00	9.65E-04	1.81E-04	0.00E+00	4.04E-04	0.00E+00	0.00E+00	9.63E-04
0.00E+00	0.00E+00	9.63E-04	1.81E-04	0.00E+00	4.03E-04	0.00E+00	0.00E+00	9.61E-04
0.00E+00	0.00E+00	9.56E-04	1.80E-04	0.00E+00	4.00E-04	0.00E+00	0.00E+00	9.54E-04
0.00E+00	0.00E+00	9.50E-04	1.78E-04	0.00E+00	3.97E-04	0.00E+00	0.00E+00	9.47E-04
0.00E+00	0.00E+00	9.38E-04	1.76E-04	0.00E+00	3.92E-04	0.00E+00	0.00E+00	9.35E-04
0.00E+00	0.00E+00	9.27E-04	1.74E-04	0.00E+00	3.88E-04	0.00E+00	0.00E+00	9.25E-04
0.00E+00	0.00E+00	9.11E-04	1.71E-04	0.00E+00	3.81E-04	0.00E+00	0.00E+00	9.08E-04
0.00E+00	0.00E+00	9.03E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.01E-04
0.00E+00	0.00E+00	8.97E-04	1.68E-04	0.00E+00	3.75E-04	0.00E+00	0.00E+00	8.94E-04
0.00E+00	0.00E+00	8.86E-04	1.66E-04	0.00E+00	3.71E-04	0.00E+00	0.00E+00	8.83E-04
0.00E+00	0.00E+00	8.87E-04	1.67E-04	0.00E+00	3.71E-04	0.00E+00	0.00E+00	8.85E-04
0.00E+00	0.00E+00	8.91E-04	1.67E-04	0.00E+00	3.73E-04	0.00E+00	0.00E+00	8.89E-04
0.00E+00	0.00E+00	8.97E-04	1.68E-04	0.00E+00	3.75E-04	0.00E+00	0.00E+00	8.94E-04
0.00E+00	0.00E+00	8.99E-04	1.69E-04	0.00E+00	3.76E-04	0.00E+00	0.00E+00	8.96E-04
0.00E+00	0.00E+00	9.03E-04	1.70E-04	0.00E+00	3.78E-04	0.00E+00	0.00E+00	9.01E-04
0.00E+00	0.00E+00	8.77E-04	1.65E-04	0.00E+00	3.67E-04	0.00E+00	0.00E+00	8.75E-04
0.00E+00	0.00E+00	8.57E-04	1.61E-04	0.00E+00	3.59E-04	0.00E+00	0.00E+00	8.55E-04
0.00E+00	0.00E+00	8.41E-04	1.58E-04	0.00E+00	3.52E-04	0.00E+00	0.00E+00	8.38E-04
0.00E+00	0.00E+00	8.25E-04	1.55E-04	0.00E+00	3.45E-04	0.00E+00	0.00E+00	8.22E-04
0.00E+00	0.00E+00	8.09E-04	1.52E-04	0.00E+00	3.38E-04	0.00E+00	0.00E+00	8.07E-04
0.00E+00	0.00E+00	8.06E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.04E-04
0.00E+00	0.00E+00	8.06E-04	1.51E-04	0.00E+00	3.37E-04	0.00E+00	0.00E+00	8.03E-04
0.00E+00	0.00E+00	8.08E-04	1.52E-04	0.00E+00	3.38E-04	0.00E+00	0.00E+00	8.05E-04
0.00E+00	0.00E+00	8.10E-04	1.52E-04	0.00E+00	3.39E-04	0.00E+00	0.00E+00	8.07E-04
0.00E+00	0.00E+00	8.12E-04	1.53E-04	0.00E+00	3.40E-04	0.00E+00	0.00E+00	8.10E-04
0.00E+00	0.00E+00	8.16E-04	1.53E-04	0.00E+00	3.41E-04	0.00E+00	0.00E+00	8.13E-04
0.00E+00	0.00E+00	8.20E-04	1.54E-04	0.00E+00	3.43E-04	0.00E+00	0.00E+00	8.18E-04
0.00E+00	0.00E+00	8.29E-04	1.56E-04	0.00E+00	3.47E-04	0.00E+00	0.00E+00	8.27E-04
0.00E+00	0.00E+00	8.07E-04	1.52E-04	0.00E+00	3.38E-04	0.00E+00	0.00E+00	8.04E-04
0.00E+00	0.00E+00	7.89E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.87E-04
0.00E+00	0.00E+00	7.75E-04	1.46E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.73E-04
0.00E+00	0.00E+00	7.74E-04	1.45E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.72E-04

0.00E+00	0.00E+00	7.73E-04	1.45E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.71E-04
0.00E+00	0.00E+00	7.72E-04	1.45E-04	0.00E+00	3.23E-04	0.00E+00	0.00E+00	7.70E-04
0.00E+00	0.00E+00	7.70E-04	1.45E-04	0.00E+00	3.22E-04	0.00E+00	0.00E+00	7.68E-04
0.00E+00	0.00E+00	7.66E-04	1.44E-04	0.00E+00	3.21E-04	0.00E+00	0.00E+00	7.64E-04
0.00E+00	0.00E+00	7.63E-04	1.43E-04	0.00E+00	3.19E-04	0.00E+00	0.00E+00	7.61E-04
0.00E+00	0.00E+00	7.59E-04	1.43E-04	0.00E+00	3.18E-04	0.00E+00	0.00E+00	7.57E-04
0.00E+00	0.00E+00	7.61E-04	1.43E-04	0.00E+00	3.19E-04	0.00E+00	0.00E+00	7.59E-04
0.00E+00	0.00E+00	7.67E-04	1.44E-04	0.00E+00	3.21E-04	0.00E+00	0.00E+00	7.65E-04
0.00E+00	0.00E+00	7.74E-04	1.45E-04	0.00E+00	3.24E-04	0.00E+00	0.00E+00	7.72E-04
0.00E+00	0.00E+00	7.81E-04	1.47E-04	0.00E+00	3.27E-04	0.00E+00	0.00E+00	7.79E-04
0.00E+00	0.00E+00	7.86E-04	1.48E-04	0.00E+00	3.29E-04	0.00E+00	0.00E+00	7.84E-04
0.00E+00	0.00E+00	7.88E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.86E-04
0.00E+00	0.00E+00	7.89E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.87E-04
0.00E+00	0.00E+00	7.88E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.86E-04
0.00E+00	0.00E+00	7.89E-04	1.48E-04	0.00E+00	3.30E-04	0.00E+00	0.00E+00	7.87E-04
0.00E+00	0.00E+00	7.91E-04	1.49E-04	0.00E+00	3.31E-04	0.00E+00	0.00E+00	7.89E-04
0.00E+00	0.00E+00	7.93E-04	1.49E-04	0.00E+00	3.32E-04	0.00E+00	0.00E+00	7.91E-04
0.00E+00	0.00E+00	7.95E-04	1.49E-04	0.00E+00	3.33E-04	0.00E+00	0.00E+00	7.92E-04
0.00E+00	0.00E+00	7.93E-04	1.49E-04	0.00E+00	3.32E-04	0.00E+00	0.00E+00	7.91E-04
0.00E+00	0.00E+00	7.91E-04	1.49E-04	0.00E+00	3.31E-04	0.00E+00	0.00E+00	7.89E-04
0.00E+00	0.00E+00	7.90E-04	1.48E-04	0.00E+00	3.31E-04	0.00E+00	0.00E+00	7.88E-04
0.00E+00	0.00E+00	8.10E-04	1.52E-04	0.00E+00	3.39E-04	0.00E+00	0.00E+00	8.08E-04
0.00E+00	0.00E+00	8.31E-04	1.56E-04	0.00E+00	3.48E-04	0.00E+00	0.00E+00	8.29E-04
0.00E+00	0.00E+00	8.53E-04	1.60E-04	0.00E+00	3.57E-04	0.00E+00	0.00E+00	8.50E-04
0.00E+00	0.00E+00	8.76E-04	1.65E-04	0.00E+00	3.67E-04	0.00E+00	0.00E+00	8.74E-04
0.00E+00	0.00E+00	9.07E-04	1.70E-04	0.00E+00	3.80E-04	0.00E+00	0.00E+00	9.05E-04
0.00E+00	0.00E+00	9.36E-04	1.76E-04	0.00E+00	3.92E-04	0.00E+00	0.00E+00	9.34E-04
0.00E+00	0.00E+00	9.65E-04	1.81E-04	0.00E+00	4.04E-04	0.00E+00	0.00E+00	9.62E-04

ODOR	GENERAL	MAXHI
0.00E+00	0.00E+00	6.37E-04
0.00E+00	0.00E+00	6.56E-04
0.00E+00	0.00E+00	6.75E-04
0.00E+00	0.00E+00	6.98E-04
0.00E+00	0.00E+00	7.21E-04
0.00E+00	0.00E+00	7.44E-04
0.00E+00	0.00E+00	7.74E-04
0.00E+00	0.00E+00	8.13E-04
0.00E+00	0.00E+00	8.53E-04
0.00E+00	0.00E+00	8.93E-04
0.00E+00	0.00E+00	9.32E-04
0.00E+00	0.00E+00	9.78E-04
0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.50E-04
0.00E+00	0.00E+00	6.66E-04
0.00E+00	0.00E+00	6.87E-04
0.00E+00	0.00E+00	7.07E-04
0.00E+00	0.00E+00	7.27E-04
0.00E+00	0.00E+00	7.50E-04
0.00E+00	0.00E+00	7.75E-04
0.00E+00	0.00E+00	8.08E-04
0.00E+00	0.00E+00	8.48E-04
0.00E+00	0.00E+00	8.89E-04
0.00E+00	0.00E+00	9.30E-04
0.00E+00	0.00E+00	9.75E-04
0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.65E-04
0.00E+00	0.00E+00	6.78E-04
0.00E+00	0.00E+00	6.96E-04
0.00E+00	0.00E+00	7.16E-04
0.00E+00	0.00E+00	7.37E-04
0.00E+00	0.00E+00	7.58E-04
0.00E+00	0.00E+00	7.79E-04
0.00E+00	0.00E+00	8.05E-04
0.00E+00	0.00E+00	8.40E-04
0.00E+00	0.00E+00	8.81E-04
0.00E+00	0.00E+00	9.24E-04
0.00E+00	0.00E+00	9.68E-04
0.00E+00	0.00E+00	1.02E-03
0.00E+00	0.00E+00	6.77E-04
0.00E+00	0.00E+00	6.93E-04
0.00E+00	0.00E+00	7.06E-04
0.00E+00	0.00E+00	7.24E-04
0.00E+00	0.00E+00	7.44E-04
0.00E+00	0.00E+00	7.65E-04

0.00E+00	0.00E+00	7.85E-04
0.00E+00	0.00E+00	8.07E-04
0.00E+00	0.00E+00	8.34E-04
0.00E+00	0.00E+00	8.69E-04
0.00E+00	0.00E+00	9.13E-04
0.00E+00	0.00E+00	9.66E-04
0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	6.88E-04
0.00E+00	0.00E+00	7.04E-04
0.00E+00	0.00E+00	7.18E-04
0.00E+00	0.00E+00	7.30E-04
0.00E+00	0.00E+00	7.48E-04
0.00E+00	0.00E+00	7.69E-04
0.00E+00	0.00E+00	7.89E-04
0.00E+00	0.00E+00	8.10E-04
0.00E+00	0.00E+00	8.34E-04
0.00E+00	0.00E+00	8.66E-04
0.00E+00	0.00E+00	9.09E-04
0.00E+00	0.00E+00	9.68E-04
0.00E+00	0.00E+00	1.03E-03
0.00E+00	0.00E+00	7.00E-04
0.00E+00	0.00E+00	7.14E-04
0.00E+00	0.00E+00	7.27E-04
0.00E+00	0.00E+00	7.39E-04
0.00E+00	0.00E+00	7.51E-04
0.00E+00	0.00E+00	7.70E-04
0.00E+00	0.00E+00	7.91E-04
0.00E+00	0.00E+00	8.14E-04
0.00E+00	0.00E+00	8.41E-04
0.00E+00	0.00E+00	8.76E-04
0.00E+00	0.00E+00	9.16E-04
0.00E+00	0.00E+00	9.67E-04
0.00E+00	0.00E+00	1.04E-03
0.00E+00	0.00E+00	7.10E-04
0.00E+00	0.00E+00	7.26E-04
0.00E+00	0.00E+00	7.39E-04
0.00E+00	0.00E+00	7.51E-04
0.00E+00	0.00E+00	7.60E-04
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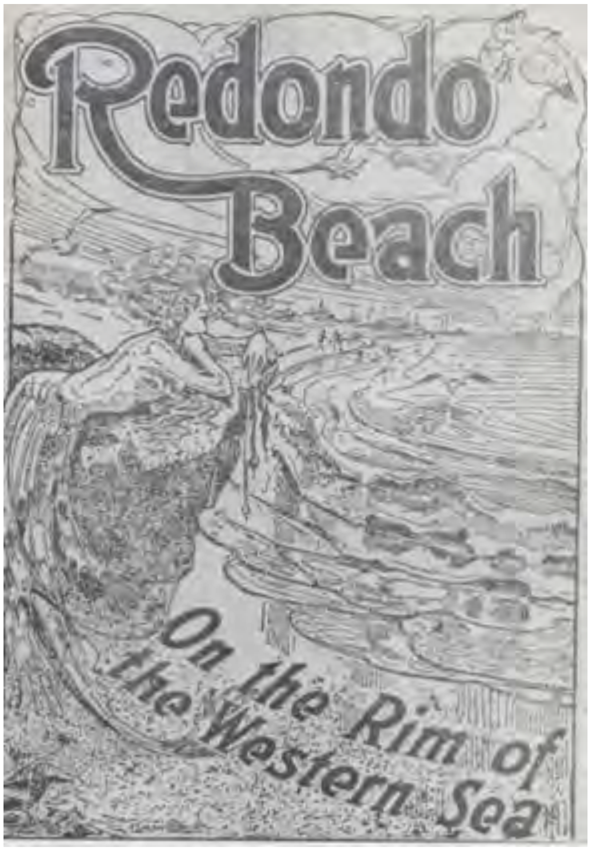
Appendix F

Historic Resource Evaluation and Preservation Plan



100-132 N. Catalina Avenue
Redondo Beach, California
Historic Resource Evaluation

November 20, 2020

Submitted by:

Kaplan Chen Kaplan
2526 Eighteenth Street
Santa Monica, CA 90405

David Kaplan, Principal
Pam O'Connor, Architectural Historian

Table of Contents

Executive Summary and Purpose 1
Summary of Research and Field Methodology 2
Regulatory Framework 2
Project Location and Setting 7
History of Commercial/Industrial Development in Redondo Beach. 8
Development History of 100 Block of N. Catalina Avenue 21
History and Description of Buildings 28
Review of Previous Surveys 50
Evaluation of Significance 52
Proposed Project and Potential Impacts 75
Conclusion 91
References 92

Attachments

Attachment A: Maps
Attachment B: Historic Aerial Photographs and Sanborn Insurance Maps

EXECUTIVE SUMMARY AND PURPOSE

This report, completed by Kaplan Chen Kaplan, presents the findings of the historic resources evaluation conducted regarding the properties at 100 N. Catalina Avenue, 112 N. Catalina Avenue, 116 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue, and 132 N. Catalina Avenue. All of the properties, except 100 N. Catalina Avenue, contain buildings.

Based on the facts and evidence presented this report, none of the properties meet the criteria to be eligible for inclusion on the National Register of Historic Places or for the California Register of Historical Resources. The properties at 112 N. Catalina Avenue and 126 N. Catalina Avenue appear eligible as City of Redondo Beach individual landmarks.

The buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue are eligible contributing buildings to a City of Redondo Beach Historic District. The buildings are rare resources representing early 20th Century commercial development in Redondo Beach as very few early 20th Century commercial buildings remain. The subject buildings represent the continuum of commercial building property types in Redondo Beach during the first half of the 20th Century, 1904 to 1949. Although the buildings have undergone alteration over the decades, they all still retain original form and massing and enough character-defining features that guide rehabilitation of the buildings.

The property at 116 N. Catalina Avenue does not meet the criteria for designation as a City of Redondo Beach Landmark as it no longer retains its original form and massing which was lost when the building was remodeled from a hybrid residential-commercial building into a commercial building.

The proposed project, Catalina Village is adaptive reuse and rehabilitation of the buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue. The parcels will be consolidated along with the undeveloped parcel at the corner of N. Catalina Avenue and Emerald Avenue. New residential buildings will be constructed at the rear of the subject parcels as well as on the front of the undeveloped corner parcel.

This report provides an analysis and evaluation of the project regarding its compliance with the Secretary of the Interior's Standards for Rehabilitation. The proposed adaptive reuse and rehabilitation of the eligible properties comply with the Standards. The properties are in an urbanized neighborhood and there are residential multi-family buildings to the east and west. The addition of the new residential buildings on the subject properties provide a uniform and neutral backdrop for the historic buildings. The addition of the new buildings will not have an adverse impact on the eligible historic district.

The findings of this report are the result of thorough research, field observations and property evaluations using current technical guidance from national, state, and local historic preservation agencies.

SUMMARY OF RESEARCH AND METHODOLOGY

A comprehensive methodology for researching the development history of properties and evaluation of the research to determine potential historic eligibility included conducting the following activities:

- Field review of subject properties in March 2019 and March 2020
- Field review of adjacent area in March 2019 and March 2020
- Photography of subject properties and adjacent area
- Review of City of Redondo Beach Building Permit records
- Assessor data research
- Research online databases and sources including Redondo Beach Historical Society
- Research Redondo Beach Library and Los Angeles Public Library online resources
- Review of City Directories
- Review of historic maps including Sanborn, aerial and topographic maps
- Research online photographic databases
- Research historic newspaper databases
- Review of Redondo Beach historic resource surveys
- Historic Records Search, South Central Coastal Information Center (SCCIC)
- Analysis of materials reviewed and researched
- Evaluation of properties in accordance with federal, state and local eligibility criteria

All of the field data and research data were analyzed and evaluated by an architectural historian who meets the Secretary of the Interior's Professional Qualification Standards for Historic Preservation and by an architect who meets the Professional Qualification Standards for Historic Architect.

REGULATORY FRAMEWORK

The importance of historic resources has been recognized by federal, state, and local governments through programs and legislation that identify and recognize buildings, structures, object, landscapes and districts that possess historic significance.

National Register of Historic Places

The National Historic Preservation Act (NHPA) of 1966 established the National Register of Historic Places (National Register) as an authoritative guide "used by Federal, State, and local governments, private groups and citizens to identify the Nation's cultural resources and indicate what properties should be afforded protection from destruction or impairment."[1] Buildings, districts, sites and structures may be eligible for listing in the National Register if they possess significance at the national, state or local level in

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[1] 36 Code of Federal Regulations, Section 60.

American history, culture, architecture or archeology, and in general, are over 50 years old. Significance is evaluated using established criteria:

A. Are associated with events that have made a significant contribution to the broad patterns of our history; or
B. Are associated with the lives of persons significant in our past; or
C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. Yield, or may be likely to yield, information important in prehistory or history.

Significance of Association. National Register Bulletin 32, Guidelines for Evaluating and Documenting Properties Associated with Significant Persons, provides guidance on evaluating potential historic association with people who have "made contributions or played a role that can be justified as significant." For association with leaders or prominent families it is necessary "to explain their significant accomplishments" and they "must be compared to those of others who were active, successful, prosperous, or influential in the same field." Most properties nominated for associations with significant persons also are nominated for other reasons and a majority of properties nominated under the association criterion are also significant in the area of architecture or for the area in which the individual(s) achieved recognition.

National Register Bulletin 32 adds that the fact that we value certain professions, or the contributions of certain groups historically does not mean that every property associated with or used by a member of that group is significant. Associations with one or more individuals in a particular profession, economic or social class, or ethnic group will not automatically qualify a property. The contribution must be distinctive: it is not enough to show that an individual has acquired wealth, run a successful business, or held public office, unless any of these accomplishments, or their number or combination, is a significant achievement in the community in comparison with the activities and accomplishments of others.

Integrity. Properties may be eligible for inclusion on the National Register as individual resources and/or as contributors to an historic district. *National Register Bulletin 15: How to Apply National Register Criteria for Evaluation* states that in addition to meeting at least one of the four criteria, a resource should be evaluated to assess its integrity. For individual resources to qualify for inclusion they must represent an important aspect of an area's history and possess integrity. An historic district must retain integrity as a whole, "the majority of the components that make up the district's historic character must possess integrity even if they are individually undistinguished."

Integrity is the ability of a property to convey its significance. There are seven aspects to be evaluated to determine the historic integrity of a property. To be eligible for designation to the National Register a property must retain historic integrity. To "retain historic integrity a property will always possess several, and usually most, of the aspects." The seven aspects of integrity are location, design, feeling, association, setting, workmanship and materials.

Location is the place where the historic property was constructed or the place where the historic event occurred. The relationship between the property and its location is often important to understanding why the property was created or why something happened. The actual location of a historic property, complemented by its setting, is particularly important in recapturing the sense of historic events and persons.

Design is the combination of elements that create the form, plan, space, structure, and style of a property. It results from conscious decisions made during the original conception and planning of a property. Design includes such elements as organization of space, proportion, scale, technology, ornamentation, and materials. A property's design reflects historic functions and technologies as well as aesthetics. It includes such considerations as the structural system; massing; arrangement of spaces; pattern of fenestration; textures and colors of surface materials; type, amount, and style of ornamental detailing; and arrangement and type of plantings in a designed landscape.

Setting is the physical environment of a historic property. Whereas location refers to the specific place where a property was built or an event occurred, setting refers to the character of the place in which the property played its historical role. It involves how, not just where, the property is situated and its relationship to surrounding features and open space. Setting often reflects the basic physical conditions under which a property was built and the functions it was intended to serve. In addition, the way in which a property is positioned in its environment can reflect the designer's concept of nature and aesthetic preferences. The physical features that constitute the setting of a historic property can be either natural or manmade, including such elements as: topographic features (a gorge or the crest of a hill); vegetation; simple manmade features (paths or fences); and relationships between buildings and other features or open space.

Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. The choice and combination of materials reveal the preferences of those who created the property and indicate the availability of particular types of materials and technologies. A property must retain the key exterior materials dating from the period of its historic significance. If the property has been rehabilitated, the historic materials and significant features must have been preserved.

Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. It is the evidence of artisans' labor and skill in constructing or altering a building, structure, object, or site. Workmanship can apply to the property as a whole or to its individual components. Workmanship is important because it can furnish evidence of the technology of a craft, illustrate the aesthetic principles of a historic or prehistoric period, and reveal individual, local, regional, or national applications of both technological practices and aesthetic principles. Examples of workmanship in historic buildings include tooling, carving, painting, graining, turning, and joinery.

Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. For example, a rural historic district retaining original design, materials, workmanship, and setting will relate the feeling of agricultural life in the 19th century.

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Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character. Because feeling and association depend on individual perceptions, their retention alone is never sufficient to support eligibility of a property for historic designation.

Historic Context. A resource should be evaluated within their historic context. *National Register Bulletin 15* states that an historic context explains “those patterns, themes, or trends in history by which a specific…property or site is understood and its meaning…is made clear.”

Historic District. According to *National Register Bulletin 15,* an historic district derives its importance from being a unified entity whose identity as a district “results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment.” An historic district is “a definable geographic area that can be distinguished from surrounding properties by changes such as density, scale, type, age, style of sites, buildings, structures, and objects, or by documented differences in patterns of historic development or associations...the boundaries must be based upon a shared relationship among the properties constituting the district.”[2]

California Register of Historical Resources

The California Register, based on the National Register, is the “authoritative guide to be used by state and local agencies, private groups, and citizens to identify the state’s historical resources and indicate which properties are to be protected.” A building, site, structure, object, or historic district may be eligible for inclusion on the California Register if it meets one or more of the following criteria:

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States
2. It is associated with the lives of persons important to local, California, or national history
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

California Office of Historic Preservation Technical Assistance Series #6, California Register and National Register: A Comparison states that in addition to meeting one of the criteria of significance, a resource must “retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their

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[2] National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation, pp. 5-6, https://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf

significance" and "integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association." Historical resources that "have been rehabilitated or restored may be evaluated for listing."

Series 6 Guidance also states, "Alterations over time to a resource or historic changes in its use may themselves have historical, cultural, or architectural significance." Historical resources that do not retain sufficient integrity to qualify for the National Register may still be eligible for listing in the California Register: "a resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if it maintains the potential to yield significant scientific or historical information or specific data."[3]

City of Redondo Beach Historic Resource Preservation

The City of Redondo Beach historic preservation ordinance allows for designation of historic resources including "buildings, structures, sites, places and districts within the City that reflect special elements of the City's architectural, artistic, cultural, historical, political, and social heritage."[4]

An historic resource may be designated a landmark, and a geographic area may be designated an historic district if it meets one or more of the following criteria:

a. It exemplifies or reflects special elements of the City's cultural, social, political, aesthetic, engineering, or architectural history; or
b. It is identified with persons or events significant in local, state, or national history; or
c. It embodies distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftsmanship; or
d. It is representative of the notable work of a builder, designer, or architect; or
e. Its unique location or singular physical characteristic(s) represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The ordinance also specifies that "nominations of an historic resource as a landmark shall be made only by application of the property owner or property owners representing a majority or controlling interest in the property on which the resource is located."[5]

The City of Redondo Breach historic preservation ordinance is silent regarding the level of integrity required for determining eligibility for designation as a City landmark.

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[3] California Office of Historic Preservation Technical Assistance Series #6: California Register and National Register: A Comparison, p. 3.
[4] City of Redondo Beach Zoning Code Section 10-4, 102
[5] City of Redondo Beach Zoning Code ,Section 2, Ord. 2554

PROJECT LOCATION AND SETTING

The subject properties are located on N. Catalina Avenue in the City of Redondo Beach. These properties include six parcels. Five of the parcels contain buildings in commercial/industrial use; one parcel is vacant:

100 N. Catalina Avenue, APN 7505-005-012, vacant (surface parking)
112 N. Catalina Avenue, APN 7505-005-019, 1904
116 N. Catalina Avenue, APN 7505-005-021, 1925/1945
124 N. Catalina Avenue, APN 7505-005-008, 1946
126 N. Catalina Avenue, APN 7505-005-007, 1949
132 N. Catalina Avenue, APN 7505-005-006, 1905

North Catalina Avenue is a busy arterial street with two lanes of traffic in each direction and a parking lane on each side of the street. The east side of the 100 block of N. Catalina Avenue contains eight parcels, all with commercial buildings except for the southernmost parcel which is vacant. The buildings on the east side all date from the first half of the 20th Century. The west side of N. Catalina Avenue contains multi-story multi-family complex known as The Village, constructed in the late 1970s.

The 100 block of N. Catalina Avenue is bounded by Emerald Street on the south. The first parcel adjacent to the subject property on Emerald Street (adjacent to 100 N. Catalina Avenue to the east) is 305 Emerald Street, the Oklahoma Apartments, a Redondo Beach Landmark constructed in 1908. Other buildings on the 100 block of Emerald Street are multi-family residential buildings constructed in the late 20th Century.

The 100 block of N. Catalina Avenue is bounded by Diamond Street on the north. The 300 block of Diamond Street contains multi-family residential buildings constructed in the late 20th Century except for the parcel on the northwest corner of Diamond Street and Broadway which contains 321 Diamond Street, a mixed use building, the Redondo Van and Storage/Diamond Apartments, a Redondo Beach Landmark, constructed in 1913. There is a designated historic district consisting of three buildings on two parcels one block to the north, at 216 N. Catalina Avenue and 218 N. Catalina Avenue.

Subject parcels and vicinity

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East side of the 100 block of N. Catalina Avenue (Google Earth, 2018)

West side of the 100 block of N. Catalina Avenue (Google Earth, 2018)

HISTORY OF COMMERCIAL/INDUSTRIAL DEVELOPMENT IN REDONDO BEACH

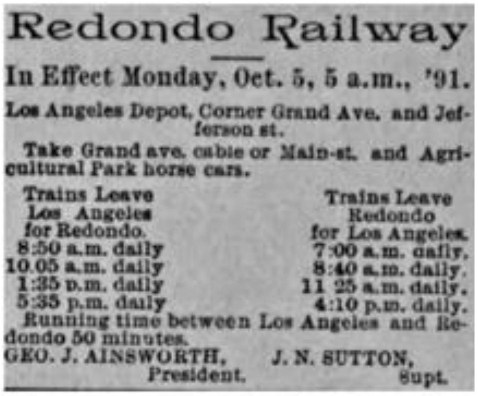
Utilized by the earliest human inhabitants, current day Redondo Beach became part of the Dominquez Rancho in 1854 when Manuel Dominguez received the patent for the Rancho San Pedro. Portions of the Rancho were sold off and some early attempts at industrialization occurred in the 1860s with the intermittent operation of the Pacific Salt Works at the Old Salt Lake site. With the dissolution of the Ranchos in the 1860s and the coming of the railroads in the 1870s, Southern California changed from open range to small farms and towns. In 1889 the Santa Fe Railroad reached Redondo Beach and the city also began developing as a port.

Thus, began the urbanization of Redondo Beach. The *City of Redondo Beach Context Statement* states: “The boom of the 1880s was largely an urban phenomenon. Although land was sold in farm size parcels as well as town lots and continued to be prized for farming and orchards, the emphasis had clearly shifted to town building.” Early town developers such as the Redondo Beach Company, envisioned a resort and commercial center. Development of piers, ship and pleasure boat landings as well as beach and beachfront amusements began to take place. The large Redondo Hotel with park-like grounds was to the south while railroad yards and industrial functions lay to the north.

Development of an industrialized port required robust ground transportation infrastructure. The Redondo Beach Improvement Company (successor to the Redondo Beach Company) was established by J.C. Ainsworth and R. R. Thompson and focused on developing the harbor and townsite area.

The evolution of rail transportation was important to the development of Redondo Beach. In 1888 the Santa Fe Railroad selected Redondo Beach as its terminus and incorporated the Redondo Beach Railway to connect with Los Angeles. The rail line provided freight service to the industrial areas of the City including the wharf as well as passenger services to Redondo's beach and resort facilities. In 1889 the company consolidated with the Southern California Railway, a subsidiary of the Santa Fe Railroad.

In 1889 the Ainsworth and Thompson's Redondo Beach Improvement Company purchased a narrow gauge steam railroad, the Rosecrans Rapid Transit Company, a narrow gauge steam railroad. They renamed it the Redondo Railway with a route starting from a depot behind the Redondo Hotel going through Inglewood into downtown Los Angeles. Several years later Ainsworth and Thompson formed another company, the Los Angeles and Redondo Railway to operate the rail line as well as the wharf. In 1896 the trains carried over 15,000 passengers.



Redondo Railway

In Effect Monday, Oct. 5, 5 a.m., '91.

Los Angeles Depot, Corner Grand Ave. and Jefferson st.

Take Grand ave. cable or Main-st. and Agricultural Park horse cars.

Trains Leave Los Angeles for Redondo.	Trains Leave Redondo for Los Angeles.
8:50 a.m. daily	7:00 a.m. daily.
10.05 a.m. daily	8:40 a.m. daily.
1:35 p.m. daily	11 25 a.m. daily.
5:35 p.m. daily	4:10 p.m. daily.

Running time between Los Angeles and Redondo 50 minutes.

GEO. J. AINSWORTH, President. J. N. SUTTON, Supt.

At the turn of the 20th Century, in 1902, the steam railway was converted to electric propulsion and service was expanded and a railroad yard was constructed. By 1904 over 111,000 passengers were served annually. In 1905 Henry E. Huntington purchased the Los Angeles and Redondo Railway and the railroad was converted from narrow gauge to standard gauge and double tracks. Along with Huntington's established Pacific Electric, service continued to provide interurban lines connecting Redondo Beach to the regional network.

As a terminus of one of the lines of the passenger rail network was in Redondo Beach as were freight rail line services, operations and maintenance facilities were located in the City and provided jobs for local residents. In 1910 Huntington sold the Pacific Electric network to the Southern Pacific Railroad. The rail lines provided important passenger and freight connections to Redondo Beach into the 1940s.

Images of railcars, Redondo Beach Rail Maintenance shop and its workers

Henry E. Huntington spurred a significant period of development with his 1905 purchase of the Redondo Beach Improvement company and the Los Angeles and Redondo Railway. Buoyed by Huntington's confidence in the area, others followed. As the Context Statement observes: "within the original town site, development also occurred as investors who had purchased lots prior to Huntington's investment subdivided and developed these sites, nearly completing the settlement of coastal Redondo Beach…the final result was that the region developed steadily, with a variety of areas to appeal to incoming residents."

Sanborn Map of Redondo Beach early Commercial District, 1904

Sanborn Map of Redondo Beach early Commercial District 1908

Commercial development occurred both around the Redondo Hotel, where a train depot was located as well as farther north adjacent to the beachfront and pier facilities. A range of services to support the growing City were located on these blocks.

Over the decades of the late 19th and early 20th centuries the commercial areas of Redondo Beach evolved as shown in the following photographs.

Redondo Beach Commercial Development Late 19th Century

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Redondo Beach Commercial Development Late 19th Century

Redondo Beach Commercial Development Late 19th Century

Redondo Beach Commercial Development and Redondo Railway,
Late 19th Century

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Redondo Beach Commercial Development with Redondo Railway, early 20th Century

Redondo Beach Commercial Development, early 20th Century

Redondo Beach Commercial Development, early 20th Century

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Redondo Beach Commercial Development with Redondo Railway, early 20th Century

Buildings of Redondo Beach's Commercial district, early 20th Century

Redondo Beach Commercial Development with Redondo Railway, early 20th Century

Redondo Beach Commercial Development with Redondo Railway, early 20th Century

Redondo Beach Commercial Development, early 20th Century

Redondo Beach Commercial Development showing train tracks, early 20th Century

Early 20th Century buildings of Redondo Beach’s commercial district

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Buildings of Redondo Beach's Commercial district, 1920s

Redondo Beach Commercial Development with Redondo Railway, c1930's

Buildings of Redondo Beach's Commercial district

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Buildings of Redondo Beach's Commercial district, early 20th Century

Civic boosters contributed to the City's growth in the early 20th century and established organizations including fraternal orders and the Chamber of Commerce. The Context Statement states that "as a result of the community support, everyone who came to Redondo Beach, left a booster with advertising buttons or brochures…efforts paid off. In 1900 the population had been 855; by 1910 it had grown to 2,935." And the population continued to grow with 4,913 residents in 1920 and almost doubling by 1930. Population growth pace slowed during the decade following the Great Depression growing to 13,092 in 1940 and picked up after World War II with 25,226 in 1950 and 46,984 by 1960.

At mid-Century, the post-way growth of Southern California spurred housing development. Residential development was encouraged, and industrial areas of the City were redeveloped with housing in the 1950s and 1960s. At the same time wide swaths of the city, including much of the commercial areas, were redeveloped and many of the early 20th Century buildings were demolished.

Redondo Beach Commercial District and Beachfront Amusements, c1930s

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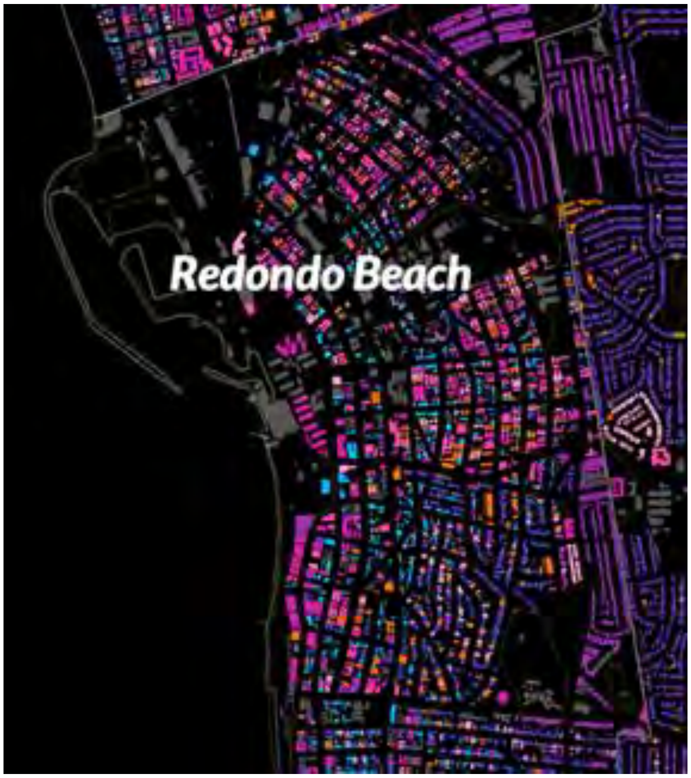
Redondo Beach Commercial District and Beachfront, c1950s

Redondo Beach Commercial District and Beachfront, c1960s

The Built: LA Building Age Interactive Map, a visual development history database, shows the age of many buildings in Redondo Beach. Buildings are color coded based on the decade of their construction with a color for each decade from 1920 to 2000 and a “1909 and earlier” category. Although the data is incomplete (some buildings are not colored), the map shows the general development history of the original townsite and environs.

The map shows a concentration of early 20th century residential buildings on the 300 block of N. Gertruda Avenue, the Original Townsite Residential Historic District. In most other residential areas, the map shows that bursts of development occurred in the1950s, 1970s and 1980s.



http://cityhubla.github.io/LA_Building_Age/#13.53/33.8411/-118.4033

Commercial areas of the City running along the 400 block of N. Catalina Avenue and 200 block of Broadway show redevelopment of that area took place in the 1960s and 1970s. Across from the subject buildings on the west side of the 100 block of N. Catalina Avenue are large multi-family residential buildings of “The Village” which were constructed in the late 1970s. While a few early 20th Century buildings remain, including the landmark Redondo Van and Storage Diamond Apartment Building (321 Diamond Avenue), many of those remaining have been substantially altered. Commercial areas on the 200-400 South blocks of Catalina Avenue show the majority of buildings were constructed in the 1970s and 1980s.

Area around subject block

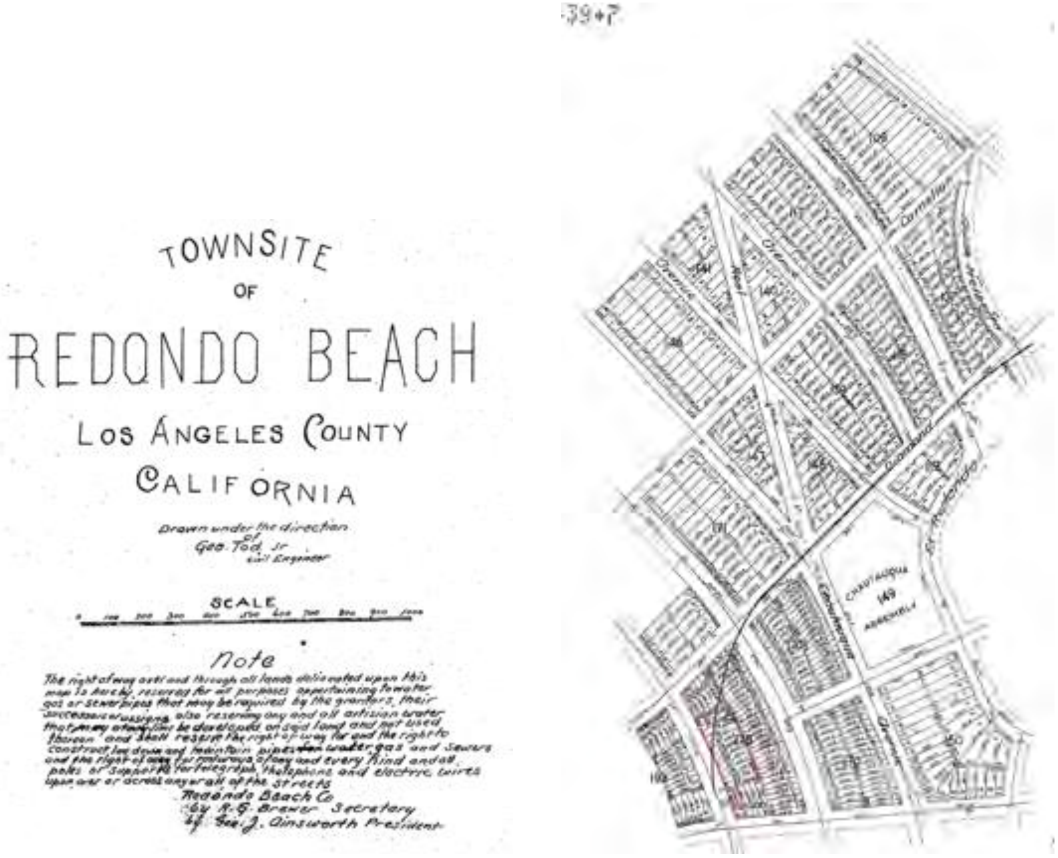
100 block of N. Catalina Avenue

Since 2008, there are over 2.9 million buildings in Los Angeles County. Hover over a building for the time it was built or click on the timeline to explore.

Built: LA. Legend (no data for grey footprints)

DEVELOPMENT HISTORY OF 100 BLOCK OF N. CATALINA AVENUE

The 100 block of N. Catalina Avenue is part of the Original Townsite of the City of Redondo Beach. Catalina Avenue is a street that curves and originally connected two open space areas. The Hotel Redondo was located on the large parcel with open space to the south.



Tract Map of Redondo Beach Original Townsite and page with subject parcels

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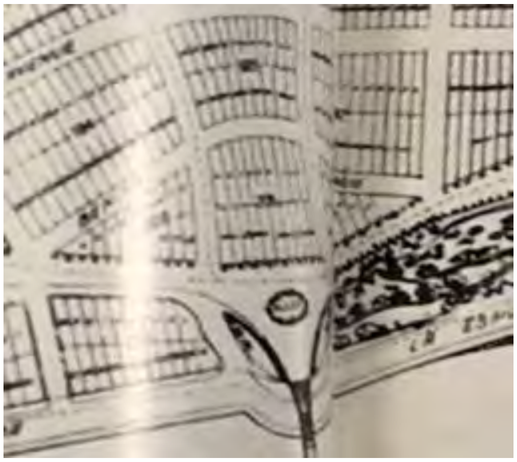
Map of Original Townsite



Excerpt of Original Townsite Map showing area around 100 block of N. Catalina Avenue

Area around 100 block of N. Catalina Avenue (Google Earth, 2018)

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100 block of N. Catalina Avenue (Google Earth, c2018

Sanborn Maps and aerial images show the development of the 100 block of North Catalina Avenue between 1895 and 1964. The block was sub-divided into two larger corner parcels and 12 long, narrow parcels; these parcels were later reconfigured and consolidated to create the eight parcels that exist today.

In 1895 the developments on the block were at both the north and south end parcels and consisted of dwellings and a grocery store. The main track of the Redondo Railroad traversed the subject properties on the northern one-third of the block on an angle as the rail alignment moved from Broadway onto Catalina Avenue south towards the depot that was located on the 100 S. block of Catalina Avenue. Aerial map images show that alignment existed throughout the first four decades of the 20th Century Later aerial images show how the northern area of the block transitioned starting in the 1940s from industrial railroad operations and maintenance functions into land uses that included commercial services along Catalina Avenue.

The 1904 Sanborn Map shows the two-story Masonic Hall had been constructed on the parcel at 112 N. Catalina Avenue. The next Sanborn Map from 1908 shows that a blacksmith and woodworking shop had been constructed on the parcel at 132 N. Catalina Avenue. By 1916 the blacksmith shop had expanded on the south and included auto repair services.

The next Sanborn Map was drawn thirty years later, in 1946. That map shows the commercial/residential buildings at 116 N. Catalina Avenue that were built and combined together in the 1920s. Also, a commercial building had been constructed in 1926 at 136 N. Catalina Avenue. The 1946 map also shows the beginning of the transition of that section of the block from railroad operations and maintenance uses to commercial service buildings. The dry cleaners building, built in 1946 on the parcel at 124 N. Catalina Avenue, is seen on the 1946 Sanborn Map. The transition of this section of the block continued with construction of another dry cleaners building at 126 N. Catalina Avenue. In 1957 the corner parcel at Diamond Street, 144 N. Catalina Avenue, was redeveloped with a commercial building.

In the 62 years since 1957, the only change on the 100 block of N. Catalina Avenue was demolition of the structures on the south corner of the block at 100 N. Catalina Avenue.

Sanborn Map Excerpts – 100 Block of N. Catalina Avenue

1895

1904

1908

1912

1916

1946

1959

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Aerial Photographs Excerpts – 100 Block of N. Catalina Avenue


1928 Aerial Map


1938 Aerial Map


1947 Aerial Map


1952 Aerial Map

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1964 Aerial Map

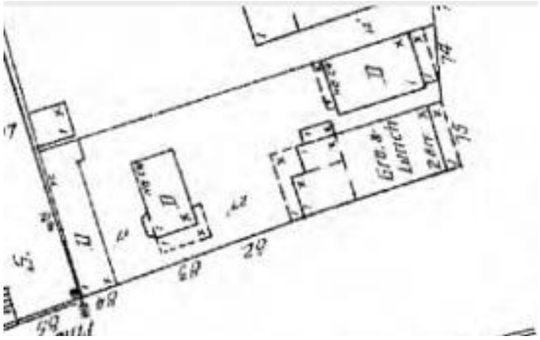
HISTORY AND DESCRIPTION OF BUILDINGS

100 N. Catalina Avenue

The parcel at 100 N. Catalina Avenue is a paved surface parking lot. The 1904 Sanborn Map shows there was a commercial building on the corner that contained a grocery store and lunch restaurant; there were also three dwellings on the parcel. Those buildings were on the site until the 1960s and were demolished. Currently, there are no buildings on the parcel.

Corner parcel, surface parking lot, at 100 N. Catalina Avenue

Plan view of corner parcel, surface parking lot, at 100 N. Catalina Avenue (Google Earth, c2019)



112 N. Catalina Avenue [parcel, 1904 Sanborn Map excerpt

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112 N. Catalina Avenue

The building at 112 N. Catalina Avenue was constructed 1904. The owner was a fraternal organization, the Masons. The building served as the headquarters for the Redondo Beach Chapter of the Masons, housing its facilities and assembly space on the building's upper level. The first level was rented to business tenants as commercial and retail space.

The building was originally known as the Masonic Hall and was the first lodge building constructed by a Redondo Beach fraternal organization and dedicated for their use. The building served members of the Masonic Lodge until 1927 when the group constructed a new building, called the Masonic Temple, a few blocks south at 501 S. Catalina Avenue (also known as 116 Ruby Street).

The Masons allowed their lodge assembly space to be used by other organizations in Redondo Beach and for the first quarter of the 20th Century the building served the majority of social clubs (fraternal orders and lodges) active in Redondo Beach. City Directories from the early 20th Century list the City's fraternal societies and their meeting dates and times. As many as thirteen fraternal groups used the Masonic Hall at 112 N. Catalina Avenue for their meetings over the first half of the 20th Century. After the Masons moved to their new building, the 112 S. Catalina Avenue building was known as the IOOF Hall, used by the Redondo Beach chapter of the Independent Order of Odd Fellows. The building continued to serve Redondo Beach's fraternal orders as well as numerous philanthropic organizations into the 1950s.

The Redondo Beach Historical Society observes that "Redondo Beach residents have a long history of active lodge and philanthropic organization involvement."[6] By 1917 there were 16 lodges and societies active in Redondo Beach according to City Directories.

In addition to the Masons, early lodges established in Redondo Beach included the Benevolent and Protective Order of the Elks who were located in a Victorian era building, the former rail depot (demolished), that was located on South Catalina Avenue. In 1957 the Elks constructed a lodge chapter headquarters at 315 Esplanade. Another fraternal organization, The American Legion, constructed its Clubhouse at 412 S. Camino Real 1927 and that building is a designated City of Redondo Beach Landmark.

Throughout the decades numerous local businesses were located on the ground floor of the building. By the middle of the 20th Century the building was no longer home of any fraternal organization and the upper story was available for lease. Uses of the building included organizations such as the Salvation Army which operated in the building from the 1940s into the 1960s. In 1972 the building was adapted to serve as a U.S. Post Office and in recent decade it has again housed local small businesses.

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[6] https://www.redondohistorical.org/?page_id=490

LODGES AND SOCIETIES

MASONIC

Redondo Lodge No. 328, F. & A. M.—Meet third Thursday of each month at Masonic Hall, Catalina avenue.

R. A. M.

Redondo Chapter No. 101, R. A. M.—Stated Convocations on second Thursday of each month at Masonic Hall.

O. E. S.

Carnation Chapter No. 173—Meet second and fourth Tuesday of each month at Masonic Hall.

K. OF P.

America Lodge No. 63—Meet every second and fourth Wednesday nights in Masonic Hall.

PYTHIAN SISTERS

Moonstone Temple No. 101—Meets on second and fourth Wednesdays each month in Masonic Hall.

UNIFORM RANK

Redondo Beach Company No. 77, U. R. K. of P.—Meet first Wednesday each month at 8 p.m. in Masonic Hall.

I. O. O. F.

Redondo Lodge No. 186—Meet every Friday evening of each month in Masonic Hall.

REBEKAH

Silver Crest Rebekah Lodge No. 293—Meet second and fourth Mondays each month in Masonic Hall.

W. O. W.

Carnation Camp No. 741—Meet first and third Monday evening at Whichelo Hall.

F. O. E.

Redondo Aerie No. 935—Meet every first and third Monday evening in Masonic Hall.

L. O. T. M.

Meet second and fourth Friday evenings each month at Whichelo Hall.

M. W. OF A.

Ocean View Camp No. 13233—Meet first and third Tuesday evenings in Masonic Hall.

K. O. T. M.

Meet first Saturday night of each month at Masonic Hall.

I. O. F.

Meet third Friday evening of each month at Whichelo Hall.

L. O. O. M.

Redondo Lodge No. 613, Loyal Order of Moose—Meet every Wednesday evening in Whichelo Hall.

FRATERNAL BROTHERHOOD

Redondo Lodge No. 405—Meet every Tuesday evening at Whichelo Hall.

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1917 City Directory

MINGS BROS.

REALTORS

REAL ESTATE

RENTALS

LOANS

All Lines of Insurance

REDONDO BEACH

DR. SAFFORD, D. C., Ph. C., CHIROPRACTOR

Hermosa Electric Co.

Electrical Contractors

T. C. Waldrever

1923 City Directory

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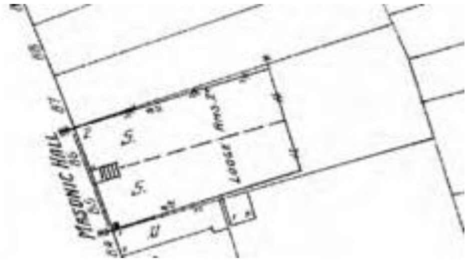
112 N. Catalina Avenue, front (west) elevation

Plan view of 112 N. Catalina Avenue (Google Earth, c2019)



1904 Sanborn Map excerpt

1912 Sanborn Map excerpt

1946 Sanborn Map excerpt

1959 Sanborn Map excerpt

The 112 N. Catalina Avenue building is a two-story vernacular commercial building containing 9,200 square feet. The building is rectangular in plan with a flat roof behind a parapet. It is a masonry structure with plaster façade. The building is on a mid-block parcel and has no side setbacks. It is likely that aspirations anticipated additional development of commercial buildings on the block would abut this two-story building, thus rendering at least most of the side walls unviewable.

The building's volume and massing and the symmetrical composition of the front façade are representative of early 20th Century commercial buildings and the building has undergone alterations over the past 116 years. However, the building retains its original form and massing. The division of the front façade into three bays still reflects the original organization of the elevation.

In 1993 the building underwent a seismic retrofit upgrade which included insertion of new steel frames across the building including a frame behind the front façade. The front façade of the building was remodeled at that time.

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South end of west elevation, 2019

South end of west elevation, c1992

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The original building exterior was re-plastered, and the original windows were removed and replaced. The photograph of the building from 1993 shows a defined horizontal cornice panel at the top of the building. The photograph also shows that there was a window centered along the upper elevation which has been enclosed; the other window openings are in the original locations of windows and generally of the same size. There was a horizontal band above a storefront with a recessed entry. There is an exposed original cornerstone setback at the northwest corner of the building.

Alterations to the front façade during the 1993 remodel included addition of new applied decorative elements. The building's front façade features tile details including decoration at the parapet with a centered inverted triangle of tile located at the center of the building. Other added decorative features on the front façade include scoring at each end of the front elevation. These are topped by a square with diagonals through each square. That square pattern is repeated above each side of the centered rectangle. On the upper level there are two large aluminum frame, multi-pane windows which have operable upper sashes. None of these windows are original. The blank wall between the upper story windows and above the centered ground level entry is enframed by a rectangular tile outline. At the ground floor there are another two windows. There are three entrances at the street level each consisting of a single glazed aluminum frame door with aluminum frame transom. Including. None of the windows or doors are original.

North (side) elevation of 112 N. Catalina Avenue (Google Earth, c2019)

The long side elevations are broken up by a series of vertical pilasters that stop short of reaching the parapet. The side walls are windowless except for one large and one small window. There are arched brick headers in the second bay from the front on both sides and infilled openings in the first and third bays on the south side. There are no architectural details other than the pilasters on the side elevations. The lack of fenestration and architectural details on the side elevations was likely due to aspirations and anticipation of adjacent development which would obscure views of these elevations.

The rear elevation has three arched opening on the upper floor and an exterior metal stair. There are storage sheds and surface parking at the rear of the parcel.

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112 N. Catalina Avenue, east (rear) elevation, Google Earth, c2019

Integrity Analysis of 112 N. Catalina Avenue

Aspect of Integrity	*Evaluation*	*Level of Integrity*
Location	The building is in its original location	High
Design	Retains original volume and massing; retains symmetrical organization of front façade; retains pattern of fenestration; front elevation surfaces has been remodeled.	Low
Setting	Remains part of pre-1950 commercial corridor of 100 block of N. Catalina Avenue	High
Materials	Remodeled in 1993 with some new materials added	Low
Workmanship	Unremarkable workmanship	Low
Feeling	Building remains reminiscent of and early 20th Century commercial building	Fair
Association	Building has historic relationship to early fraternal, civic organizations in the City of Redondo Beach	High

116 N. Catalina Avenue

The building is a commercial building constructed in 1921. In 1925 a duplex dwelling was added onto the building. Later a portion of the duplex, on the north side, was demolished to create a driveway to provide vehicular access to the rear of the parcel. The remaining portion of the dwelling was converted to commercial uses. The building has served as a carpentry shop and cabinet shop for several decades.

116 N. Catalina Avenue, front (west) elevation

116 N. Catalina Avenue, north elevation

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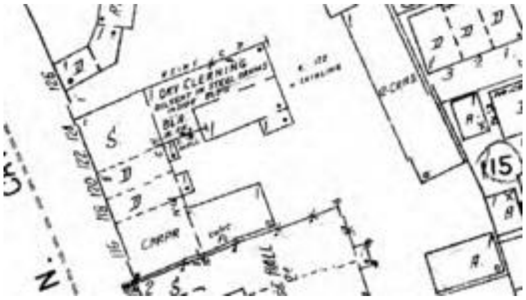
1946 Sanborn Map excerpt


1959 Sanborn Map excerpt


Plan view showing driveway in upper left where a section of the duplex was removed for driveway

The building is one-story with 1, 601 square feet. It has a side-gable roof and is clad in wide wood plank siding. Very limited areas retain original narrow siding and are visible only on some areas of the rear elevation. Rear additions to the building were constructed in a somewhat haphazard process and with a mix of exterior appearances. The rear sections of the building have flat roofs. The street facing elevation. The front (west) elevation contains three very large plate glass windows with wood frames that take up much of the area of this street facing elevation. All evidence of the 1925 residential building has been removed and what was left of what had been a residential building now has a large plate glass display window. The three large plate glass windows, were installed in the 1990s and are not original. There is a single entry door located to the north of the southernmost window creating an asymmetrically balanced front façade. There is a low planter that runs along the west elevation. A driveway is located on the north side of the parcel leading to a paved rear parking area which also contains a storage structure and storage area.

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116 N. Catalina Avenue, rear (east) elevation
and rear yard (Google Earth, c2019)

Integrity Analysis of 116 N. Catalina Avenue

Aspect of Integrity	*Evaluation*	*Level of Integrity*
Location	The building is in its original location	High
Design	The building does not retain its original volume and massing or any features reminiscent of 1920s property types as a combined residential and commercial building.	Low
Setting	It is not representative of a pre-1950s commercial building	The setting of other buildings is high but this building in its own setting is Low
Materials	Most materials are not original	Low
Workmanship	Unremarkable workmanship	Low
Feeling	Does not communicate early 20th Century design – three large plate glass windows, which are not representative of a 1920s era building, dominate front façade.	Low
Association	The building has no significant historic associations related to its residential or commercial uses.	Low

124 N. Catalina Avenue

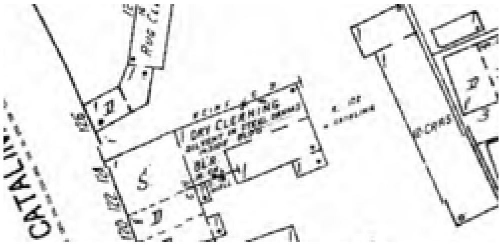
This vernacular commercial/industrial building was constructed in 1946 as a retail dry cleaning service for Wardrobe Cleaners with on-site cleaning facilities. Dry cleaning businesses have operated in the building since its construction.

124 N. Catalina Avenue, west (front) elevation

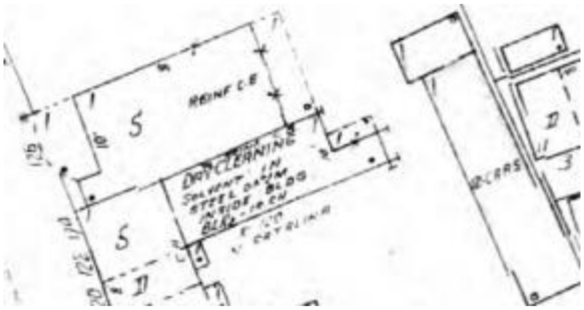
Plan view of 124 N. Catalina Avenue(Google Earth)

The front retail section of the one-story building is rectangular in plan with simple massing. The north side of the building is adjacent to the neighboring building. The south elevation of the building faces a driveway that leads to surface parking at the rear of the parcel. A long rear section of the building contains the industrial dry cleaning plant. Between 1946 and 1959 the rear was extended.

124 N. Catalina Avenue, west and south elevation



1946 Sanborn Map excerpt



1959 Sanborn Map excerpt

The building has a flat roof with parapet. The exterior is clad in smooth cement plaster. The front elevation, the retail portion of the building, consists of an enframed storefront assembly. The front façade retains the original configuration of the storefront opening including the horizontal mullion that separates the upper transom windows. The composition of the front façade is asymmetrical with the entry door offset from the center of the building to the north. The original entry doors were two separate doors which was changed to a single double-door entry around 1995. Windows include plate glass windows with a horizontal mullion that separates the upper transom windows. The window sash and storefront has been changed to dark finished aluminum. There is a decorative pattern of masonry at the bulkhead that may be original. Existing signage is not original.

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124 N. Catalina Avenue, south elevation (Google Earth, c2019)

The south side elevation of the retail building is plain without any architectural details. The north side elevation abuts the neighboring building. The far rear of the building contained the industrial cleaning operations. There is a garage door opening on the south elevation towards the front of the rear industrial (cleaning) wing of the building. There is no architectural detailing on the side elevation.

In 1949 Wardrobe Cleaners expanded by constructing a building on the adjacent parcel to the north,126 N. Catalina Avenue, which featured a drive-in service for customers. Over time the buildings operated in tandem.

Integrity Analysis of 124 N. Catalina Avenue

Aspect of Integrity	*Evaluation*	*Level of Integrity*
Location	The building is in its original location	High
Design	The building retains its original volume and massing. It retains its original late 1940s storefront storefront features.	Good
Setting	Remains part of pre-1950 commercial corridor of 100 block of N. Catalina Avenue	High
Materials	Most materials are original.	Good
Workmanship	The workmanship is modest as befitting a vernacular commercial building.	Good
Feeling	Façade remains reminiscent of a small mid-20th Century store/storefront.	Good
Association	The building is associated with the pre-1950s commercial development of the City of Redondo Beach.	Good

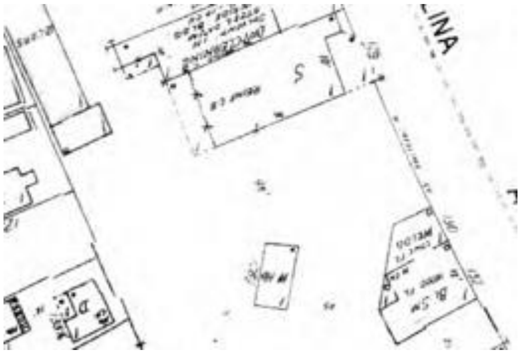
126 N. Catalina Avenue

This building was constructed in 1949 in the Mid-century Modern architectural style featuring an early Modernist flair with expressive front entry covering and angled support. There is no architect or contractor listed on the building permit. The building functioned as a drive-in facility for Wardrobe Cleaners as well as service as its dry-cleaning plant. Based on a Palos Verdes Peninsula News article from January 1950, the new plant was “next door to the Wardrobe Cleaners former quarters.”[7] .

The building was converted into a coffee shop/bookstore in 1994 with additional tenant improvements made in 2001 as a coffeehouse with the area under the canopy adapted as a patio for outdoor seating. The building was vacated in 2017.

126 N. Catalina Avenue, west (front) elevation

Plan view 126 N. Catalina Avenue.
(Google Earth, c2019)



1959 Sanborn Map excerpt.

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[7] “Wardrobe Cleaners To Have Opening,” *Palos Verdes Peninsula News,* January 9, 1950

The building is located on the south half of the parcel; the other half of the parcel and the rear are paved and serves as vehicular access and as a surface parking lot. The building is one-story of 2,548 square feet. The building is generally rectangular in plan, with a small bump-out addition at the south end of the front elevation. The building has a flat roof with parapet. The exterior walls are clad with smooth stucco.

The front elevation is asymmetrically composed. The storefront setback within the space is continuous glazing with corner butt-joint glass. A large aluminum sliding window at the south end does not appear original; the other windows appear to be original. The building's entrance consists of a set of double doors, which appear to be original, located in the middle of the expanse of windows. The exterior surface of the front portion of the building has a heavily textured plaster. The base of the recessed storefront has a bulkhead with a decorative masonry pattern.

The south one-third of the front façade has an addition that projects forward with a curved corner. A set of double aluminum framed windows are centered on the front of this wing. There is no bulkhead on this added corner of the building. Evidence points to this section being a later addition.

The majority of the front façade of the building features an expanse of windows and has a masonry bulkhead. The pair of windows in this south corner addition are unremarkable aluminum frame windows.

The building is setback from the front property line and features a patio area. The building has a canopy that covers the patio. The canopy is a slightly projecting band along the front wing of the elevation but where the building is recessed at its north end, the canopy juts out to create a semi-circular roof and is supported by a series of tapered posts. The angles of the front windows and the tapered columns align with the curve of the canopy giving the building a dynamic aesthetic. Adding to that dynamism is the projecting sign, integral to the canopy, that sits atop the canopy.

126 N. Catalina Avenue,. North and west elevations

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126 N. Catalina Avenue, west elevation and canopy

126 N. Catalina Avenue, west elevation

126 N. Catalina Avenue, north and west elevations

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126 N. Catalina Avenue, north elevation (Google Earth, c2019)

The south side of the building is not visible as it is adjacent to the building at 124 N. Catalina Avenue. The north side of the building faces the parcel's parking area. The very front of the north elevation is the wrap-around of the front windows and includes the return of the curved canopy with its Modernistic flair. However, beyond that, making up most of this side elevation, there is no architectural detailing and no continuation of any Modernistic style influences. Rather, it is a simple wall with regularly placed small windows arranged along its elevation. The front portion of this elevation is distinguished from the rear portions that have dropped parapets and appears as an appendage to the front structure and has a different finished surface.

Integrity Analysis of 126 N. Catalina Avenue

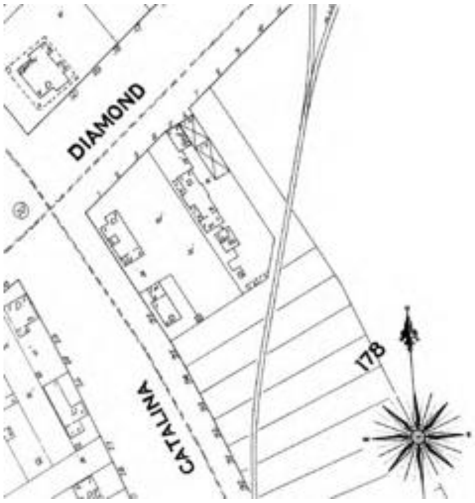
Aspect of Integrity	*Evaluation*	*Level of Integrity*
Location	The building is in its original location	High
Design	The building retains its original volume and massing. It retains its original late 1940s storefront storefront features and Mid-Century Modern design	Good
Setting	Remains part of pre-1950 commercial corridor of 100 block of N. Catalina Avenue	High
Materials	Many materials are original	Good
Workmanship	The workmanship is modest as befitting a vernacular commercial building.	Good
Feeling	Façade remains reminiscent of a small mid-20th Century storefront	Good
Association	The building is associated with the pre-1950s commercial development of the City of Redondo Beach	Good

132 N. Catalina Avenue

This building, constructed in 1905, was used as a blacksmith shop, ironworks and woodworking shop over the decades with business including Star Blacksmith (1924), H.J. Campeau Ornamental Iron and E.L. Martin, Blacksmith (1931), and E.L, Martin, Blacksmith (1947). Inside the building mechanical systems that supported industrial operations remain. The building had a relationship to the train tracks and the operations and maintenance facilities of the railroad from the early 20th Century when the main track of the narrow gauge Redondo Railway and the area to the south and east of the building was used as a freight yard for a railroad. This parcel and the northern portion of the block continued to be used for operations of the Redondo Railway until the 1940s with aerial photographs showing that the train tracks traversed the area behind this building in the 1930s and 1940s.

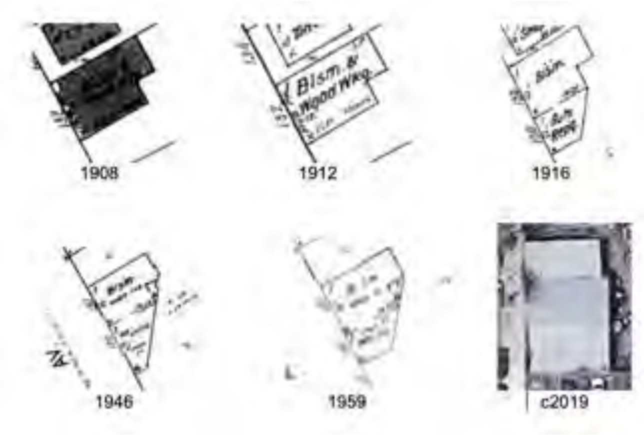

132 N. Catalina Avenue, west and south elevations

Sanborn Maps show how the footprint of the building has evolved over time. The 1906 Sanborn Map shows the building as “L” shape in plan. The 1916 Sanborn Map shows an addition to the south with an angled rear side. The 1946 Sanborn Map shows an additional extension to the south with the rear elevation continuing to be angled. By 1959 the farthest south extension had been eliminated. The angled shape was determined by the railroad tracks, conforming to the tracks, and operations to the south and east of the building with the use continuing into the 1940s.



1895 Sanborn Map excerpt

1916 Sanborn Map excerpt



Building footprints from Sanborn M

Plan view of 132 N. Catalina Avenue (Google Earth c2019)

The building is rectangular in plan. The central section of the building has a shallow gabled roof that is hidden by the front parapet that steps up. This stepped up false façade form was often used for late 19th and early 20th Century small industrial buildings and workshops. While the location and massing of the original building remain, little of the original appears to be extant.

The front façade at the central portion and south addition is wood covered with metal panels stamped with a brick-like pattern; other sections of the exterior walls are exposed concrete masonry units and some areas of plywood. The metal panels are nailed and screwed onto the façade and also wrap the southwest corner and continue for approximately ten feet along the south side of the building. Metal panels would have been installed after the construction of the south addition.

Over the years doors and windows have been replaced; currently there is a large central opening and a horizontal window opening to the north of the entry way. A large gate marks the end of the central portion of the structure and serves as entry into the south addition. There is also a door at the southern end of the front façade that accesses an electrical closet directly behind the front of the building.

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132 N. Catalina Avenue, west (front) elevation

132 N. Catalina Avenue, west and south elevations

132 N. Catalina Avenue, west elevation

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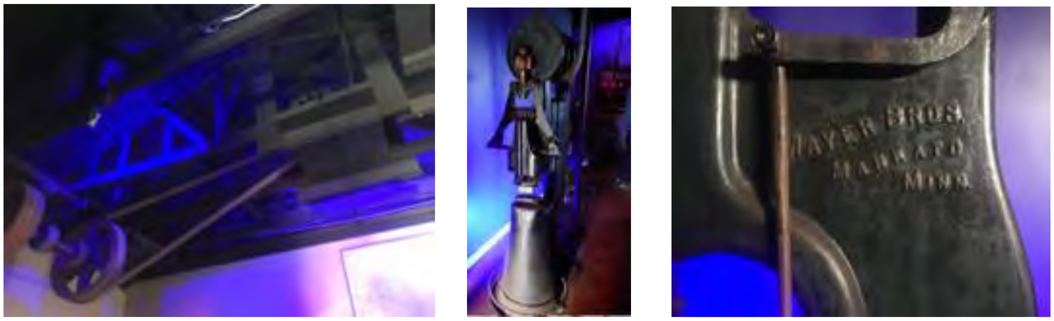
132 N. Catalina Avenue, west elevation

132 N. Catalina Avenue, rear (east) elevation and rear yard (Google Earth, c2019)

Much of the structure from the interior appears updated with plywood sheathing although some lumber looks older with true dimensions and square corners. Interior elements that relate to the building's original use as a blacksmith and metalwork chop remain. Large pulleys in the ceiling at the back of the main building connect a series of machines with a single motor. The assembly of machine elements are an interesting feature of the interior space.



132 N. Catalina Avenue, historic mechanical system inside

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Integrity Analysis of 132 N. Catalina Avenue

Aspect of Integrity	*Evaluation*	*Level of Integrity*
Location	The building is in its original location	High
Design	The building has evolved over the decades, but the front elevation retains an early 20th Century form	Fair
Setting	Remains part of pre-1950 commercial corridor of 100 block of N. Catalina Avenue	High
Materials	Many materials have been replaced	Low
Workmanship	This was a utilitarian building, and its workmanship is unremarkable	Low
Feeling	The building's front facade retains the feeling of an early 20th Century building	Fair
Association	The building is associated with the City's early industrial history and with early transportation/railroad operations	Good

REVIEW OF PREVIOUS SURVEYS

The City of Redondo Beach conducted a citywide reconnaissance-level historic resources survey in two phases. The first phase was conducted in 1985-86 and surveyed most of the original town site area and two adjacent areas to the south: Clifton-by-the-Sea and Clifton Heights. Buildings that were 40 years old or older were surveyed. According to the city's 1998 Preservation Plan "the survey results documented 1,400 individual buildings constructed on or before 1946. Of those, 126 buildings were determined individually significant while 712 were considered potentially significant as contributors to historic districts. The buildings reflect a variety of architectural styles and date primarily from the period of early settlement to pre-World War II."

A second phase of the survey was conducted in 1996 and included buildings which were 45 years of age or older and was focused on the North Redondo Beach area. This second survey phase "recorded 1,402 buildings. Sixty-four of the resources were determined potentially eligible for the National Register or for local designation. The majority of the buildings date from the post-World War II period of expansion."

The 1986 survey developed a rating system unique to Redondo Beach. In describing the rating system, the 1986 survey stated that the survey team "drove through the entire study area on a street-by-street basis." Evaluation criteria unique to the City of Redondo Beach was developed and consisted of four levels of historic eligibility. Based on the surveys' initial review, each structure (or group of structures) was assigned to one of four categories (A through D).

This rating system defined "A" resources as those "buildings which are obvious examples of historically significant or notable structures indicated by distinctive architectural characteristics or age. Occasionally, the structure's relationship to patterns of local history is evident (such as an early church) and would be included. Many of these buildings are potential candidates for individual listing on the National Register of Historic Places and research is likely to reveal a connection with important persons or events.

The “B” category includes “buildings which are somewhat less unusual or distinctive in terms of age or architecture. In general, however, these are well designed buildings which research may prove to have a relationship to important events or persons in history. Many of these buildings are likely to have local significance and some of these buildings may also be candidates for the National Register, depending on the results of research.”

The “C” category includes “pre-1946 buildings which reveal much of their original architectural style (not substantially altered). These buildings are fairly modest in architectural style or design and are less likely to have historical importance. Most of these buildings are good candidates as contributing structures in an historic district.”

And the “D” category includes pre-1946 buildings that are clearly not significant in terms of architectural style or have been substantially altered from the original style. While information from other general research could indicate a link between some of these buildings and important persons or events in local history, the modest nature of the building makes this connection fairly unlikely. Buildings in this category that are not altered or can be restored may contribute to a historic district.

Three of the subject buildings were identified in the Redondo Beach Historic Resources Inventory: 112 N. Catalina Avenue, 116 N. Catalina Avenue and 132 N. Catalina Avenue and were given the local evaluation rating of C+. As the 1985-86 historic resources survey did not review buildings constructed from 1946 on, the buildings at 124 N. Catalina Avenue and 126 N. Catalina Avenue were not given evaluation codes.

Two buildings near the subject properties are City of Redondo Beach Landmarks: 305 Emerald Street, a multi-family residential building adjacent to the project’s undeveloped parcel at 100 N. Catalina Avenue; and the mixed use building nearby at 321 Diamond Street. There is a designated local historic district on the block to the north that consists of two residential buildings, 216 and 218 N. Catalina Avenue.

Redondo Beach Landmark, 321 Diamond Street, Redondo Van and Storage/Diamond Apartments, 1913

Redondo Beach Landmark, 305 Emerald Street, Oklahoma Apartments, 1908

A historic records search was conducted at the South Central Coastal Information Center (SCCIC) at California State University, Fullerton. No previously recorded historic or cultural resources were identified within the project site or vicinity.

EVALUATION OF SIGNIFICANCE

112 N. CATALINA AVENUE

National Register of Historic Places

The property at 112 N. Catalina Avenue is evaluated for its eligibility for inclusion on the National Register of Historic Places under the National Register criteria for significance.

National Register Criterion A.

To be eligible for inclusion on the National Register under Criterion A, a property must have a direct association with events that have made a significant contribution to the broad patterns of our history and cultural heritage. The building at 112 N. Catalina Avenue was constructed in 1904 by the Redondo Beach division of the fraternal order of the Masons. It was the first fraternal lodge built specifically for a fraternal organization in Redondo Beach. Throughout the first quarter of the 20th Century the building's assembly hall and facilities were regularly used by the Masons and by at least 16 other Redondo Beach fraternal orders, associations and societies. These organizations contributed to and built civic engagement and volunteerism in the early decades of the City. The building continued to be used by fraternal orders, philanthropic societies and non-profit organizations throughout the first half of the 20th Century.

The property at 112 N. Catalina Avenue appears to be eligible for the National Register of Historic Places under Criterion A based on the significant role the building played in support of civic engagement and volunteerism in the early years of the history of the City of Redondo Beach.

National Register Criterion B

To be eligible for inclusion on the National Register under Criterion B, a property must be associated with the lives of persons significant in the past who have made an important impact on national, state or local history. The building is associated with many individuals who participated in the fraternal, philanthropic and non-profit organizations who met and worked at the property. However, there is no evidence that the property is associated with any important individual early settlers, civic leaders, or business owners/operators.

The property at 112 N. Catalina Avenue does not meet Criterion B and is not eligible for the National Register of Historic Places under Criterion B.

National Register Criterion C

A property is eligible under Criterion C if it embodies the distinguishing characteristics of an architectural type, specimen, or is inherently valuable for study of a period style or method of construction. A property also is eligible if it represents notable work of a master builder, designer or architect or possesses high artistic values or represents a significant and distinguishable entity whose components may lack individual distinction. An eligible historic resource must retain integrity to be eligible for the National Register.

There is no information regarding whether an architect designed the building. There is no evidence that the building was the work of a master architect or master builder. The materials and workmanship do not reflect that of a skilled builder/craftsman.

While the volume and massing of the building and the basic organization of the front façade remain, many original character-defining elements were changed in the remodel of 1993. As a result, the building has only a fair level of architectural integrity. The building is not an outstanding or unique example of the vernacular commercial architectural style and property type.

The building at 112 N. Catalina Avenue has a low level of historic integrity for design, workmanship and materials and as such does not meet National Register Criterion C and is not eligible for the National Register of Historic Places under Criterion C.

National Register Criterion D.

This criterion applies to archaeological resources. The property was constructed during historic times, so the building on the property would not have yielded information important to the prehistory or early history of the area, state or nation. Thus, Criterion D is not applicable to 112 N. Catalina Avenue.

California Register of Historical Resources

According to the *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register)* "because the California Register was consciously designed on the model of the National Register, the two programs are extremely similar."[8] California Register eligibility criteria 1 through 4 are based on and parallel to National Register criteria A to D.

California *Technical Assistance Series #6* also states that "it's possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if is maintains the potential to yield significant scientific or historical information or specific data.[9]

The building at 112 N. Catalina Avenue is eligible for listing in the California Register of Historical Resources under California Register Criterion 1 for the same reasons explained under National Register Criterion A in the section above.

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[8] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* p. 1.

[9] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* pp. 1-2.

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The building at 112 N. Catalina Avenue is not eligible for listing in the California Register of Historical Resources under criteria 2 and 4 based on the evaluations explained under the National Register criteria B and D in the section above.

The building at 112 N. Catalina Avenue is not eligible for listing in the California Register under criterion 3 based on the evaluation explained under National Register criterion C in the section above. The building at 112 N. Catalina Avenue was constructed in the early 20th Century and has been remodeled. The building is a typical early 20th Century commercial vernacular building property type however the building was remodeled in 1993 resulting in a loss of integrity.

As a typical example of its property type, the subject building would not yield significant scientific or historical information or specific data, the integrity standard required for a property to be eligible for inclusion in the California Register. Because the building at does not retain a high level of integrity, the building at 112 N. Catalina Avenue is not eligible for the California Register of Historical Resource.

City of Redondo Beach Landmark

The property at 112 N. Catalina Avenue is evaluated for its eligibility as a City of Redondo Beach Landmark under the five City of Redondo Beach criteria for historic resource designation.

Redondo Beach Criterion A

To be eligible under City of Redondo Beach Criterion A, a property must exemplify or reflect special elements of the City's cultural, social, economic, political, aesthetic, engineering, or architectural history.

As stated under National Register Criterion A, this building was the first building specifically constructed for a Redondo Beach fraternal order, the Masons, and in addition to the Masons it served as an assembly hall for at least 16 fraternal orders, philanthropic organizations and societies in the decades of the early 20th Century and continued to serve such organizations into the mid-20th Century.

The building at 112 N. Catalina Avenue appears to be eligible as a City of Redondo Beach Landmark under Redondo Beach Criterion A.

Redondo Beach Criterion B

To be eligible under City of Redondo Beach Criterion B, a property must be identified with persons or events significant in local, state or national history.

There is no evidence that the property is associated with and important Redondo Beach individual early settlers, civic leaders, or business owners/operators. There is no evidence that any historic events occurred at the property.

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The building at 112 N. Catalina Avenue does not meet Criterion B and is not eligible to be designated as a City of Redondo Beach landmark under Criterion B.

Redondo Beach Criterion C

To be eligible under City of Redondo Beach Criterion C, a property must embody distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials of craftsmanship.

While the building was remodeled in 1993 and features removed, the building still retains its original volume and massing and the organization of fenestration on the front façade into three bays all of which are representative of the building's original design. The City of Redondo Beach historic preservation ordinance is silent regarding integrity. The City of Redondo Beach historic resources survey evaluated the building as a C+ resource, a combination of the C and D categories. The C category states that buildings in that category "are good candidates as contributing structures in an historic district" and Category D states that "buildings in this category that are not altered or *can be restored* may contribute to a historic district."

As the building at 112 N. Catalina Avenue is a good candidate for rehabilitation of its front façade based on photographic documentation and as the City of Redondo Beach historic preservation ordinance is silent regarding integrity, this building may be eligible as a City of Redondo Beach historic resource under Redondo Beach Criterion C.

Redondo Beach Criterion D

To be eligible under City of Redondo Beach Criterion D, a property must be representative of the notable work of a builder, designer, or architect.

There is no evidence that the building at 112 N. Catalina Avenue is the work of a notable builder, designer or architect.

The building at 112 N. Catalina Avenue does not meet Criterion D and is not eligible to be designated as a City of Redondo Beach landmark under Criterion D.

Redondo Beach Criterion E

To be eligible under City of Redondo Beach Criterion E, a property must have a unique location or singular physical characteristic(s) that represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The building is mid-block on a street that contains both residential and commercial buildings. There is no view shed in which the building stands out as a significant visual feature or as a landmark of the neighborhood.

The building at 112 N. Catalina Avenue does not meet Criterion E and is not eligible to be designated as a City of Redondo Beach landmark under Criterion E

Integrity

The building at 112 N. Catalina Avenue was identified in the 1986 Redondo Beach Historic Resources Survey with an evaluation code of C+. This evaluation was based on the appearance of the building in 1986; in 1993 the building was remodeled. The City of Redondo Beach historic preservation ordinance is silent regarding requirements for integrity.

Another building that served as the home for a service organization is the American Legion Clubhouse, constructed in 1927 at 412 S. Camino Real, is a designated City of Redondo Beach landmark. This building is not an excellent example of its architectural style, Spanish Colonial Revival. The major design elements on the front façade are non-original aluminum frame windows and a non-original door. However, the building retains its original volume and massing and exterior cladding and roof. The building was evaluated as significant for its association with the service organization and although having a low level of architectural integrity, and was designated as a City landmark.

American Legion Clubhouse (Google Maps, 2020)

Similar to the designated American Legion Clubhouse, the subject building at 112 N. Catalina Avenue is significant for its association with early civic engagement and service organizations. And similar to the American Legion Clubhouse, the building at 112 N. Catalina Avenue has a low level of architectural integrity but retains its original volume and massing and organization of its front elevation. In addition, the building at 112 N. Catalina Avenue can be rehabilitated based on existing photo-documentation.

As the building at 112 N. Catalina Avenue meets the City of Redondo Beach Criterion A for its association with early civic engagement and may meet Category C because it retains a sufficient level of architectural integrity to be rehabilitated, the building appears to be eligible for designation as an individual City of Redondo Beach historic landmark.

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116 N. CATALINA AVENUE

National Register of Historic Places

The property at 116 N. Catalina Avenue is evaluated for its eligibility for inclusion on the National Register of Historic Places under the National Register criteria for significance.

National Register Criterion A.

To be eligible for inclusion on the National Register under Criterion A, a property must have a direct association with events that have made a significant contribution to the broad patterns of our history and cultural heritage. The building at 116 N. Catalina Avenue was constructed in 1921 as a small commercial building and in 1925 a duplex residence was added. Later a portion of the residence was demolished, and the combined buildings converted into a single commercial building. There is no evidence that this remodeled building was significant in the City's commercial development history. There is no evidence that any historic event took place at the property

The property at 116 N. Catalina Avenue does not meet Criterion A and is not eligible for the National Register of Historic Places under Criterion A.

National Register Criterion B

To be eligible for inclusion on the National Register under Criterion B, a property must be associated with the lives of persons significant in the past who have made an important impact on national, state or local history. There is no evidence that the property is associated with any important individual early settlers, civic leaders, or business owners/operators.

The property at 116 N. Catalina Avenue does not meet Criterion B and is not eligible for the National Register of Historic Places under Criterion B.

National Register Criterion C

A property is eligible under Criterion C if it embodies the distinguishing characteristics of an architectural type, specimen, inherently valuable for study of a period style or method of construction. A property also is eligible if it represents notable work of a master builder, designer or architect or possesses high artistic values or represents a significant and distinguishable entity whose components may lack individual distinction.

There is no information if there was an architect of the building and it is very unlikely any portion of the building was designed by a master architect. There is no evidence that the building was the work of a master builder as the materials and workmanship do not reflect that of a skilled builder/craftsman.

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The building was identified in the 1986 Redondo Beach Historic Resources Survey with an evaluation of C+ which includes "pre-1946 buildings which reveal much of their original architectural style (not substantially altered)." Research conducted for the current report has identified the building's evolution from an early 20th Century commercial building to a remodeled and blended residential/commercial building and then into a fully commercial building of no particular architectural style.

The only original materials from the original buildings are small portions of narrow wood siding on the rear elevation. The existing siding is later addition of wide-board siding and all windows and doors are later alterations. The front elevation consists of three large plate glass display windows that are not representative of the building's historic residential use or are they representative of any early 20th century commercial building design. The building is not an excellent or intact example of the vernacular commercial architectural style.

The building at 116 N. Catalina Avenue does not meet Criterion C and is not eligible for the National Register of Historic Places under Criterion C.

National Register Criterion D.

This criterion applies to archaeological resources. The property was constructed during historic times, so the building on the property would not have yielded information important to the prehistory or early history of the area, state or nation. Thus, Criterion D is not applicable to 116 N. Catalina Avenue.

The building at 116 N. Catalina Avenue does not meet any of the National Register criterion and is not eligible for inclusion on the National Register of Historic Places.

California Register of Historical Resources

According to the *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register)* "because the California Register was consciously designed on the model of the National Register, the two programs are extremely similar."[10] California Register eligibility criteria 1 through 4 are based on and parallel to National Register criteria A to D.

California *Technical Assistance Series #6* also states that "it's possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if is maintains the potential to yield significant scientific or historical information or specific data.[11]

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[10] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* p. 1.

[11] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* pp. 1-2.

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The building at 116 N. Catalina Avenue lost its original historic character/appearance through the many alterations and remodels that occurred over the decades. The building does not retain sufficient integrity for the California Register as it does not possess any potential to yield significant scientific or historical information or specific data.

The building at 116 N. Catalina Avenue is not eligible for listing in the California Register of Historical Resources as it does not meet California Register Criterion 1, 2, 3 and 4 for the same reasons explained under National Register criteria A, B, C and D in the section above.

City of Redondo Beach Landmark

The property at 116 N. Catalina Avenue is evaluated for its eligibility as a City of Redondo Beach Landmark under the five City of Redondo Beach criteria for historic resource designation.

Redondo Beach Criterion A

To be eligible under City of Redondo Beach Criterion A, a property must exemplify or reflect special elements of the City's cultural, social, economic, political, aesthetic, engineering, or architectural history. There is no evidence that this building is associated with important patterns of history or architectural history significant in Redondo Beach. The building did not stimulate commercial development in the City.

The building at 116 N. Catalina Avenue does not meet Criterion A and is not eligible to be designated as a City of Redondo Beach landmark under Criterion A.

Redondo Beach Criterion B

To be eligible under City of Redondo Beach Criterion B, a property must be identified with persons or events significant in local, state or national history.

There is no evidence that the property is associated with any important Redondo Beach individual early settlers, civic leaders, or business owners/operators. There is no evidence that any historic events occurred at the property.

The building at 116 N. Catalina Avenue does not meet Criterion B and is not eligible to be designated as a City of Redondo Beach landmark under Criterion B.

Redondo Beach Criterion C

To be eligible under City of Redondo Beach Criterion C, a property must embody distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials of craftsmanship.

As noted under National Register Criterion C, the building at 116 N. Catalina Avenue has undergone significant alterations and no longer exhibits its original volume and massing nor does it exhibit any of its original architectural design, materials or workmanship. The building is not representative of any significant property type or architectural style.

The building at 116 N. Catalina Avenue does not meet Criterion C and is not eligible to be designated as a City of Redondo Beach landmark under Criterion C.

Redondo Beach Criterion D

To be eligible under City of Redondo Beach Criterion D, a property must be representative of the notable work of a builder, designer, or architect.

There is no evidence that the building at 116 N. Catalina Avenue is the work of a notable builder, designer or architect or master craftsman.

The building at 116 N. Catalina Avenue does not meet Criterion D and is not eligible to be designated as a City of Redondo Beach landmark under Criterion D.

Redondo Beach Criterion E

To be eligible under City of Redondo Beach Criterion E, a property must have a unique location or singular physical characteristic(s) that represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The building is mid-block on a street that contains both residential and commercial buildings. There is no view shed in which the building stands out as a significant visual feature or as a landmark of the neighborhood.

The building at 116 N. Catalina Avenue does not meet Criterion E and is not eligible to be designated as a City of Redondo Beach landmark under Criterion E.

The building at 116 N. Catalina Avenue does not meet the criteria to be eligible for designation as a City of Redondo Beach Landmark.

124 N. CATALINA AVENUE

National Register of Historic Places

The property at 124 N. Catalina Avenue is evaluated for its eligibility for inclusion on the National Register of Historic Places under the National Register criteria for significance.

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National Register Criterion A.

To be eligible for inclusion on the National Register under Criterion A, a property must have a direct association with events that have made a significant contribution to the broad patterns of our history and cultural heritage. The building at 124 N. Catalina Avenue was constructed in 1946 as a small vernacular commercial building and included a retail store and dry cleaning facilities in the rear. The building is a typical example of a mid-century vernacular storefront which was a common property type in the mid-20th Century.

There is no evidence that this building stimulated development of similar buildings in the City or was significant in any aspect of the City's commercial development history. There is no evidence that any historic event took place at the property

The property at 124 N. Catalina Avenue does not meet Criterion A and is not eligible for the National Register of Historic Places under Criterion A.

National Register Criterion B

To be eligible for inclusion on the National Register under Criterion B, a property must be associated with the lives of persons significant in the past who have made an important impact on national, state or local history.

There is no evidence that the property is associated with any important individual early settlers, civic leaders, or business owners/operators.

The property at 124 N. Catalina Avenue does not meet Criterion B and is not eligible for the National Register of Historic Places under Criterion B.

National Register Criterion C

A property is eligible under Criterion C if it embodies the distinguishing characteristics of an architectural type, specimen, inherently valuable for study of a period style or method of construction. A property also is eligible if it represents notable work of a master builder, designer or architect or possesses high artistic values or represents a significant and distinguishable entity whose components may lack individual distinction.

There is no information if there was an architect for the building. There is no evidence that the building was the work of a master architect or master builder and it is unlikely that an architect designed this vernacular building. The materials and workmanship do not reflect that of a skilled builder/craftsman.

The 1986 Redondo Beach Historic Resources Survey evaluated pre-1946 properties—surveying buildings that were 40 years old or older. The building at 124 N. Catalina Avenue was constructed in 1946, and less than 40 years old at the time of the survey and thus was not evaluated in that survey. The building is a simple vernacular one-part commercial building. While representative of the property type it is not an excellent or unique example of an architectural style or property type.

The building at 124 N. Catalina Avenue does not meet Criterion C and is not eligible for the National Register of Historic Places under Criterion C.

National Register Criterion D.

This criterion applies to archaeological resources. The property was constructed during historic times, so the building on the property would not have yielded information important to the prehistory or early history of the area, state or nation. Thus, Criterion D is not applicable to 124 N. Catalina Avenue.

The building at 124 N. Catalina Avenue does not meet any of the National Register criterion and is not eligible for inclusion on the National Register of Historic Places.

California Register of Historical Resources

According to the *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register)* “because the California Register was consciously designed on the model of the National Register, the two programs are extremely similar.”[12] California Register eligibility criteria 1 through 4 are based on and parallel to National Register criteria A through D.

California *Technical Assistance Series #6* also states that “it’s possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if is maintains the potential to yield significant scientific or historical information or specific data.[13]

The building at 124 N. Catalina Avenue has a good level of integrity, however the building is not eligible for listing in the California Register of Historical Resources as it does not meet the threshold to be eligible under Criteria 1, 2, 3 and 4 of the California Register as explained in the evaluations of National Register criteria A, B, C and D in the section above.

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[12] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* p. 1.

[13] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* pp. 1-2.

City of Redondo Beach Landmark

The property at 124 N. Catalina Avenue is evaluated for its eligibility as a City of Redondo Beach Landmark under the five City of Redondo Beach criteria for historic resource designation.

Redondo Beach Criterion A

To be eligible under City of Redondo Beach Criterion A, a property must exemplify or reflect special elements of the City's cultural, social, economic, political, aesthetic, engineering, or architectural history. There is no evidence that this building is associated with significant patterns of history or with the architectural history of Redondo Beach. There is no evidence that this building stimulated development of similar buildings in the City or was significant in any aspect of the City's commercial development history as the building was a common property type in the mid-20th Century. There is no evidence that any historic event took place at the property.

The building at 124 N. Catalina Avenue does not meet Criterion A and is not eligible to be designated as a City of Redondo Beach landmark under Criterion A.

Redondo Beach Criterion B

To be eligible under City of Redondo Beach Criterion B, a property must be identified with persons or events significant in local, state or national history.

There is no evidence that the property is associated with any important Redondo Beach individual early settlers, civic leaders, or business owners/operators. There is no evidence that any historic events occurred at the property.

The building at 124 N. Catalina Avenue does not meet Criterion B and is not eligible to be designated as a City of Redondo Beach landmark under Criterion B.

Redondo Beach Criterion C

To be eligible under City of Redondo Beach Criterion C, a property must embody distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials of craftsmanship.

The 1986 Redondo Beach Historic Resources Survey evaluated pre-1946 properties. The building at 124 N. Catalina Avenue was constructed in 1946 and thus was not evaluated in that survey. The building at 124 N. Catalina Avenue appears to meet the City of Redondo Beach Survey category of "C" for "buildings which reveal much of their original architectural style (not substantially altered). These buildings are fairly modest in architectural style or design and are less likely to have historical importance. Most of these buildings are good candidates as contributing structures in an historic district."

The building is a simple one-part vernacular commercial building. While representative of the property type it is not an excellent or unique example of the style or property type.

The building at 124 N. Catalina Avenue does not meet Criterion C and is not eligible to be designated as a City of Redondo Beach landmark under Criterion C.

Redondo Beach Criterion D

To be eligible under City of Redondo Beach Criterion D, a property must be representative of the notable work of a builder, designer, or architect.

There is no evidence that the building at 124 N. Catalina Avenue is the work of a notable builder, designer or architect or master craftsman.

The building at 124 N. Catalina Avenue does not meet Criterion D and is not eligible to be designated as a City of Redondo Beach landmark under Criterion D.

Redondo Beach Criterion E

To be eligible under City of Redondo Beach Criterion E, a property must have a unique location or singular physical characteristic(s) that represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The building is mid-block on a street that contains both residential and commercial buildings. There is no view shed in which the building stands out as a significant visual feature or as a landmark of the neighborhood.

The building at 124 N. Catalina Avenue does not meet Criterion E and is not eligible to be designated as a City of Redondo Beach landmark under Criterion E.

The building at 124 N. Catalina Avenue does not meet the criteria to be eligible for designation as a City of Redondo Beach Landmark.

126 N. CATALINA AVENUE

National Register of Historic Places

The property at 126 N. Catalina Avenue is evaluated for its eligibility for inclusion on the National Register of Historic Places under the National Register criteria for significance.

National Register Criterion A.

To be eligible for inclusion on the National Register under Criterion A, a property must have a direct association with events that have made a significant contribution to the broad patterns of our history and cultural heritage. The building at 126 N. Catalina

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Avenue was constructed in 1949 as a one-story vernacular commercial building and included a retail store and dry cleaning facilities in the rear. In 1994 the building was adapted to serve as a coffee shop and bookstore; the building continued to serve as a coffee shop until 2019.

There is no evidence that this building was significant in the City's commercial development history as a dry cleaner. It has been in use as a coffee shop for less than 30 years and thus that use does not qualify as an historic use. There is no evidence that any historic event took place at the property.

The property at 126 N. Catalina Avenue does not meet Criterion A and is not eligible for the National Register of Historic Places under Criterion A.

National Register Criterion B

To be eligible for inclusion on the National Register under Criterion B, a property must be associated with the lives of persons significant in the past who have made an important impact on national, state or local history. There is no evidence that the property is associated with any individuals, civic leaders, or business owners/operator of historic significance.

The property at 126 N. Catalina Avenue does not meet Criterion B and is not eligible for the National Register of Historic Places under Criterion B.

National Register Criterion C

A property is eligible under Criterion C if it embodies the distinguishing characteristics of an architectural type, specimen, inherently valuable for study of a period style or method of construction. A property also is eligible if it represents notable work of a master builder, designer or architect or possesses high artistic values or represents a significant and distinguishable entity whose components may lack individual distinction.

The 1986 Redondo Beach Historic Resources Survey evaluated pre-1946 properties—surveying buildings that were 40 years old or older. The building at 124 N. Catalina Avenue was constructed in 1946, and less than 40 years old at the time of the survey and thus was not evaluated in that survey.

The building was built as a dry cleaning retail shop in the front and with industrial dry cleaning operations in the rear. The front is designed in a Mid-Century Modern architectural style. Its most notable architectural feature is its expressive front elevation which sports a Modernistic flair. The building was adapted into a coffee shop in the early 21st Century and the area under the front canopy was converted into outdoor café seating.

The front section of the building served as the retail area accessed by the public. The majority of the building behind the former retail front section is a large area which housed clothes cleaning industrial machines and operations. That area was adapted into the café's seating area.

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The front portion of the building contains Modernist architectural features applied to a small commercial building. The projecting corner on the south end of the front façade is a later, incompatible, addition. The area behind the front section of the building was built to house the cleaning equipment and cleaning operations of the business. It is a simple rectangular form and massing and lacks any architectural details on its side and rear elevations.

There is no evidence that the building was the work of a master architect or master builder. The materials and workmanship do not reflect that of a skilled builder/craftsman.

The building is a modest example of the Mid-Century Modern architectural style; it is not an excellent or unique example of the style.

The building at 126 N. Catalina Avenue does not meet Criterion C and is not eligible for the National Register of Historic Places under Criterion C.

National Register Criterion D.

This criterion applies to archaeological resources. The property was constructed during historic times, so the building on the property would not have yielded information important to the prehistory or early history of the area, state or nation. Thus, Criterion D is not applicable to 126 N. Catalina Avenue.

The building at 126 N. Catalina Avenue does not meet any of the National Register criterion and is not eligible for inclusion on the National Register of Historic Places.

California Register of Historical Resources

According to the *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register)* "because the California Register was consciously designed on the model of the National Register, the two programs are extremely similar."[14] California Register eligibility criteria 1 through 4 are based on and parallel to National Register criteria A through D.

California *Technical Assistance Series #6* also states that "it's possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if is maintains the potential to yield significant scientific or historical information or specific data.[15]

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[14] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* p. 1.

[15] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* pp. 1-2.

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The building at 126 N. Catalina Avenue has a good level of integrity, however the building is not eligible for listing in the California Register of Historical Resources as it does not meet the threshold to be eligible under Criteria 1, 2, 3 and 4 of the California Register as explained in the evaluations of National Register criteria A, B, C and D in the section above.

City of Redondo Beach Landmark

The property at 126 N. Catalina Avenue is evaluated for its eligibility as a City of Redondo Beach Landmark under the five City of Redondo Beach criteria for historic resource designation.

Redondo Beach Criterion A

To be eligible under City of Redondo Beach Criterion A, a property must exemplify or reflect special elements of the City's cultural, social, economic, political, aesthetic, engineering, or architectural history. There is no evidence that this building is associated with significant patterns of history, commercial development or architectural history in Redondo Beach.

The building at 126 N. Catalina Avenue does not meet Criterion A and is not eligible to be designated as a City of Redondo Beach landmark under Criterion A.

Redondo Beach Criterion B

To be eligible under City of Redondo Beach Criterion B, a property must be identified with persons or events significant in local, state or national history.

There is no evidence that the property is associated with any important Redondo Beach individuals, civic leaders, or business leaders or owners/operators. There is no evidence that any historic events occurred at the property.

The building at 126 N. Catalina Avenue does not meet Criterion B and is not eligible to be designated as a City of Redondo Beach landmark under Criterion B.

Redondo Beach Criterion C

To be eligible under City of Redondo Beach Criterion C, a property must embody distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials of craftsmanship.

The 1986 Redondo Beach Historic Resources Survey evaluated pre-1946 properties. The building at 126 N. Catalina Avenue was constructed in 1949 and thus not evaluated in that survey.

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The building at 126 N. Catalina Avenue appears to meet the City of Redondo Beach Survey category of "C" for "buildings which reveal much of their original architectural style (not substantially altered). These buildings are fairly modest in architectural style or design and are less likely to have historical importance. Most of these buildings are good candidates as contributing structures in an historic district."

The building at 126 N. Catalina Avenue was constructed as a dry cleaning retail shop in the front with industrial dry cleaning operations in the rear. The front is designed in a Mid-Century Modern architectural style. Its most notable architectural feature is its expressive front entry which sports a Modernistic flair. The building was adapted into a coffee shop in the early 21st Century and the area under the front canopy was converted into outdoor café seating.

The building is a good example of a Mid-Century Modern architectural features applied to a small commercial building in Redondo Beach. While not an exceptional example of the architectural style, the building is a good local example of the Modern style exhibiting a Modernistic flair with its curving canopy. Thus, the front retail section of the building appears to meet Criterion C to be eligible as a City of Redondo Beach landmark based on its Mid-century Modern style.

The building at 126 N. Catalina Avenue appears to meet Criterion C and is eligible to be designated as a City of Redondo Beach landmark under Criterion C.

Redondo Beach Criterion D

To be eligible under City of Redondo Beach Criterion D, a property must be representative of the notable work of a builder, designer, or architect.

There is no evidence that the building at 126 N. Catalina Avenue is the work of a notable builder, designer or architect or master craftsman.

The building at 126 N. Catalina Avenue does not meet Criterion D and is not eligible to be designated as a City of Redondo Beach landmark under Criterion D.

Redondo Beach Criterion E

To be eligible under City of Redondo Beach Criterion E, a property must have a unique location or singular physical characteristic(s) that represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The building is mid-block on a street that contains both residential and commercial buildings. There is no view shed in which the building stands out as a significant visual feature or as a landmark of the neighborhood.

The building at 126 N. Catalina Avenue does not meet Criterion E and is not eligible to be designated as a City of Redondo Beach landmark under Criterion E.

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The building at 126 N. Catalina Avenue appears eligible to be designated as a City of Redondo Beach Landmark based on its local significance as an example of the Mid-Century Modern architectural style applied to a small commercial building

132 N. CATALINA AVENUE

National Register of Historic Places

The property at 132 N. Catalina Avenue is evaluated for its eligibility for inclusion on the National Register of Historic Places under the four National Register criteria for significance.

National Register Criterion A.

To be eligible for inclusion on the National Register under Criterion A, a property must have a direct association with events that have made a significant contribution to the broad patterns of our history and cultural heritage. The building at 132 N. Catalina Avenue is a small vernacular industrial building. A portion of the building at 132 N. Catalina Avenue was constructed in 1905 as a blacksmith shop. The building evolved with additions to the south over the decades. During the first half of the 20th Century the building housed a variety of industrial and commercial operations including blacksmithing in its first decade and other industrial and woodworking uses in subsequent decades.

There is no evidence that this building was significant in the City's industrial development. While it provided commercial industrial and commercial services, there is no evidence that it was significant or influential in the history of the development of any industry or industrial commercial services in Redondo Beach. There is no evidence that any historic event took place at the property.

The property at 132 N. Catalina Avenue does not meet Criterion A and is not eligible for the National Register of Historic Places under Criterion A.

National Register Criterion B

To be eligible for inclusion on the National Register under Criterion B, a property must be associated with the lives of persons significant in the past who have made an important impact on national, state or local history. There is no evidence that the property is associated with any important individual business or civic leaders, or business owners/operators.

The property at 132 N. Catalina Avenue does not meet Criterion B and is not eligible for the National Register of Historic Places under Criterion B.

National Register Criterion C

A property is eligible under Criterion C if it embodies the distinguishing characteristics of an architectural type, specimen, is inherently valuable for study of a period style or method of construction. A property also is eligible if it represents notable work of a master builder, designer or architect or possesses high artistic values or represents a significant and distinguishable entity whose components may lack individual distinction.

The building was identified in the 1986 Redondo Beach Historic Resources Survey with an evaluation of C+. The C category includes “pre-1946 buildings which reveal much of their original architectural style (not substantially altered).” Research conducted for the current report has identified the building’s evolution from an early 20th Century commercial building to an expanded and remodeled commercial/industrial building.

Although the building retains the shape of an early 20th Century façade on its front elevation, the shape and form of the rest of the building reflect later alterations. These include the change in the building’s footprint, addition of a new roof (both form and materials), and addition of sections of metal exterior sheathing. The majority of exterior materials are of later 20th Century provenance. The building is not an example of an intact early 20th Century vernacular commercial industrial building.

It is very unlikely that this building was designed by an architect. There is no evidence that the building was the work of a master builder. The materials and workmanship do not reflect that of a skilled builder/craftsman.

The building at 132 N. Catalina Avenue does not meet Criterion C and is not eligible for the National Register of Historic Places under Criterion C.

National Register Criterion D.

This criterion applies to archaeological resources. The property was constructed during historic times, so the building on the property would not have yielded information important to the prehistory or early history of the area, state or nation. Thus, Criterion D is not applicable to 132 N. Catalina Avenue.

The building at 132 N. Catalina Avenue does not meet any of the National Register criterion and is not eligible for inclusion on the National Register of Historic Places.

California Register of Historical Resources

According to the *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register)* “because the California Register was consciously designed on the model of the National Register, the two programs are extremely similar.”[16]

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[16] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* p. 1.

California Register eligibility criteria 1 through 4 are based on and parallel to National Register criteria A through D.

California *Technical Assistance Series #6* also states that “it’s possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register if is maintains the potential to yield significant scientific or historical information or specific data.[17]

The building is not eligible for listing in the California Register of Historical Resources as it does not meet the threshold to be eligible under California Register Criteria 1, 2, 3 and 4 as explained in the evaluations of National Register criteria A, B, C and D in the section above. The building at 132 N. Catalina Avenue has a low-fair level of integrity and does not have the potential to yield significant scientific or historical information or specific data. The building at 132 N. Catalina Avenue is not eligible for inclusion on the California Register.

City of Redondo Beach Landmark

The property at 132 N. Catalina Avenue is evaluated for its eligibility as a City of Redondo Beach Landmark under the five City of Redondo Beach criteria for historic resource designation.

Redondo Beach Criterion A

To be eligible under City of Redondo Beach Criterion A, a property must exemplify or reflect special elements of the City’s cultural, social, economic, political, aesthetic, engineering, or architectural history. There is no evidence that this building is associated with significant patterns of history, industrial or commercial development or architectural history in Redondo Beach.

The building at 132 N. Catalina Avenue does not meet Criterion A and is not eligible to be designated as a City of Redondo Beach landmark under Criterion A.

Redondo Beach Criterion B

To be eligible under City of Redondo Beach Criterion B, a property must be identified with persons or events significant in local, state or national history.

There is no evidence that the property is associated with any significant Redondo Beach early settlers or important early industrial or commercial leaders, civic leaders, or

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[17] *California Office of Historic Preservation Technical Assistance Series #6 California and National Register: A Comparison (for purposes of determining eligibility for the California Register),* pp. 1-2.

business owners/operators. There is no evidence that any historic events occurred at the property.

The building at 132 N. Catalina Avenue does not meet Criterion B and is not eligible to be designated as a City of Redondo Beach landmark under Criterion B.

Redondo Beach Criterion C

To be eligible under City of Redondo Beach Criterion C, a property must embody distinctive characteristics of a style, type, period, or method of construction, or is a valuable example of the use of indigenous materials of craftsmanship.

The building was identified in the 1986 Redondo Beach Historic Resources Survey with an evaluation of C+. The C survey category includes "pre-1946 buildings which reveal much of their original architectural style (not substantially altered)" and the "D" survey category includes " buildings that are clearly not significant in terms of architectural style or have been substantially altered from the original style." Both survey categories state that buildings in those categories "are good candidates as contributing structures in an historic district."

Research conducted for the current report has identified that the building has evolved from an early 20th Century industrial building to an expanded and remodeled commercial/industrial building. The building retains the shape of an early 20th Century façade on its front elevation, but the shape and form of the rest of the building reflect later alterations. These include the change in the building's footprint, addition of a new roof (both form and materials), and addition of sections of metal exterior sheathing. The majority of exterior materials are of later 20th Century provenance. The building is not an excellent or unique example of an early 20th Century vernacular commercial industrial building.

The building at 132 N. Catalina Avenue does not meet Criterion C and is not eligible to be designated as a City of Redondo Beach individual landmark under Criterion C.

Redondo Beach Criterion D

To be eligible under City of Redondo Beach Criterion D, a property must be representative of the notable work of a builder, designer, or architect.

There is no evidence that the building at 132 N. Catalina Avenue is the work of a notable builder, designer or architect or master craftsman.

The building at 132 N. Catalina Avenue does not meet Criterion D and is not eligible to be designated as a City of Redondo Beach landmark under Criterion D.

Redondo Beach Criterion E

To be eligible under City of Redondo Beach Criterion E, a property must have a unique location or singular physical characteristic(s) that represents an established and familiar visual feature or landmark of a neighborhood, community, or the City.

The building is mid-block on a street that contains both residential and commercial buildings. There is no view shed in which the building stands out as a significant visual feature or as a landmark of the neighborhood.

The building at 132 N. Catalina Avenue does not meet Criterion E and is not eligible to be designated as a City of Redondo Beach landmark under Criterion E.

The building at 132 N. Catalina Avenue is not eligible to be designated as a City of Redondo Beach Landmark.

Historic District Evaluation

According to *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*" a district derives its importance from being a unified entity, even though it is often composed of a variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties." In addition, "a district must be significant, as well as being an identifiable entity" and that the majority of the components "add to the district's historic character, even if they are individually undistinguished."[18]

Historic District Evaluation

According to *National Register Bulletin 15, How to Apply the National Register Criteria for Evaluation*" a district derives its importance from being a unified entity, even though it is often composed of a variety of resources. The identity of a district results from the interrelationship of its resources, which can convey a visual sense of the overall historic environment or be an arrangement of historically or functionally related properties." In addition, "a district must be significant, as well as being an identifiable entity" and that the majority of the components "add to the district's historic character, even if they are individually undistinguished."[19]

The City of Redondo Beach historic preservation ordinance is silent on requiring integrity. The City of Redondo Beach survey categories state that buildings that "can be restored may contribute to a historic district."

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[18] https://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf, p. 5.

[19] https://www.nps.gov/nr/publications/bulletins/pdfs/nrb15.pdf, p. 5

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East side of the 100 block of N. Catalina Avenue

The buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue meet Criterion A in that they exemplify and reflect special elements of the City's social, commercial and transportation history as well as its architectural history

The building at 112 N. Catalina Avenue was associated with many fraternal orders and philanthropic societies over the first half of the 20th Century. These groups were essential to building community and fostering civic engagement in Redondo Beach in the early decades of the 20th Century. This building retains its historic volume and massing and documentation regarding the building's original appearance can guide its rehabilitation.

The building at 132 N. Catalina Avenue is associated with the early industrial and transportation history of Redondo Beach. While much of the building has evolved over the decades, the front façade reflects the building's early 20th Century industrial provenance. The building also retains interior mechanical equipment from the early 20th Century.

The buildings at 124 N. Catalina Avenue and 126 N. Catalina Avenue were constructed in the 1940s on land that had been used in previous decades to support the rail regional rail network. When the rail service was disbanded, the tracks and all ancillary elements were removed. The buildings at 124 N. Catalina Avenue and 126 N. Catalina Avenue represent the transition from a mixed industrial/commercial block to that of a block/district of commercial buildings housing businesses that served local residents.

The buildings at 112 N. Catalina Avenue and 132 N. Catalina Avenue represent the early commercial development of Redondo Beach and are rare resources as few early 20th Century commercial buildings remain. These buildings retain sufficient historic features and can be rehabilitated using the Secretary of the Interior's Standards for Rehabilitation. The buildings at 124 N. Catalina Avenue and 126 N. Catalina Avenue are examples of mid-20th Century Redondo Beach commercial buildings including a typical vernacular storefront building at 124 N. Catalina Avenue and a Mid-Century Modern style building at 236 N. Catalina Avenue. .

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This group of four buildings represent the commercial/industrial development of Redondo Beach in the first half of the 20th Century with a period of significance of 1904 to 1949.

Two of the buildings are rare resources as they from the first decade of the 20th Century. Only three City of Redondo Beach Landmarks are commercial buildings and none of them date from the first decade of the 20th Century. Only a few other commercial buildings were identified in the City of Redondo Beach Historic Resources Inventory and none of them date from the first decade of the 20th Century.

The two buildings, 112 N. Catalina Avenue and 132 N. Catalina Avenue, that date from the first decade of the 20th Century were constructed shortly after the railroad tracks and rail service was established in Redondo Beach. Those two buildings are related to the early years of rail service in Redondo Beach as well as with the commercial/industrial development of the City as a district. The period of rail service continued into the 1940s.

When the railroad was disbanded the open land on the block that had been used for rail support operations was ripe for development. The two 1940s era buildings on the block represent the transition to the post-railroad era. The building at 132 N. Catalina Avenue also has significant association to the social history of fraternal and philanthropic organizations active in Redondo Beach and early civic engagement in the early 20th Century.

These four buildings convey a visual sense representing commercial/industrial development in the first half of 20th Century in the City of Redondo Beach. The buildings are significant for their associations with the history of railroads in Redondo Beach and with fraternal organizations and philanthropic societies and civic engagement in Redondo Beach. The buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue together meet the criteria to be designated as a City of Redondo Beach Historic District. .

PROPOSED PROJECT AND ANALYSIS OF POTENTIAL IMPACTS

The proposed project will cover six parcels of varying sizes. These parcels include four eligible historic buildings that contribute to a N. Catalina Avenue Historic District: 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 112 N. Catalina Avenue. The buildings at 124 N. Catalina Avenue and 126 N. Catalina Avenue are treated as a single building in the project.

Known as Catalina Village, the project will consist of the adaptive reuse and rehabilitation the historic buildings. The building at 112 N. Catalina Avenue will be adapted into residential use. The other two buildings (includes the combined 124/126 N. Catalina Avenue building and the 132 N. Catalina Avenue building) will provide commercial/retail space. At the rear of the parcels and on the vacant parcels, new apartment residential units will be constructed.

As the street facing buildings create an historic district, the project must comply with the Secretary of the Interior's Standards to ensure that the project will not result in any adverse impacts on historic resource.

The Secretary of the Interior's Standards for Rehabilitation

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive feature, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that if removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Catalina Village project area

Proposed Project Site Plan

Catalina Village Proposed Project streetfront along the 100 Block of N. Catalina Avenue

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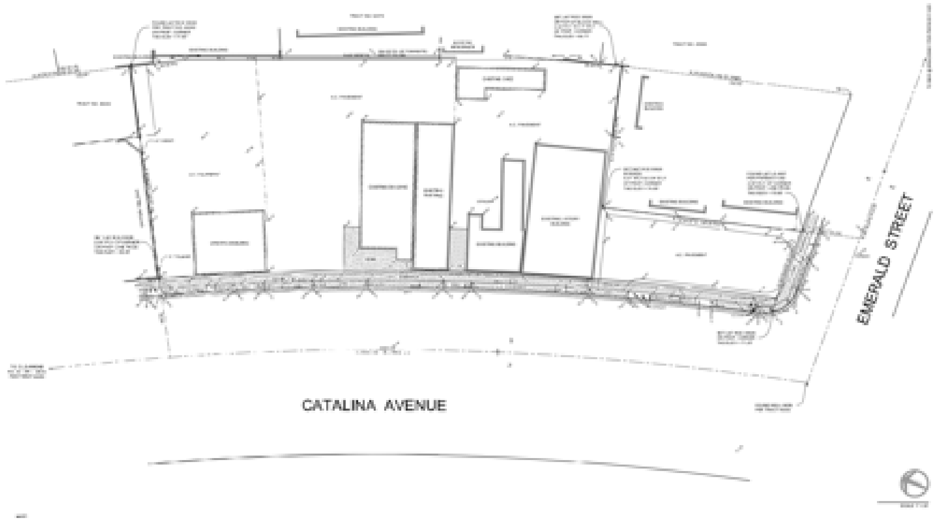
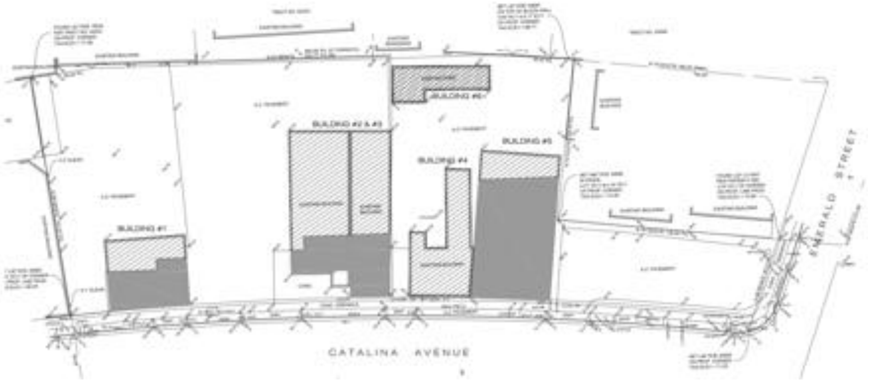


Existing Site Plan



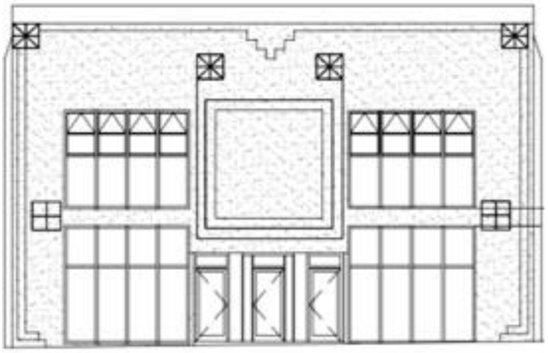
Proposed Project Plan

112 N. Catalina Avenue

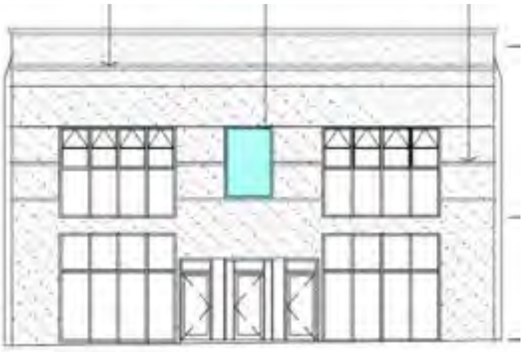
112 N. Catalina Avenue

The building at 112 N. Catalina Avenue retains its original volume and massing as well as the division of the front façade into three modules and symmetrical design. There are no architectural details on the sides of the building except for five pilasters. During a 1993 remodel original features were removed or covered. The proposed rehabilitation of the building includes restoring original elements based on photographic documentation of the building's pre-1993 front façade.

The original building design included a cornice which will be reconstructed. Also, horizontal banding at the upper level of windows will be reintroduced. The original upper middle window had been removed; that area will re-reconfigured with a centered window similar to the original design.



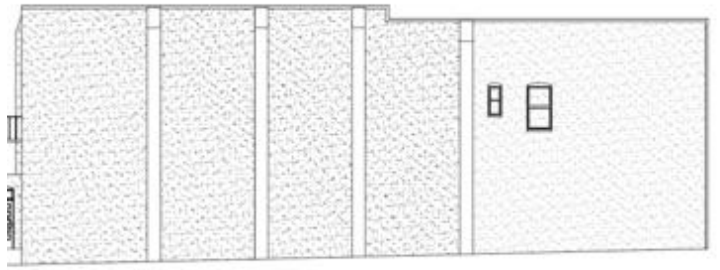
112 N. Catalina Ave., drawing of existing front elevation



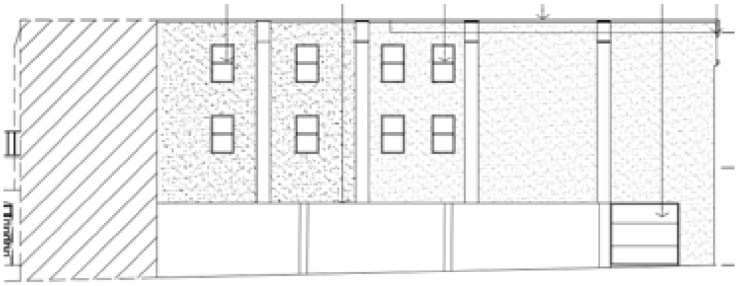
Drawing of proposed front elevation

The building at 112 N. Catalina Avenue will be adapted to provide housing units. The first floor level of the north side elevation has been obscured from view since construction of the adjacent building (116 N. Catalina Avenue) in 1921. The north elevation is a blank wall except for the five pilasters, a cornice and two windows. The north elevation will become fully visible with the demolition of the non-historic 116 N. Catalina Avenue building which will be replaced by a driveway that will provide access into the complex. About 20 percent of the building, at the rear, will be demolished; one pilaster, the farthest back, will be removed. On the second and third floors of the building, new double-hung windows will be inserted to support the new interior residential program. At the first floor level most of the building will have garage openings that will lead to parking spaces. The first level parking space closest to the front of the building will have a roll up garage door as this area of the building will be the most visible from the public right of way.

The south elevation is similar to the north elevation with five pilasters and few windows, and it has been visible at least since the adjacent parcel at 100 N. Catalina Avenue was cleared of buildings in recent decades. There are no architectural details on either the north or south side elevations as it was thought that the adjacent parcels could be developed with buildings with no side yard setbacks. The proposed Catalina Village project will add a three-story building adjacent to and abutting the 112 N. Catalina Avenue building on its south side. As a result, the south elevation will no longer be visible.



132 N. Catalina Avenue, drawing of existing side (north) elevation



132 N. Catalina Avenue, drawing of proposed side (north) elevation

The building at 112 N. Catalina Avenue will be adapted to a new use providing housing units. The historic character of the building will be restored with the rehabilitation of the front façade which is based on photographic documentation. The distinctive massing and volume of the building will be retained. The only changes to the building are demolition of a small portion of the rear of the building and the introduction of windows on the upper stories of the north side elevation and garage openings on the ground floor level portion of the building – an area of the building that has not been visible for 100 years. As such, there will be no adverse impact on the north side elevation. The reconstruction of historic features of the front elevation are evidence based.

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The proposed adaptive reuse and rehabilitation of the building at 112 N. Catalina Avenue meets the Secretary of the Interior's Standards for Rehabilitation. There will be no adverse impact to any historic resources.

124 N. Catalina Avenue and 126 N. Catalina Avenue

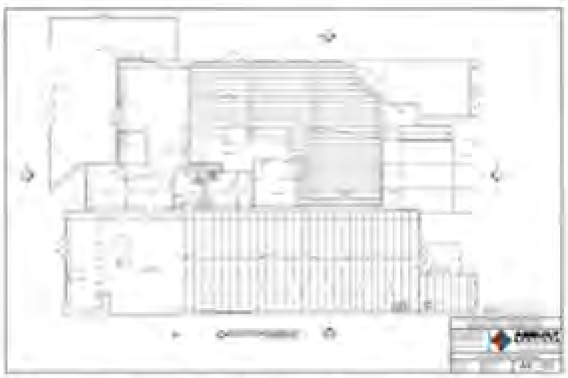
126 N. Catalina Avenue and 124 N. Catalina Avenue

The building at 124 N. Catalina Avenue was constructed in 1946 on a 25-foot wide parcel to house a clothes cleaning service. Four of the similarly narrow parcels to the north were consolidated to create a 200-foot wide parcel and in 1949 an addition to the existing cleaners building was constructed on that parcel. Known as 126 N. Catalina Avenue, the building offered drive-through service window with most of the building supporting clothes cleaning operations.

The 126 N. Catalina Avenue building was sited on the south half of the parcel, abutting the 124 N. Catalina Avenue building (with which it shared operations). This allowed for the north half of the parcel to be used to support vehicle parking as well as for vehicles to use the drive-through area of the cleaners. It is unknown when the drive-through service ended. The building was adapted into a Coffee Shop in 1994 and has generally functioned as a café for almost 25 years.

Sketch of 126 N. Catalina Avenue and 124 N. Catalina Avenue as part of Catalina Village

The two buildings will function as a single unit in the proposed project. The buildings will be adapted to function together as a café. Each storefront will retain their original designs.

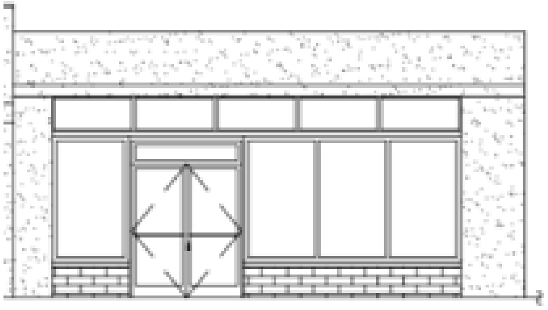


Existing floor plan of 124 N. Catalina Avenue and 126 N. Catalina Avenue

Proposed floor plan of 124 N. Catalina Avenue and 126 N. Catalina Avenue

The industrial rear portion of each building will be demolished. These areas supported cleaning operations and the side and rear elevations of each building have unadorned walls. The rear of these buildings were a shell to house the industrial operations of a cleaning plant. There are no historic features or elements of historic significance on this area of the building in terms of construction, design or the operations it housed. The historic significance of each of these buildings is based on their storefronts, street-facing architectural designs which will be retained, and the storefronts will be rehabilitated. The buildings' historic significance is not based on the industrial use of the buildings or the architectural design of the rear portions of these buildings.

124 N. Catalina Avenue



Drawing of 124 N. Catalina Ave., existing front elevation

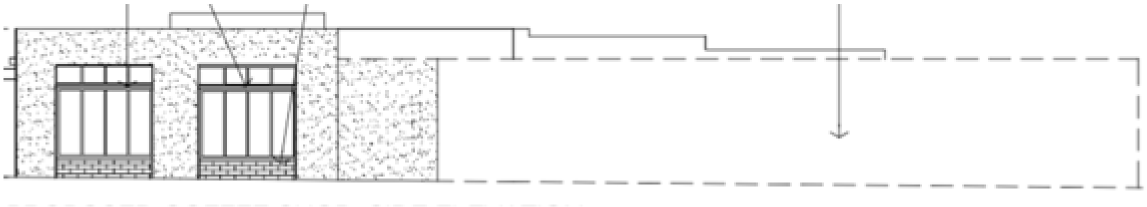
Photo of 124 N. Catalina Ave., front elevation.

The front elevation of 124 N. Catalina Avenue will remain the same. The original windows and doors remain as well as the original stacked stone bulkhead. A new sign will be placed at the upper level of the building – the traditional location on the building for signage.

Sketch of 124 N. Catalina Ave., front (west) and proposed side (south) elevation

124 N. Catalina Ave., Photo of existing side (south) elevation (Google Earth, c2020)

124 N. Catalina Ave., Drawing of existing side (south) elevation



124 N. Catalina Ave., Drawing of proposed side (south) elevation

Two new windows will be inserted into the front portion, the original retail section, of the qw4 N. Catalina Avenue building. They will be the same height as the front storefront windows but will be differentiated with more mullions. There will be a stacked stone bulkhead under each of the windows. The stacked stone will be discontinuous along this elevation to differentiate it from the original continuous stacked stone bulkhead of the front façade. The addition of similarly sized windows and the treatment of the glazing and stacked stone bring design elements of the front façade to this visible side of the building, but their design is sufficiently differentiated.

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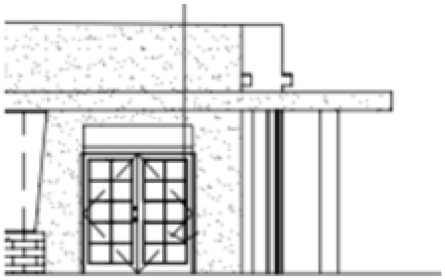
126 N. Catalina Ave., and 124 N. Catalina Ave. showing proposed north side elevation of 124 N. Catalina Ave.

Beige wall is north elevation of 124 N. Catalina Ave. and green is projecting addition of 126 N. Catalina Ave.



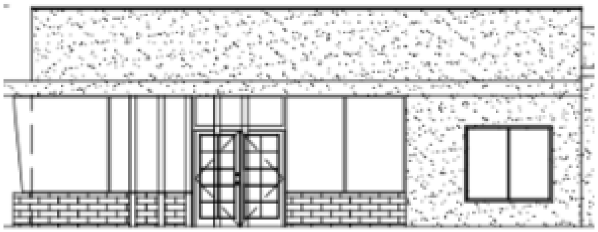
When green projecting wing of 126 N. Catalina Ave. is demolished, more of the north elevation of 124 N. Catalina Ave. will be revealed. A set of double doors will be added to that elevation

A new door will be added to the north elevation of the 124 N. Catalina Avenue building. As the 126 N. Catalina Avenue building is set-back from the sidewalk (with the canopy over the setback area) a portion of the north elevations of 124 N. Catalina Avenue is currently visible. More of that elevation was visible before the projecting office wing of 126 N. Catalina Avenue was constructed. That office wing (painted green) will be demolished, exposing more of the north elevation of 124 N. Catalina Avenue. To support the adaptive reuse of the two buildings, a set of glazed double doors will be inserted into that elevation. The wall is blank so there are no architectural details that would be impacted with the addition of the door.

Based on the description and analysis above, the building at 124 N. Catalina Avenue will be placed in a new use that will have no change on the character defining characteristics of the historic front storefront façade of the building. The distinctive features of the front façade will be preserved. While the adaptive reuse of the site will result in the demolition of a portion of the rear of the building, that area does not retain any character-defining features and its use to house industrial operations is not of historic significance. The addition of new windows on the side (south) elevation support the adaptive reuse of the building. The design of the windows and bulkhead is compatible with the existing architectural features of the building and are sufficiently differentiated from the historic storefronts. The addition of new doors on the north elevation will have no adverse impact to the historic design of the building.

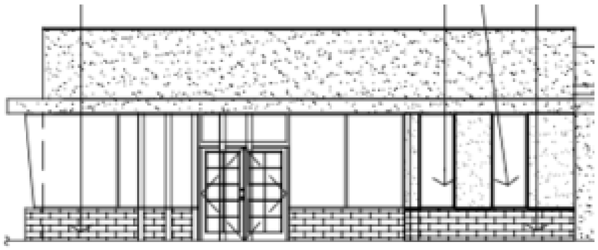
The proposed adaptive reuse and rehabilitation of the building at 124 N. Catalina Avenue meets the Secretary of the Interior’s Standards for Rehabilitation. There will be no adverse impact to any historic resources.

126 N. Catalina Avenue



126 N. Catalina Ave., drawing of front elevation

126 N. Catalina Ave., photo of front elevation



126 N. Catalina Ave., drawing of proposed front elevation

Sketch of front elevation

The proposed rehabilitation of the Mid-Century Modern building at 126 N. Catalina Avenue includes retention of all original features on the historic street-facing storefront elevation – windows, doors, and canopy with its integral blade sign and pillars. The rehabilitation proposal for the front elevation of 126 N. Catalina Avenue also proposes demolition of the projecting office wing (painted green) on its south end. This wing was added at a later point in time. Although there are no building permit records, physical evidence shows that this is not original: the position and type of windows located on this projecting office wing are dissimilar to the other windows on the front elevation and are not representative of window types employed on the front elevation. Also, the stacked stone bulkhead which is a feature of the main portion of the front elevation is missing from the projecting office wing. Removal of this wing will not result in an adverse impact to any historic features.

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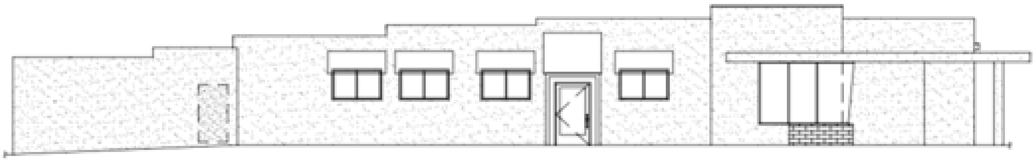
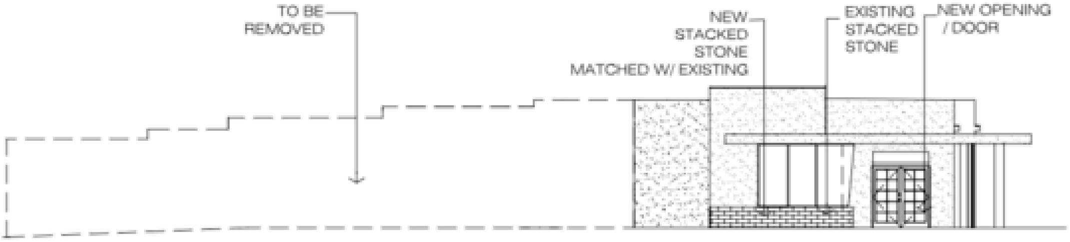
With the removal of this added wing, the front elevation will be a single plane. The new wall section will be consisting of four windows of the same height as the original windows of the storefront façade. The new windows will differ from the original windows in that they will be narrower. A stacked stone bulkhead, similar to the original, will be constructed; the stacked stone bulkhead is an existing feature on both buildings and filling in the “gap” provides continuity of design along this elevation. The Modernistic curved canopy with its projecting blade sign and pillars will be retained.

Photo of side (north) elevation of 126 N. Catalina Ave.



Existing side (north) elevation of 126 N. Catalina Avenue



Proposed side (north) elevation of 126 N. Catalina Avenue

The proposed design retains all the existing original elements of the Modernistic design of the front portion of the historic 126 N. Catalina Avenue building. The new windows that are to be added are compatible with the original design. The replacement of the stacked stone bulkhead will use similar sized stone and pattern. The Modernistic curved canopy with its projecting sign and pillars is retained. Although a portion of the building will be demolished, the rear two-thirds of the building, this section has no Modernistic architectural features nor is its use as an industrial cleaning plant of historic significance.

The proposed adaptive reuse and rehabilitation of 126 N. Catalina Avenue meets the Secretary of the Interior’s Standards for Rehabilitation. There will be no adverse impact to any historic resources.

132 N. Catalina Avenue

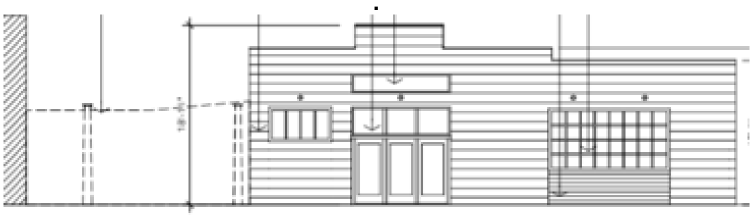
132 N. Catalina Avenue, photograph of front elevation

The building at 132 N. Catalina Avenue retains the original form of its stepped front parapet that hides the gabled roof building. A portion of the rear of the building will be demolished but the gable roof form will remain and will be visible looking at the rear of the building.

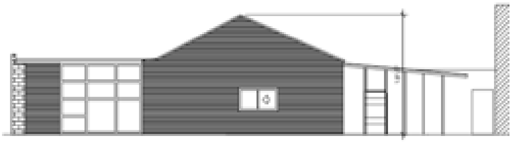
The building is proposed to be adapted from industrial uses/office to a tasting room. The lean-to shed on the north side of the building will be demolished to make way for a driveway into the complex. This shed lean-to is of unknown provenance and not a substantive element of the building. While the windows and doors are not original their location and size appears to have been in place for decades. The pattern and size will be retained; a set of transom windows will be added above the entry doors. The thin metal siding is not original; it will be replaced by horizontal wood siding.

132 N. Catalina Avenue, front and side (south) elevations

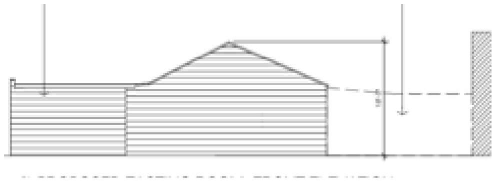
The sides of 132 N. Catalina Avenue are devoid of any architectural style or detailing. To adapt the building into a tasting room two new windows will be inserted into the south side elevation. The north side elevation which will be facing the driveway will a panel with a painted mural attached to the side of the building.



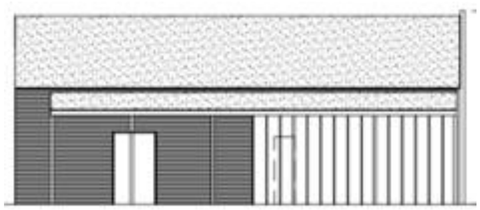
126 N. Catalina Avenue, drawing of proposed front elevation



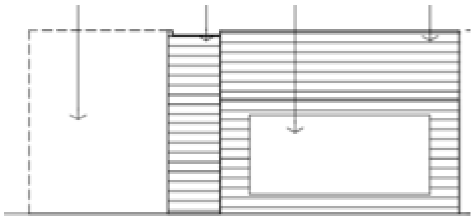
132 N. Catalina Ave., drawing of existing rear elevation



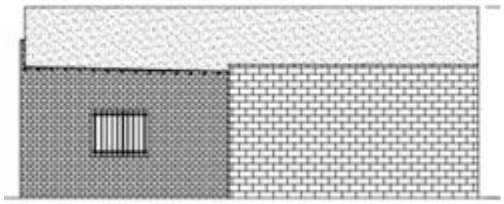
Drawing of proposed rear elevation



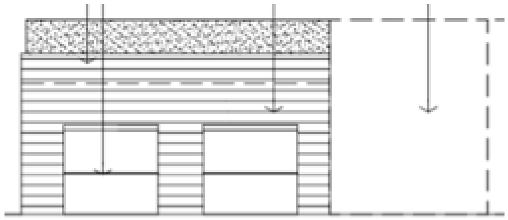
132 N. Catalina Ave., drawing of existing north elevation



Drawing of proposed north elevation



132 N. Catalina Ave., drawing of existing south elevation



Drawing of proposed south elevation

The original exterior cladding of the building is unknown. Horizontal wood siding will be applied to the building and it will conform to the stepped front profile of the building. A unique feature of the building is period machinery in the building which will be retained.

The adaptive reuse of the building will allow for this older building to remain in productive use. The building was constructed to serve businesses such as blacksmithing and as such were not built to be substantial buildings in terms of building materials and expectancy of longevity. This building, typical of its type, has evolved over the last century, with materials such as exterior cladding being removed and replaced. The rehabilitation of the building relies on simple materials that are evocative of the industrial history of the building.

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The proposed adaptive reuse and rehabilitation of 132 N. Catalina Avenue meets the Secretary of the Interior's Standards for Rehabilitation. There will be no adverse impact to any historic resources.

Proposed New Multi-family Residential Buildings

New residential apartment buildings to be constructed at the back of parcels

New residential apartment buildings to be constructed at the back of parcels

126 N. Catalina Avenue in foreground and buildings at rear of the parcels on N. Broadway, the street behind Catalina Avenue to its east

The Catalina Village project proposes to add new three-story residential apartment buildings to the rear of the parcels that contain contributing buildings of the eligible early 20th Century commercial district: 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue. The proposed multi-family buildings are set back at the rear property line of the parcels. This is an urbanized area of the city. The parcels directly to the east, abutting the subject parcels of the eligible historic district, are already developed with multi-story multi-family residential buildings; none of these buildings are historic resources. The proposed buildings are similar to height and massing to some of those(non-historic) existing buildings. The proposed residential buildings are uniform in height and neutral in color. As such they provide a neutral backdrop for the streetfront historic district.

The proposed multi-family buildings will not have an adverse impact on the setting of the eligible historic district or an adverse impact on any individual building of the eligible historic district.

Emerald Street showing Catalina Village proposed apartment building and the City of Redondo Beach Landmark building, the Oklahoma Apartments at 305 Emerald Street

Oklahoma Apartments at 305 Emerald Street between N. Catalina Avenue and N. Broadway

The proposed Catalina Village project also includes construction of a 3-story apartment building on the undeveloped corner parcel at 100 N. Catalina Avenue. On the parcel due east of the 100 N. Catalina Avenue parcel contains a designated City of Redondo Beach Landmark, the Oklahoma Apartments at 305 Emerald Street. The setting of the along Emerald Street already includes multi-story multi-family buildings from the late 20th Century. The adjacency of these buildings has not impacted the historic designation of the Oklahoma Apartments. The proposed building to the west of the Oklahoma

Apartments is similarly a contemporary multi-story, multi-family building. There is adequate setback separation between the proposed building and the Oklahoma Apartments, similar to the setback of the existing multi-family building to the east of the Oklahoma Apartments.

There will be no adverse impacts to the designated City of Redondo Beach landmark Oklahoma Apartments as a result of the construction of the proposed Catalina Village apartment building at 100 N. Catalina Avenue or from construction of the rest of the Catalina Village project.

CONCLUSION

Based on the facts presented in the report above, the buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue are contributing buildings to an eligible City of Redondo Beach historic district of commercial buildings from the first half of the 20th Century. The buildings at 112 N. Catalina Avenue and 126 N. Catalina Avenue appear individually eligible as City of Redondo Beach landmarks. None of the buildings meet the threshold for inclusion on the California Register of Historical Resources or to the National Register of Historic Places either as individual resources or as an historic district.

The proposed adaptive reuse and rehabilitation of these contributing buildings of a local historic district complies with the Secretary of the Interior's Standards for Rehabilitation and the project will not cause any adverse impacts to any historic resources.

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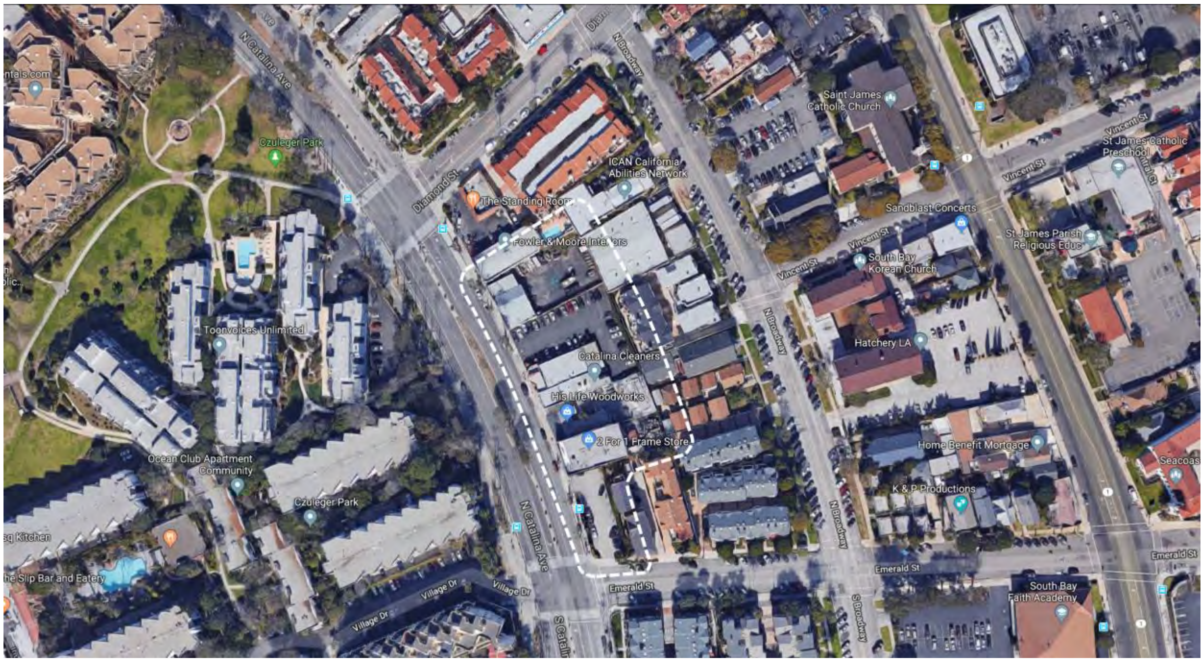
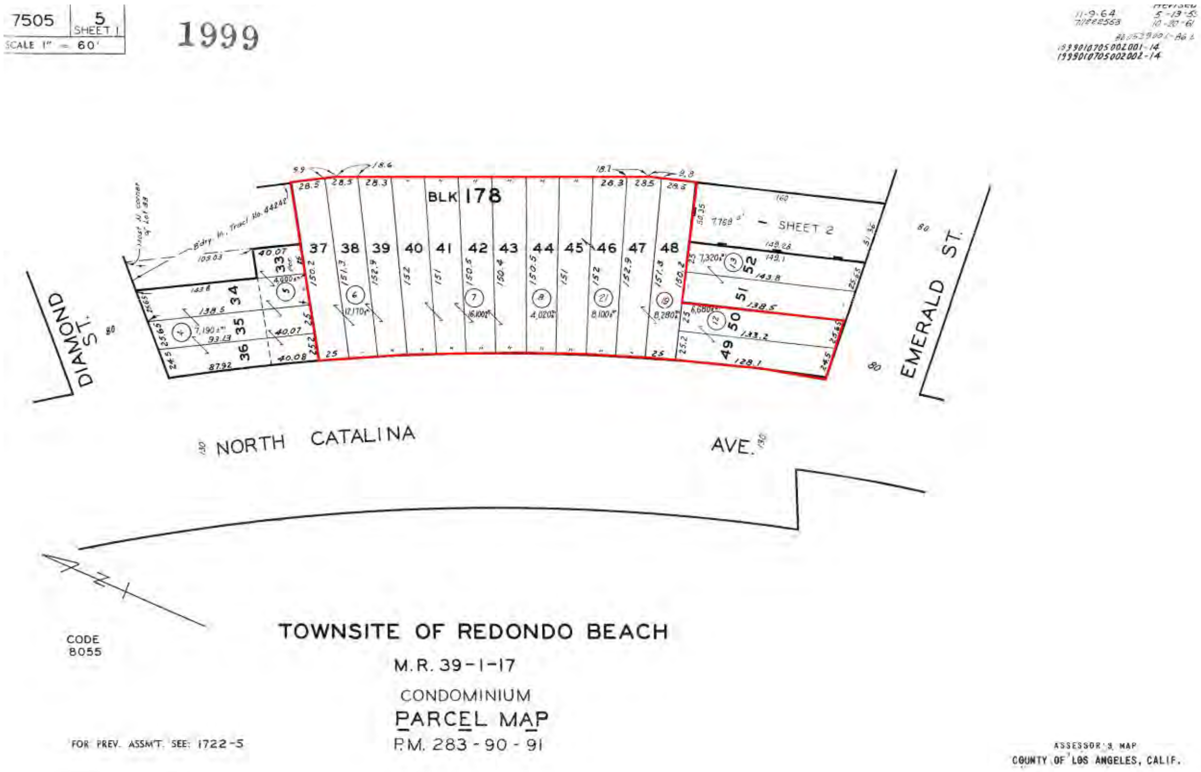
Attachment A: Maps

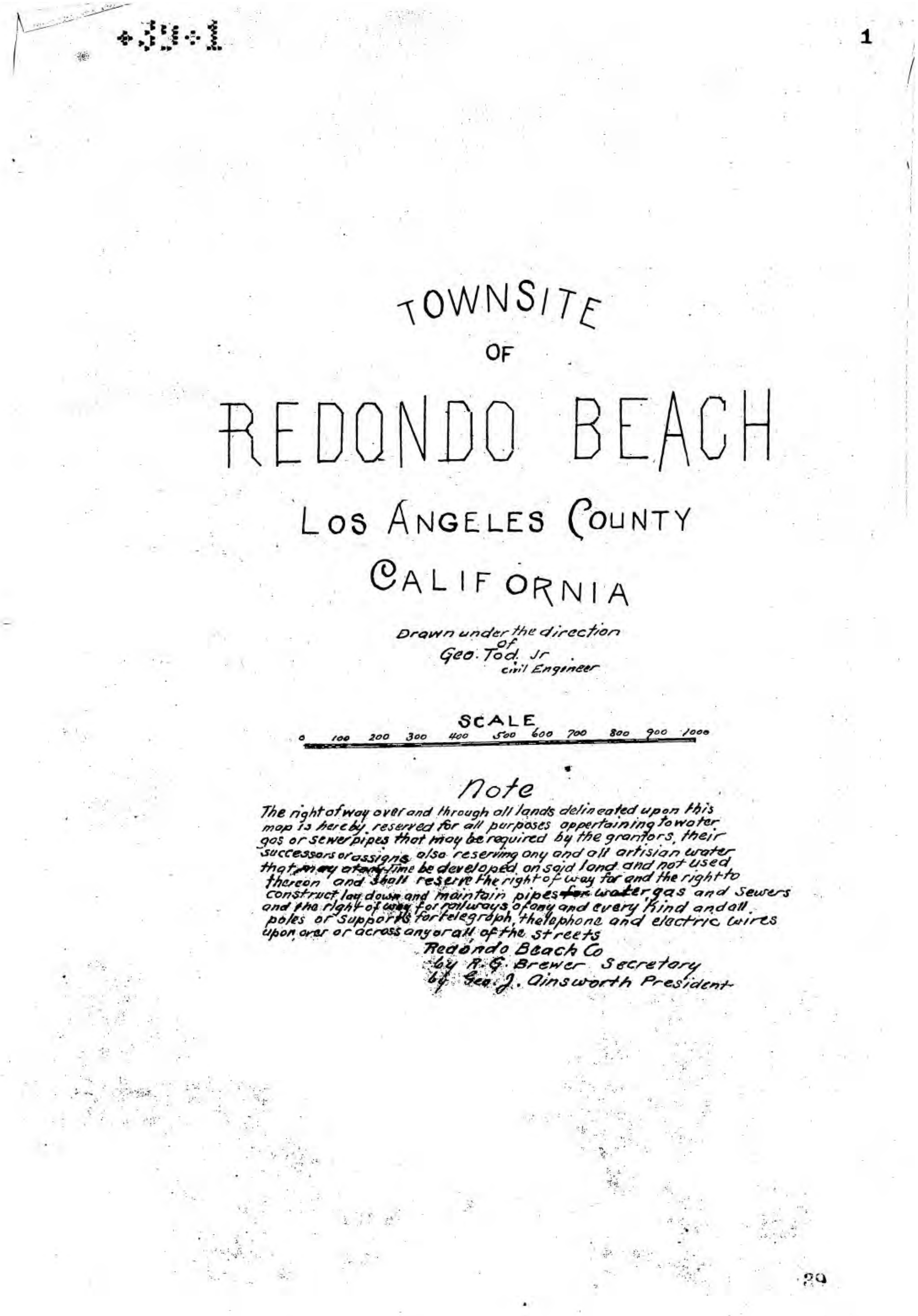


Aerial photograph (ca. 2017)



Los Angeles County Assessor's Map – Parcels including 100 N. Catalina at south corner

Original Tract Map



+39+1

1

TOWNSITE
OF
REDONDO BEACH
LOS ANGELES COUNTY
CALIFORNIA

Drawn under the direction
of
Geo. Tod. Jr
civil Engineer

SCALE
0 100 200 300 400 500 600 700 800 900 1000

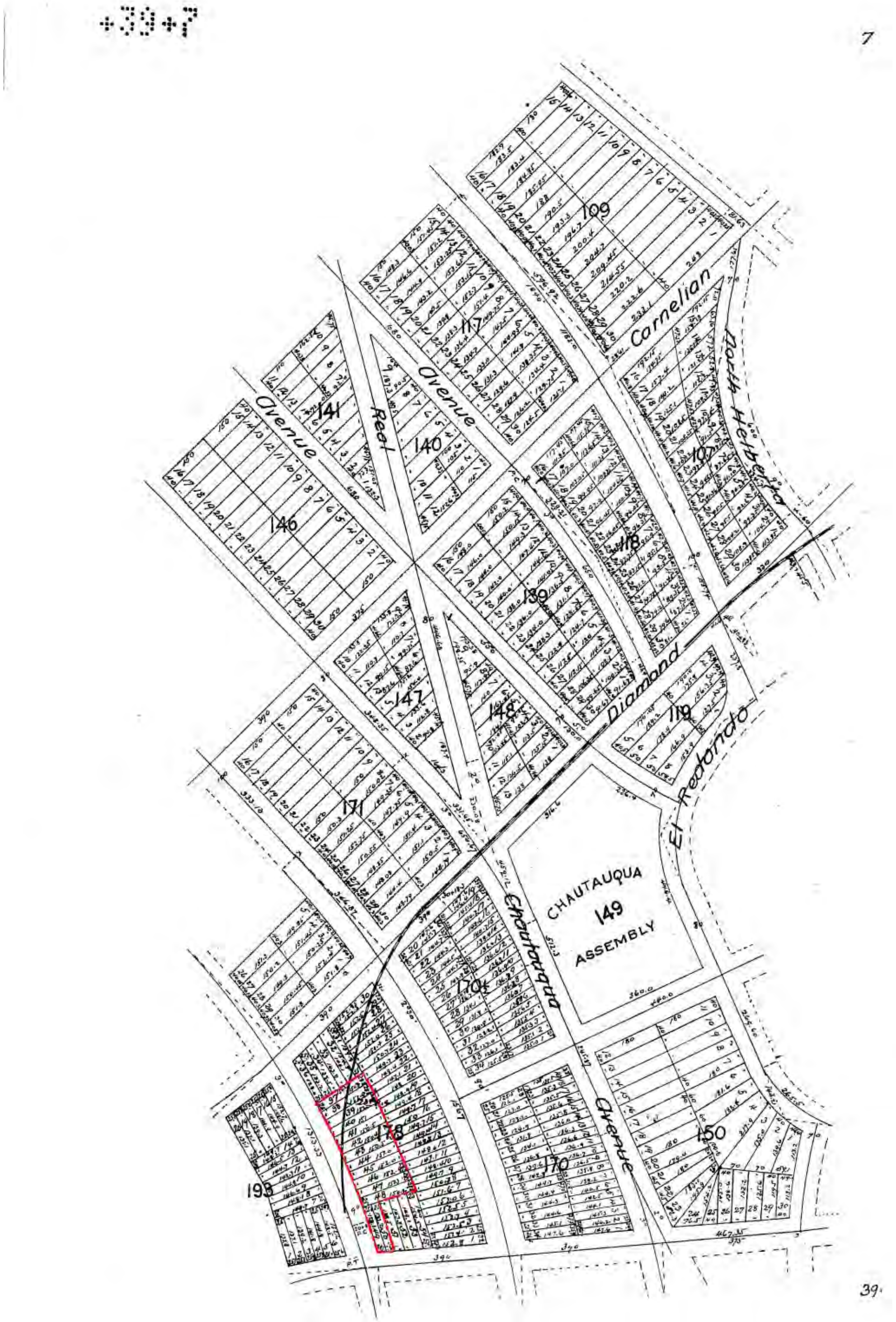
Note

The right of way over and through all lands delineated upon this map is hereby reserved for all purposes appertaining to water gas or sewer pipes that may be required by the grantors, their successors or assigns also reserving any and all artisian water that may at any time be developed on said land and not used thereon and shall reserve the right of way for and the right to construct lay down and maintain pipes ~~for~~ water, gas and Sewers and the right of way for railways of any and every kind and all poles or supports for telegraph, thelephone and electric wires upon over or across any or all of the streets

Redondo Beach Co
by R. G. Brewer Secretary
by Geo. J. Ainsworth President

29

Tract Map, Page 1 of 2



Tract Map, Page 2 of 2

Attachment B: Historic Aerial Photographs and Sanborn Insurance Maps

Historic Aerial Photograghs

Aerial Photo 1928

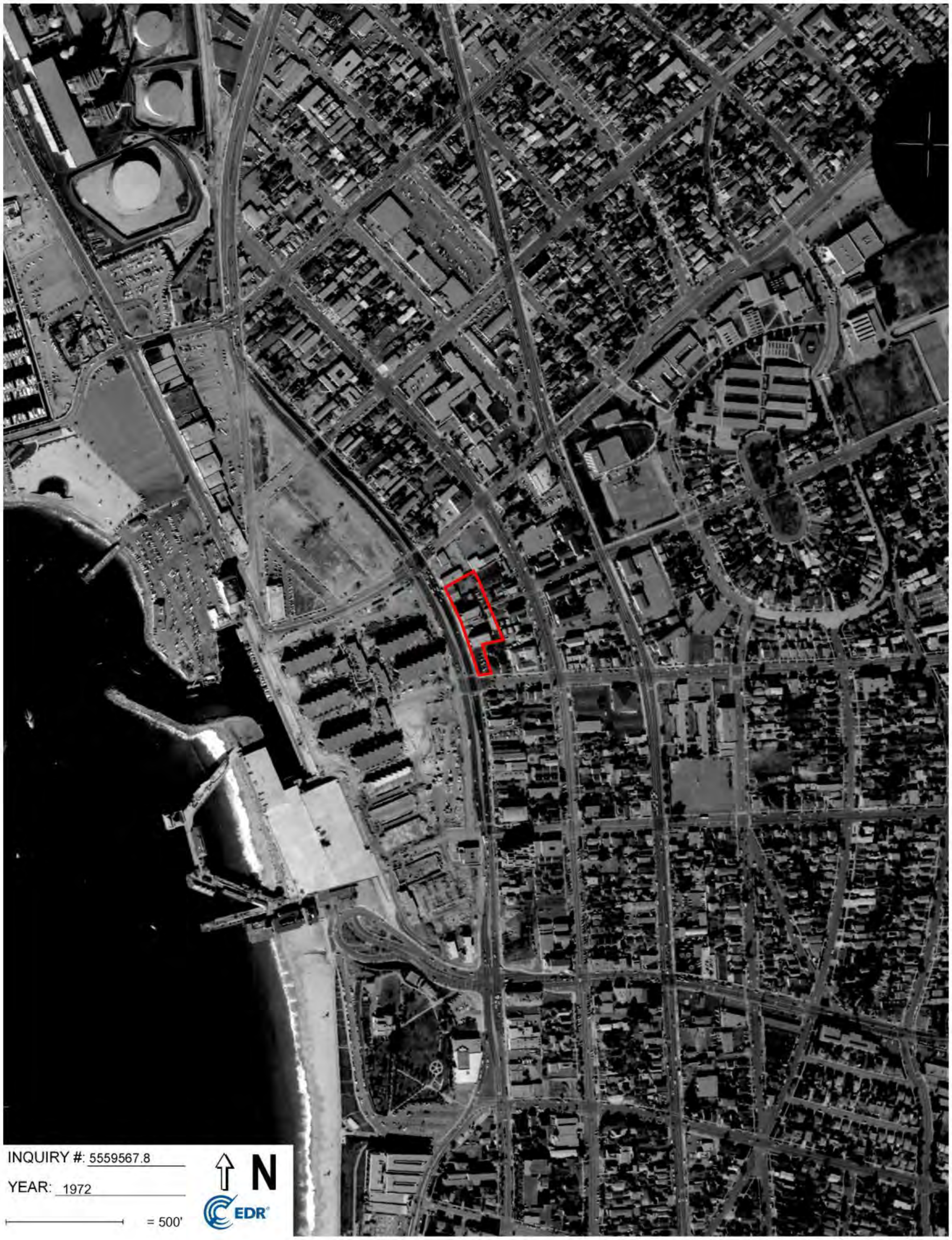

INQUIRY #: 5559567.8
YEAR: 1938
= 500'
N
EDR

Aerial Photo 1938

Aerial Photo 1947

Aerial Photo 1952

Aerial Photo 1963



Aerial Photo 1972

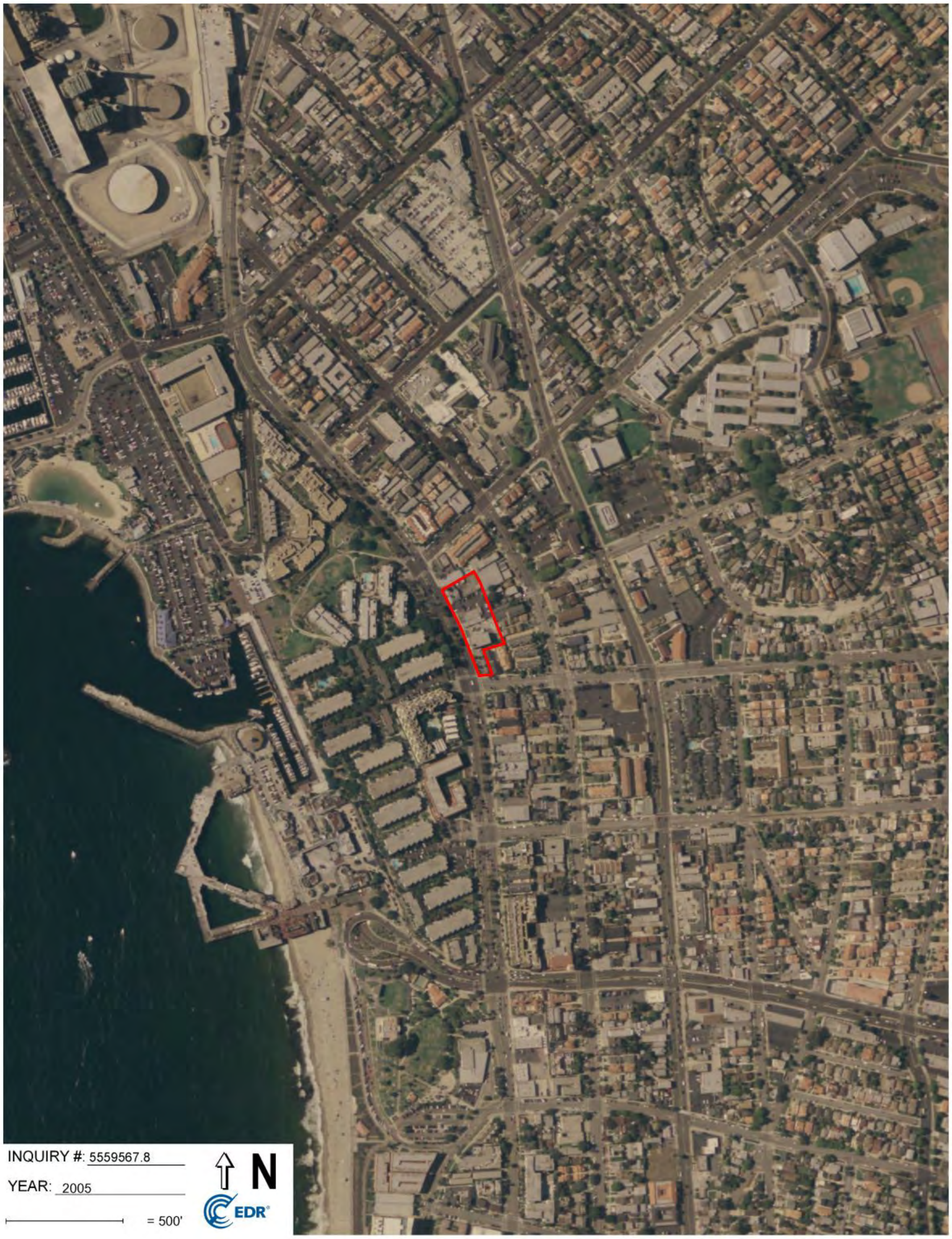
Aerial Photo 1977

Aerial Photo 1983

Aerial Photo 1989

Aerial Photo 1994

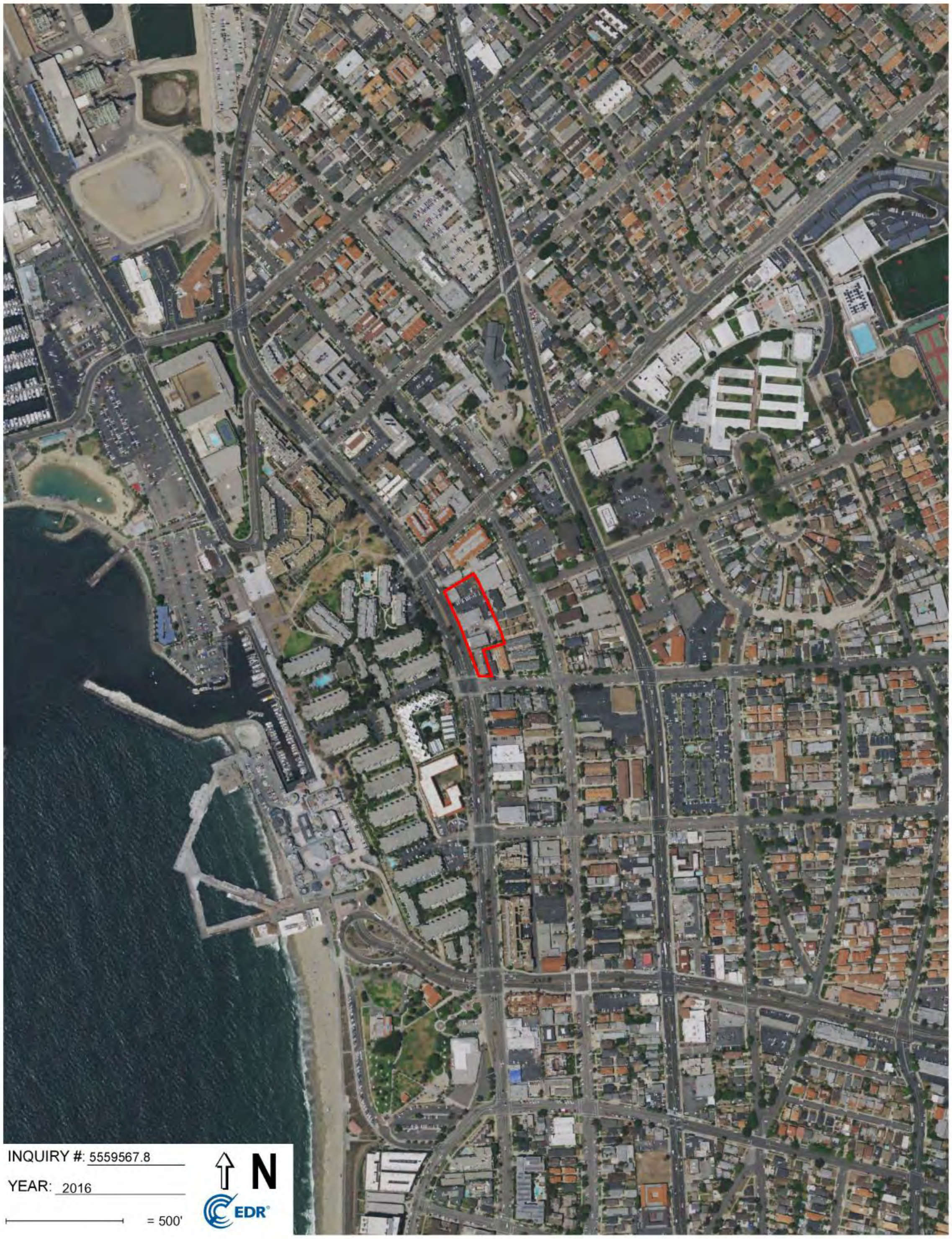
Aerial Photo 2002



Aerial Photo 2005

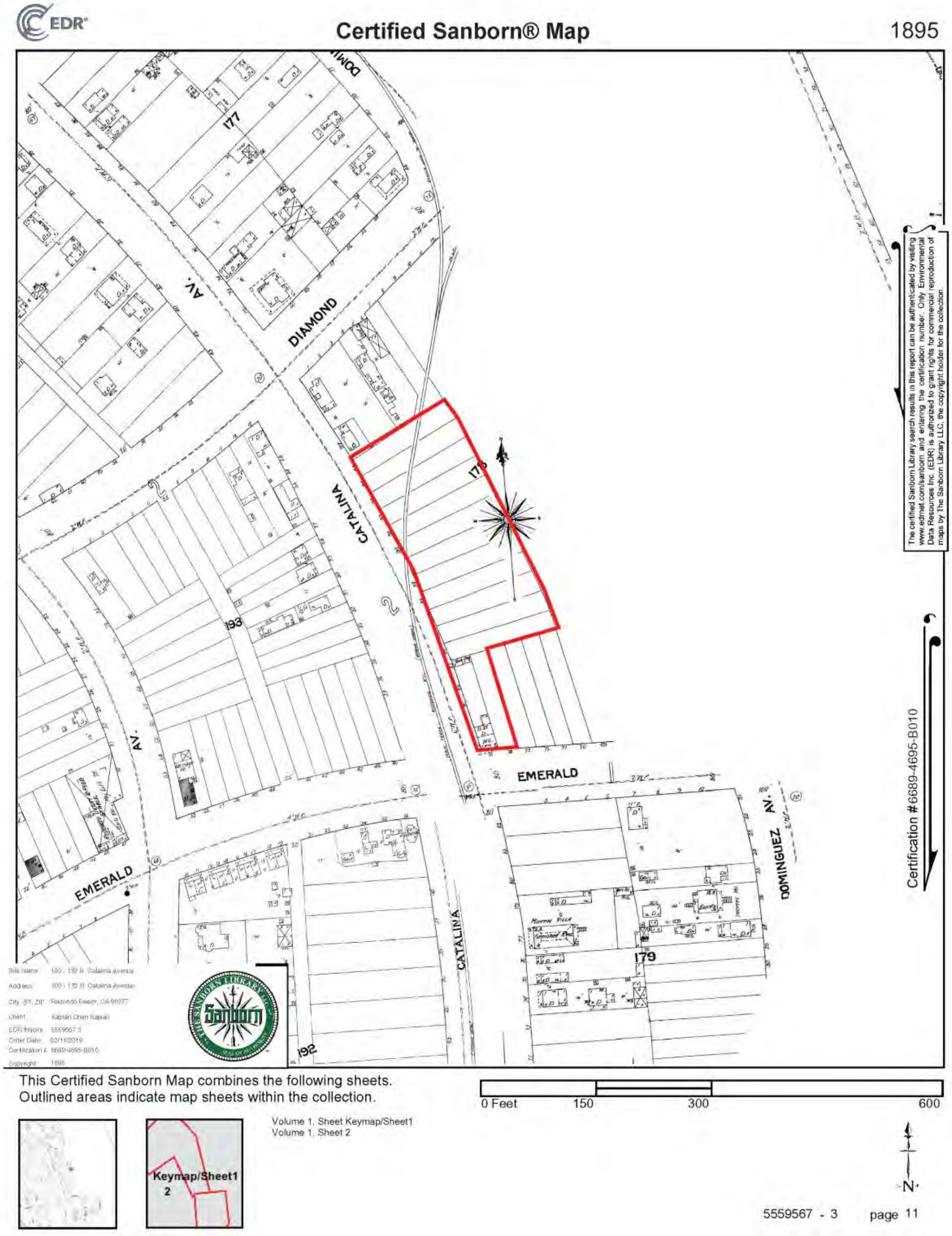
Aerial Photo 2009

Aerial Photo 2012



Aerial Photo 2016

Sanborn Insurance Maps



Site Name 100 - 132 N. Catalina Avenue
Address 100 - 132 N. Catalina Avenue
City, ST, ZIP Redondo Beach, CA 90277
Client Kaplan Chen Kaplan
EDR Inquiry 5559567.3
Order Date 02/11/2019
Certification # 6689-4695-B010
Copyright 1895

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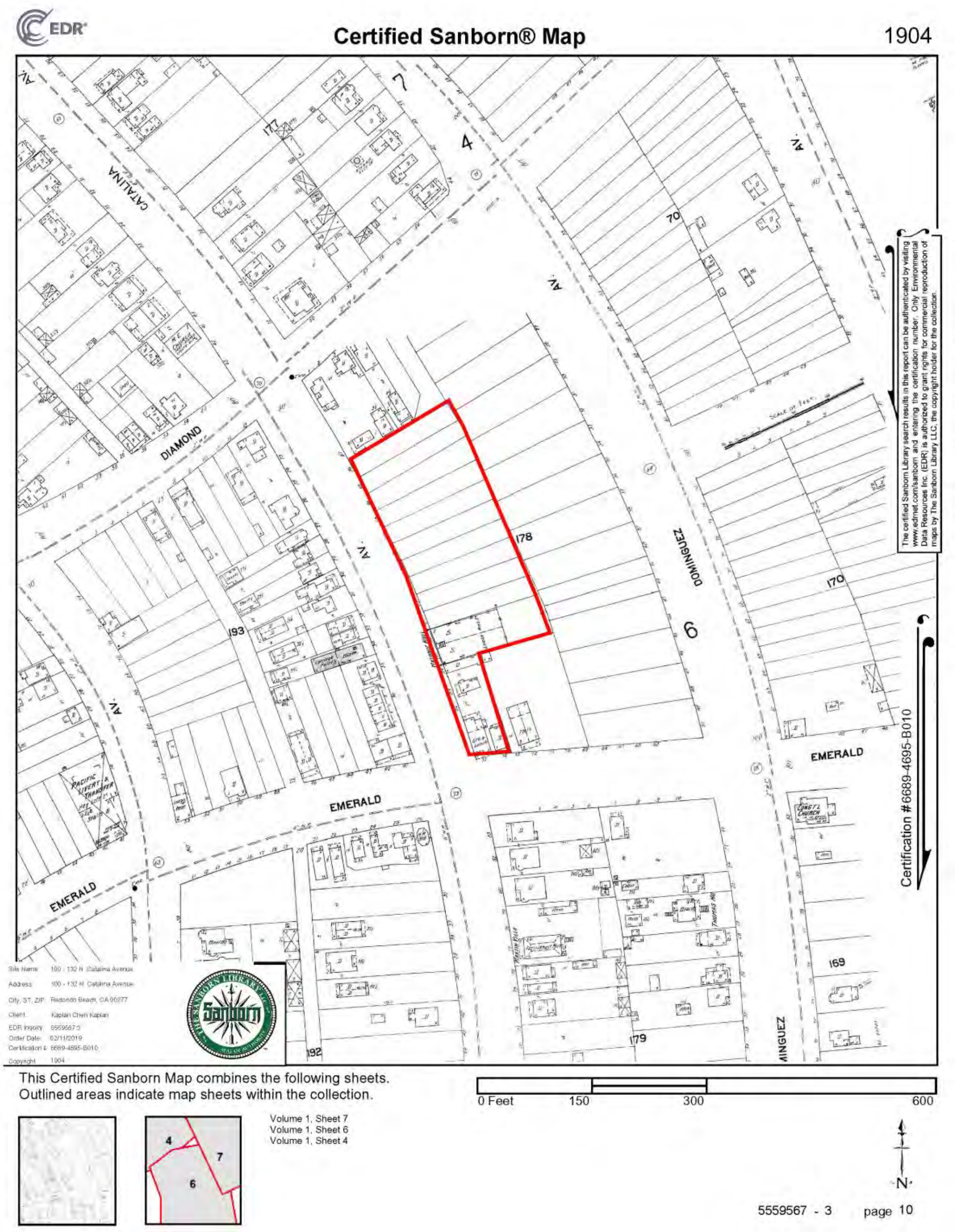
Volume 1, Sheet 2

5559567 - 3 page 11

1895 Sanborn map



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Address: 100 - 132 N. Catalina Avenue
City, ST, ZIP: Redondo Beach, CA 90277
Client: Kaplan Chen Kaplan
EDR Inquiry: 5559567.3
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Copyright: 1904

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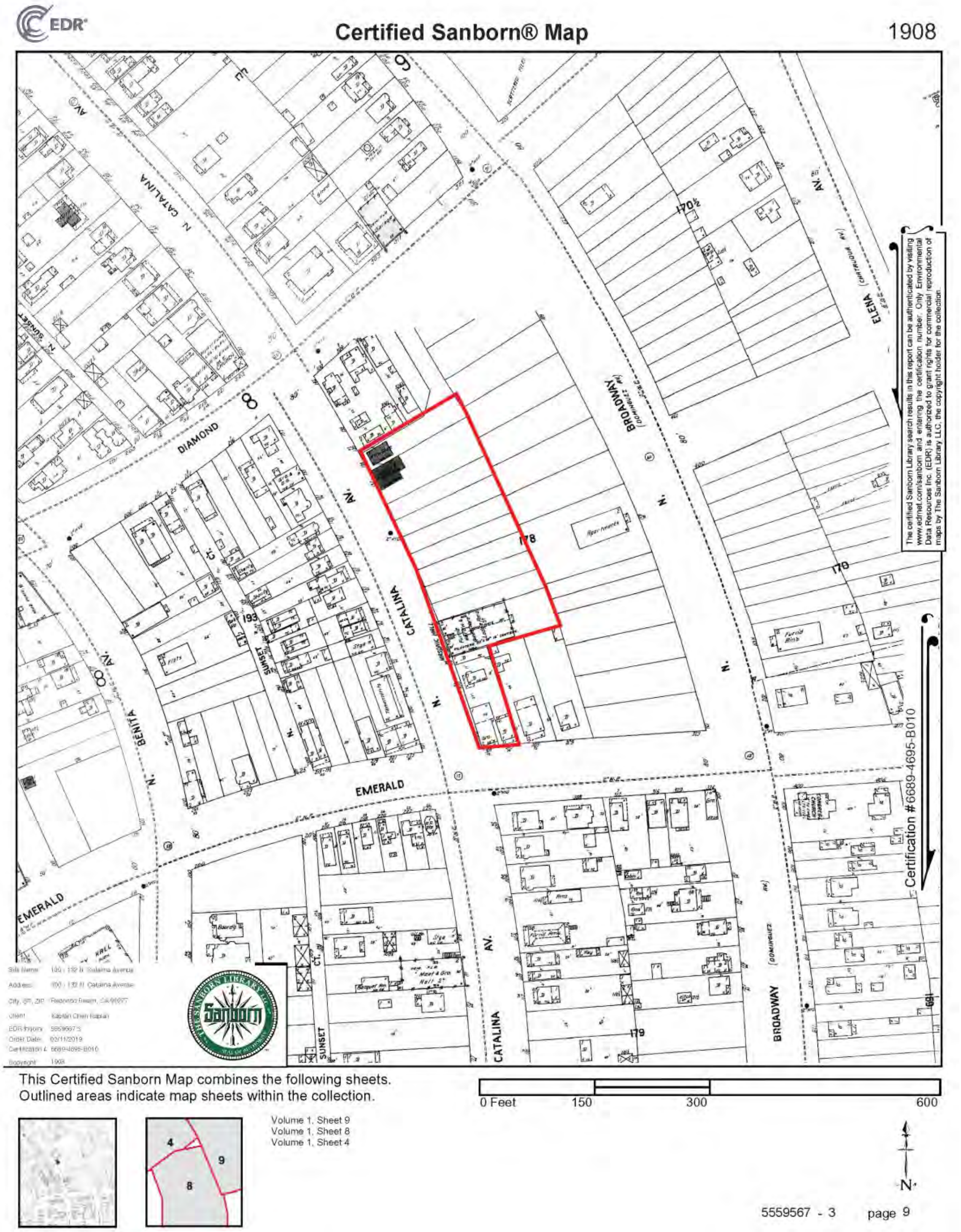
5559567 - 3 page 10

1904 Sanborn map



Site Name 100 - 132 N. Catalina Avenue
Address 100 - 132 N. Catalina Avenue
City, ST, ZIP Redondo Beach, CA 90277
Client Kaplan Chen Kaplan
EDR Inquiry 5559567.3
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Volume 1, Sheet 4

1908 Sanborn map

EDR®

Certified Sanborn® Map

1912

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Address 100 - 132 N. Catalina Avenue
City, ST, ZIP Redondo Beach, CA 90277
Client Kaplan Chen Kaplan
EDR Inquiry 5559567.3
Order Date 03/11/2019
Certification # 6689-4695-B010
Copyright 1912

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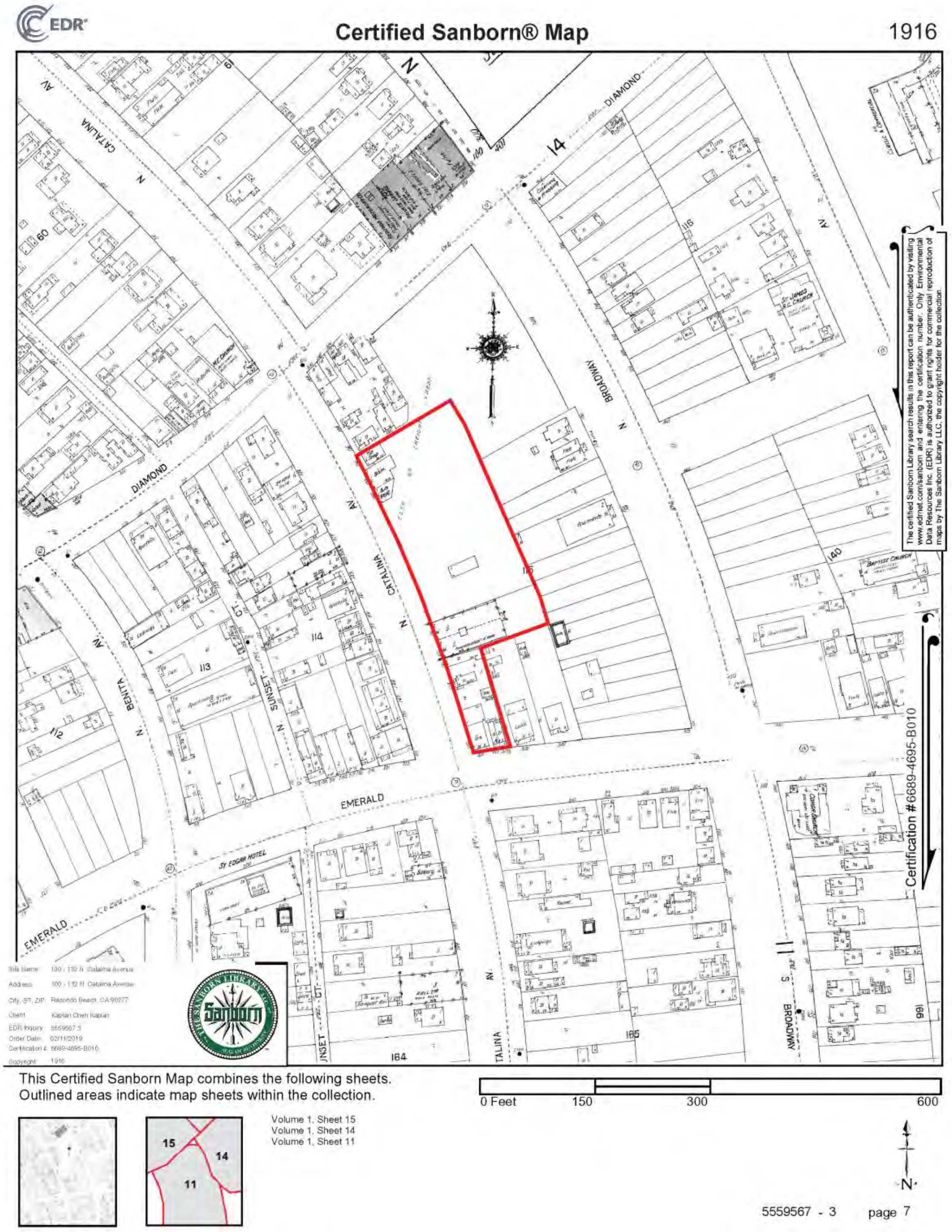
Volume 1, Sheet 11
Volume 1, Sheet 10
Volume 1, Sheet 8

N

5559567 - 3 page 8

1912 Sanborn map


Certified Sanborn® Map 1916

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Site Name 100 - 132 N. Catalina Avenue
Address 100 - 132 N. Catalina Avenue
City, ST, ZIP Redondo Beach, CA 90277
Client Kaplan Chen Kaplan
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Copyright 1916

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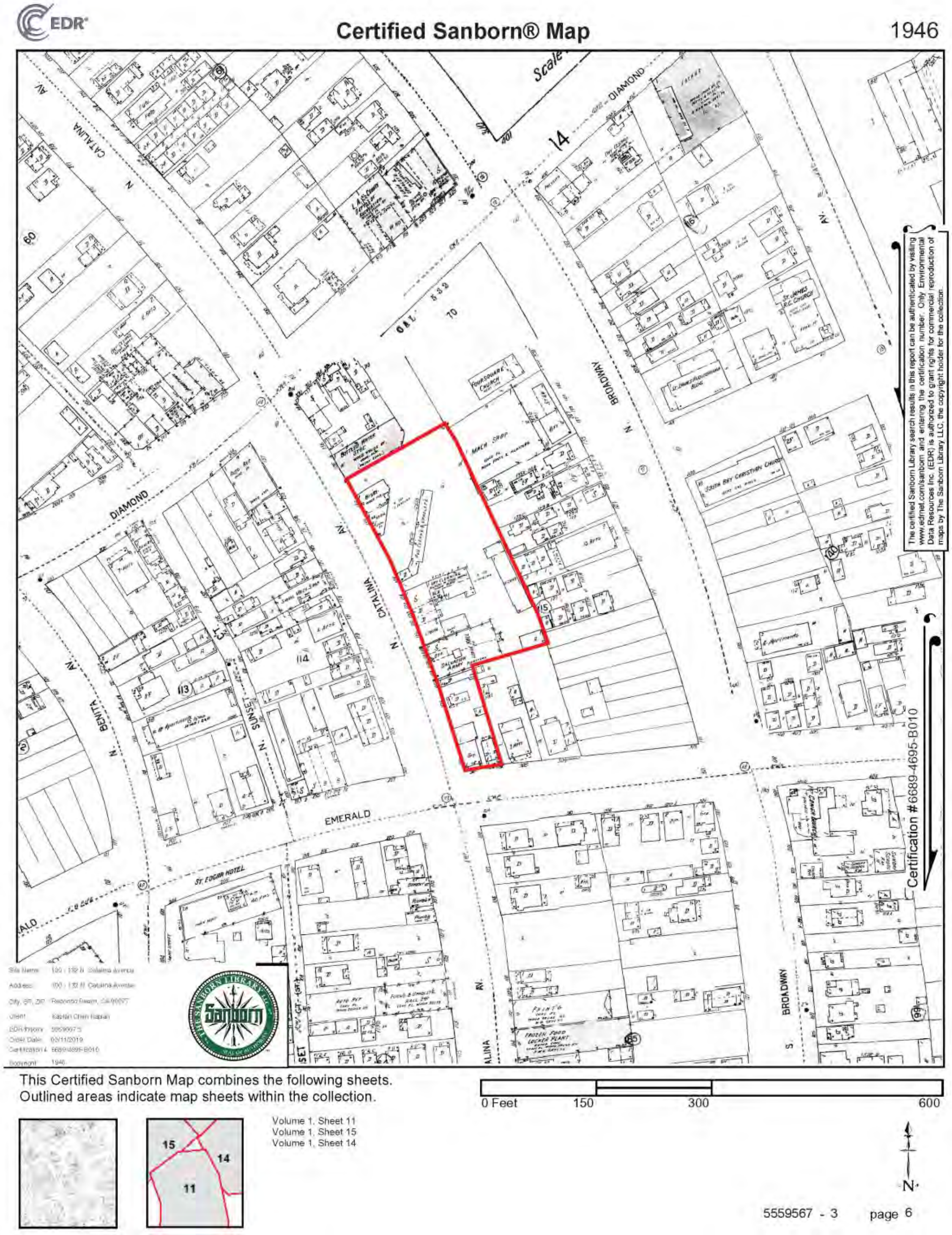
Volume 1, Sheet 14
Volume 1, Sheet 11

5559567 - 3 page 7

1916 Sanborn map



Certified Sanborn® Map 1946

Site Name: 100 - 132 N. Catalina Avenue
Address: 100 - 132 N. Catalina Avenue
City, ST, ZIP: Redondo Beach, CA 90277
Client: Kaplan Chen Kaplan
EDR Inquiry: 5559567.3
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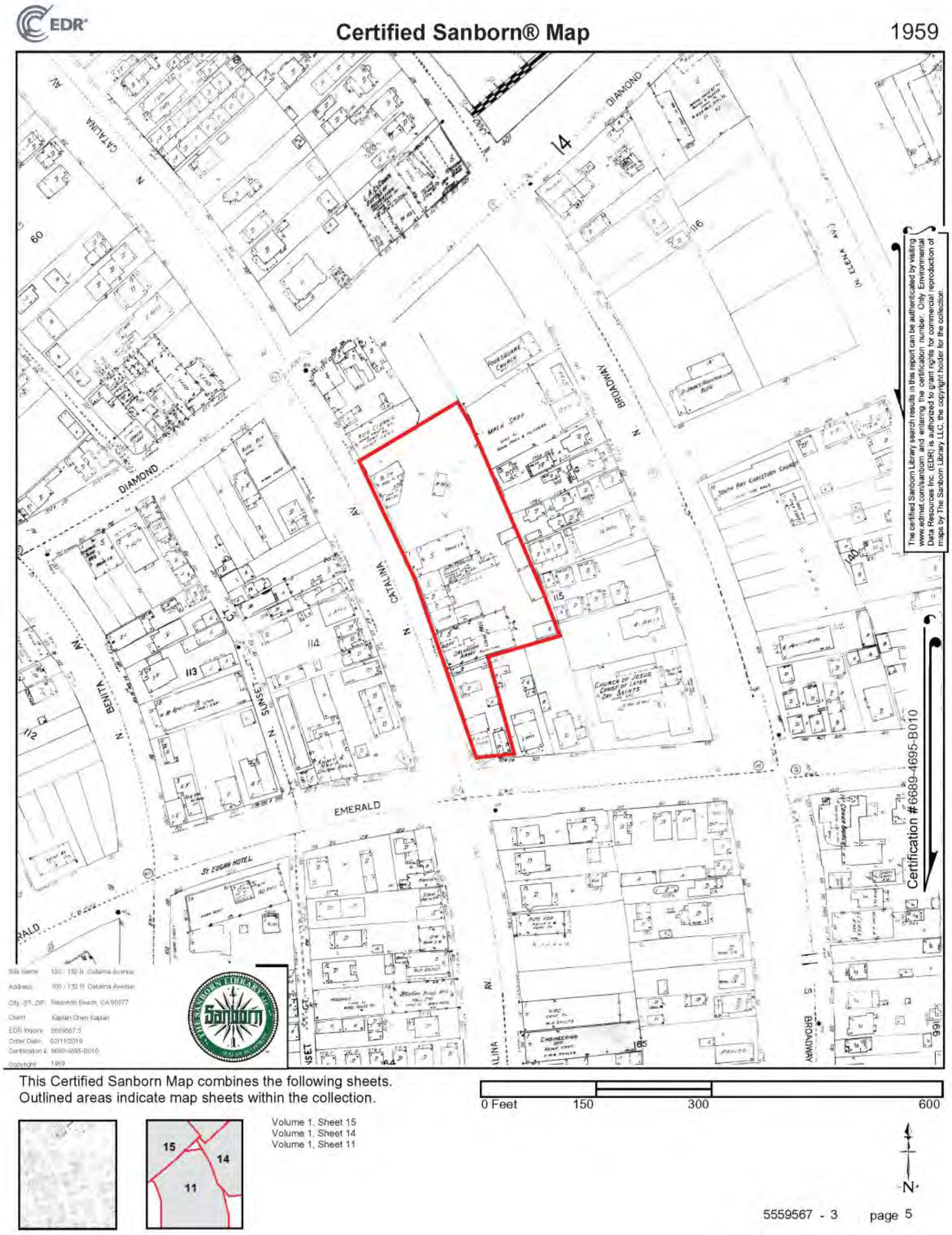
Volume 1, Sheet 14

5559567 - 3 page 6

1946 Sanborn map



Certified Sanborn® Map 1959

Site Name 100 - 132 N. Catalina Avenue
Address 100 - 132 N. Catalina Avenue
City, ST, ZIP Redondo Beach, CA 90277
Client Kaplan Chen Kaplan
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Copyright 1959

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5559567 - 3 page 5

1959 Sanborn map

100 – 132 N. Catalina Avenue
Historic Preservation Plan

Redondo Beach, California

November 20, 2020

Submitted by

Kaplan Chen Kaplan
2526 Eighteenth Street
Santa Monica, CA 90405

David Kaplan, Principal
Pam O'Connor, Architectural Historian

NORTH CATALINA AVENUE HISTORIC DISTRICT
Rehabilitation and Adaptive Reuse – Historic Preservation Plan
100 – 132 N. Catalina Avenue, Redondo Beach, California

Historic Rehabilitation and Reuse Plan

The proposed North Catalina Avenue Commercial Historic District consists of one story structures at 132, 126, 124 N. Catalina Avenue and the two story masonry building at 112 N. Catalina Avenue. A mixed use project is being developed consisting of the existing contributors to the historic district together with new living units and parking sited along the rear of parcels from 112 to 132 N. Catalina Avenue as well as located on the currently empty corner lot at 100 N. Catalina Avenue. The three existing contributing one story buildings will contain commercial uses and the existing two story building is planned for mixed use residential.

A historic resource evaluation report completed by Kaplan Chen Kaplan provides findings regarding properties at 112 N. Catalina Avenue, 116 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue, and 132 N. Catalina Avenue[1]:

"The buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue are eligible contributing buildings to a City of Redondo Beach Historic District. The buildings are rare resources representing early 20th Century commercial development in Redondo Beach as very few early 20th Century commercial buildings remain. The subject buildings represent the continuum of commercial building property types in Redondo Beach during the first half of the 20th Century, 1904 to 1949. Although the buildings have undergone alteration over the decades, they all still retain original form and massing and enough character-defining features that guide rehabilitation of the buildings."

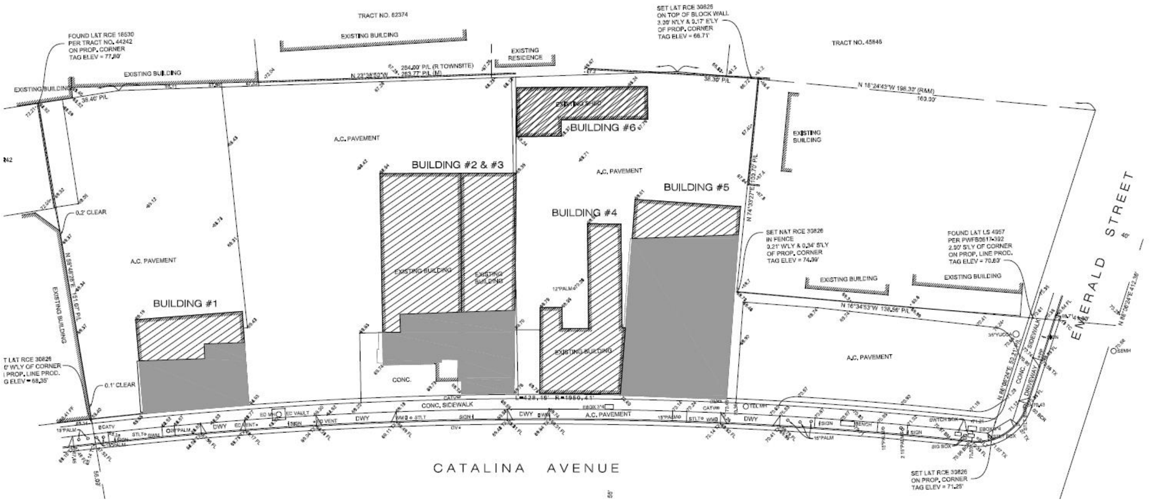
The proposed project, Catalina Village is adaptive reuse and rehabilitation of the buildings at 112 N. Catalina Avenue, 124 N. Catalina Avenue, 126 N. Catalina Avenue and 132 N. Catalina Avenue. The parcels will be consolidated along with the undeveloped parcel at the corner of N. Catalina Avenue and Emerald Avenue. New residential buildings will be constructed at the rear of the subject parcels as well as on the undeveloped corner parcel.

The proposed rehabilitation plan is subject to review by City of Redondo Beach Historical Commission and as an historic resource all proposed work must comply with the Secretary of the Interiors Standards for Rehabilitation of Historic Structures as well as generally accepted practices and procedures for historic resources. The following historic Preservation Plan includes evaluation of character-defining features, review of proposed rehabilitation, review of proposed treatments as well as review of procedures during construction to help ensure conformance to historic preservation guidelines and standards.

---

[1] 100-132 N. Catalina Avenue, Redondo Beach, Historic Resource Evaluation Kaplan Chen Kaplan, November 20, 2020

Overall Site



Project property with retained historic contributors highlighted in solid gray. Currently the area between buildings is paved open space used for parking and storage

Description

The existing site contains four buildings that have been evaluated as contributors to the historic district and one non-contributing structure. The remainder of the site including space behind the buildings is open space. The four buildings, their character defining elements and treatments are individually described in this Preservation Plan. There are no landscape features.

Condition Assessment (see individual buildings)

The overall site is in fair condition with significant deferred maintenance for all structures. Asphalt paving in fair condition covers much of the open space.

Character defining features (see individual buildings)

Street front entries and storefronts for all buildings
Low rise one story commercial buildings and one two story mixed-use building
Open space between buildings

Rehabilitation

The project is to adaptively reuse retained building elements that express the character of the historic district primarily expressed through the street facing elements of the four identified resources to be preserved and rehabilitated. The rehabilitation of individual structures is reviewed in this Preservation Plan. Rehabilitation of the overall setting maintains the street front open space that includes new paving, landscape and furnishings for enhanced public outdoor areas along the street front relating to uses in the adjacent rehabilitated buildings. No new structures are placed between the identified street front resources. The new housing is arranged behind the low rise structures and creates a backdrop that highlights the varied street front historic resources. New housing is also sited at the end of the block, south of the two story building that provides a transition to the existing two story housing including a historic landmark around the corner on Emerald Street.

Overall street front view along N. Catalina Avenue of adaptively reused and rehabilitated contributors to the historic district with new housing as backdrop and at south corner.

View looking south along North Catalina shows how the historic buildings are featured along the street front, framed and highlighted by the new housing development

View looking north with new housing at the vacant corner lot adjacent to the existing two story building. The Housing helps to frame the historic district as well as to transition around the corner to adjacent historic multi-story housing.

112 N. Catalina Avenue (1904/1945)

112 N. Catalina Avenue

Description

The building at 112 N. Catalina Avenue is a two story masonry structure with plaster façade. The current façade was installed in 1992 along with seismic upgrades. Seismic upgrade included new steel frames throughout the building including a frame behind the front façade. The front windows are aluminum storefront at both ground and upper level. There is operable upper sash on the second floor windows. The long side elevations are articulated by a series of vertical pilasters. The side walls are windowless except for one large and one small window with arched brick headers in the second bay from the front on both sides. The rear elevation has three arched openings on the upper floor and an exterior metal stair. The entire front façade appears to have been plastered over at one time.

Condition Assessment

The building exterior is in relatively good condition although the front façade is a dated design with minimal references to the original building design. Along with fading, the textured plaster has accumulated dirt creating an uneven appearance. Aluminum mullions for windows and doors have faded but otherwise the window assemblies appear in satisfactory condition.

Character defining features

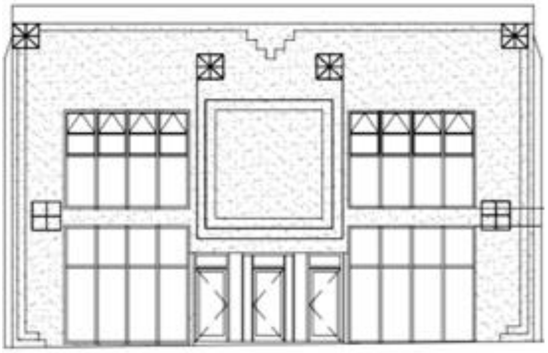
Two story rectangular building and street front facade
Large storefront type openings at ground floor
Large upper window openings aligning with lower
Central entry with separate ground floor entries
Long side elevations with exposed brick, pilasters and minimal windows
Original cornerstone revealed at building base

Rehabilitation

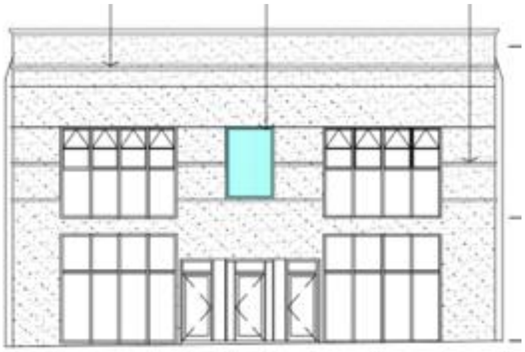
112 N. Catalina Avenue

The 112 N. Catalina Avenue building retains its original volume and massing as well as the division of the front façade into three modules and symmetrical design. There are no architectural details on the sides of the building except for five pilasters. During a 1993 remodel original features were removed or covered. The proposed rehabilitation of the building includes restoring original elements based on photographic documentation of the building's pre-1993 front façade.

The original building design included a cornice which will be reconstructed. Also, horizontal banding at the upper level of windows will be reintroduced. The original upper middle window had been removed; that area will re-reconfigured with a centered window similar to the original design.



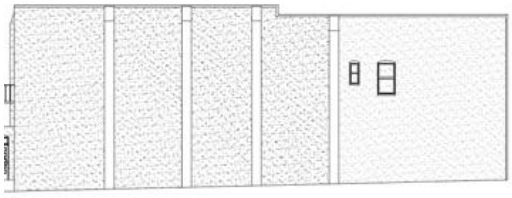
112 N. Catalina Ave., drawing of existing front elevation



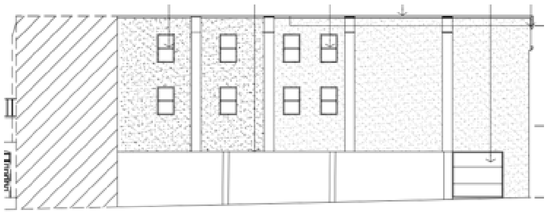
Drawing of proposed front elevation

The building at 112 N. Catalina Avenue will be adapted to provide housing units. The first floor level of the north side elevation has been obscured from view since construction of the adjacent building (116 N. Catalina Avenue) in 1921. The north elevation is a blank wall except for the five pilasters, a cornice and two windows. The north elevation will become fully visible with the demolition of the non-historic 116 N. Catalina Avenue building which will be replaced by a driveway that will provide access into the complex. About 20 percent of the building, at the rear, will be demolished; one pilaster, the farthest back, will be removed. On the second and third floors of the building, new double-hung windows will be inserted to support the new interior residential program. At the first floor level most of the building will have garage openings that will lead to parking spaces. The first level parking space closest to the front of the building will have a roll up garage door as this area of the building will be the most visible from the public right of way.

The south elevation is similar to the north elevation with five pilasters and few windows, and it has been visible at least since the adjacent parcel at 100 N. Catalina Avenue was cleared of buildings in recent decades. There are no architectural details on either the north or south side elevations as it was thought that the adjacent parcels could be developed with buildings with no side yard setbacks. The proposed Catalina Village project will add a three-story building adjacent to and abutting the 112 N. Catalina Avenue building on its south side. As a result, the south elevation will no longer be visible.



132 N. Catalina Avenue, drawing of existing side (north) elevation



132 N. Catalina Avenue, drawing of proposed side (north) elevation

124 N. Catalina Avenue (1946/1950)

124 N. Catalina Avenue

Description

The front façade retains the original configuration of the storefront opening including the horizontal mullion that separates the upper transom windows although the window sash and storefront has been changed to dark finished aluminum. There is a decorative pattern of masonry at the bulkhead that may be original. Existing signage is not original. The building extends back into the parcel with space for laundry equipment. That area is generally unadorned on the exterior and the massing offsets along the south elevation separating the significant front part of the building from the less meaningful rear structure.

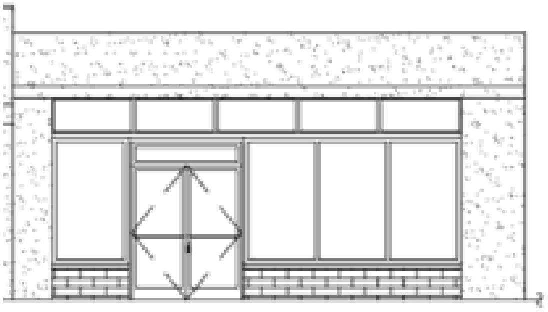
Condition Assessment

The façade is generally in satisfactory condition. There have been unattractive modifications to the front façade mostly from exposed electrical service and outdoor lighting applied to the building that impacts the historic quality of the building. The horizontal wood mullion separating the transom windows should be refurbished.

Character Defining Features

Storefront at street front
Defined front portion of building massing
Varied stone base matching adjacent building
Small front overhang with curvilinear shape
Storefront Glazing with area for clerestory windows separated by mullion
Smooth finish on front of concrete block building
Recessed entry door area

Rehabilitation



Drawing of 124 N. Catalina Ave., existing front elevation

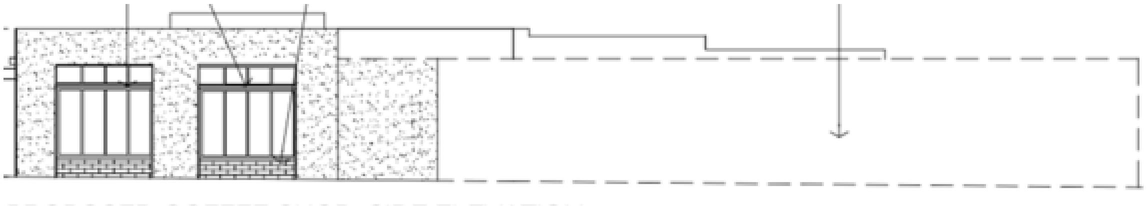
Photo of 124 N. Catalina Ave., front elevation.

The front elevation of 124 N. Catalina Avenue will remain the same. The original windows and doors remain as well as the original stacked stone bulkhead. A new sign will be placed at the upper level of the building – the traditional location on the building for signage.

Sketch of 124 N. Catalina Ave., front (west) and proposed side (south) elevation

124 N. Catalina Ave., Photo of existing side (south) elevation (Google Earth, c2020)

124 N. Catalina Ave., Drawing of existing side (south) elevation

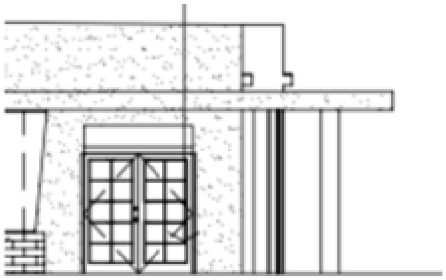


124 N. Catalina Ave., Drawing of proposed side (south) elevation

Two new windows will be inserted into the front portion, the original retail section, of the qw4 N. Catalina Avenue building. They will be the same height as the front storefront windows but will be differentiated with more mullions. There will be a stacked stone bulkhead under each of the windows. The stacked stone will be discontinuous along this elevation to differentiate it from the original continuous stacked stone bulkhead of the front façade. The addition of similarly sized windows and the treatment of the glazing and stacked stone bring design elements of the front façade to this visible side of the building, but their design is sufficiently differentiated.

126 N. Catalina Ave., and 124 N. Catalina Ave. showing proposed north side elevation of 124 N. Catalina Ave.

Beige wall is north elevation of 124 N. Catalina Ave. and green is projecting addition of 126 N. Catalina Ave.



When green projecting wing of 126 N. Catalina Ave. is demolished, more of the north elevation of 124 N. Catalina Ave. will be revealed. A set of double doors will be added to that elevation

A new door will be added to the north elevation of the 124 N. Catalina Avenue building. As the 126 N. Catalina Avenue building is set-back from the sidewalk (with the canopy over the setback area) a portion of the north elevations of 124 N. Catalina Avenue is currently visible. More of that elevation was visible before the projecting office wing of 126 N. Catalina Avenue was constructed. That office wing (painted green) will be demolished, exposing more of the north elevation of 124 N. Catalina Avenue. To support the adaptive reuse of the two buildings, a set of glazed double doors will be inserted into that elevation. The wall is blank so there are no architectural details that would be impacted with the addition of the door.

126 N. Catalina Avenue (1949)

126 N. Catalina Avenue

Description

The one-story building is designed with a modernist flair with expressive front entry covering and angled supports. The storefront setback within the space is continuous glazing with corner butt-joint glass. A large aluminum sliding window at the south end does not appear original. The exterior surface of the front portion of the building is a heavily textured plaster. The base of the storefront has a bulkhead with a decorative masonry pattern very similar to the adjacent building. An odd downspout has been strapped to a front column. Electrical conduits are visible by the upper signage. The south side abuts the neighboring building while the north side is visible facing open space. The front portion of the building is distinguished from the rear portions that have a dropped parapet and appear as an appendage to the front structure with a different finished surface.

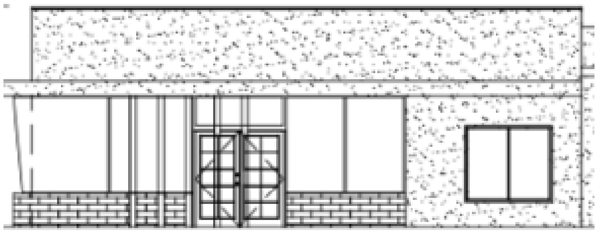
Condition Assessment

The coffee shop front façade is generally in good condition with stylistic architectural elements intact. The glazed storefront including the corner without mullions will need further assessment to ensure longevity. The pair of front entry doors may not be original but are in satisfactory condition. The curved and rough plastered extension at the south end with large sliding window do not appear original but both appears in satisfactory condition.

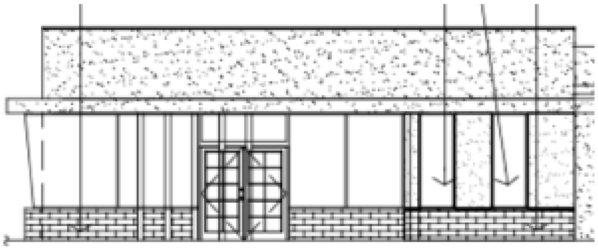
Character Defining Features

Defined front portion of building
Storefront facing street frontage
Varied stone base
Large front overhang with curvilinear shape
Angled pylons (5) supporting projecting roof
Perpendicular signage parapet above roof
Plaster wall finish with recessed horizontal banding
Canted storefront glazing with thin line mullions
Storefront return on north side
Recessed entry door area

Rehabilitation


126 N. Catalina Ave., drawing of front elevation


126 N. Catalina Ave., photo of front elevation

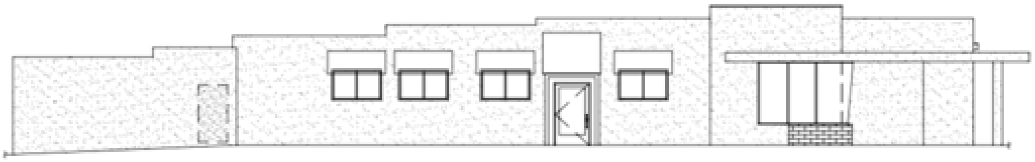

126 N. Catalina Ave., drawing of proposed front elevation

Sketch of front elevation

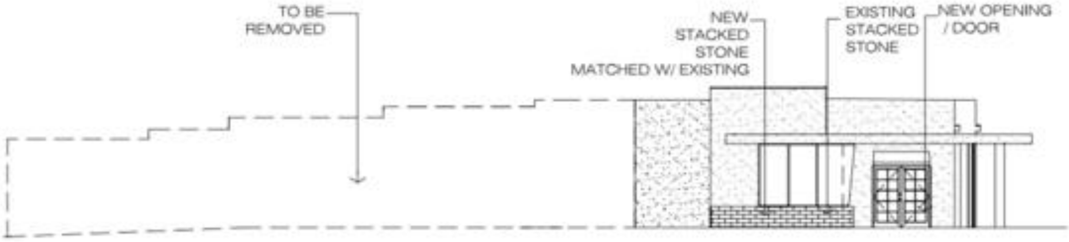
Rehabilitation of the Mid-Century Modern building at 126 N. Catalina Avenue includes retention of all original features on the historic street-facing storefront elevation – windows, doors, and canopy with its integral blade sign and pillars. The rehabilitation proposal for the front elevation of 126 N. Catalina Avenue also proposes demolition of the projecting office wing (painted green) on its south end. This wing was added at a later point in time. Although there are no building permit records, physical evidence shows that this is not original: the position and type of windows located on this projecting office wing are dissimilar to the other windows on the front elevation and are not representative of window types employed on the front elevation. Also, the stacked stone bulkhead which is a feature of the main portion of the front elevation is missing from the projecting office wing. Removal of this wing will not result in an adverse impact to any historic features.

With the removal of this added wing, the front elevation will be a single plane. The new wall section will be consisting of four windows of the same height as the original windows of the storefront façade. The new windows will differ from the original windows in that they will be narrower. A stacked stone bulkhead, similar to the original, will be constructed; the stacked stone bulkhead is an existing feature on both buildings and filling in the "gap" provides continuity of design along this elevation. The Modernistic curved canopy with its projecting blade sign and pillars will be retained.

Photo of side (north) elevation of 126 N. Catalina Ave.



Existing side (north) elevation of 126 N. Catalina Avenue



Proposed side (north) elevation of 126 N. Catalina Avenue

132 N. Catalina Avenue (1905/1930)

132 N. Catalina Avenue

Description

The current structure retains the location and massing of the original building along with previous side additions on north and south. Little of the original structure remains while interior elements that relate to the buildings original use as a blacksmith and then later a metalwork shop are intact. The roof appears to be of more recent construction.

On the north is a covered area that has two column/pilaster elements with a wall constructed of wood and flat metal panels at the frontage that may have been originally a portal into the space that has since been infilled. According to the City of Redondo Beach Sanborn Insurance Map, a small building on site may have been moved into this location.

The front façade extending across the central portion with stepped parapet and south addition is vertical wood planks covered over with large metal panels stamped with a brick-like pattern. The metal panels are nailed and screwed onto the façade and also wrap the southwest corner and continue for approximately 10 feet along the south side of the building. Metal panels would have been installed after the construction of the south addition. There is a large central opening and a horizonal window opening to the north of the entry way. A large gate to the south at the street frontage marks the end of the central portion of the structure and serves as entry into the south addition. There is also a door at the far southern end of the front façade that accesses an electrical closet directly behind the building front.

Large pulleys in the ceiling at the back of the main building connect a series of machines with a single motor. The assembly of machine elements is a historic feature of the space.

Condition Assessment

Initial investigation found unfinished vertical wood siding that is in poor condition behind the metal panels. The wood framing of the wall behind the woodwork appears to be of relatively recent construction. At the front façade of the north portion, the woodwork at the columns and wall is in extremely poor condition. The enclosed north area has a low sloping roof that spans across the space but leaves a gap along the side property line. This structure may require removal or re-construction.

Much of the roof structure from the interior appears updated with plywood sheathing although some lumber looks older with true dimensions and square corners The current main façade appears to have been constructed around WWII. The assessor indicates changes in 1930 which may relate to the additions to the building. One possibility is that there may have been a masonry façade that collapsed in the Long Beach Earthquake. Alternatively, the building may have had a vertical wood façade that was eventually covered with the metal siding although it is unusual that a wood façade would be unfinished. The current condition is that the wood façade behind the metal panels appears heavily deteriorated. The metal panels have also been applied in a haphazard process with a mix of nails and screws and metal panels were bent around the corner to extend along the south facade.

Character defining features

Street front stepped façade with central entry
Large vehicle size opening toward south end of front façade
Area covered with plywood over entry may conceal taller opening or clerestory windows
Plain façade with minimal trim
Gabled roof structure
Shed at north with pylons
Machinery inside structure

Rehabilitation

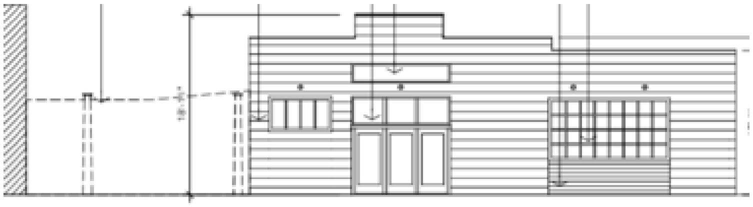
132 N. Catalina Avenue, photograph of front elevation

The 132 N. Catalina Avenue building retains the original form of its stepped front parapet that hides the gabled roof building. A portion of the rear of the building will be demolished but the gable roof form will remain and will be visible looking at the rear of the building.

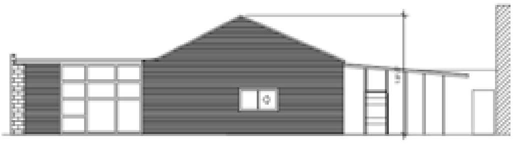
The building will be adapted from industrial uses/office to a tasting room. The lean-to shed on the north side of the building will be demolished to make way for a driveway into the complex. This shed lean-to is of unknown provenance and not a substantive element of the building. While the windows and doors are not original their location and size appear to have been in place for decades. The pattern and size will be retained; a set of transom windows will be added above the entry doors. The thin metal siding is not original; it will be replaced by horizontal wood siding.

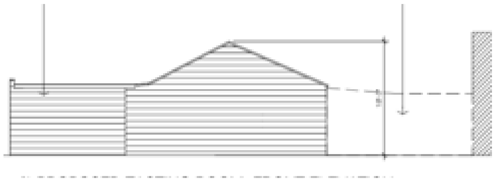
132 N. Catalina Avenue, front and side (south) elevations

The sides of 132 N. Catalina Avenue are devoid of any architectural style or detailing. To adapt the building into a tasting room two new windows will be inserted into the south side elevation. The north side elevation which will be facing the driveway will a panel with a painted mural attached to the side of the building.

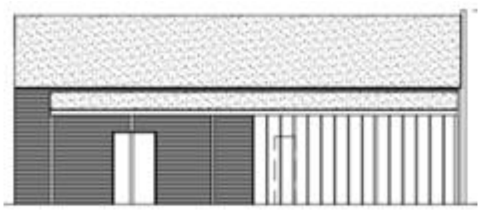


126 N. Catalina Avenue, drawing of proposed front elevation

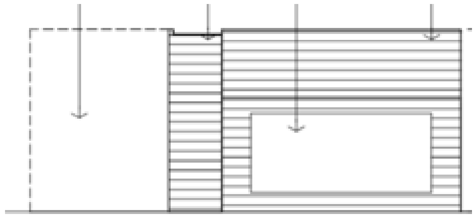




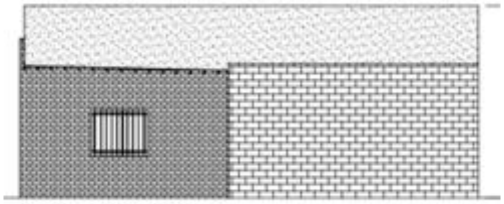
132 N. Catalina Ave., drawing of existing rear elevation   Drawing of proposed rear elevation



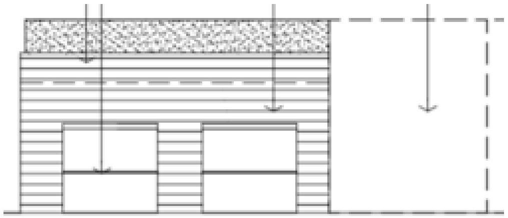
132 N. Catalina Ave., drawing of existing north elevation



Drawing of proposed north elevation



132 N. Catalina Ave., drawing of existing south elevation



Drawing of proposed south elevation

The original exterior cladding of the building is unknown. Horizontal wood siding will be applied to the building and it will conform to the stepped front profile of the building. A unique feature of the building is period machinery in the building which will be retained.

Methodology and Process

Secretary of the Interiors Standards & Preservation Briefs

The Secretary of the Interiors' Standards for Rehabilitating Historic Buildings will guide the overall approach to rehabilitation for this project. The Standards are listed at the end of this report. Along with the Secretary of the Interiors' Standards, the National Park Service through its Technical Preservation Services provides guidance through the Preservation Briefs series (currently 50) and a Technical Notes series.

These publications offer background and case studies for issues ranging from preparation of surveys and site documentation to treatments of windows, plaster, woodwork, metalwork and paint removal. There are also supplementary technical briefs that similarly provide overall rehabilitation strategies along with specific case studies for design for historic structures. These Briefs and Technical Notes can be included in specific specification sections as needed for reference.

California Historical Building Code (CHBC)

The buildings may be considered a qualified historic resource for use of the California Historical Building Code. The code covers alternate provisions for historic structures that promote safety and access while tailoring the requirements to specific building conditions. Sections of the Historic Building code allow for alternate provisions for Change of Use, Accessibility, Egress, Fire Safety, Archaic Materials, Structural Regulations and other building systems when a regular code provision could potentially impact historic features

Specifications

Treatments for historic features are to be appropriately specified. Rehabilitation of existing plaster, wood, metal and tile finishes should follow treatments recommended in National Park Service Technical Briefs and that meet the Secretary of the Interior's Standards for Rehabilitation.

Alternates, Mock Ups and Submittals

A review of possible alternates is important to successful rehabilitation of historic buildings. Rehabilitation work requires comprehensive submittals as well as tests and mock-ups to determine the best approach to individual treatment or repair of historic elements.. Proactive reviews and jobwalks will help the team to respond appropriately to historic preservation issues within limits of time and budget.

Protection

The contractor should have a construction and protection plan for retained structures and finishes including ongoing review by the project team through phases of work. Although some elements may be reconstructed, documentation and samples of original should be preserved for comparison during fabrication and installation. All storage of retained elements should be in weather protected and secure locations. Duct tape should never be applied to finish materials. Buildings that remain on site are to be protected from adjacent construction and movement of equipment and material during construction. There should be minimal disturbance of the ground as there are no subterranean spaces but new foundations adjacent to existing construction will be subject to common practice construction procedures. During the course of the work protection will require ongoing maintenance.

Overall Work Process

The project team will work together to highlight issues that may affect building elements. Early discussion of issues will help maintain the project schedule while finding solutions to meet the Secretary of the Interior's Standards for Rehabilitation. Documentation of the elements and process through drawings and photographs is important for the work.

Process for Historic Preservation during Proposed Project

Review proposed design with project design team
Review treatments and specifications for historic materials and features
Review procedures at start of work and throughout construction
Review documentation of existing historic elements prior to construction
Review site during demolition for protection and preservation of historic features
Visit site during the work to confirm appropriate compliance with Standards
Review mock-ups and submittals for rehabilitation of historic features and materials
Issue Field Notes as needed
Maintain photographic record

Conclusion

The character defining features of the site and individual buildings can be preserved during development of the project. The proposed design is to retain the identified key character defining features of the original structures and incorporate these elements as part of a mixed-use development. The consistent backdrop of housing subtly highlights and features the contributing buildings to the historic district along N. Catalina Avenue and reinforces the character of the historic district. With adherence to the Secretary of the Interior's Standards for Rehabilitation of Historic Structures and ongoing review by Historic Preservation professionals a successful adaptive reuse and historic preservation project can be accomplished for the properties at 100 – 132 N. Catalina Avenue.

The Secretary of the Interior's Standards for Rehabilitation

1. A property shall be used for its historic purpose or be placed in a new use that requires minimal change to the defining characteristics of the building and its site and environment.

2. The historic character of a property shall be retained and preserved. The removal of historic materials or alteration of features and spaces that characterize a property shall be avoided.

3. Each property shall be recognized as a physical record of its time, place, and use. Changes that create a false sense of historical development, such as adding conjectural features or architectural elements from other buildings, shall not be undertaken.

4. Most properties change over time; those changes that have acquired historic significance in their own right shall be retained and preserved.

5. Distinctive features, finishes, and construction techniques or examples of craftsmanship that characterize a property shall be preserved.

6. Deteriorated historic features shall be repaired rather than replaced. Where the severity of deterioration requires replacement of a distinctive features, the new feature shall match the old in design, color, texture, and other visual qualities and, where possible, materials. Replacement of missing features shall be substantiated by documentary, physical, or pictorial evidence.

7. Chemical or physical treatments, such as sandblasting, that cause damage to historic materials shall not be used. The surface cleaning of structures, if appropriate, shall be undertaken using the gentlest means possible.

8. Significant archeological resources affected by a project shall be protected and preserved. If such resources must be disturbed, mitigation measures shall be undertaken.

9. New additions, exterior alterations, or related new construction shall not destroy historic materials that characterize the property. The new work shall be differentiated from the old and shall be compatible with the massing, size, scale, and architectural features to protect the historic integrity of the property and its environment.

10. New additions and adjacent or related new construction shall be undertaken in such a manner that is removed in the future, the essential form and integrity of the historic property and its environment would be unimpaired.

Appendix G

Cultural and Paleontological Assessment

January 2021

MATERIAL CULTURE
CONSULTING

Submitted to:

Beach City Capital, LLC.
1221 Hermosa Ave. Suite 101
Hermosa Beach, CA 90254

CULTURAL AND PALEONTOLOGICAL RESOURCES ASSESSMENT

Catalina Village Project

Redondo Beach, Los Angeles County, California

Material Culture Consulting™

MATERIAL CULTURE
CONSULTING

CULTURAL AND PALEONTOLOGICAL PHASE I ASSESSMENT: CATALINA VILLAGE PROJECT, CITY OF REDONDO BEACH, LOS ANGELES COUNTY, CALIFORNIA

Prepared for:
Beach City Capital, LLC
1221 Hermosa Avenue, Suite 101
Hermosa Beach, CA 90254

Principal Investigators/Authors:
Tria Marie Belcourt, M.A., Registered Professional Archaeologist
Jennifer Kelly, M.Sc., Paleontological Principal Investigator
Erika McMullin, B.A.

January 2021

Type of Study: Cultural and Paleontological resources assessment
Cultural/ Paleontological Resources within Area of Potential Impact: None
Paleontological Formations: Older Quaternary dune sands, San Pedro Formation
USGS 7.5-minute Quadrangle: Redondo Beach, unsectioned location of Township 4 S, Range 20 W
Survey Area: Approx. 1.28 acres
Date of Fieldwork: May 13, 2020
Key Words: Archaeology, Paleontology, CEQA, Phase I Survey, Negative Cultural Result, San Pedro Formation, older Quaternary dune sands, Los Angeles County, City of Redondo Beach

MANAGEMENT SUMMARY

This Project proposes a mixed-use development Project in the City of Redondo Beach, within Los Angeles County, California. Material Culture Consulting, Inc. (MCC) was retained by Beach City Capital, LLC. to conduct a Phase I cultural and paleontological resource investigation of the Project Area. These assessments were conducted in accordance with the California Environmental Quality Act (CEQA) and included a cultural resources records search and background research, a fossil locality search at the National History Museum of Los Angeles County (LACM), an examination of geological maps and paleontological literature, a search of the Sacred Lands File (SLF) by the Native American Heritage Commission (NAHC), outreach efforts with seven Native American tribal representatives, and a pedestrian survey.

Staff at the South Central Coastal Information Center (SCCIC), located on the campus of California State University, Fullerton, conducted a search of the California Historical Resource Information System (CHRIS) on behalf of MCC. MCC received the results of the records search on June 8, 2020. The records search identified 63 previous cultural resource studies within a 1-mile radius of the Project Area. Three of these previous studies intersect the Project Area. In addition, 17 cultural resources have been previously recorded within a 1-mile radius of the Project Area. A review of historic-era aerial photographs and topographic maps indicate that structures associated with the current Project Area were established as late as 1952. An architectural historian will be assessing the historic-era buildings and potential for Project impacts in a separate report.

The SLF search did not identify any previously known tribal cultural resources or sacred lands within the Project Area. The NAHC provided seven Native American contacts. MCC sent outreach letters to all contacts on April 30, 2020, requesting any information related to cultural resources or heritage sites within or adjacent to the Project Area. Additional attempts at contact by email or phone call were made on May 28, and June 18, 2020. MCC received four responses. No specific cultural resources were identified in the responses; however, several individuals stated an interest in the Project and provided comments. The detailed results of our outreach efforts are found in in the Native American Outreach and Background Research section of this report and in Appendix C. MCC did not conduct formal consultation with Native American representatives.

The Project Area is comprised of older Quaternary dune sands (Qoe). These types of deposits typically do not contain significant vertebrate fossils in the uppermost layers, but in older sedimentary deposits at depth they may contain significant fossil vertebrate remains. No previously recorded fossil localities are located within the Project Area; however, there are nearby localities from similar sedimentary deposits, either at the surface or at depth. Excavation extending more than ten feet below surface has the potential to impact the paleontologically sensitive older Quaternary sand dunes within the Project Area.

The pedestrian survey of the Project Area was conducted on May 13, 2020 by MCC Archaeologist, and Cross-Trained Paleontologist, Neil Kohanski. The majority of the Project Area was not accessible but was viewed from a distance and observed to be completely disturbed and developed. The accessible area is developed into commercial properties and a parking lot. No cultural or paleontological resources were identified during the survey.

The probability of encountering significant cultural resources within the Project Area is considered low (due to extensive prior development) to moderate (due to the presence of historic era buildings). MCC recommends no further mitigation efforts measure prior to implementation of the proposed Project. Full time cultural resources monitoring is recommended during the initial stages of ground disturbance of the Project Area, due to the presence of historic era buildings, and potential of encountering subsurface cultural resources within the Project Area. Tribal cultural resources monitoring may be required for this project. If cultural resources are discovered at any phase of the Project, all work must be halted or diverted until a qualified Archaeologist can evaluate the nature and significance of the find (s).

MCC recommends that a cultural and paleontological resource mitigation program be put in place prior to project implementation. This plan will include the recommendations to provide full time cultural resources monitoring, and paleontological monitoring during substantial excavation below 10 feet, to confirm the presence or absence of sensitive paleontological sediments or deposits. This program will include monitoring methods, as well as outline the plan for addressing inadvertent discovery of sensitive cultural and paleontological resources, and methods to salvage and curate any recovered archaeological materials and/or fossils discovered during ground disturbing activities.

All notes, photographs, correspondence, and other materials related to this Project are located at MCC, Inc., located in Pomona, California.

TABLE OF CONTENTS

MANAGEMENT SUMMARY **2**

LIST OF FIGURES .... **V**

LIST OF TABLES .... **V**

INTRODUCTION **6**

PROJECT LOCATION AND DESCRIPTION 6
PROJECT PERSONNEL 6

REGULATORY ENVIRONMENT **10**

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) 10
NATIVE AMERICAN HERITAGE COMMISION (PRC 5097.9 -5079.991) 10
ASSEMBLY BILL (AB) 52 10
CALIFORNIA HEALTH AND SAFETY CODE 7050.5. 11
CALIFORNIA HISTORICAL LANDMARKS AND POINTS OF HISTORICAL INTEREST 11
PALEONTOLOGY 12
CALIFORNIA COASTAL ACT OF 1976 13

BACKGROUND **15**

ENVIRONMENTAL SETTING 15
PALEONTOLOGICAL SETTING 15
PREHISTORIC CONTEXT 18
ETHNOGRAPHY 18
HISTORICAL SETTING 19

METHODS **23**

CALIFORNIA HISTORIC RESOURCES INVENTORY SYSTEM AND CULTURAL BACKGROUND RESEARCH 23
NATIVE AMERICAN OUTREACH AND BACKGROUND RESEARCH 23
PALEONTOLOGICAL RECORDS SEARCH 23
CULTURAL AND PALEONTOLOGICAL FIELD SURVEY AND SITE VISIT 23

RESULTS **25**

CALIFORNIA HISTORIC RESOURCES INVENTORY SYSTEM AND CULTURAL BACKGROUND RESEARCH 25
NATIVE AMERICAN OUTREACH AND BACKGROUND RESEARCH 31
PALEONTOLOGICAL RECORDS SEARCH 32
CULTURAL AND PALEONTOLOGICAL FIELD SURVEY AND SITE VISIT RESULTS 32

CONCLUSIONS AND RECOMMENDATIONS **36**

CULTURAL RESOURCES CONCLUSIONS 36
CULTURAL RESOURCES RECOMMENDATIONS 36
PALEONTOLOGICAL RESOURCES CONCLUSIONS 37
PALEONTOLOGICAL RESOURCES RECOMMENDATIONS 37

REFERENCES **38**

LIST OF FIGURES

FIGURE 1. CATALINA VILLAGE PROJECT LOCATION (1:500,000) 7
FIGURE 2. CATALINA VILLAGE PROJECT AREA (1:24,000, AS DEPICTED ON REDONDO BEACH AND TORRANCE USGS 7.5 MINUTE QUADRANGLE) 8
FIGURE 3. CATALINA VILLAGE PROJECT AREA (1:2,000, AS DEPICTED ON AERIAL PHOTOGRAPH) 9
FIGURE 4. CATALINA VILLAGE PROJECT GEOLOGICAL MAP (1:24,000; FROM JENNINGS, STRAND, AND ROGERS 1977) 16
FIGURE 5. CATALINA VILLAGE PROJECT GEOLOGICAL MAP (1:50,000; FROM J. SAUCEDO ET AL 2016) 17
FIGURE 6.HOTEL REDONDO, CIRCA 1910 (CITY OF REDONDO BEACH) 21
FIGURE 7. REDONDO BEACH WITH PIER, CIRCA 1910 (CITY OF REDONDO BEACH) 21
FIGURE 8. CITY OF REDONDO BEACH CITY HALL, CIRCA 1920 (CITY OF REDONDO BEACH) 22
FIGURE 9. PROJECT AREA SHOWING DEVELOPMENT (AS DEPICTED ON 1952 AERIAL PHOTOGRAPH) 30
FIGURE 10. PROJECT AREA SHOWING RESIDENTIAL AND COMMERCIAL DEVELOPMENT (AS DEPICTED ON 1952 AERIAL PHOTOGRAPH) 30
FIGURE 11. CURRENT PROJECT AREA (AS DEPICTED ON 2016 AERIAL PHOTOGRAPH) 31
FIGURE 12. REPRESENTATIVE AREA OF PROJECT AREA NOT ACCESSIBLE FOR SURVEY, VIEW NORTHWEST 33
FIGURE 13. REPRESENTATIVE AREA OF PROJECT AREA NOT ACCESSIBLE FOR SURVEY, VIEW SOUTHWEST 33
FIGURE 14. OVERVIEW OF PROJECT AREA (PARKING LOT), VIEW NORTH 34
FIGURE 15. OVERVIEW OF BACK LOT AREA OF 112 N. CATALINA AVENUE, VIEW NORTHWEST 34
FIGURE 16. REPRESENTATIVE PHOTO OF SURFICIAL DEPOSITS OBSERVED ON CATALINA AVENUE, PLAN VIEW 35

LIST OF TABLES

TABLE 1. PREVIOUSLY CONDUCTED CULTURAL RESOURCE STUDIES WITHIN 1-MILE BUFFER OF PROJECT AREA 25
TABLE 2: PREVIOUSLY RECORDED CULTURAL RESOURCES WITHIN 1-MILE OF PROJECT AREA 27
TABLE 3. ADDITIONAL SOURCES CONSULTED FOR THE PROJECT 29

APPENDIX A: QUALIFICATIONS
APPENDIX B: (CONFIDENTIAL) CHRIS RESULTS TABLES
APPENDIX C: NAHC AND NATIVE AMERICAN CORRESPONDENCE
APPENDIX D: LACM LOCAILTY SEARCH RESULTS

INTRODUCTION

This Project proposes a mixed use development in the City of Redondo Beach, within Los Angeles County, California. Material Culture Consulting, Inc. (MCC) was retained by Beach City Capital, LLC to conduct a Phase I cultural and paleontological resource investigation of the Project Area. These assessments were conducted in accordance with the California Environmental Quality Act (CEQA) and local regulations, and included a cultural resources records search and background research, a fossil locality search at the National History Museum of Los Angeles County (LACM), an examination of geological maps and paleontological literature, a search of the Sacred Lands File (SLF) by the Native American Heritage Commission (NAHC), outreach efforts with seven Native American tribal representatives, and a pedestrian survey.

PROJECT LOCATION AND DESCRIPTION

The proposed Project Area is located at 100-132 North Catalina Avenue in the City of Redondo Beach, in Los Angeles County, California (Figure 1). The Project Area is bound by Emerald Street to the south, residential and commercial development to the east and north, and Catalina Avenue to the west (Figures 2 and 3). Specifically, the proposed Project is located within an unsectioned portion of Township 4 South and Range 20 West, USGS 7.5-minute Redondo Beach quadrangle (San Bernardino Base Meridian) (Figure 2). Currently, the Project Area consists of an entirely developed area with a parking lot and commercial and residential buildings. The Project proposes to construct twenty-two townhomes and the adaptive reuse of two historic buildings.

PROJECT PERSONNEL

Tria Belcourt, M.A., RPA, President of MCC, served as the Project Manager and Principal Archaeologist for the study. Ms. Belcourt oversaw the Project and performed editorial review of this report. Belcourt is a Registered Professional Archaeologist (RPA) with a M.A. in Anthropology from the University of Florida, a B.A. in Anthropology from the University of California at Los Angeles, over 16 years of experience in California archaeology and 10 years of experience overseeing paleontological assessments in California (See Appendix A). Jennifer Kelly, M.S., served as the Principal Investigator for Paleontology for the study. Ms. Kelly conducted the paleontological resource literature and map reviews, oversaw the field study, and prepared the paleontological sections of the report. Ms. Kelly has a M.Sc. in Geology from California State University, Long Beach, and has over ten years of experience in environmental and paleontological compliance in California (See Appendix A). Julia Carvajal, M.A., MCC Archaeologist and GIS Specialist, created maps for this report and co-authored the report. Neil Kohanski, B.A., MCC Archaeologist and cross trained Paleontologist, conducted the fieldwork. Erika McMullin, B.A., MCC Archaeologist, co-authored this report.

Figure 1. Catalina Village Project Location (1:500,000)

Figure 2. Catalina Village Project Area (1:24,000, as depicted on Redondo Beach and Torrance USGS 7.5 Minute Quadrangle)

Figure 3. Catalina Village Project Area (1:2,000, as depicted on aerial photograph)

REGULATORY ENVIRONMENT

The Project is subject to state and local laws and regulations regarding cultural resources. These regulations require the identification of cultural resources during the planning stage of new Projects; include application review for Projects that would potentially involve land disturbance; provide a Project-level standard conditions of approval that address unanticipated archaeological discoveries; and provide requirements to develop specific mitigation measures if resources are encountered during any development activity. Specific governing legislation and regulations include the following:

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

This monitoring effort was undertaken in compliance with Section 21082.3 of the 2015 California Environmental Quality Act (CEQA) Statute and Guidelines, which states that, “Any mitigation measures agreed upon in the consultation conducted pursuant to Section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to paragraph (2) of subdivision (b), and shall be fully enforceable.” The agencies and procedures required to comply with CEQA are defined in the 2017 California Environmental Quality Act (CEQA) Statute and Guidelines.

NATIVE AMERICAN HERITAGE COMMISION (PRC 5097.9 -5079.991)

- **PRC Section 5097.9** created the California NAHC with the purpose of making recommendations that can encourage private property owners to protect and preserve sacred places in a natural state and allow Native Americans appropriate access for ceremonial or spiritual practices. As part of their duties, the Commission is authorized to assist tribal members in obtaining similar access to sacred sites that are situated on public lands, as well as to assist State agencies in negotiations with federal agencies related to the protection of Native American sacred places located on federally administered lands within the borders of California.

- **PRC Sections 5097.98 through 5097.99** requires that the California NAHC must be consulted upon the discovery and identification of and Native American graves. Furthermore, these sections established that it is illegal to take or possess remains or artifacts taken from Native American graves after 1984. In addition, any violations of these sections that occur after January 1, 1988, are considered felonies, punishable by law.

ASSEMBLY BILL (AB) 52

Assembly Bill (AB) 52, which was enacted in September 2015, established a requirement under CEQA to consider “tribal cultural values, as well as scientific and archaeological values when determining impacts and mitigation.” Public Resources Code (PRC) Section 21074(a) defines “tribal cultural resources” (TCRs) as “sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe” that are either “included or determined to be eligible for inclusion in the California Register of Historical Resources” or “in a local register of historical resources.” Additionally, defined cultural landscapes, historical resources, and archaeological resources may be considered tribal cultural resources. PRC Section 21074(b), (c). The lead agency may also in its discretion treat a resource as a TCR if it is supported with substantial evidence. AB 52 also requires lead agencies offer California Native American tribes that are traditionally and culturally affiliated with the project area the opportunity to consultation on certain CEQA documents in order to protect TCRs.

CALIFORNIA HEALTH AND SAFETY CODE 7050.5.

(a) Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the Public Resources Code. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the Public Resources Code or to any person authorized to implement Section 5097.98 of the Public Resources Code.

(b) In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the Government Code, that the remains are not subject to the provisions of Section 27491 of the Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.

(c) If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission.

(Amended by Stats. 1987, Ch. 404, Sec. 1.)

California Penal Code 622.5 (2017)

Every person, not the owner thereof, who willfully injures, disfigures, defaces, or destroys any object or thing of archeological or historical interest or value, whether situated on private lands or within any public park or place, is guilty of a misdemeanor.
(Added by Stats. 1939, Ch. 90.)

CALIFORNIA HISTORICAL LANDMARKS AND POINTS OF HISTORICAL INTEREST

Historical landmarks are sites, buildings, features, or events that are of statewide significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. In order to be considered a California Historical Landmark, the landmark must meet at least one of the following criteria:

1) Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States;
2) Associated with the lives of persons important to local, California, or national history;
3) Embodies the distinctive characteristics of a type, period, region, or method of construction; represents the work of a master; or possesses high artistic values;
4) Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

If a site is primarily of local or countywide interest, it may meet the criteria for the California Point of Historical Interest Program. Points of Historical Interest are sites, buildings, features, or events that are of local (city or county) significance and have anthropological, cultural, military, political, architectural, economic, scientific or technical, religious, experimental, or other value. To be eligible for designation as a Point of Historical Interest, a resource must meet at least one of the following criteria:

1. The first, last, only, or most significant of its type in the local geographic region (city or county);
2. Associated with an individual or group having a profound influence on the history of the local area;
3. A prototype of, or an outstanding example of, a period, style, architectural movement or construction; or
4. One of the more notable works or the best surviving work in the local region of a pioneer architect, designer, or master builder.

Points of Historical Interest designated after December 1997 and recommended by the State Historical Resources Commission are also listed in the California Register. No historical resource may be designated as both a Landmark and a Point of Interest. If a Point of Interest is subsequently granted status as a Landmark, the Point of Interest designation will be retired.

PALEONTOLOGY

The State of California Public Resources Code (Chapter 1.7), Sections 5097.5 and 30244, includes additional state level requirements for the assessment and management of paleontological resources. These statutes require reasonable mitigation of adverse impacts to paleontological resources resulting from development on state lands, define the removal of paleontological “sites” or “features” from state lands as a misdemeanor, and prohibit the removal of any paleontological “site” or “feature” from State land without permission of the jurisdictional agency. These protections apply only to State of California land, and thus apply only to portions of the Project, if any, which occur on State land.

As defined by Society for Vertebrate Paleontology (SVP), paleontological resources means any fossilized remains, traces, or imprints of prehistoric plants and/or animals which are preserved in or on the earth’s crust that can provide information about the history of past life on the planet (2009). Generally, any resource greater than 5,000 years old is considered to be a fossil and are considered a nonrenewable resource that are subject to impacts from land development (SVP, 2010). Paleontological resources are important scientific and educational resources because they are used to:

1) Document the evolutionary history of now extinct organisms to study any associated evolution patterns and/or speciation;
2) Reconstruct the environments, climate change, and/or paleoecological relationships these organism lived in; and
3) Determine the relative geologic age of the strata in which the resources occur and any geological events that resulted in the deposition of the sediments that formed the strata.

Fossil resources vary widely in their relative abundance and distribution and not all are regarded as significant. Vertebrate fossils, whether preserved remains or trackways, are classed as significant by most state and federal agencies and professional groups (and are specifically protected under the California Public Resources Code). In some cases, fossils of plants or invertebrate animals are also considered significant and can provide important information about ancient local environments. Assessment of significance is also subject to the California Environmental Quality Act (CEQA) criterion that the resource constitutes a “unique paleontological resource or site.” A significant paleontological resource is considered to be of scientific interest if it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has an identified educational or recreational value. Paleontological resources that may be considered not to have scientific significance include those that lack provenience or context, lack physical integrity due to decay or natural erosion, or that are overly redundant or are otherwise not useful for research. Vertebrate fossil remains and traces include bone, scales, scutes, skin impressions, burrows, tracks, tail drag marks, vertebrate coprolites (feces), gastroliths (stomach stones), or other physical evidence of past vertebrate life or activities (BLM, 2007). The full significance of fossil specimens or fossil assemblages cannot be accurately predicted before they are collected, and in many cases, before they are prepared in the laboratory and compared with previously collected material.

Pre-construction assessment of significance associated with an area or formation must be made based on previous finds, characteristics of the sediments, and other methods that can be used to determine paleoenvironmental conditions. A separate issue is the potential of a given geographic area or geologic unit to preserve fossils. Information that can contribute to assessment of this potential includes:

1) The existence of known fossil localities or documented absence of fossils nearby and in the same geologic unit (e.g. “Formation” or one of its subunits);
2) Observation of fossils within the Project vicinity;
3) The nature of sedimentary deposits in the area of interest, compared with those of similar deposits known elsewhere (size of particles, clasts and sedimentary structures conducive or non-conducive to fossil inclusion) that may favor or disfavor inclusion of fossils; and
4) Sedimentology details, and known geologic history, of the sedimentary unit of interest in terms of the environments in which the sediments were deposited, and assessment of the favorability of those environments for the probable preservation of fossils.

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important (Scott and Springer 2003; Scott et al. 2004).

CALIFORNIA COASTAL ACT OF 1976

The California Coastal Commission (CCC) is a state agency tasked overseeing the land use and public access in the California coastal zone. The California Coastal Act was implemented in 1976 with basic goals (Section 30001.5) to:

> (a) Protect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural and artificial resources.
>
> (b) Assure orderly, balanced utilization and conservation of coastal zone resources taking into account the social and economic needs of the people of the state.
>
> (c) Maximize public access to and along the coast and maximize public recreational opportunities in the coastal zone consistent with sound resources conservation principles and constitutionally protected rights of private property owners.
>
> (d) Assure priority for coastal-dependent and coastal-related development over other development on the coast.
>
> (e) Encourage state and local initiatives and cooperation in preparing procedures to implement coordinated planning and development for mutually beneficial uses, including educational uses, in

the coastal zone.

In addition, the commission prepared a plan for the conversation, use, and management of natural, scenic, cultural, recreational, and manmade resources of the coastal zone (Section 30002). Furthering this, all public and federal agencies must adhere to the provisions set forth by the CCC in the California Coastal Act.

Local

In 1989, City Ordinance 2554 (Section 10, Chapter 4) of the Redondo Beach Municipal Code (RBMC) established the City Preservation Commission (currently known as the Historical Commission) and created criteria for "….the identification, protection, enhancement, perpetuation, and use of historic resources such as building, structures, sites, places and districts within the City that reflect special elements of the City's architectural, artistic, cultural, historical, political, and social heritage". The criteria formulated for City of Redondo Beach were created in order to "safeguard the City's heritage by encouraging the protection of landmarks representing significant elements of its history" (Redondo Beach Municipal Code, 2020).

BACKGROUND

ENVIRONMENTAL SETTING

The Project Area is located at 100-132 North Catalina Avenue in the city of Redondo Beach. The City of Redondo Beach is located along the Pacific Ocean in the Santa Monica Bay area, approximately 25 miles southwest of the City of Los Angeles, in Los Angeles County. The Project Area is located within a heavily developed area and is surrounded by existing residential neighborhoods and commercial properties in all cardinal directions. Elevations within the Project Area average 19 meters (m) (62 ft) above mean sea level (AMSL). The climate of the area is characterized as local steppe with mild winters and dry summers. Vegetation within the Project Area is limited to overgrowth of weeds and grasses, with some commercial landscaping present.

PALEONTOLOGICAL SETTING

Los Angeles County is situated within the Transverse Ranges Geologic Province and the City of Redondo Beach is situated within the area known as the Los Angeles Basin. The Los Angeles Basin is located within the Peninsular Ranges. The basin of coastal Southern California is an alluviated lowland, also referred to as the coastal plain (Yerkes et al. 1965) (Figure 4). The city is bound on the southwest by the Palos Verdes Fault and on the northeast by the Newport-Inglewood Fault (Yerkes et al. 1965). Jennings, Strand, and Rogers (1977) map the Project Area within Older Quaternary alluvial deposits (Figure 4). However, Saucedo et al (2016) mapped the entire Project Area as older Quaternary dune sands (Qoe) (Figure 5).The oldest Quaternary geologic unit mapped in the Redondo Beach Quadrangle is the Pleistocene San Pedro Formation (Qsp), a predominately marine sand and gravel deposit exposed in the Palos Verdes Peninsula (Jennings et al. 2010). The San Pedro Formation is comprised of modern eolian deposits (Qe) that form a half-mile long belt along the coastline, adjacent to the beach.

Older Quaternary dune sands (Qoe)*:* Extensive marine and nonmarine sand deposits, generally near the coast or desert playas *(*Jennings, Strand, and Rogers 1977)

Modern eolian deposits (Qe): composed of very well-sorted, fine- to medium-grained sand that rapidly grade into Pleistocene moderately dense silty sand of older eolian deposits (Qoe). (Woodring et al. 1946)

Pleistocene San Pedro Formation (Qsp): This formation is a massive, poorly consolidated, light brown, marine sand deposit exposed in the Palos Verdes Hills. Lower Pleistocene San Pedro Sand is typically composed of cross-bedded to massive sand and silty sand. (Woodring et al. 1946).

Figure 4. Catalina Village Project Geological Map (1:24,000; from Jennings, Strand, and Rogers 1977)

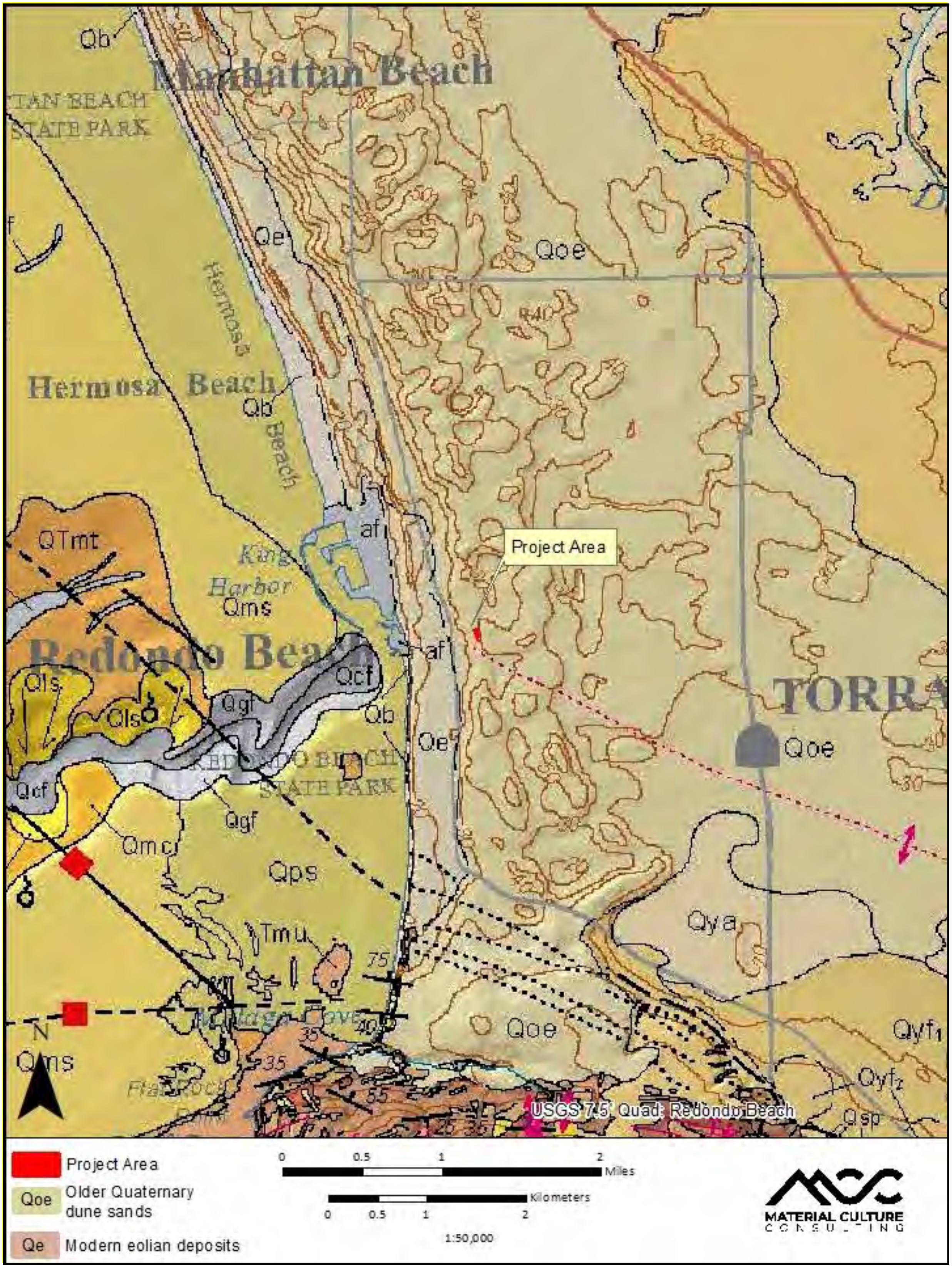


Figure 5. Catalina Village Project Geological Map (1:50,000; from J. Saucedo et al 2016)

PREHISTORIC CONTEXT

The prehistoric cultural chronology for the proposed Project Area is based on chronological information provided by Wallace (1955), Mason, Koerper and Langenwalter (1997), and Koerper, Mason and Peterson (2003). Three prehistoric periods are defined:

Milling Stone Period

The Milling Stone Period dates back well over 8,000-3,000 years before present (YBP) and is characterized by a generalized plant collecting economy supplemented by hunting and fishing. Regional interaction is limited when compared to later periods. Sites from this period appear to be part of an expansion of settlement to take advantage of new habitats and resources that became available as sea levels stabilized between about six to five thousand years ago. Gorges were used for fishing and mano/metate pairs were used to process plant materials. Most sites were in coastal areas. Around 3500 YBP, there was an economic shift to more reliance on hunting. Sites attributed to this period appear to have been occupied by small groups of people. This period persisted over thousands of years without great change (Mason et al. 1997; Koerper et al. 2003).

Intermediate Period

The Intermediate Period dates from roughly 3000-1000 YBP and is associated with a number of socioeconomic changes (Wallace 1955). Sites attributed to this time period indicate an increased reliance on coastal resources and with continued reliance on hunting and collecting. In addition, the advent of the bow and arrow, the appearance of increased quantities of bone tools, and increased reliance on the mortar and pestle, typify this time period. The first circular fishhooks appear in the tool kit in this period and use of plant grinding tools increases. Hunting tools consist of the atlatl and dart. Most sites were in coastal areas (Mason et al. 1997; Koerper et al. 2003).

Late Prehistoric Period

The period dates from 1,350 YBP to 150 YBP and is characterized by an increasing political-economic-social complexity. Villages tend to be larger, with a more varied assemblage, and there appears to be an increase in smaller satellite sites, established to support the main village, and reflecting seasonal use of a particular area. There seems to be more intensive exploitation of localized resources, and social contacts and economic influences appear accelerated through trade and social interaction. There is an increase in the number of sites in the area, which is interpreted as a result of population increase. The Late Period was a time when there are a greater number of more specialized sites in terms of their location and function, and an amplification of all aspects of the prior cultural system. In this period the atlatl and dart hunting tools are replaced by the bow and arrow. In addition, manos/metates were gradually replaced by pestle/mortars. Use of other traditional tools continued. Settlement was expanded into the hills and canyons inland (Mason et al. 1997; Koerper et al. 2003).

ETHNOGRAPHY

Ethnographic records identify the lands in the Los Angeles basin inhabited by a large Native American population at the time of contact by the Spanish. It is unknown what these people called themselves before the Spanish arrived, but today they call themselves “Tongva”, meaning “people of the earth”. The southern extent of their culture area is bound by Aliso Creek, the eastern extent is located east of present-day San Bernardino along the Santa Ana River, the northern extent includes the San Fernando Valley, and the western extent includes portions of the Santa Monica Mountains. The Tongva also occupied several Channel Islands including Santa Barbara Island, Santa Catalina Island, San Nicholas Island, and San Clemente Island. Because of their access to certain resources, including a steatite source from Santa Catalina Island, this group was among the wealthiest and most populous aboriginal groups in all of southern California. Trade of materials and resources controlled by the Tongva extended as far north as the San Joaquin Valley, as far east as the Colorado River, and as far south as Baja California (Johnson

1962; Kroeber 1976; Bean and Smith 1978). After European contact, many Tongva were taken to live at Mission San Gabriel, originally located in present-day Whittier Narrows, on a small tributary of the San Gabriel River (Garabedian and Ruud 2016). They were then given the Spanish name “Gabrielino”, in reference to the Native Americans associated with the Mission San Gabriel. Most Mission Indians were trained as vaqueros, sheepshearers, farm laborers and domestic laborers and continued in those professions after the mission were secularized (Talley 1984).

Villages were comprised of 50-100 people. Each community included one or more patrilineal extended families or lineal kinship groups (clans) (Kroeber 1976; Johnson 1962; Bean and Smith 1978; McCawley 1996). Each village was united under the leadership of a chief who inherited the position from his father. The chief was the leader of the religious and secular life of the community and served as chief administrator, fiscal officer, war leader, legal arbitrator and religious leader (Harrington 1942; Bean and Smith 1978). The chief was assisted by a Council of Elders consisting of the heads of the lineages residing in the community. Shamans were also important as doctors, therapists, philosophers and intellectuals (Bean 1974).

The Tongva/Gabrielino tribe carried out food exploitation strategies that utilized local resources ranging from plants to animals; coastal resources were also exploited. Rabbit and deer were hunted and acorns, buckwheat, chia, berries, fruits and many other plants were collected. Artifacts associated with their occupations include a wide array of chipped stone tools including knives and projectile points, wooden tools like digging sticks and bows, and ground stone tools like bedrock and portable mortars, metates and pestles. Local vegetation was used to construct shelters as well as for medicinal purposes. Cooked foods were prepared on hearths (Kroeber 1976; Bean and Smith 1978; McCawley 1996).

Acorns were one of the most important food resources utilized by the Tongva/Gabrielino and other Native American groups across California. The acorns were ground into a fine powder in order to make an acorn mush or gruel. A dietary staple, acorns provided a large number of calories and nutrients. The ability to store and create stockpiles in case of lean times also contributed to the importance of acorns as a vital natural resource. Much of the material evidence available to archaeologists concerning the Tongva/Gabrielino is a result of tools and technologies related to their subsistence activities.

The arrival of Europeans marked the end of traditional lifestyle of the Native American populations. The population faced forced conversions, subjugations, compulsory relocation to the San Gabriel Mission, and the institution of slave labor (Garabedian and Ruud 2016). European diseases also decimated the Native American population. The following years into the American Period (post 1848) did not improve conditions for Native American populations in California, including the Tongva/Gabrielino. New laws during this time period had adverse effects on the Native Americans in California. New labor laws virtually turned the Native population into slaves, with many Euro-Americans exploiting the situation as well as fostering the institutionalization of kidnapping Native children throughout California (Castillo 1978).

HISTORICAL SETTING

While indigenous peoples adapted to environmental conditions in what is now California, those same lands remained isolated from European and Asian cultures until the early-sixteenth century. In 1521, Spain sent explorer and conquistador Hernan Cortes and his army into what is now Mexico to conquer the indigenous Aztecs and capture the wealth of the land and its people. “New Spain,” as the region soon became known, quickly became the hub of Spanish colonial efforts in the New World. Cortes, hopeful of finding comparable wealth in the northern Pacific, authorized the first explorations, and in 1535, founded the first nonnative settlement in Baja (or Lower)

California. Inspired by Cortes' success in the New World and hoping to find a waterway from the Pacific to the Atlantic, the Spanish dispatched Juan Rodriguez Cabrillo in 1542 to explore the northwest coast of New Spain. It is believed that Cabrillo sailed as far north as the Oregon border, and that he became the first European to see what was then termed "Alta (or Upper) California" (Paddison 1999: xi).

In 1602, the Spanish Crown ordered Sebastian Vizcaino to make the first detailed survey of the Alta California coast. Vizcaino eventually anchored at Monterey Bay, and in subsequent reports to Spain, greatly exaggerated the quality of the natural harbor he found (Paddison 1999: xii). Despite Vizcaino's inflated recommendations, it took the Spanish almost 170 years to act. The so-called "Sacred Expedition" of 1769, led by Spaniard Gaspar de Portola and Franciscan Fray (or Father) Junipero Serra, was meant to begin the permanent settlement of Alta California, beginning in San Diego. The plan called for the Spanish to converge on San Diego by land and sea, and to use the newly established San Diego settlement as a base to begin further colonization and mission-building activities along the California coast.

The Portola expedition consisted of colonists to settle in selected pueblos or towns; missionaries to convert the natives and prepare them to become "civilized" enough to assume control of the land which the missions held in trust for the Indians; and, soldiers to establish military strong points or "presidios" to protect both groups, as well as to keep foreign interests such as Russia or England from invading lands claimed by Spain. The Mission San Gabriel Arcángel was established in 1771 and served as a main supply station between Mexico and Monterey. Five years later, a flood wiped out the mission complex and its surrounding crops, forcing the relocation of the mission five miles upstream to its current location (Garabedian and Ruud 2016). In 1785, Juan Jose Dominguez, a soldier, received a Spanish land grant, known as *Rancho Los Nietos*, for the Rancho San Pedro area (75,000 acres) which included present-day Redondo Beach (City of Redondo Beach 2020).

In 1809, Dominguez died before he could develop much of his property. The land was passed down to his nephew, Jose Cristobal Dominguez, a resident of the San Diego area. After Jose Cristobal's death in 1825, his son, Manuel owned the property. Manuel and his family moved north from San Diego and constructed their home in present-day Compton. Manual died in 1882, leaving all his lands to his six daughters. (Redondo Beach Historical Society 2020)

City of Redondo Beach

In 1887, Redondo Beach caught the interest of real estate developers Vail and Freeman. The pair purchased a piece of land from the Dominguez sisters. A year later, Vail and Freeman sold the land due to little success to Captain J.C. Ainsworth and R.R. Thompson. Tourism started to take off in 1889 when the Hotel Redondo opened (Figure 6). The hotel was one of the largest and finest resorts on the coast, attracting many visitors due to its lavish amenities, including an 18-hole golf course, a staircase to the beach, steam heat, and an elegant ballroom. Redondo quickly became a tourist destination due to natural and man-made attractions. Moonstone Beach was a popular place. Here, visitors could visit mounds of gemstones that filled the area. Carnation Gardens offered 12-acres of fragrant and blooming flowers almost all year long. Another attraction was the pier, which offered games, rides, and fishing (Figure 7). (City of Redondo Beach 2020)

Figure 6. Hotel Redondo, circa 1910 (City of Redondo Beach).

Figure 7. Redondo Beach with pier, circa 1910 (City of Redondo Beach)

With the newly built railroad and harbor, transportation systems brought economic growth to the area. The Redondo Railway Company and Santa Fe Railroad left daily to and from the City of Los Angeles at regular intervals, bringing in thousands of tourists. In addition to transporting tourists, the railroads and ships also exported natural resources, like oil and lumber. With established railways, small businesses and houses sprang up above the waterfront. Tourism and the lumber industry continued to bring growth to the town. (Redondo Beach Historical Society 2020)

From 1887 to 1926, lumber was Redondo's major economic resource. With the rail system in place, the city was able to transport lumber across California, Nevada, Arizona, and the Southwest. In 1892, the wharf was responsible for nearly 60% of the shipping business for the Los Angeles and the surrounding area. By 1906, the Redondo lumber mills were all locally owned. The prominent mills were: Ganahl Lumber Co., Redondo Planing & Feed Mill, and Montgomery & Mullin Lumber Co. By 1926, Wharf 3 was dismantled due to homeowners complaining of the unsightly conditions caused by the mills, like excessive trains and lumber stacks.

Figure 8. City of Redondo Beach City Hall, circa 1920 (City of Redondo Beach)

On April 18, 1892, Redondo was adopted into cityhood by local voters, and the first City Hall was built in 1908 (Figure 8). Starting in the 1910s, the city's popularity started to decline and so did it's economic resources. In 1912, the Pacific Steamship Company stopped docking at harbor. A powerful storm in 1915 weakened Wharf 1, and consequently it was removed. A year later, a second storm caused the removal of Wharf 2. In 1926, the railroad also ceased using Redondo as a stop. At the same time, the $250,000 Hotel Redondo had to close its door due to prohibition. It was sold for lumber for $300. The Depression brought big stakes gambling and mobsters into the area. By 1936 until 1940, a casino opened along with smaller chip games and bingo parlors on ships off the coast. The gambling ships were accessed via a water taxi (Redondo Beach Historical Society).

Redondo Beach saw a population boom in the 1950's and 1960's. Today, it is still known as a tourist and resort town. Extensive urbanization was completed in the neighborhoods surrounding the Project Area as late as 1950. Historic topographic maps and aerial photography indicate that the current Project Area, and the surrounding neighborhood, has been continuously developed since 1896.

METHODS

CALIFORNIA HISTORIC RESOURCES INVENTORY SYSTEM AND CULTURAL BACKGROUND RESEARCH

A search of the California Historical Resource Information System (CHRIS) at the South Central Coast Information Center (SCCIC), located at California State University, Fullerton, Orange County was completed by SCCIC staff. MCC received the results on June 8, 2020. The search identified previously recorded cultural resources and investigations within the Project Area and within a 1-mile radius of the Project Area. The CHRIS search also included a review of the National Register of Historic Places (NRHP), the California Register of Historical Resources (CRHR), the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Inventory of Historical Resources.

NATIVE AMERICAN OUTREACH AND BACKGROUND RESEARCH

A Sacred Lands File search was requested by MCC from the Native American Heritage Commission (NAHC) on April 21, 2020. The Commission responded on April 29, 2020, stating that there are no known tribal cultural resources or sacred lands within a 1-mile radius of the Project Area. The NAHC requested that seven Native American tribes or individuals be contacted for further information regarding the general Project vicinity. MCC subsequently sent letters on April 30, 2020 to the seven Native American contacts, requesting any information related to cultural resources or heritage sites within or adjacent to the Project Area. Additional attempts at contact by letter, email, or phone call were made on May 28, 2020 and June 18,2020. MCC did not conduct formal consultation with the Native American representatives.

PALEONTOLOGICAL RECORDS SEARCH

The paleontological literature and desktop review included an examination of geologic maps of the Project Area and a review of relevant geological and paleontological literature to determine which geologic units are present within the Project Area and whether fossils have been recovered from those geologic units elsewhere in the region. As geologic units may extend over large geographic areas and contain similar lithologies and fossils, the literature review includes areas well beyond the Project Area. The results of this literature review include an overview of the geology of the Project Areas and a discussion of the paleontological sensitivity (or potential) of the geologic units within the Project Area. A search for paleontological records was completed by staff of the Natural History Museum of Los Angeles County (LACM) on May 5, 2020. The records search included a one-mile radius around the Project Area, as well as the Project Area itself, and identified any vertebrate localities in the museum's records that exist near the Project Area in the same or similar deposits.

CULTURAL AND PALEONTOLOGICAL FIELD SURVEY AND SITE VISIT

The survey stage is important in a Project's environmental assessment phase to verify the exact location of each identified cultural or paleontological resource, the condition or integrity of the resource, and the proximity of the resource to areas of cultural resources sensitivity. In addition, the field survey provides invaluable information on the type of sediment present within the Project Area, which informs the assessment of paleontological sensitivity. Neil Kohanski, MCC Archaeologist and cross-trained Paleontologist, conducted the survey and site visit of the Project Area on May 15, 2020. The survey consisted of walking in parallel transects spaced at approximately 15-meter intervals over the Project Area while closely inspecting the ground surface. All undeveloped and accessible ground surface areas within the Project Area were examined for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools or fire-affected rock), soil discoloration that might indicate the presence of a cultural midden, soil depressions and features indicative of the former presence of structures or buildings (e.g., postholes, foundations), or historic-era debris (e.g., metal, glass, ceramics). Existing ground disturbances (e.g. cutbanks, ditches, animal burrows, etc.) were visually inspected. Representative photographs were taken of the entire Project Area.

RESULTS

CALIFORNIA HISTORIC RESOURCES INVENTORY SYSTEM AND CULTURAL BACKGROUND RESEARCH

The CHRIS records search identified a total of 63 prior cultural resource studies within a 1-mile radius of the Project Area, three of which intersect the Project Area (see Table 1). The records search identified 17 previously recorded cultural resources within 1-mile of the Project Area (see Table 2). No previously recorded cultural resources are located within the Project Area. The complete results of the CHRIS resources records search are included as Confidential Appendix B of this report.

Table 1. Previously Conducted Cultural Resource Studies Within 1-mile Buffer of Project Area

CHRIS Report No.	Year	Author(s)	Title	Affiliation	Distance from Project Area
LA-00159	1987	Wallace, William J.	An Archaeological Survey of a Parcel of Land at 5500 Torrance Boulevard, Torrance, California	William Wallace, Consulting Archaeologist	Within 1-mile
LA-00206	1976	Hector, Susan M.	Engineer Report for South Bay Cities Main Extension No. 3 Relief Trunk Sewer (#2)	University of California, Los Angeles Archaeological Survey	Within 1-mile
LA-00858	1980	Dillon, Brian D.	Archaeological Resource Survey and Impact Assessment of Torrance Blvd. Between Lucia and Francisca Streets, City of Redondo Beach	University of California, Los Angeles Archaeological Survey	Within 1-mile
LA-01624	1987	Woodward, Jim	Archaeological Survey of Redondo State Beach	California Department of Parks and Recreation	Within 1-mile
LA-01682	1987	Parker, John	Cultural Resources Evaluation of Proposed Condominium Complex at 5500 Torrance Blvd.	N/A	Within 1-mile
LA-02101	1984	Wallace, William J.	Prehistoric Cultural Development in the South Bay District, Los Angeles County, California	University of Southern California	Within 1-mile
LA-02189	1990	Demcak, Carol R.	Archaeological Assessment of the Property Located at 8111 North Catalina Avenue, Redondo Beach, County of Los Angeles, California	Archaeological Resource Management Corp.	Within 1-mile
LA-02190	1990	Van Wormer, Stephen R.	Historical Assessment of the Property Located at 811 North Catalina Avenue, Redondo Beach, County of Los Angeles, California	Archaeological Resource Management Corp.	Within 1-mile
LA-02197	1990	Romani, Gwendolyn R.	Archaeological Investigations at 811 North Catalina Avenue for He Proposed Commercial/industrial Mini-storage Located in Redondo Beach, Los Angeles County, California	Greenwood and Associates	Within 1-mile
LA-02201	1990	Greenwood, Roberta S.	Historical and Architectural Evaluation, 811-819 North Catalina Avenue, Redondo Beach	Greenwood and Associates	Within 1-mile
LA-02499	1991	McKenna, Jeanette A.	Results of a Standard Prehistoric Archaeological Records Check, City of Redondo Beach, Los Angeles County, California - General Plan Eir	McKenna et al.	In Project Area
LA-02904	1993	Stickel, Gary E.	Draft Report a Phase I Cultural Resources Literature Search for the West Basin Water Reclamation Project	Environmental Research Archaeologists: A Scientific Consortium	Within 1-mile
LA-03265	1983	Hatheway, Roger G.	Cultural Resources Assessment of the General Plan and Zone Changes for the Hermosa Beach School District Properties Hermosa Beach, California	Jim Hinzdel & Associates	Within 1-mile
LA-03544	1996	McManus, Jim	Results of Phase Ii Testing: CA-LAN-1872-h, 811 Catalina Avenue Redondo Beach, Los Angeles County, California	Compass Rose Archaeological, Inc.	Within 1-mile
LA-04171	1991	Maxwell, Pamela	Redondo Beach Breakwater Repair: Cultural Resources		Within 1-mile

CHRIS Report No.	Year	Author(s)	Title	Affiliation	Distance from Project Area
LA-04757	1999	Duke, Curt	Cultural Resource Assessment for Pacific Bell Mobile Services Facility La 466-04, County of Los Angeles, California	LSA Associates, Inc.	Within 1-mile
LA-05166	1983	Unknown	Cultural History Appendix 1: Redondo Beach Breakwater Emergency Repair History of Redondo Beach King Harbor	City of Redondo beach	Within 1-mile
LA-05167	1987	Sturm, Bradley L.	Redondo Beach Harbor Feasibility Study- cultural Resources Analysis	U.S. Army Corps of Engineers	Within 1-mile
LA-05250	1985	Dillon, Brian D.	An Archaeological Resource Survey and Impact Assessment of Torrance Blvd. Between Lucia and Francisca Streets, City of Redondo Beach, California	UCLA	Within 1-mile
LA-05251	1990	Romani, Gwendolyn R.	Archaeological Investigations at 811 North Catalina Avenue for the Proposed Commercial/industrial Mini-storage Located in Redondo Beach, Los Angeles County, Ca	Greenwood & Associates	Within 1-mile
LA-05915	2001	Mason, Roger D.	Cultural Resources Records Search and Literature Review Report for an American Tower Corporation Telecommunications Facility: Number La_990_n1 Anita Prospect in the City of Redondo Beach, Los Angeles County, California	Chambers Group, Inc.	Within 1-mile
LA-05917	2002	Duke, Curt	Cultural Resource Assessment At&t Wireless Services Facility No. 05163a Los Angeles County, California	LSA Associates, Inc.	Within 1-mile
LA-06206	2003	McKenna, Jeanette A.	Evaluation of the Residential Structure Located at 625 Diamond Street, Redondo Beach, Los Angeles County, California	McKenna et al.	Within 1-mile
LA-06208	2002	Bonner, Wayne H.	Cultural Resources Monitoring Tyco Global Network (tgn) Transpacific Fiber Optic Cable and Hermosa Beach Landing Project, City of Hermosa Beach, Los Angeles County, California	W. H. Bonner Associates	Within 1-mile
LA-06989	2003	McKenna, Jeanette A.	An Evaluation of Residential Structures: 615 Through 621 S. Pacific Coast Highway, Redondo Beach, Los Angeles County, California	McKenna et al.	Within 1-mile
LA-06990	2002	McKenna, Jeanette A.	An Evaluation of the Residential Structure Located at 291 S. Francisca Avenue, City of Redondo Beach, Los Angeles County, California	McKenna et al.	Within 1-mile
LA-08058	2006	Billat, Lorna	Sunnyglen Park/la-2889b, 5525 Del Amo Boulevard, Torrance, Los Angeles County, Ca 90503	EarthTouch, Inc.	Within 1-mile
LA-08154	2005	Bonner, Wayne H. and Kathleen A. Crawford	Cultural Resources Records Search and Site Visit Results for Nextel Communications Candidate Ca6340c Freeman Avenue, Sce Tower M4-t7, Phelan Lane and Curtis Avenue, Redondo Beach, Los Angeles County, California	Michael Brandman Associates	Within 1-mile
LA-08799	2007	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for Royal Street Communications, LLC Candidate La2619a (Redondo Beach Sce), 834 North Lucia Avenue, Redondo Beach, Los Angeles County, California	Michael Brandman Associates	Within 1-mile
LA-09157	2007	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate LA03370E (Beach Cities Medical), 514 North Prospect Avenue, Redondo Beach, Los Angeles County, California	Michael Brandman Associates	Within 1-mile
LA-09158	2007	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for Sprint Nextel Candidate LA73XC324 (Wilderness Park), 1102 Camino Real, Redondo Beach, Los Angeles County, California	Michael Brandman Associates	Within 1-mile
LA-09875	2009	Wayne Bonner	Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate LA03370G (Redondo Beach Lattice Tower), 896 North Prospect Avenue, Redondo Beach, Los Angeles County, CA.	Michael Brandman Associates	Within 1-mile

CHRIS Report No.	**Year**	**Author(s)**	**Title**	**Affiliation**	**Distance from Project Area**
LA-10069	2005	Wlodarski, Robert J.	Records Search and Pedestrian Survey for Cingular Wireless Telecommunication Site El- 0131-02 (sce - 190th & Paulina) Located at 895 E. Paulina Avenue, City of Redondo Beach, Los Angeles County, California	Cellular, Archaeological Resource, Evaluations	Within 1-mile
LA-10132	1965	Johnson, Ken	Fun, Frustration and Fulfillment an Historical Study of the City of Redondo Beach	Unknown	In Project Area
LA-10333	2009	McKenna, Jeanette M.	A Brief Historic Context Statement Prepared for the General Plan Update: The City of Torrance, Los Angeles County, California	McKenna et al.	Within 1-mile
LA-10652	2008	Wallace, William J.	Avocados to Millingstones: Papers in Honor of D.L. True - Grave Goods vs. Midden Artifacts: The Case of Palmer-Redondo	Archaeological Research Center	Within 1-mile
LA-10852	1986	Dreizler, Patricia, Gloria Snyder, Harry Johnson, and Pat Botsai	Historic Resources Survey - City of Redondo Beach	Thirtieth Street Architects	In Project Area
LA-11136	2011	Pecora, Meredith	Cultural Resource Survey Reports for FEMA Project: LA County Beach Repairs, Various Location Project	URS	Within 1-mile
LA-11138	1987	Pierson, Larry, Shiner, Gerald, and Slater, Richard	California Outer Continental Shelf, Archaeological Resource Study: Morro Bay to Mexican Border, Final Report.	PS Associates	Within 1-mile
LA-12288	2013	Bonner, Wayne and Crawford, Kathleen	Cultural Resources Records Search and Site Visit Results for T-Mobile West, LLC Candidate LA03370G (SCE Redondo Beach Tower) 896 North Prospect Avenue, Redondo Beach, Los Angeles County, California	MBA	Within 1-mile
LA-12595	2014	Smallwood, Josh	Historical Resource Evaluation of the Redondo Beach Generating Station and SEA Lab, 1021 and 100 North Harbor Drive, Redondo Beach, Los Angeles County, California	Applied EarthWorks	Within 1-mile
LA-13024	2013	Bonner, Wayne H. and Kathleen A. Crawford	Cultural Resources Records Search and Site Visit Results for T Mobile West, LLC Candidate LA02471A (Redondo Beach), 220 South Pacific Coast Highway, Redondo Beach, Los Angeles County, California.	Environmental Assessment Specialists, Inc	Within 1-mile

Table 2: Previously Recorded Cultural Resources Within 1-Mile of Project Area

Primary No.	**Trinomial**	**Temporal Affiliation**	**Resource Type**	**Resource Eligibility Status**	**Resource Description**	**Recorded by and Year**	**Relation to Project Area**
P-19-000127	CA-LAN-000127	Prehistoric	Site	N/A	Lithic scatter; ceramic scatter Habitation debris	Eberhart, LACM (1951); William J. Wallace, CSUS , (2008)	Within 1-mile
P-19-000137	CA-LAN-000137	Prehistoric	Site	N/A	Lithic scatter; Habitation debris	N.C. Nelson (1971)	Within 1-mile
P-19-000383	CA-LAN-000383	Prehistoric	Site	N/A	Lithic scatter; Burial; Habitation debris	S. Mayhew (1969); Joan Carpenter, UCLA (1979)	Within 1-mile
P-19-001872	CA-LAN-001872/H	Prehistoric, Historic	Site	N/A	Railroad; Standing structure; Lithic scatter; Habitation debris	John M. Foster, Greenwood & Associates (1990)	Within 1-mile
P-19-177518	N/A	Historic	Building	5S2: Individual property that is eligible for local listing or designation	Weddle Woodcraft	Portia Lee, California Archives (1990)	Within 1-mile

Primary No.	**Trinomial**	**Temporal Affiliation**	**Resource Type**	**Resource Eligibility Status**	**Resource Description**	**Recorded by and Year**	**Relation to Project Area**
P-19-177541	N/A	Historic	Building	1S: Individual Property listed in NR. Listed in the CR.	Multiple Family Property	S. Dyan (1991)	Within 1-mile
P-19-177599	N/A	Historic	Building	7N: Needs to be reevaluated.	Single Family Property	C. McAvoy, Johnson Research Associates (1984)	Within 1-mile
P-19-177600	N/A	Historic	Building	1S: Individual Property listed in NR. Listed in the CR.	Community Center, Women's Property	J. Loranger(1983)	Within 1-mile
P-19-177601	N/A	Historic	Building	1S: Individual Property listed in NR. Listed in the CR.	Public Utility Building	B. Strojny & V. Anderson, City of Redondo Beach Department of Intergovernmental Programs(1980)	Within 1-mile
P-19-177668	N/A	Historic	Building	6X: Determined Ineligible for NR	Single Family Property	J. McKenna (2003)	Within 1-mile
P-177669	N/A	Historic	District	1S: Individual Property listed in NR. Listed in the CR.	Redondo Beach Original Townsite	S. Dyan, Redondo Beach Historical Society (1987)	Within 1-mile
P-19-186114	N/A	Historic	Object	N/A	Monument	J. Arbuckle (1980)	Within 1-mile
P-19-190110	N/A	Historic	Building	N/A	Multiple Family Structure	Jeanette A. McKenna, McKenna et al.(2002)	Within 1-mile
P-19-190298	N/A	Historic	Structure	N/A	Engineering structure	K.A. Crawford, Michael Brandman Associates (2012)	Within 1-mile
P-19-190647	N/A	Historic	Building	N/A	Educational building	K.A.Crawford, Crawford Historic Services (2013)	Within 1-mile
P-19-190801	N/A	Historic	Building, Structure	N/A	Public utility building	Josh Smallwood, Applied Earthworks(2013)	Within 1-mile

Several additional sources were consulted for this Project (Table 3). These additional sources did not identify significant potential for historic-era or prehistoric cultural resources directly in the Project Area. However, within 600 feet of the Project Area, several resources have been deemed as being registered, determined eligible for register, or appear to be eligible in the National Register (NR) and/or the California Register (CR). The proposed Project site plan indicates there are two historical buildings in the Project Area. More information pertaining to the historic-era built environment can be found in the separate report prepared by an architectural historian.

Table 3. Additional Sources Consulted for the Project

Source	**Results**
National Register of Historic Places (1979-2002 & supplements)	Positive
Historical United States Geological Survey Topographic maps (USGS 2012)	The Project Area has been developed for commercial and residential properties
Historical United States Department of Agriculture Aerial Photos	The Project Area has been developed for commercial and residential properties
California Register of Historical Resources (1992-2010)	Positive
California Inventory of Historic Resources (1976-2010)	Negative
California Historical Landmarks (1995 & supplements to 2010)	Negative
California Points of Historical Interest (1992 to 2010)	Negative
Local Historical Register Listings	Positive
Bureau of Land Management General Land Office Records	Positive

A review of historical aerial photographs and maps indicate that major development occurred within the Project Area prior to the 1950s (Figure 9). Within 70 years, a drastic encroachment of residential and commercial development took place, with structures observed within the Project Area (Figure 10). Continued development in and surrounding the Project Area has continued into to present day (Figure 11). The proposed site plan indicates that two historic buildings are located within the Project Area on North Catalina Avenue. These buildings will be evaluated by an architectural historian and the results and recommendations are provided in a separate report.

The Bureau of Land Management General Land Office (GLO) Records results returned a land patent (document # PLC 440) granted by the Spanish/Mexican government issued on December 18, 1858 to Jose Aquina, Andres Dominguez, Esteban Dominguez, Feliciana Dominguez, Jose Dominguez, Madalina Dominguez, Manuel Dominguez, Maria Dominguez, Maria Jesus Dominguez, and Pedro Dominguez (Bureau of Land Management GLO 2020).

Figure 9. Project Area showing development (as depicted on 1952 aerial photograph)

Figure 10. Project Area showing residential and commercial development (as depicted on 1952 aerial photograph)

Figure 11. Current Project Area (as depicted on 2016 aerial photograph)

NATIVE AMERICAN OUTREACH AND BACKGROUND RESEARCH

As a result of the effort to contact the seven Native American Tribes or individuals identified by the NAHC, MCC received four responses. On May 13, 2020, MCC received an email from Gabrieleño Band of Mission Indians-Kizh Nation. The email stated that Andrew Salas, Chairperson, would like to request the contact information of the individual(s) from the lead agency, and the Tribal Council would like to provide confidential information in a government to government consultation. On May 28, 2020, MCC conversed with Chairperson Robert Dorame from the Gabrieliño Tongva Indians of California Tribal Council. Mr. Dorame stated that the area is considered highly sensitive and should be monitored by a member of the tribe. He also requested formal consultation with the lead agency. On June 18, 2020, MCC spoke with Joseph Ontiveros from the Cultural Resource Department for the Soboba Band of Luiseno Indians. Mr. Ontiveros indicated that the Project Area is outside of their Tribal area and defers to other local tribes. On June 18, 2020, MCC also spoke with Chairperson Anthony Morales of Gabrieleño/Tongva San Gabriel Band of Mission Indians. Mr. Morales stated the Project Area is highly sensitive and ground disturbance should be monitored by a tribal member. In addition, he also requested a formal consultation with the lead agency. As of June 25, 2020, no other additional groups or individuals have responded with information about the Project Area. All written NAHC and Native American correspondence materials and our communication log are provided as Appendix C.

PALEONTOLOGICAL RECORDS SEARCH

The fossil locality search results from the LACM (McLeod 2020, Appendix D) do not indicate any fossils have been found directly within the Project Area, but did note nearby localities from similar sedimentary deposits. The Project Area is comprised of older Quaternary sand dunes (McLeod 2020). These deposits are derived from the San Pedro Formation (Yerkes et al. 1965). These types of deposits typically do not contain significant vertebrate fossils in the uppermost layers, but in older sedimentary deposits at depth they may well contain significant fossil vertebrate remains (McLeod 2020).

The closest vertebrate fossil locality from similar deposits is LACM 4444 located approximately 4.5 miles from the Project Area. LACM 4444 is situated east-northeast of the proposed Project Area at the Mobil Oil Refinery property located west of Crenshaw Boulevard and just south of 190th Street. This locality produced a horse fossil specimen (*Equus)* and marine whale (*Cetacea*) at a depth of 15 feet below the surface. Further southeast of the proposed Project Area is LACM 1839, located near the intersection of Crenshaw Boulevard and 236th Street, approximately 5.5 miles away. This locality produced a horse fossil specimen (*Equus),* at a depth of 35 feet below the surface. Northeast of the proposed Project Area approximately 6.7 miles away, near the intersection of Prairie Avenue and 139th Street, LACM 2035 produced fossil mammoth bones at an unrecorded depth. Additional literature was consulted, including The University of California Museum of Paleontology (UCMP)'s Miocene Mammal Mapping Project (MioMap), which did not result in additional fossil localities within the vicinity of the Project Area.

CULTURAL AND PALEONTOLOGICAL FIELD SURVEY AND SITE VISIT RESULTS

During the course of fieldwork, the majority of the Project Area was not accessible, due to restricted access by locked gates and by commercial property development (Figure 12 and 13). While MCC was unable to survey the Project Area that included the commercial properties and areas behind the locked gates, the area was observed from the perimeter of the Project Area and found to be entirely developed into buildings. Project parcels that could be surveyed were done so by walking parallel transects spaced at approximately 15-meter intervals over each Project Parcel, while closely examining the ground surface. The areas that were surveyed had zero ground visibility due to payment covering all open areas (Figure 14). The entirety of the Project Area is developed with asphalt/concrete portions and buildings (Figure 15). Vegetation in the Project Area included seasonal grasses growing from cracks in the pavement in addition to residential landscaping of Cypress trees, other various trees and shrubs. Along Catalina Avenue and Emerald Street, a number of palm trees are located on the sidewalks. Although no soil was present in the Project Area due to pavement, a soil sample was taken from outside the immediate vicinity. The soil was brown sandy clay loam, with well-sorted high sphericity-subrounded to subangular inclusions (Figure 16). No cultural or paleontological resources were observed during the survey effort.

Figure 12. Representative area of Project Area not accessible for survey, view northwest

Figure 13. Representative area of Project Area not accessible for survey, view southwest

Figure 14. Overview of Project Area (Parking Lot), view north

Figure 15. Overview of back lot area of 112 N. Catalina Avenue, view northwest

Figure 16. Representative photo of surficial deposits observed on Catalina Avenue, plan view

CONCLUSIONS AND RECOMMENDATIONS

CULTURAL RESOURCES CONCLUSIONS

The Phase I cultural resource assessment of the Project Area included a CHRIS records search, Sacred Lands File search, NAHC outreach, background research, and a field pedestrian survey. The SLF was negative, however the Gabrieleño Band of Mission Indians- Kizh Nation have indicated that they will be sharing confidential resource information with the Agency regarding the Project Area. The nature of this information is unknown at this time. The records search identified 17 previously recorded cultural resources within 1-mile of the Project Area. Historic aerials indicate the Project Area has been developed into residential and commercial properties for the last 70 years. The cultural resources survey resulted in negative findings and reaffirmed the extensive development within the Project Area.

CULTURAL RESOURCES RECOMMENDATIONS

Based on the above findings, MCC recommends preparation of a Cultural Resources Management Plan (CRMP), and full-time cultural monitoring during the initial stages of ground disturbance, at a minimum. Prior to the start of construction, the following mitigation measures or conditions of approval are recommended, to avoid potential impacts to significant cultural resources if they are encountered during the course of construction activities:

- The probability of encountering significant cultural resources withing the Project Area is considered low (due to extensive development) to moderate (due to the presence of historic era buildings) within the Project Area. All recommendations for historic buildings currently present on the Catalina Village property can be found in a separate Historic Built Environment Report. MCC recommends no further mitigations measure prior to implementation of the proposed Project, however we recommend preparation of a Cultural Resources Management Plan, which includes the requirement of full time cultural resources monitoring during the initial stages of ground disturbance of the Project Area, due to the presence of historic era buildings and extensive history associated with the prior use of the Project Area. A report documenting the results of the monitoring, including any salvage activities and the significance of any resources, will be prepared and submitted to the appropriate City personnel.

- MCC's Native American outreach efforts have indicated the area is considered highly sensitive for tribal cultural resources. The Gabrieleno/Tongva San Gabriel Band of Mission Indians and Gabrielino Tongva Indians of California Tribal Council have requested tribal monitoring for all ground disturbance activities. Also, the Gabrieleno Band of Mission Indians-Kizh Nation have requested consultation with the lead agency. A formal consultation with the lead agency and the tribes is recommended as the next step in the cultural resources review process. Pending information shared during formal consultation, it is noted that archaeological and tribal cultural resources monitoring may be required for this project. If cultural resources are discovered at any phase of the Project, all work must be halted or diverted until a qualified Archaeologist can evaluate the nature and significance of the find (s).

- Development of a Cultural Resources Management Plan shall also include protocol for addressing inadvertent discovery of archaeological and / or tribal cultural resources, should these be encountered during any phase of development associated with the Project. In the event that these resources are inadvertently discovered during ground-disturbing activities, work must be halted within 50 feet of the find until it can be evaluated by a qualified archaeologist. Construction activities could continue in other areas. If the discovery proves to be significant, additional work, such as data recovery excavation, may be warranted and would be discussed in consultation with the appropriate regulatory agency(ies).

- Procedures of conduct following the discovery of human remains on non-federal lands have been mandated by California Health and Safety Code §7050.5, PRC §5097.98 and the California Code of Regulations (CCR) §15064.5(e). According to the provisions in CEQA, should human remains be encountered, all work in the immediate vicinity of the burial must cease, and any necessary steps to ensure the integrity of the immediate area must be taken. The Humboldt County Coroner shall be immediately notified and must then determine whether the remains are Native American. If the Coroner determines the remains are Native American, the Coroner has 24 hours to notify the NAHC, who will in turn, notify the person they identify as the Most-Likely-Descendent (MLD) of any human remains. Further actions will be determined, in part, by the desires of the MLD. The MLD has 48 hours to make recommendations regarding the disposition of the remains following notification from the NAHC of the discovery. If the MLD does not make recommendations within 48 hours, the owner shall, with appropriate dignity, reinter the remains in an area of the property secure from further disturbance. Alternatively, if the owner does not accept the MLD's recommendations, the owner or the descendent may request mediation by the NAHC.

PALEONTOLOGICAL RESOURCES CONCLUSIONS

The Phase I paleontological resource assessment of the Project Area included a locality records search, literature review, and a field pedestrian survey. No significant paleontological resources were identified within the direct Project Area during the locality search or the field survey. The geological units mapped within the Project Area are comprised of older Quaternary sand dunes. While shallow excavations of the uppermost few feet typically do not uncover significant vertebrate fossils, deeper excavations that extend down into older Quaternary deposits have the potential to contain significant fossil vertebrate fossils. There are noted nearby localities discovered within similar sedimentary deposits at shallow depths.

PALEONTOLOGICAL RESOURCES RECOMMENDATIONS

Based on the above findings, MCC recommends preparation of a Paleontological Resources Impact Mitigation Plan (PRIMP), and full-time paleontological monitoring when excavation exceeds depths of ten feet to determine if older, paleontologically sensitive sediments are present. If present, monitoring should be implemented. Prior to the start of construction, the following mitigation measures or conditions of approval are recommended, to avoid potential impacts to significant paleontological resources if they are encountered during the course of construction activities:

- A trained and qualified paleontological monitor shall perform full-time monitoring of any excavations on the Project that have the potential to impact paleontological resources in undisturbed native sediments below ten feet in depth. The monitor will have the ability to redirect construction activities to ensure avoidance of adverse impacts to paleontological resources.
- The Project paleontologist may re-evaluate the necessity for paleontological monitoring after examination of the affected sediments during excavation, with approval from Lead Agency and Client representatives.
- Any potentially significant fossils observed shall be collected and recorded in conjunction with best management practices and SVP professional standards.
- Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.
- A report documenting the results of the monitoring, including any salvage activities and the significance of any fossils, will be prepared and submitted to the appropriate personnel.

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Appendix H

Geotechnical Engineering Investigation

Geotechnologies, Inc.
Consulting Geotechnical Engineers

439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

April 22, 2019
File No. 21759

Catalina Fund, LLC
1240 Rosecrans Avenue
Manhattan Beach, California 90266

Attention: Lindsey Mills

Subject: Geotechnical Engineering Investigation
Proposed Mixed-Use Development
100 - 132 North Catalina Avenue, Redondo Beach, California

Ladies and Gentlemen:

This letter transmits the Geotechnical Engineering Investigation for the subject site prepared by Geotechnologies, Inc. This report provides geotechnical recommendations for the development of the site, including earthwork, seismic design, temporary excavations, foundations, and floor slabs. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

The validity of the recommendations presented herein is dependent upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

STANLEY S'U KEI TANG
No 56178
Exp 12/31/20
CIVIL

ANDRES E. LOZANO
Staff Engineer

STANLEY S. TANG
R.C.E. 56178

AEL/SST:km

Distribution: (4) Addressee

Email to: [lindsey@beachcitycapital.com]

TABLE OF CONTENTS

SECTION **PAGE**

- INTRODUCTION 1
- PROPOSED DEVELOPMENT 1
- SITE CONDITIONS 2
- GEOTECHNICAL EXPLORATION 2
  - FIELD EXPLORATION 2
    - Geologic Materials 3
    - Groundwater 3
    - Caving 4
  - OIL WELLS 5
  - METHANE 5
- SEISMIC EVALUATION 5
  - REGIONAL GEOLOGIC SETTING 5
  - REGIONAL FAULTING 6
  - SEISMIC HAZARDS AND DESIGN CONSIDERATIONS 7
    - Surface Rupture 7
    - Liquefaction 8
    - Dynamic Dry Settlement 9
    - Tsunamis, Seiches and Flooding 10
    - Landsliding 10
- CONCLUSIONS AND RECOMMENDATIONS 10
  - SEISMIC DESIGN CONSIDERATIONS 12
    - 2016 CBC Seismic Parameters 12
  - FILL SOILS 13
  - EXPANSIVE SOILS 13
  - WATER-SOLUBLE SULFATES 13
  - GRADING GUIDELINES 14
    - Site Preparation 14
    - Recommended Overexcavation 14
    - Compaction 15
    - Acceptable Materials 15
    - Utility Trench Backfill 16
    - Shrinkage 16
    - Weather Related Grading Considerations 16
    - Abandoned Seepage Pits 17
    - LEED Considerations 18
    - Geotechnical Observations and Testing During Grading 19
  - FOUNDATION DESIGN 19
    - Conventional Foundation Design 19
    - Miscellaneous Foundations 20
    - Conventional Foundations General 20
    - Lateral Design 21
    - Foundation Settlement 21
    - Foundation Observations 21

TABLE OF CONTENTS

SECTION **PAGE**

RETAINING WALL DESIGN 22
- Cantilever Retaining Walls 22
- Dynamic (Seismic) Earth Pressure 22
- Waterproofing 23
- Retaining Wall Drainage 23
- Retaining Wall Backfill 24
- Sump Pump Design 24

TEMPORARY EXCAVATIONS 25
- Excavation Adjacent to Buildings or Property Lines 25
- Excavation Observations 26

SLABS ON GRADE 26
- Concrete Slabs-on-Grade 26
- Design Of Slabs That Receive Moisture-Sensitive Floor Coverings 27
- Concrete Crack Control 27
- Slab Reinforcing 28

PAVEMENTS 28

SITE DRAINAGE 30

STORMWATER DISPOSAL 30
- Introduction 30
- Percolation Testing 31
  - Shallow Percolation Testing 31
  - Deep Percolation Testing 32
- Recommendations 33

DESIGN REVIEW 35

CONSTRUCTION MONITORING 36

EXCAVATION CHARACTERISTICS 36

CLOSURE AND LIMITATIONS 37

GEOTECHNICAL TESTING 37
- Classification and Sampling 37
- Moisture and Density Relationships 38
- Direct Shear Testing 38
- Consolidation Testing 39
- Expansion Index Testing 39
- Laboratory Compaction Characteristics 40

ENCLOSURES

- References
- Vicinity Map
- Plot Plan
- Local Geologic Map - Dibblee
- Historically Highest Groundwater Levels Map
- Water Well Location Map
- Oil Well Location Map

TABLE OF CONTENTS

SECTION **PAGE**

ENCLOSURES - continued

Seismic Hazard Zone Map
Plates A-1 through A-6
Plates B-1 and B-2
Plates C-1 through C-3
Plate D
Calculation Sheets (3 pages)
Monitoring Well Measurement Logs (6 pages)

GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
100 – 132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical engineering investigation performed on the subject site. The purpose of this investigation was to identify the distribution and engineering properties of the geologic materials underlying the site, and to provide geotechnical recommendations for the design of the proposed development.

This investigation included six exploratory excavations, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information and the preparation of this report. The site location is shown on the enclosed Vicinity Map, and the boring locations are shown on the enclosed Plot Plan. The results of the exploration and laboratory tests are provided in the Appendix of this report.

PROPOSED DEVELOPMENT

Information concerning the proposed project was furnished by the client. The proposed project consists of a new mixed-use development. The plan proposed 13,500 square feet of commercial space located in three existing structures to be renovated. The residential portion of the development consists of 22, three-story townhomes, and a three-story, 8-unit apartment building. The structures will be constructed at, or near, current grade, with surface parking. Grading will consist of removal and recompaction of existing unsuitable soils.

Any changes in the design or location of the relocated structure, as outlined in this report, should be reviewed by this office. The recommendations contained herein should not be considered valid until reviewed and modified or reaffirmed subsequent to such review.

SITE CONDITIONS

The property is located at 100 – 132 North Catalina Avenue, in the City of Redondo Beach, California. The site is bounded by Emerald Street to the south, by a 1-story commercial structure to the north, by North Catalina Avenue to the west, and by 1 to 2-story near grade residential and commercial structures to the east.

At the time of exploration, the site was occupied by 1 to 2-story near-grade commercial structures. The existing commercial structures will be renovated as part of the proposed development. The site is relatively level, with no pronounced highs or lows.

The neighboring developments consist of multi-story commercial and residential structures. Vegetation at the site consists of a few mature trees and shrubs, contained in planter areas. Drainage appears to be by sheetflow to the city streets.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on February 25 and 26, 2019, by excavating four exploratory borings and two test pits. The borings varied in depth from 20 and 50 feet below the existing grade, and Borings B1, B2 and B3 were excavated with the aid of a truck mounted drilling machine using 8-inch diameter hollow stem augers and B4 was excavated using 4-inch hand auger. The test pits were excavated to a depths ranging from 6 to 20 feet with the aid of hand tools and hand labor.

The exploration locations are shown on the enclosed Plot Plan, and the geologic materials encountered are logged on Plates A-1 through A-6.

The location of the exploratory excavations was determined from hardscaped features shown on the attached Plot Plan. The location of the exploratory excavations should be considered accurate only to the degree implied by the method used.

Geologic Materials

Fill materials underlying the subject site predominantly consists of silty sands, which are dark brown in color, moist, medium dense, and fine grained. The observed fill materials extend to a depth of 1½ to 3 feet below existing grade.

The fill is underlain by native alluvial soils, consisting predominantly of silty sands and sands. The native alluvial soils range from yellowish brown to dark brown in color, and are slightly moist to very moist, medium dense to very dense, and fine to medium grained. More detailed descriptions of the earth materials encountered may be obtained from individual logs of the subsurface excavations.

Groundwater

Groundwater was not encountered during exploration which was conducted to a maximum depth of 50 feet below the existing ground surface at Boring B2. According to the Redondo Beach 7½ Minute Quadrangle Seismic Hazard Evaluation Report, Plate 1.2, Historically Highest Ground Water Contours (CDMG, 1998, Revised 2006), the historic-high groundwater level at the site is not well defined in this area. The 10-foot contour is over 0.25 miles to the west and no contour shows for over a mile to the east of the site. It is the opinion of this firm that this closest groundwater level contour is not representative of the site's historically highest groundwater level. A copy of this plate is included in the Appendix as Historically Highest Groundwater Levels Map.

The Los Angeles Department of Public Works lists a water monitoring well less than 100 feet east of the subject site. This monitoring well is numbered 715B, and its location is shown relative to the subject site in the enclosed Water Well Location Map. Groundwater levels were measured in this well at least annually from 1958 through 2008. According to water-well logs obtained from the Los Angeles Department of Public Works Website (enclosed in the Appendix), the highest groundwater level for Well 715B was approximately 46.3 feet below ground surface (or approximate elevation 18.7 feet) in 1989. The deepest groundwater level measured on this well is reported to be 85.2 feet (or approximate elevation -20.2 feet), which was measured in 1958. Based on the nearby groundwater well data, it is recommended that a historically highest groundwater elevation of 20.0 feet above Mean Sea Level (MSL), which corresponds to approximately 45 feet below the existing site grade.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving

Caving could not be directly observed during drilling because the boreholes were cased during drilling, and caving was not possible. Caving was not experienced during excavation of the test pits. However, based on the general experience of this firm, large diameter excavations, excavations that encounter granular, cohesionless soils will most likely experience caving.

OIL WELLS

Based on review of the California State Division of Oil, Gas and Geothermal Resources (DOGGR) Online Mapping System, the site is located within the limits of the Torrance Oil Field. Review of the DOGGR On-line Mapping System also indicates that the closest oil and gas wells are located approximately 2,000 feet to the northwest and 3,700 feet to the east. No oil wells are reported to be located at the subject site. The enclosed Oil Well Location Map shows the reported location of nearby wells.

METHANE

Since the site is located within the limits of an oil field, and the nearest oil and gas well is approximately 2,000 feet to the northwest, this firm recommends that a qualified environmental consultant is contacted to determine if methane mitigation would be required for the project.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject site is located within the Los Angeles Basin and Peninsular Ranges Geomorphic Province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-west trending reverse faults that form the southern margin of the Transverse Ranges.

The Los Angeles Basin is located at the northern end of the Peninsular Ranges Geomorphic Province. The basin is bounded by the east and southeast by the Santa Ana Mountains and San Joaquin Hills, and to the northwest by the Santa Monica Mountains. Over 22 million years ago, the Los Angeles Basin was a deep marine basin formed by tectonic forces between the North

American and Pacific plates. Since that time, over 5 miles of marine and non-marine sedimentary rock as well as, intrusive and extrusive igneous rocks have filled the basin. During the last 2 million years, defined by the Pleistocene and Holocene epochs, the Los Angeles Basin and surrounding mountain ranges have been uplifted to form the present day landscape. Erosion of the surrounding mountains has resulted in deposition of unconsolidated sediments in low-lying areas by rivers such as the Los Angeles River. Areas that have experienced subtle uplift have been eroded with gullies.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), faults may be categorized as active, potentially active, or inactive. Active faults are those which show evidence of surface displacement within the last 11,000 years (Holocene-age). Potentially-active faults are those that show evidence of most recent surface displacement within the last 1.6 million years (Quaternary-age). Faults showing no evidence of surface displacement within the last 1.6 million years are considered inactive for most purposes, with the exception of design of some critical structures.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

SEISMIC HAZARDS AND DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

Surface Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. The Act defines “active” and “potentially active” faults utilizing the same aging criterial as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,000 years. It is this recency of fault movement that the CGS considers as characteristic for faults that have a relatively high potential for ground rupture in the future.

The CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the known fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Surface rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature, no known active faults or potentially active faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these consideration, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

Liquefaction typically occurs in areas where groundwater is less than 50 feet from the surface, and where the soils are composed of poorly consolidated, fine to medium-grained sand. In addition to the necessary soil conditions, the ground acceleration and duration of the earthquake must also be of a sufficient level to initiate liquefaction.

The Seismic Hazards Map of the Redondo Beach Quadrangle by the State of California (CDMG, 1999) does not classify the site as part of a "Liquefiable" area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake. A copy of this map has been included in the Appendix.

A site-specific liquefaction analysis was performed following the Recommended Procedures for Implementation of the California Geologic Survey Special Publication 117A, Guidelines for Analyzing and Mitigating Seismic Hazards in California (CGS, 2008), and the EERI Monograph (MNO-12) by Idriss and Boulanger (2008). The semi-empirical method is based on a correlation between measured values of Standard Penetration Test (SPT) resistance and field performance data.

Groundwater was not encountered during exploration, conducted to a maximum depth of 50 feet below the existing grade. According to the Seismic Hazard Zone Report of Redondo Beach 7½-Minute Quadrangle (CDMG, 1998, Revised 2006), the historic-high groundwater level for the site is not well defined in this area. The 10-foot contour is over 0.25 miles to the west and no contour shows for over a mile to the east of the site. However, review of the logs from a Los Angeles Department of Public Works groundwater monitoring well, located less than 100 feet east of the subject site, indicate that between 1958 and 2008 the highest groundwater level measured in this well was approximately 46.3 feet below existing grade (or approximate elevation 18.7 feet).

For the purpose of the enclosed liquefaction analysis, the historic highest groundwater level of 10 feet below the existing site grade was conservatively utilized.

The peak ground acceleration (PGA_M) and modal magnitude were obtained from the USGS websites, using the U.S. Seismic Design Maps tool (USGS, 2018) and the Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). A Site Class "D" (Stiff Soil Profile) and a published shear wave velocity of 259 meters per second were utilized for V_S30 (Tinsley and Fumal, 1985) in the USGS seismic programs. A modal magnitude (M_W) of 6.95 was obtained using the USGS Probabilistic Seismic Hazard Deaggregation program (USGS, 2008). A peak ground acceleration of 0.643g, which corresponds to the site's PGA_M, was obtained using the U.S. Seismic Design Maps tool. These parameters are used in the enclosed liquefaction analyses.

The enclosed "Liquefaction Evaluation" calculation sheet is based on Boring 2. Standard Penetration Test (SPT) data were collected at 5-foot intervals. Samples of the collected materials were conveyed to the laboratory for testing and analysis. Utilizing the adjusted blow count data, and the results of laboratory testing, the enclosed liquefaction analysis indicated that the underlying soils would not be prone to liquefaction.

Dynamic Dry Settlement

Seismically-induced settlement of compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Some seismically-induced settlement of the proposed structures should be expected as a result of strong ground-shaking, however, due to the uniform nature of the underlying geologic materials, excessive differential settlements are not expected to occur.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. Review of the County of Los Angeles Flood and Inundation Hazards Map, (Leighton, 1990), indicates the site does not lie within mapped tsunami inundation boundaries. The site is far and/or high enough from the ocean or lakes such that it would not be prone to hazards of a tsunami or seiche.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the County of Los Angeles Flood and Inundation Hazards Map (Leighton, 1990), indicates the site does not lie within the inundation boundaries due to a seiche or a breached upgradient reservoir.

Landsliding

The probability of seismically-induced landslides affecting the subject development is considered to be low, due to the lack of elevation difference across of adjacent to the site.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of this firm that the proposed project is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

Fill materials were encountered during exploration to a maximum depth of 3 feet below the existing site grade. The existing fill materials are considered to be unsuitable for support of the proposed foundations, floor slabs, or additional fill, but may be reused for the preparation of a uniform compacted fill pad. Groundwater was not encountered during exploration, conducted to a depth of 50 feet below existing grade.

The proposed new structures may be supported by conventional foundations bearing in a uniform compacted fill pad. For the construction of a uniform compacted fill pad, all existing fill materials and upper native soils shall be removed and recompacted to a minimum depth of 5 feet below the proposed grade, or 3 feet below the bottom of the proposed foundations, whichever is deeper. In addition, the compacted fill should extend horizontally a minimum of 3 feet beyond the edge of foundations, or for a distance equal to the depth of fill below the foundation, whichever is greater.

New footings may be necessary as part of the proposed renovation of the existing structures. Where new footings are needed, as determined by the project structural engineer, new footings may be deepened to bear into the underlying native soils. Where existing slab-on-grade will need to be replaced, the existing fill materials shall be properly removed and recompacted for slab support.

Foundations for small outlying structures, such as property line walls, which will not be tied-in to the proposed structures, may be supported on conventional foundations bearing in native geologic materials and/or certified compacted fill.

The validity of the conclusions and design recommendations presented herein is dependent upon review of the geotechnical aspects of the proposed construction by this firm. The subsurface conditions described herein have been projected from excavations on the site as indicated and should in no way be construed to reflect any variations which may occur between these excavations or which may result from changed in subsurface conditions. Any changes in the design, as outlined in this report, should be reviewed by this office. The recommendations contained herein should not be considered valid until reviewed and modified or reaffirmed subsequent to such review.

SEISMIC DESIGN CONSIDERATIONS

2016 CBC Seismic Parameters

Based on information derived from the subsurface investigation, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile, according to Table 1613.5.2 of the California Building Code (CBC). This information and the site coordinates were input into the USGS U.S. Seismic Design Maps tool to calculate the seismic ground motion parameters for the site. Ground motion parameters for the 2016 CBC are presented below.

2016 CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	1.802g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	1.802g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.201g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.676g
Site Coefficient (F_v)	1.5
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.014g
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.676g

FILL SOILS

The maximum depth of fill encountered on the site was 3 feet. The existing fill soils are not suitable for support of newly proposed foundations, floor slabs or additional fill buy may be reused as compacted fill. All existing fill materials shall be properly removed and recompacted for foundation and slab support.

EXPANSIVE SOILS

The onsite geologic materials are in the very low expansion range. The Expansion Index was found to be 2 and 3 for representative remolded bulk samples. Recommended reinforcing is provided in the "Foundation Design" and "Slabs-on-grade" sections of this report.

WATER-SOLUBLE SULFATES

The Portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually the two most common sources of exposure are from soil and marine environments.

The sources of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite geologic materials was tested by California Test 417. The water-soluble sulfate content was determined to be less than 0.1% percentage by weight for the soils tested. Based on American Concrete Institute (ACI) Standard 318-08, the sulfate exposure is considered to be negligible for geologic materials with less than 0.1%, and therefore, there are no restrictions on cement types for concrete foundations in contact with the site soils.

GRADING GUIDELINES

The following guidelines are provided for the preparation of the compacted fill pad recommended for support of the proposed structures, and for any other miscellaneous compaction that may be required, such as retaining wall or footing backfill, or subgrade preparation.

Site Preparation

- A thorough search should be made for possible underground utilities and/or structures. Any existing or abandoned utilities or structures located within the footprint of the proposed grading should be removed or relocated as appropriate.
- All vegetation, existing fill, and soft or disturbed geologic materials should be removed from the areas to receive controlled fill. All existing fill materials and any disturbed geologic materials resulting from grading operations shall be completely removed and properly recompacted prior to foundation excavation.
- Any vegetation or associated root system located within the footprint of the proposed structures should be removed during grading.
- Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.
- The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Recommended Overexcavation

All existing fill materials shall be properly removed and recompacted within the proposed building area. The proposed fill pad shall extend to a minimum depth of 5 feet below the bottom of the proposed grade, or 3 feet below bottom of the proposed foundations, whichever is greater. In addition, the excavation shall extend horizontally at least 3 feet beyond the edge of foundations, or for a distance equal to the depth of fill below the foundations, whichever is greater. It is very important that the position of the proposed structure is accurately located so that the limits of the graded area are accurate and the grading operation proceeds efficiently.

Compaction

All fill should be mechanically compacted in layers not more than 8 inches thick. The materials placed should be moisture conditioned to within 3 percent of the optimum moisture content of the particular material placed. All fill should be compacted to at least 90 percent of the maximum laboratory density for the materials used. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. using the test method described in the most recent revision of ASTM D 1557.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until minimum of 90 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed. Materials larger than 6 inches in maximum dimension shall not be used in the fill. Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of geologic materials with an expansion index of less than 50. The water-soluble sulfate content of the import materials should be less than 0.1% percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 90 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in accordance with the most recent revision of ASTM D-1557.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between 2 and 10 percent should be anticipated when excavating and recompacting the existing fill and underlying native geologic materials on the site to an average comparative compaction of 92 percent.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Abandoned Seepage Pits

No abandoned seepage pits were encountered during exploration and none are known to exist on the site. However, should such a structure be encountered during grading, options to permanently abandon seepage pits include complete removal and backfill of the excavation with compacted fill, or drilling out the loose materials and backfilling to within a few feet of grade with slurry, followed by a compacted fill cap.

If the subsurface structures are to be removed by grading, the entire structure should be demolished. The resulting void may be refilled with compacted soil. Concrete and brick generated during the seepage pit removal may be reused in the fill as long as all fragments are less than 6 inches in longest dimension and the debris comprises less than 15 percent of the fill by volume. All grading should comply with the recommendations of this report.

Where the seepage pit structure is to be left in place, the seepage pits should cleaned of all soil and debris. This may be accomplished by drilling. The pits should be filled with minimum 1-1/2 sack concrete slurry to within 5 feet of the bottom of the proposed foundations. In order to provide a more uniform foundation condition, the remainder of the void should be filled with controlled fill.

LEED Considerations

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System encouraged adoption of sustainable green building and development practices. Credit for LEED Certification can be assigned for reuse of construction waste and diversion of materials from landfills in new construction.

In an effort to provide the design team with a viable option in this regard, demolition debris could be crushed onsite in order to use it in the ongoing grading operations. The environmental ramifications of this option, if any, should be considered by the team.

The demolition debris should be limited to concrete, asphalt and other non-deleterious material. All deleterious materials should be removed including, but not limited to, paper, garbage, ceramic materials and wood.

For structural fill applications, the materials should be crushed to 2 inches in maximum dimension or smaller. The crushed materials should be thoroughly blended and mixed with onsite soils prior to placement as compacted fill. The amount of crushed material should not exceed 20 percent. The blended and mixed materials should be tested by this office prior to placement to insure it is suitable for compaction purposes. The blended and mixed materials should be tested by Geotechnologies, Inc. during placement to insure that it has been compacted in a suitable manner.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

FOUNDATION DESIGN

Conventional Foundation Design

The proposed structures may be supported on conventional foundations bearing in the newly placed compacted fill blanket. In addition, new footings may be necessary as part of the proposed renovation of the existing structures. Where new footings are needed, as determined by the project structural engineer, new footings may be deepened to bear into the underlying native soils. The deepened portions of the footings may be backfilled with a minimum of 3 sack slurry to the bottom of the proposed footing. The slurry is denser than the surrounding soils and will transfer the structural loads into the underlying native soils.

Continuous foundations may be designed for a bearing capacity of 2,000 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material.

Column foundations may be designed for a bearing capacity of 2,500 pounded per square foot, and should be a minimum of 24 inches in width, 18 inches in depth below the lowest adjacent grade, and 18 inches into the recommended bearing material.

The bearing capacity increase for each additional foot of width is 200 pounds per square foot. The bearing capacity increase for each additional foot of depth is 400 pounds per square foot. The maximum recommended bearing capacity is 5,000 pounds per square foot.

Miscellaneous Foundations

Foundations for small outlying structures, such as property line walls and trash enclosures, which will not be tied-in to the proposed building may be supported on conventional foundations bearing in native soils, and/or properly placed compacted fill. These footings may be designed for a bearing value of 1,500 pounds per square foot, and should be a minimum of 12 inches in width, 18 inches in depth below the lowest adjacent grade and 18 inches into the recommended bearing material. No bearing value increases are recommended.

Conventional Foundations General

A minimum factor of safety of 3 was utilized in determining the allowable bearing capacities. The bearing values indicated above are for the total of dead and frequently applied live loads, and may be increased by one third for short duration loading, which included the effects of wind or seismic forces.

Since the recommended bearing value is a net value, the weight of concrete in the foundations may be taken as 50 pounds per cubic foot and the weight of the soil backfill may be neglected when determining the downward load on the foundations.

All continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundations, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of the foundations and by passive earth pressure. An allowable coefficient of friction of 0.35 may be used with the dead load forces.

Passive earth pressure for the sides of foundations poured against undisturbed or recompacted soil may be computed as an equivalent fluid having a density of 200 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot. The passive and friction components may be combined for lateral resistance without reduction. A one-third increase in the passive value may be used for short duration loading such as wind or seismic forces.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. The maximum settlement is not expected to exceed 1 inch and would occur below the heaviest loaded elements. Differential settlement is not expected to exceed ½ inch.

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory earth materials, if necessary. Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Miscellaneous site retaining walls up to 6 feet may be required as part of the proposed development. Retaining walls supporting a level backslope may be designed utilizing a triangular distribution of pressure. Cantilever retaining walls may be designed for 30 pounds per cubic foot for walls retaining up to 6 feet of earth.

For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made. Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.

In addition to the recommended earth pressure, the upper ten feet of the retaining wall adjacent to street, driveways or parking areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal street traffic. If the traffic is kept back at least ten feet from the retaining walls, the traffic surcharge may be neglected.

The lateral earth pressures recommended above for retaining walls assume that a permanent drainage system will be installed so that external water pressure will not be developed against the walls. Also, where necessary, the retaining walls should be designed to accommodate any surcharge pressures that may be imposed by any adjacent buildings.

Dynamic (Seismic) Earth Pressure

Based on the 2016 California Building Code, retaining walls exceeding 6 feet in height shall be designed to resist the additional earth pressure caused by seismic ground shaking. Miscellaneous retaining walls anticipated for the proposed project are not expected to exceed 6 feet in height. Therefore the dynamic earth pressure may be omitted.

Waterproofing

Moisture effecting retaining walls is one of the most common post construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water inside the building. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

It is recommended that retaining walls be waterproofed. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Drainage

Retaining walls should be provided with a subdrain covered with a minimum of 12 inches of gravel, and a compacted fill blanket or other seal at the surface. The onsite earth materials are acceptable for use as retaining wall backfill as long as they are compacted to a minimum of 90 percent of the maximum density as determined by ASTM D 1557.

Certain types of subdrain pipe are not acceptable to the various municipal agencies. It is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Where retaining walls are to be constructed adjacent to property lines there is usually not enough space for emplacement of a standard pipe and gravel drainage system. Under these circumstances, the use of a flat-drainage product is acceptable.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 percent of the maximum density obtainable by the most recent revision of ASTM D 1557 method of compaction. Flooding should not be permitted. Compaction within 5 feet, measured horizontally, behind a retaining structure should be achieved by use of light weight, hand operated compaction equipment.

Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to the structure.

Sump Pump Design

The purpose of the recommended retaining wall backdrainage system is to relieve hydrostatic pressure. Groundwater was not encountered during exploration, conducted to a depth of 50 feet below existing grade. Based on the anticipated development to be constructed at/or near grade, it is the opinion of the firm that the groundwater level would not be expected to rise to the anticipated finished grade of the proposed structures level during the life of the structures. Therefore the only water which could affect the proposed retaining walls would be irrigation water and precipitation.

Based on these considerations the retaining wall backdrainage system is not expected to experience an appreciable flow of water, and in particular, no groundwater will affect it. However, for the purposes of design, a flow of 5 gallons per minute may be assumed.

TEMPORARY EXCAVATIONS

Excavations on the order of 5 feet in vertical height are anticipated for the recommended recompaction. The excavations are expected to expose fill and medium dense native soils, which are suitable for vertical excavation up to 5 feet where not surcharged by adjacent traffic of structures. Excavations which will be surcharged by adjacent traffic or structures should be shored or slot-cut.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 (h:v) slope gradient in their entirety, up to a maximum height of 10 feet. A uniform sloped excavation does not have a vertical component. Sloped excavations with vertical cuts at the toe of the slope are not recommended.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are suggested along the tops of the slopes where necessary to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Excavation Adjacent to Buildings or Property Lines

Where foundation excavations will leave an adjacent foundation of property line unsupported the proposed foundations may be slot cut a maximum vertical height of 6 feet. The slot cutting method employs the earth as a buttress and allows the earth excavation to proceed in phases. The "A-B-C" slot-cutting procedure should be utilized. The initial excavation consists of excavating the "A" slots. Alternate "A" slots of 8 feet may be worked. The remaining earth buttresses ("B" and "C" slots) should each be 8 feet in width for a combined intervening length of 16 feet. The backfill shall be properly placed or the foundation should be poured in the "A" slots before the

"B" slots are excavated. After completing the grading and/or foundation in the "B" slots, finally the "C" slots may be excavated.

The client and contractor should be aware that where slot cuts are utilized for construction of new foundations, continuous construction of the proposed foundations will not be possible.

Excavation Observations

It is critical that the soils exposed in the cut slopes are observed by a representative of this office during excavation so that modifications of the slopes can be made if variations in the earth material conditions occur. Many building officials require that temporary excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

SLABS ON GRADE

Concrete Slabs-on-Grade

Concrete floor slabs should be a minimum of 4 inches of thickness. Slabs-on-grade should be cast over properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent relative compaction.

Outdoor concrete flatwork should be a minimum of 4 inches in thickness. Outdoor concrete flatwork should be cast over undisturbed native alluvial soils or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent relative compaction.

Design Of Slabs That Receive Moisture-Sensitive Floor Coverings

Geotechnologies, Inc. does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore it is recommended that a qualified consultant be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor transmission on various components of the structure.

Where dampness would be objectionable, it is recommended that the floor slabs should be waterproofed. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection from unwanted moisture.

All concrete slabs-on-grade should be supported on vapor retarder. The design of the slab and the installation of the vapor retarder should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder should comply with ASTM E 1745 Class A requirements.

Where a vapor retarder is used, a low-slump concrete should be used to minimize possible curling of the slabs. The barrier can be covered with a layer of trimable, compactible, granular fill, where it is thought to be beneficial. See ACI 302.2R-32, Chapter 7 for information on the placement of vapor retarders and the use of a fill layer.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

For standard crack control maximum expansion joint spacing 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork (such as walkways or patio areas) and concrete pavement, is not required. However, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to at least 90 percent relative compaction.

Slab Reinforcing

Concrete slabs-on-grade and outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

PAVEMENTS

Prior to placing paving, the exposed grade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 95 percent of the maximum density as determined by the most recent revision of ASTM D 1557. The client should be aware that removal of all existing fill in the area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. The following pavement section are recommended:

Service	Asphalt Pavement Thickness Inches	Base Course Inches
Passenger Car Traffic	3	4
Medium Truck Traffic	4	6
Heavy Truck Traffic	5	8

Concrete paving may also be utilized for the project. For concrete paving, the following sections are recommended:

Service	Concrete Pavement Thickness Inches	Base Course Inches
Passenger Car Traffic	6	4
Medium Truck Traffic	6	4
Heavy Truck Traffic	7.5	6

Aggregate base should be compacted to a minimum of 95 percent of the most recent revision of ASTM D 1557 laboratory maximum dry density. Base materials should conform to Sections 200-2.2 or 200-2.4 of the "Standard Specifications for Public Works Construction", (Green Book), latest edition.

For standard control of concrete cracking, a maximum crack control joint spacing of 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer. Concrete paving should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. If planter islands are planned, the perimeter curb should extend a minimum of 12 inches below the bottom of the aggregate base.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage, with the exception of any required to dispose of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices. The proposed structures should be provided with roof drainage. Discharge from downspouts, roof drains and scupper should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

STORMWATER DISPOSAL

Introduction

Regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. This requirement is not prudent engineering practice. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

Percolation Testing

In order to establish an infiltration rate for the site soils, shallow percolation testing was conducted in Test Pit 1, and deep percolation testing was conducted in Boring 4. The location of these excavations are shown on the enclosed Plot Plan.

Shallow Percolation Testing

Test Pit 1 was initially excavated to a depth of 5 feet, and then a one cubic foot of soil was removed from the bottom of the test pit for percolation testing. Percolation testing was conducted following the excavation percolation test procedure provided in the Guidelines for Design, Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.2), dated June 30, 2017, presented in the Administrative Manual for the County of Los Angeles, Department of Public Works, Geotechnical and Material Engineering Division.

The test pit was presoaked for a minimum of 4 hours prior to the test. After the presoak, the test pit was refilled with water and the absorption of the soils was measured. The percolation test readings were recorded a minimum of 8 times, or until a stabilized rate of drop was obtained, whichever occurred first.

After a representative percolation rate was obtained from the testing, the Reduction Factor (R_f) required by the County of Los Angeles procedure to account for non-vertical flow was applied to obtain an infiltration rate. Based on the percolation testing and analysis, an infiltration rate of 1.1

inches per hour may be utilized for the design of shallow infiltration systems. No other factors of safety or correction factors have been applied to this rate. The Civil Engineer must determine and apply any additional factors of safety, or correction factors, required for the design.

Deep Percolation Testing

Boring 4 was drilled to a depth of 20 feet below the existing grade, and was utilized to conduct deep percolation testing. At the completion of drilling of the boring, a 2-inch diameter casing was placed within the center of the borehole for the purpose of conducting percolation testing. The casing consisted of a slotted PVC pipe within the lower 10 feet of the borehole, and solid PVC pipe to the top of the borehole. A sand pack consisting of #3 Monterey Sand was poured into the annular space around the slotted portion of the casing. A 1-foot thick, hydrated bentonite seal was placed over the sand and drill cuttings were placed to the ground surface.

Percolation testing was conducted following the test procedure for boring percolation provided in the Guidelines for Design, Investigation and Reporting Low Impact Development Stormwater Infiltration (GS200.2), dated June 30, 2017, presented in the Administrative Manual for the County of Los Angeles, Department of Public Works, Geotechnical and Material Engineering Division.

Prior to testing, the borehole was filled with water for the purpose of pre-soaking for 4 hours. After presoaking, the borehole was refilled with water, and the rate of drop in the water level was measured. The percolation test readings were recorded a minimum of 8 times or until a stabilized rate of drop was obtained, whichever occurred first.

The table below summarized the results of the infiltration rate derived from the testing. The infiltration rate provided below included a Reduction Factor (R_f), as required by the County of Los Angeles procedure to account for non-vertical flow. No other factors of safety or correction factors have been applied to these rates. The Civil Engineer must determine and apply any additional factors of safety, or correction factors, required for the design.

Percolation Testing Boring No.	Depth of Boring Below Existing Ground Surface (ft.)	Percolation Testing Conducted Between Depths:	Infiltration Rate (in./hr.)
B4	20	10' and 20'	0.58

At the completion of the percolation testing, the PVC casing was completely removed from the testing well, and the resulting hole was backfilled with on-site soils to the ground surface.

Recommendations

This site soils are considered suitable for stormwater infiltration. Stormwater infiltration shall only occur on undisturbed native soils, and shall not be allowed within the fill materials.

The design and location of the proposed infiltration systems has not been finalized. It is anticipated that it will consist of a combination of shallow infiltration systems and deep drywells. The final location and design of the proposed infiltration systems shall be reviewed and approved by this office prior to construction.

Any proposed infiltration system shall be located outside the proposed structures. The edge of any proposed infiltration system shall maintain a minimum horizontal setback distance of 10 feet away from any at-grade structure and private property line, and a minimum horizontal setback of 20 feet away from any new or existing below-grade retaining wall.

For any proposed infiltration drywell systems, stormwater infiltration should only occur at or deeper than 10 feet below the grade observed at the drywell location. It is anticipated that a settling chamber would be installed in the upper portion of the drywell. The seams and bottom of the settling chamber should be adequately sealed to prevent infiltration within 10 feet from the existing grade.

Stormwater infiltration is not allowed within 10 feet (vertically) from the groundwater level. Groundwater was not encountered during exploration, conducted to a maximum depth of 50 feet below the existing grade. As explained in the "Groundwater" Section of this report, the historically highest groundwater levels published by the State of California are not well defined in the vicinity of the site. However, review of the logs from a Los Angeles Department of Public Works groundwater monitoring well, located less than 100 feet to the east of the subject site, indicates that between 1958 and 2008 the highest groundwater level measure in this well was approximately 46.3 feet below existing grade (or approximate elevation 18.7 feet). Based on these considerations, it is the recommendation of this firm that the bottom of any proposed infiltration drywell does not extend below a depth of 35 feet below the existing site grade.

The proposed infiltration systems should be provided with overflow protection. Once the device is full of water, additional water flowing to the device should be diverted to another acceptable disposal area, or disposed offsite in an acceptable manner.

Based on the granular nature of the underlying native soils, the stormwater should percolate in a generally vertical manner. The potential for creating a perched water condition is considered to be remote. It is the opinion of this firm that, if the recommendations provided herein are followed, the proposed stormwater infiltration systems should not cause any damage, settlement, or adversely affect any buildings located on or off-site.

The proposed stormwater infiltration systems will not be located in a hillside area. The onsite soils are in the very low expansion range, and are not susceptible to significant hydroconsolidation.

The design and construction of stormwater infiltration facilities is not the responsibility of the geotechnical engineer. However, based on the experience of this firm, it is recommended that several aspects of the use of such facilities should be considered by the design and construction team:

- Open infiltration basins have many negative associated issues. Such a design must consider attractive nuisance, impacts to growing vegetation, impacts to air quality and vector control.
- All infiltration devices should be provided with overflow protection. Once the device is full of water, additional water flowing to the device should be diverted to another acceptable disposal area, or disposed offsite in an acceptable manner.
- All connections associated with stormwater infiltration devices should be sealed and water-tight. Water leaking into the subgrade soils can lead to loss of strength, piping, erosion, settlement and/or expansion of the effected earth materials.
- Excavations proposed for the installation of stormwater facilities should comply with the "Temporary Excavations" section of this report, as well as CalOSHA Regulations where applicable.
- Caving should be expected during drilling of the drywells. Where caving occurs, it will be necessary to utilized casing to maintain an open shaft.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein are satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. Therefore, it is critical that the geotechnical aspects of the project be reviewed by this firm during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify this office immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The scope of the geotechnical services provided did not include any environmental site assessment for the presence or absence of organic substances, hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification System. The field classification is verified in the laboratory, also in accordance with the Unified Soil Classification System.

Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the boring log.

Samples of the earth materials encountered in the borings were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Unless noted on the boring logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound automatic trip hammer. The soil is retained in brass rings of 2.50 inches inside diameter and 1.00 inches in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples noted on the boring logs as SPT samples are obtained in accordance with ASTM D 1586 utilizing an automatic hammer. Samples are retained for 30 days after the date of the geotechnical report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples by ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the "Excavation Logs", A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed by ASTM D 3080 with a strain controlled, direct shear machine manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagram," B-Plates.

The most recent revision of ASTM 3080 limits the particle size to 10 percent of the diameter of the direct shear test specimen. The sheared sample is inspected by the laboratory technician running the test. The inspection is performed by splitting the sample along the sheared plane and observing the soils exposed on both sides. Where oversize particles are observed in the shear plane, the results are discarded and the test run again with a fresh sample.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests using the most recent revision of ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the most recent revision of ASTM D4829. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hours or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height, and multiplied by 1,000. Results are presented in Plate D of this report.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined by use of the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into a mold of given dimensions, with each layer compacted by 25 blows of a 10 pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted represent a curvilinear relationship known as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve. Results are presented in Plate D of this report.

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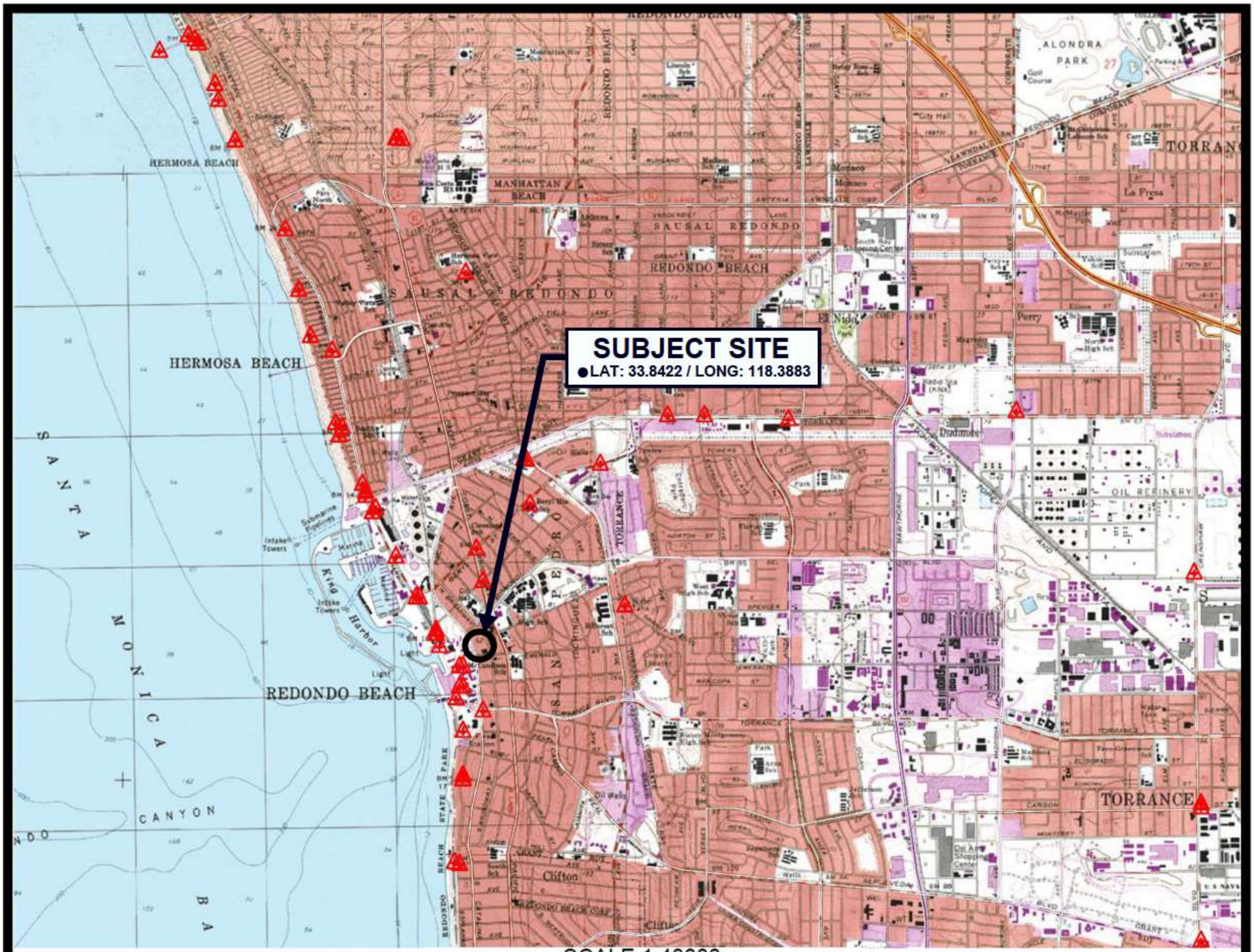


SCALE 1:48000

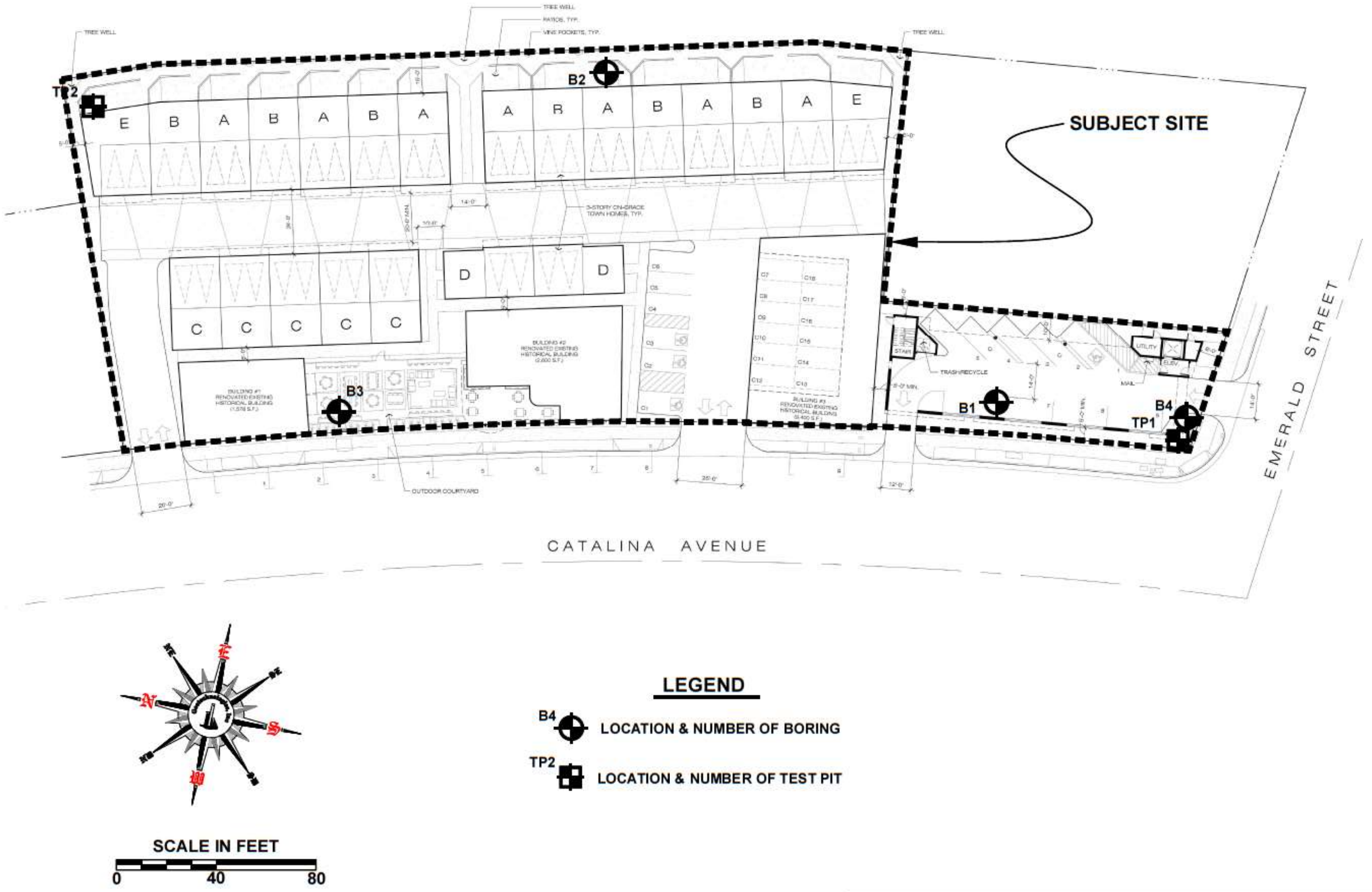
REFERENCE: **U.S.G.S. TOPOGRAPHIC MAPS, 7.5 MINUTE SERIES,**
TORRANCE, CA QUADRANGLE

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759

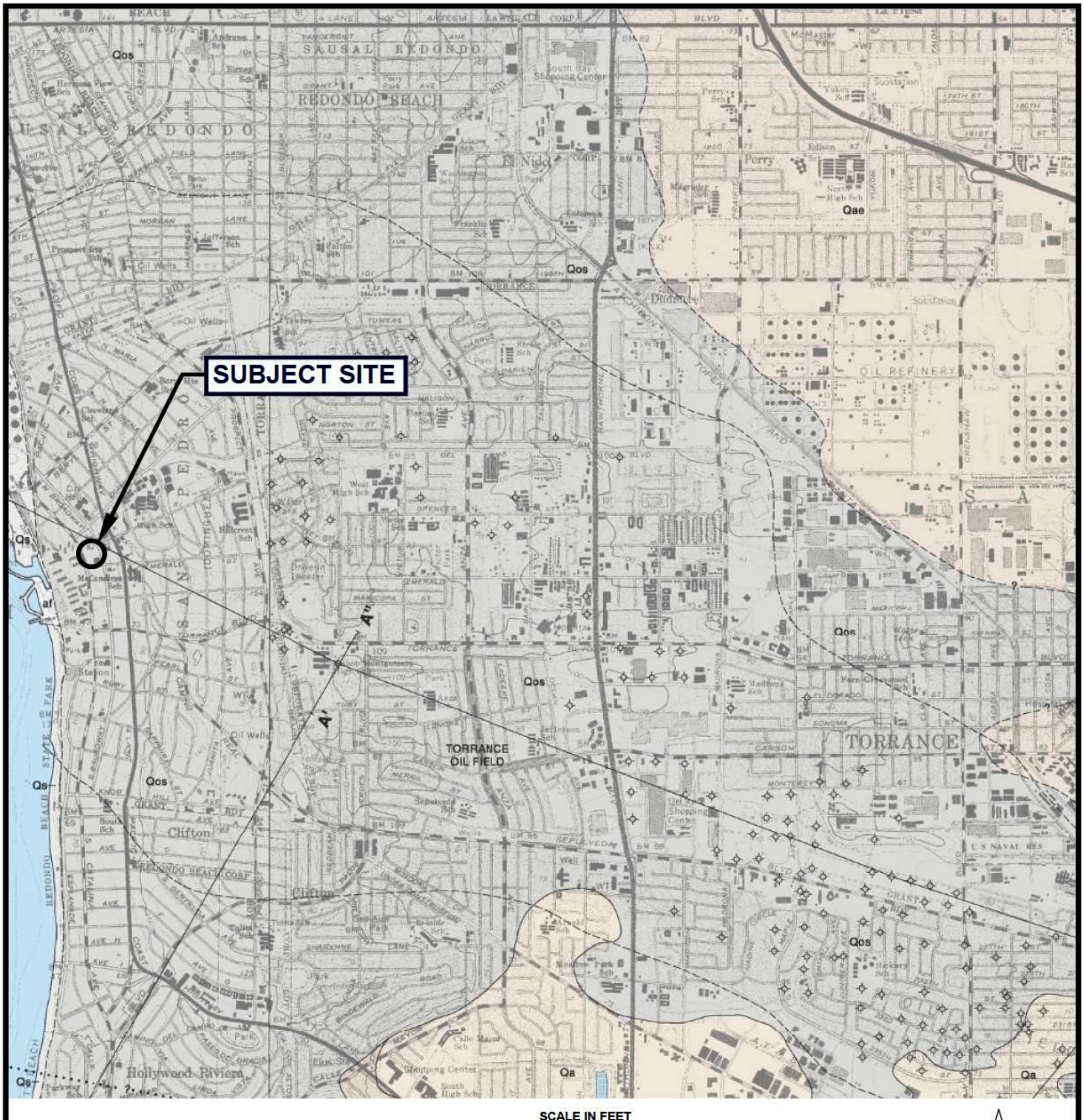


REFERENCE: BUILDING PLAN PROVIDED BY WITHEE ARCHITECTS
DATED: 12/19/2018

Geotechnologies, Inc.
Consulting Geotechnical Engineers

PLOT PLAN

CATALINA FUND, LLC.
File No.: 21759
Date: March '19



LEGEND

af: Artificial fill or cut and fill
Qa: Alluvium - gravel, sand and clay
Qae: Alluvium - similar to Qa but slightly elevated and locally dissected
Qos: Older, stabilized dune and drift sand
Qs: Beach sediments, ranging from sand to cobble-boulder gravel

REFERENCE: DIBBLEE, T.W., (1992) GEOLOGIC MAP OF THE REDONDO BEACH, TORRANCE, AND SAN PEDRO QUADRANGLES (#DF-70)

LOCAL GEOLOGIC MAP - DIBBLEE

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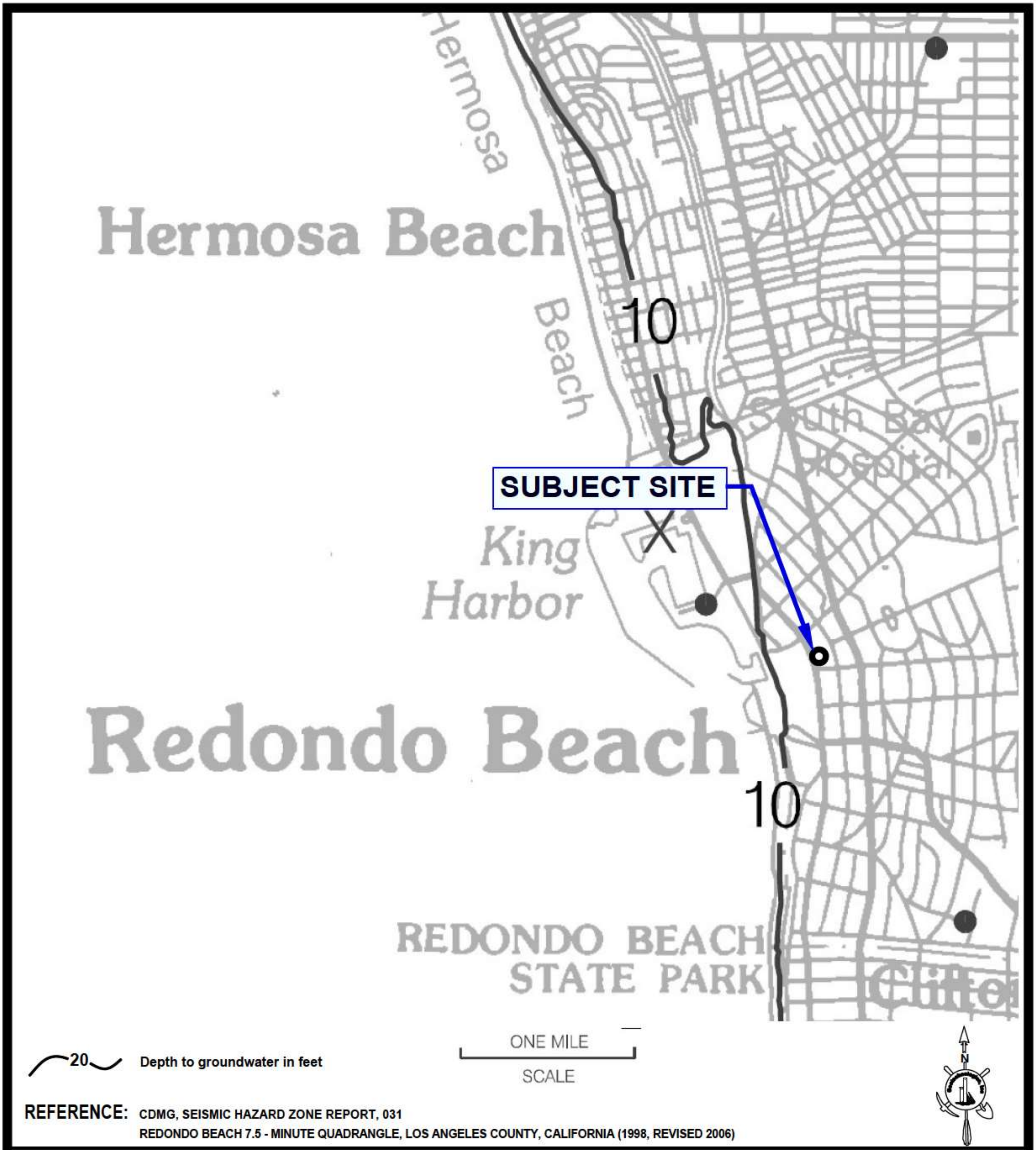
FILE NO. 21759



REFERENCE: CDMG, SEISMIC HAZARD ZONE REPORT, 031
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HISTORICALLY HIGHEST GROUNDWATER LEVELS

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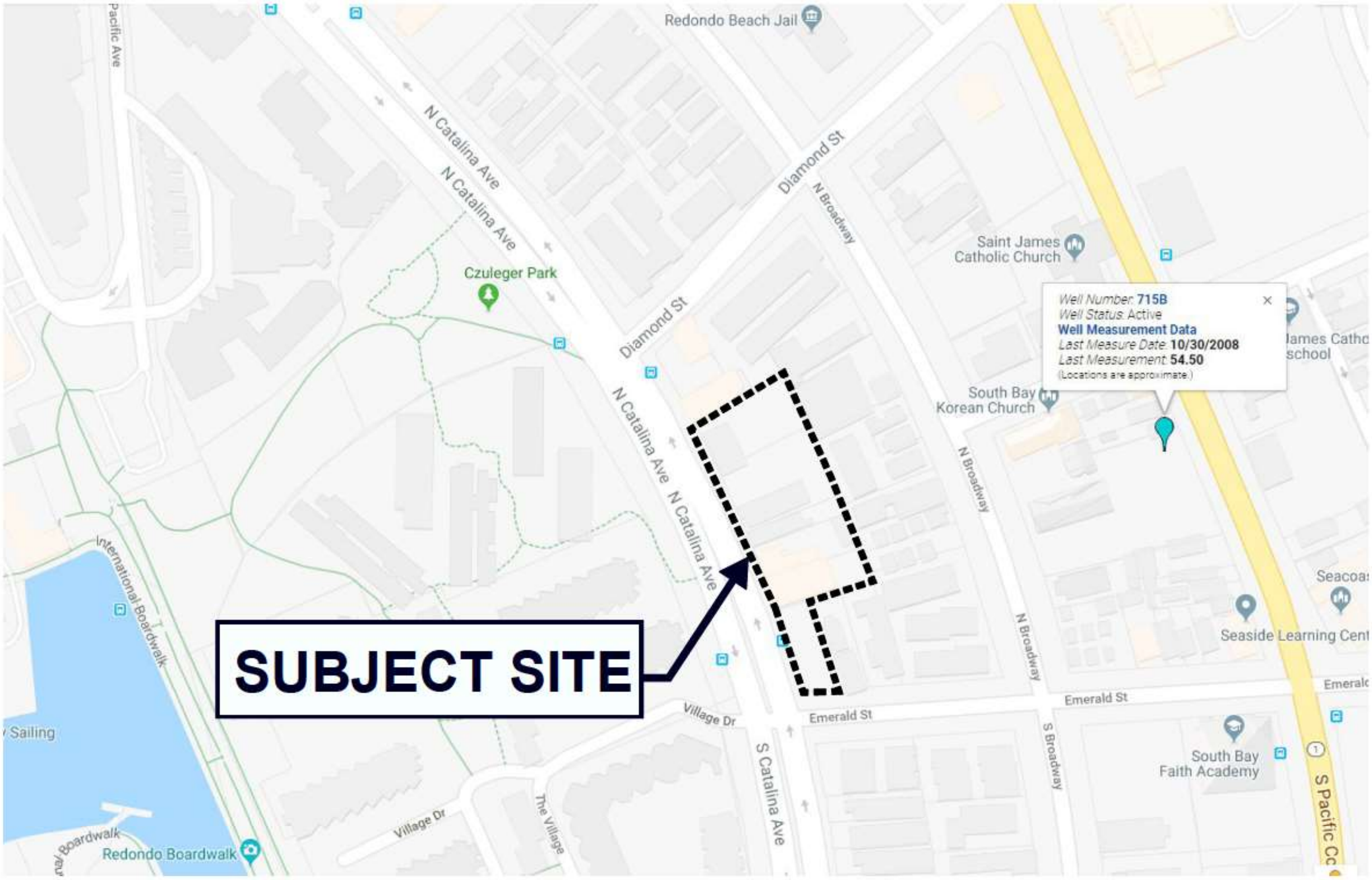
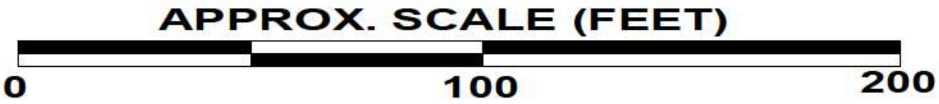
FILE No. 21759





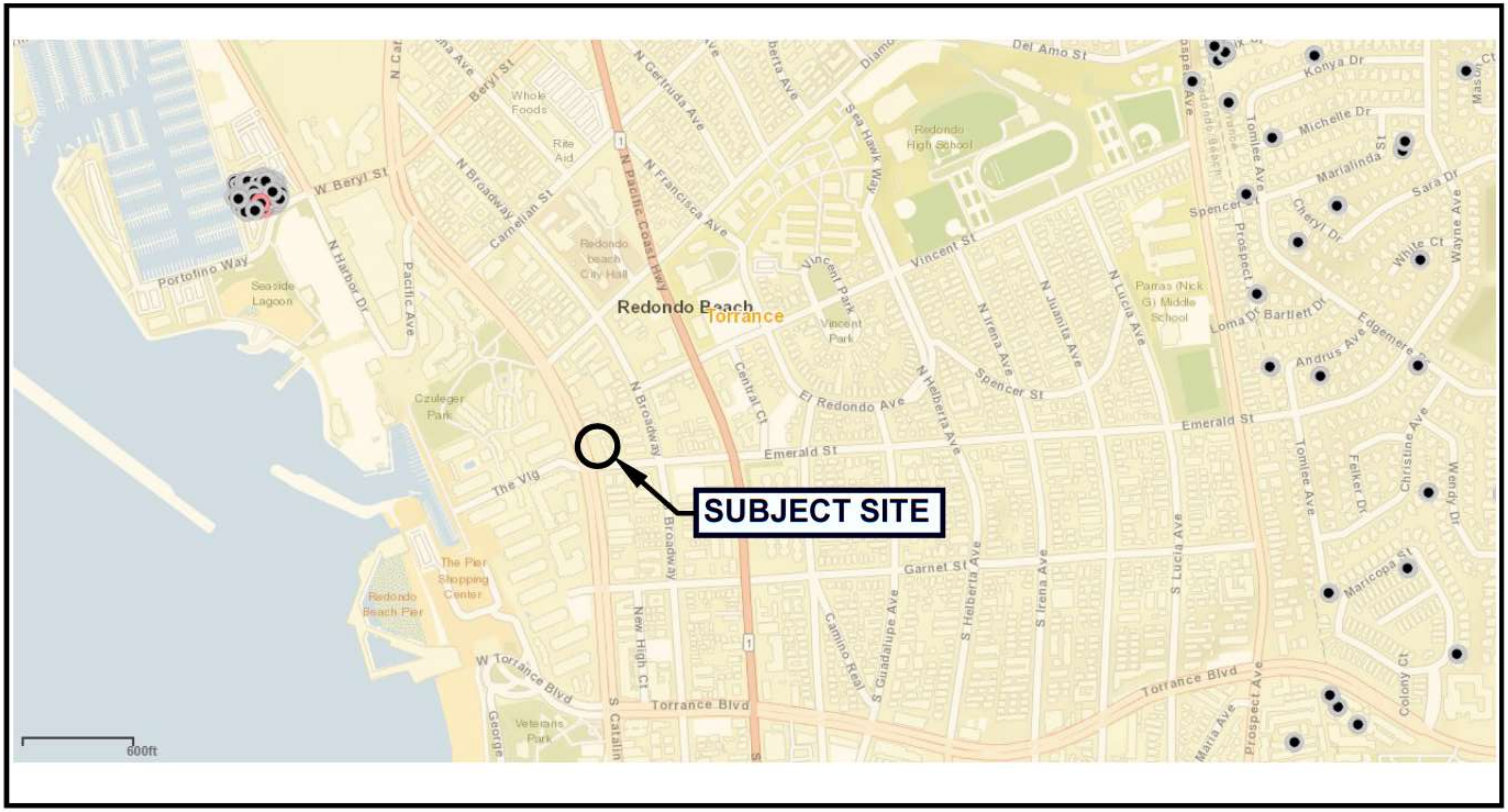
REFERENCE: LOS ANGELES DEPARTMENT OF PUBLIC WORKS WEBSITE
http://www.ladpw.org/wrd/wellInfo/well.cfm

WATER WELL LOCATION MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759



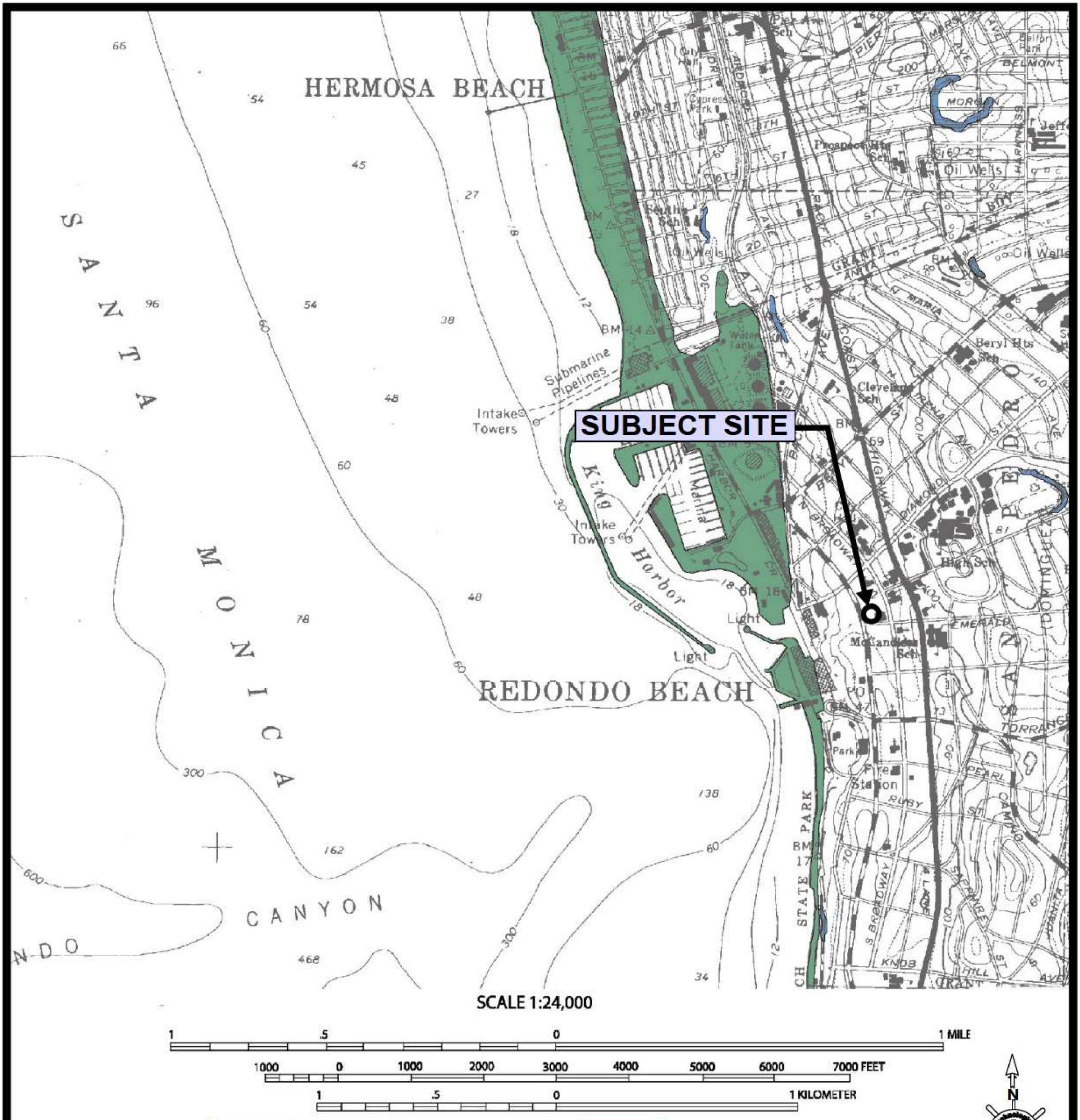
REFERENCE: DIVISION OF OIL, GAS & GEOTHERMAL RESOURCES WELL FINDER, STATE OF CALIFORNIA, 2018

OIL WELL LOCATION MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759



🟩 LIQUEFACTION AREA

🟦 EARTHQUAKE-INDUCED LANDSLIDES

REFERENCE: **SEISMIC HAZARD ZONES, REDONDO BEACH QUADRANGLE OFFICIAL MAP (CDMG, 1999)**

SEISMIC HAZARD ZONE MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC.

FILE NO. 21759

BORING LOG NUMBER 1

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt
				0 --		3-inch Asphalt over 2-inch Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	29	4.6	121.5	-		
				3 --		
				-	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, slightly moist, medium dense, fine grained
				4 --		
				-		
5	70	3.7	126.9	5 --		
				-		dense
				6 --		
				-		
				7 --		
7.5	59	2.4	116.9	-		
				8 --	SP	Sand, dark brown, slightly moist, dense, fine grained
				-		
				9 --		
				-		
10	50	2.6	111.5	10 --		
				-		
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	67	3.5	108.9	15 --		
				-		dark and yellowish brown, fine to medium grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		fine grained
20	72	3.0	105.9	20 --		
				-		Total Depth 20 feet No Water Fill to 3 feet
				21 --		
				-		
				22 --		
				-		
				23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				24 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				25 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted

BORING LOG NUMBER 2

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		3-inch Asphalt, No Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	7	8.7	116.9	-		
				3 --		
				-	SM/SP	NATIVE SOILS: Silty Sand, dark brown, moist, medium dense, fine grained
				4 --		
				-		
5	10	8.3	SPT	5 --		
				-	SP	Sand, dark brown, moist, medium dense, fine grained
				6 --		
				-		
				7 --		
7.5	18	12.6	117.0	-		
				8 --		very moist
				-		
				9 --		
				-		
10	18	6.7	SPT	10 --		
				-		moist
				11 --		
				-		
				12 --		
12.5	59	6.6	117.3	-		
				13 --		fine to medium grained
				-		
				14 --		
				-		
15	28	6.3	SPT	15 --		
				-		fine grained
				16 --		
				-		
				17 --		
17.5	84	6.3	115.0	-		
				18 --		dense to very dense
				-		
				19 --		
				-		
20	38	4.2	SPT	20 --		
				-		slightly moist, medium dense to dense, fine to medium grained
				21 --		
				-		
				22 --		
22.5	25 50/5"	4.7	111.6	-		
				23 --		very dense
				-		
				24 --		
				-		
25	37	4.3	SPT	25 --		
				-		medium dense to dense

BORING LOG NUMBER 2

Catalina Fund, LLC

File No. 21759

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				26		
				27		
27.5	37 50/4"	4.4	110.3			
				28		Sand, dark and yellowish brown, slightly moist, very dense, fine grained
				29		
30	54 50/4"	7.5	SPT	30		moist, fine to medium grained
				31		
				32		
32.5	100/9"	4.8	110.5			
				33		slightly moist, fine grained
				34		
35	93	4.5	SPT	35		
				36		
				37		
37.5	45 50/3"	3.1	107.2			
				38		fine to medium grained
				39		
40	70	4.2	SPT	40		
				41		
				42		
42.5	46 50/3"	4.9	106.4			
				43		
				44		
45	73	10.4	SPT	45		moist
				46		
				47		
47.5	49 50/4"	5.2	106.4			
				48		slightly moist
				49		
50	85	3.5	SPT	50		
						Total Depth 50 feet No Water Fill to 3 feet

NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.

Used 8-inch diameter Hollow-Stem Auger
140-lb. Automatic Hammer, 30-inch drop
Modified California Sampler used unless otherwise noted
SPT=Standard Penetration Test

BORING LOG NUMBER 3

Catalina Fund, LLC **Date: 02/25/19**

File No. 21759 **Method: 8-inch diameter Hollow Stem Auger**

km

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Parking
				0 --		8-inch Asphalt, No Base
				-		
				1 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
				-		
				2 --		
2.5	27	7.6	128.9	-		
				3 --		
				-	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				4 --		
				-		
5	24	7.8	115.7	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	37	3.0	107.3	-		
				8 --	SP	Sand, dark and yellowish brown, slightly moist, medium dense, fine grained
				-		
				9 --		
				-		
10	47	2.8	109.0	10 --		
				-		medium dense to dense
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
15	71	2.9	110.3	15 --		
				-		dark brown, dense, fine to medium grained
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
20	83	3.2	109.3	20 --		
				-		Total Depth 20 feet No Water Fill to 3 feet
				21 --		
				-		
				22 --		
				-		
				23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				24 --		
				-		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted
				25 --		
				-		

BORING LOG NUMBER 4

Catalina Fund, LLC **Date: 02/26/19**

File No. 21759 **Method: 4-inch diameter Hand Auger**

km

Sample Depth ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
1	6.0	122.1	1		
			2		
3	6.5	118.6	3	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
			4		
5	5.6	118.1	5		
			6	SP	Sand, dark and yellowish brown, slightly moist, medium dense, fine grained
7	3.6	114.5	7		
			8		
			9		
10	2.2	114.3	10		yellowish brown
			11		
			12		
			13		
			14		
15	2.0	108.6	15		dark and yellowish brown, dense, fine to medium grained
			16		
			17		
			18		
			19		
20	1.9	109.3	20		
			21		Total Depth 20 feet No Water Fill to 2 feet
			22		
			23		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			24		
			25		Used 4-inch diameter Hand Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted

LOG OF TEST PIT NUMBER 1

Catalina Fund, LLC **Drilling Date: 02/26/19**

File No. 21759 **Method: Hand Dug Test Pit**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
			0 --		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			-		
			1 --		
			-		
			2 --		
			-	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
			3 --		
			-		
			4 --		
			-		
			5 --		- - - - - - - - - - - - - -
			-		dark and medium brown
			6 --		
			-		Total Depth 6 feet
			7 --		No Water
			-		Fill to 2 feet
			8 --		
			-		
			9 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			-		
			10 --		
			-		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			11 --		
			-		
			12 --		
			-		
			13 --		
			-		
			14 --		
			-		
			15 --		
			-		
			16 --		
			-		
			17 --		
			-		
			18 --		
			-		
			19 --		
			-		
			20 --		
			-		
			21 --		
			-		
			22 --		
			-		
			23 --		
			-		
			24 --		
			-		
			25 --		
			-		

LOG OF TEST PIT NUMBER 2

Catalina Fund, LLC **Drilling Date: 02/26/19**

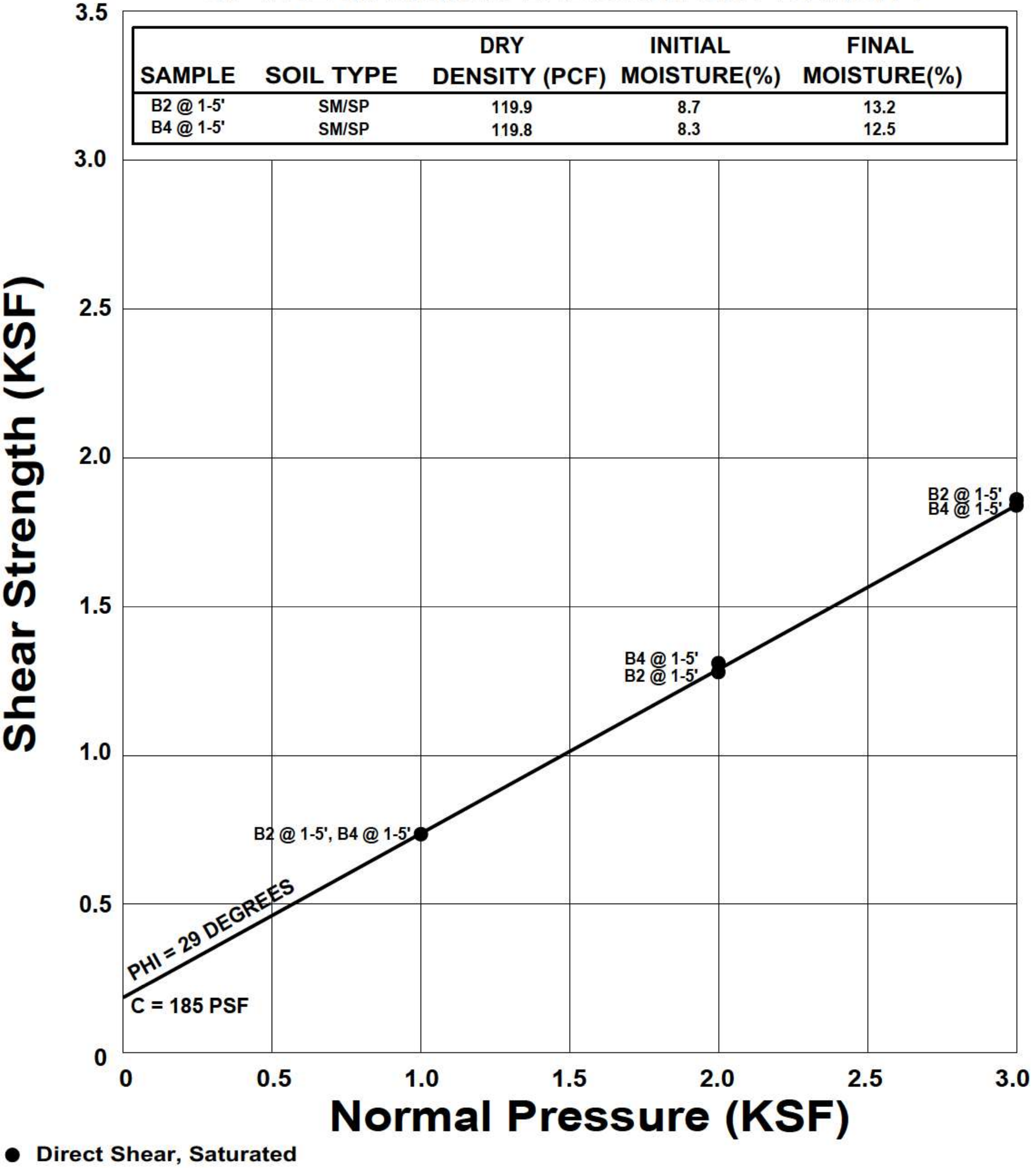
File No. 21759 **Method: Hand Dug Test Pit**

km

Sample Depth ft.	Moisture Content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Bare Ground
			0		FILL: Silty Sand, dark brown, moist, medium dense, fine grained
			1		
2	7.9	120.4	2	SM/SP	NATIVE SOILS: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
			3		
4	8.3	118.3	4	SP	Sand, dark and medium brown, moist, medium dense, fine grained
			5		
			6		
7	9.1	121.2	7		dark brown
			8		
			9		
10	7.8	88.2	10		yellowish brown, medium dense to dense
			11		
			12		
			13		
			14		
15	3.9	110.9	15		slightly moist, fine to medium grained
			16		
			17		
			18		
			19		
20	3.5	102.4	20		
			21		Total Depth 20 feet No Water Fill to 1½ feet
			22		
			23		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
			24		Used 4-inch diameter Hand-Augering Equipment; Hand Sampler
			25		

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 1-5'	SM/SP	119.9	8.7	13.2
B4 @ 1-5'	SM/SP	119.8	8.3	12.5



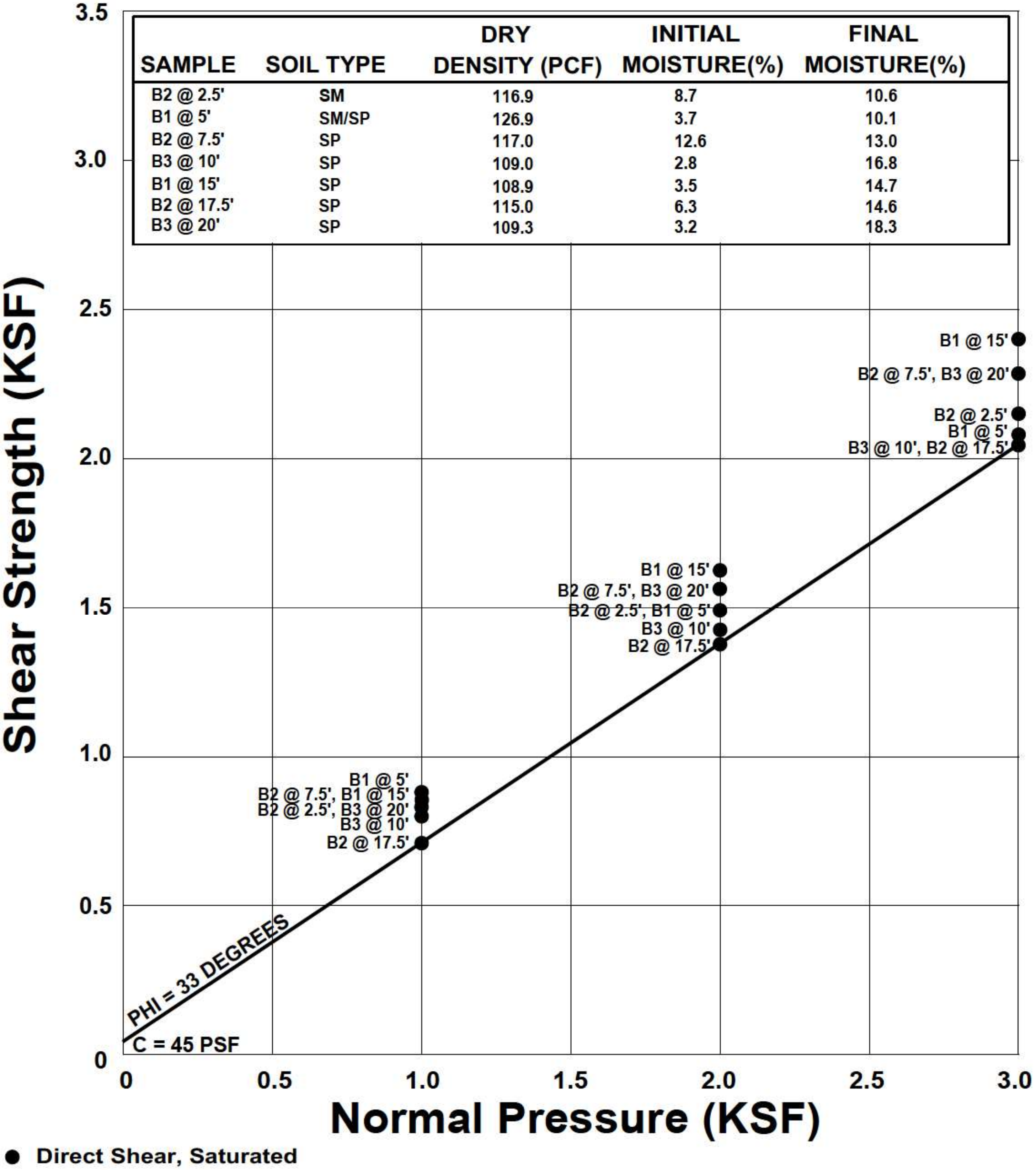
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: B-1



SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE(%)	FINAL MOISTURE(%)
B2 @ 2.5'	SM	116.9	8.7	10.6
B1 @ 5'	SM/SP	126.9	3.7	10.1
B2 @ 7.5'	SP	117.0	12.6	13.0
B3 @ 10'	SP	109.0	2.8	16.8
B1 @ 15'	SP	108.9	3.5	14.7
B2 @ 17.5'	SP	115.0	6.3	14.6
B3 @ 20'	SP	109.3	3.2	18.3

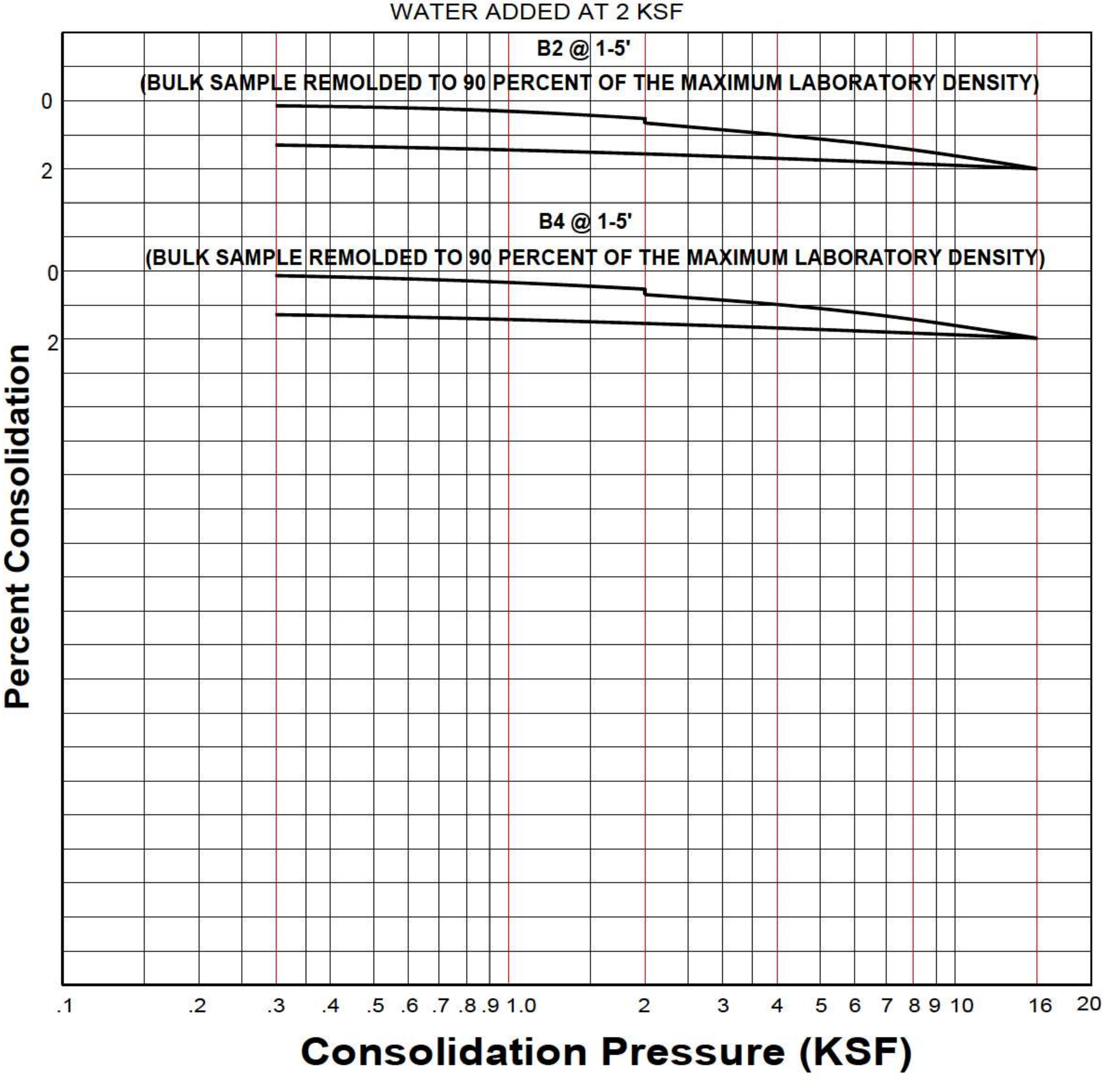
SHEAR TEST DIAGRAM

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: B-2



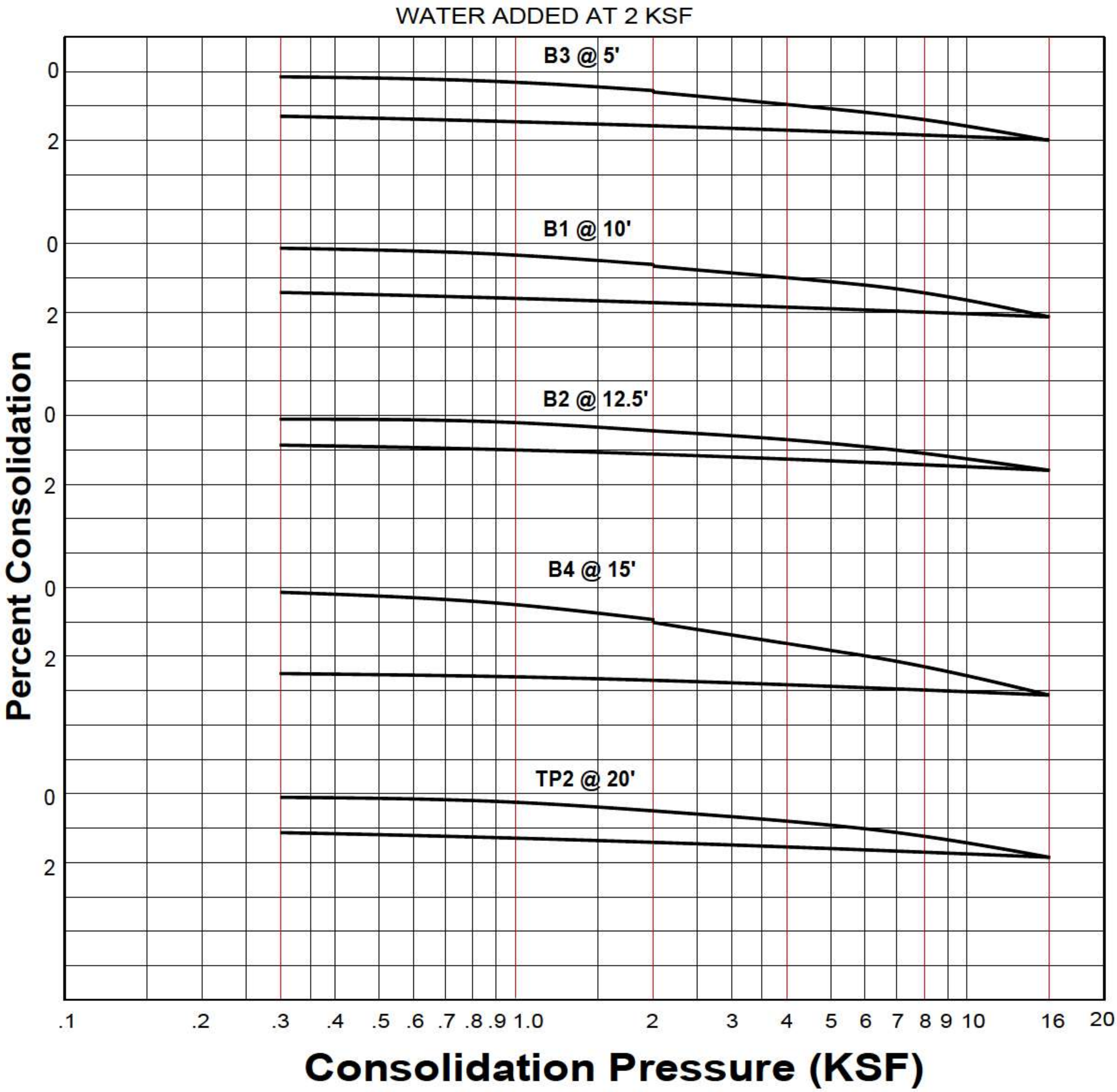
CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: C-1



CONSOLIDATION TEST

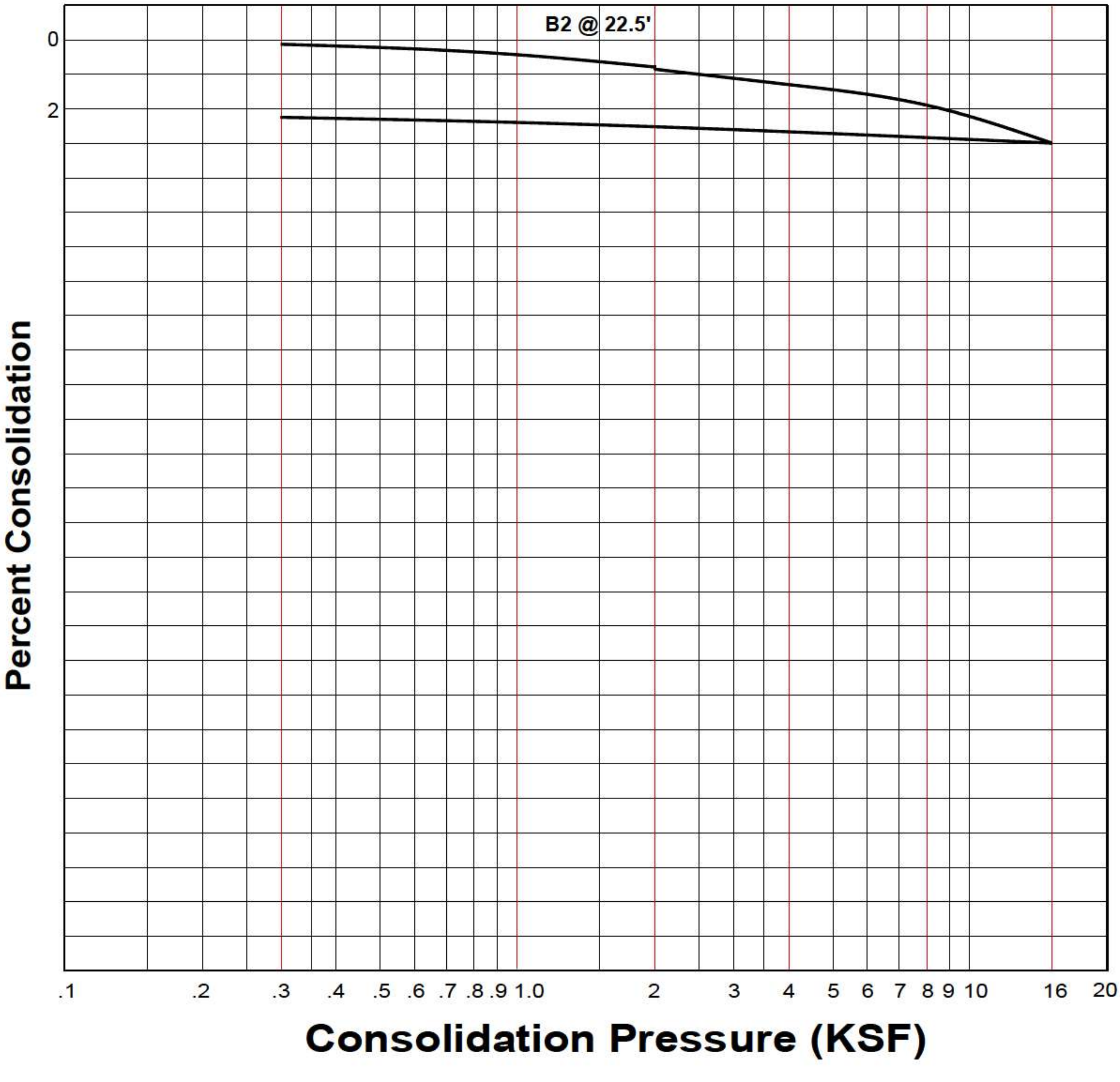
Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: C-2

WATER ADDED AT 2 KSF



CONSOLIDATION TEST

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC	
FILE NO. 21759	**PLATE: C-3**

ASTM D-1557

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SOIL TYPE:	SM/SP	SM/SP
MAXIMUM DENSITY pcf.	133.2	133.1
OPTIMUM MOISTURE %	8.7	8.3

ASTM D 4829

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SOIL TYPE:	SM/SP	SM/SP
EXPANSION INDEX UBC STANDARD 18-2	2	3
EXPANSION CHARACTER	VERY LOW	VERY LOW

SULFATE CONTENT

SAMPLE	B2 @ 1-5'	B4 @ 1-5'
SULFATE CONTENT: (percentage by weight)	< 0.10%	< 0.10%

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

CATALINA FUND, LLC

FILE NO. 21759

PLATE: D

Geotechnologies, Inc.

Project: Catalina Fund, LLC
File No.: 21759
Description: Liquefaction Analysis
Boring Numbe 2

LIQUEFACTION EVALUATION (Idriss & Boulanger, EERI NO 12)

EARTHQUAKE INFORMATION:

Earthquake Magnitude (M):	7.0
Peak Ground Horizontal Acceleration, PGA (g):	0.64
Calculated Mag.Wtg.Factor:	1.156
GROUNDWATER INFORMATION:	
Current Groundwater Level (ft):	51.0
Historically Highest Groundwater Level* (ft):	10.0
Unit Weight of Water (pcf):	62.4

* Based on California Geological Survey Seismic Hazard Evaluation Report

BOREHOLE AND SAMPLER INFORMATION:

Borehole Diameter (inches):	8
SPT Sampler with room for Liner (Y/N):	Y
LIQUEFACTION BOUNDARY:	
Plastic Index Cut Off (PI):	18
Minimum Liquefaction FS:	1.3

Depth to Base Layer (feet)	Total Unit Weight (pcf)	Current Water Level (feet)	Historical Water Level (feet)	Field SPT Blowcount N	Depth of SPT Blowcount (feet)	Fines Content #200 Sieve (%)	Plastic Index (PI)	Vetical Stress σ_{vc} (psf)	Effective Vert. Stress σ_{vc}', (psf)	Fines Corrected $(N_1)_{60-cs}$	Stress Reduction Coeff, r_d	Cyclic Shear Ratio CSR	Cyclic Resistance Ratio (CRR)	Factor of Safety CRR/CSR (F.S.)	Liquefaction Settlment ΔS_i (inches)
1	127.0	Unsaturated	Unsaturated	10	5	0.0	0	127.0	127.0	21.7	1.00	0.420	0.290	Non-Liq.	0.00
2	127.0	Unsaturated	Unsaturated	10	5	0.0	0	254.0	254.0	21.7	1.00	0.418	0.290	Non-Liq.	0.00
3	127.0	Unsaturated	Unsaturated	10	5	0.0	0	381.0	381.0	21.7	1.00	0.417	0.290	Non-Liq.	0.00
4	127.0	Unsaturated	Unsaturated	10	5	0.0	0	508.0	508.0	21.7	0.99	0.416	0.290	Non-Liq.	0.00
5	127.0	Unsaturated	Unsaturated	10	5	0.0	0	635.0	635.0	23.4	0.99	0.414	0.326	Non-Liq.	0.00
6	127.0	Unsaturated	Unsaturated	10	5	0.0	0	762.0	762.0	22.9	0.99	0.413	0.314	Non-Liq.	0.00
7	127.0	Unsaturated	Unsaturated	10	5	0.0	0	889.0	889.0	21.0	0.98	0.411	0.278	Non-Liq.	0.00
8	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1020.7	1020.7	35.3	0.98	0.410	1.513	Non-Liq.	0.00
9	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1152.4	1152.4	35.6	0.98	0.408	1.600	Non-Liq.	0.00
10	131.7	Unsaturated	Unsaturated	18	10	0.0	0	1284.1	1284.1	33.8	0.97	0.407	1.123	Non-Liq.	0.00
11	131.7	Unsaturated	Saturated	18	10	0.0	0	1415.8	1353.4	33.0	0.97	0.424	0.969	2.3	0.00
12	131.7	Unsaturated	Saturated	18	10	0.0	0	1547.5	1422.7	32.3	0.96	0.439	0.846	1.9	0.00
13	125.0	Unsaturated	Saturated	18	10	0.0	0	1672.5	1485.3	31.6	0.96	0.452	0.757	1.7	0.00
14	125.0	Unsaturated	Saturated	18	10	0.0	0	1797.5	1547.9	31.0	0.96	0.464	0.686	1.5	0.00
15	125.0	Unsaturated	Saturated	28	15	0.0	0	1922.5	1610.5	53.4	0.95	0.475	2.000	4.2	0.00
16	125.0	Unsaturated	Saturated	28	15	0.0	0	2047.5	1673.1	52.8	0.95	0.484	2.000	4.1	0.00
17	125.0	Unsaturated	Saturated	28	15	0.0	0	2172.5	1735.7	52.3	0.94	0.493	2.000	4.1	0.00
18	122.2	Unsaturated	Saturated	28	15	0.0	0	2294.7	1795.5	51.9	0.94	0.501	2.000	4.0	0.00
19	122.2	Unsaturated	Saturated	28	15	0.0	0	2416.9	1855.3	51.4	0.93	0.508	2.000	3.9	0.00
20	122.2	Unsaturated	Saturated	38	20	0.0	0	2539.1	1915.1	69.2	0.93	0.514	2.000	3.9	0.00
21	122.2	Unsaturated	Saturated	38	20	0.0	0	2661.3	1974.9	68.6	0.92	0.520	2.000	3.8	0.00
22	122.2	Unsaturated	Saturated	38	20	0.0	0	2783.5	2034.7	68.1	0.92	0.525	2.000	3.8	0.00
23	116.8	Unsaturated	Saturated	38	20	0.0	0	2900.3	2089.1	67.6	0.91	0.529	2.000	3.8	0.00
24	116.8	Unsaturated	Saturated	38	20	0.0	0	3017.1	2143.5	67.2	0.91	0.534	2.000	3.7	0.00
25	116.8	Unsaturated	Saturated	37	25	0.0	0	3133.9	2197.9	65.0	0.90	0.538	2.000	3.7	0.00
26	116.8	Unsaturated	Saturated	37	25	0.0	0	3250.7	2252.3	64.6	0.90	0.541	2.000	3.7	0.00
27	116.8	Unsaturated	Saturated	37	25	0.0	0	3367.5	2306.7	64.2	0.89	0.544	2.000	3.7	0.00
28	115.2	Unsaturated	Saturated	37	25	0.0	0	3482.7	2359.5	67.1	0.89	0.547	2.000	3.7	0.00
29	115.2	Unsaturated	Saturated	37	25	0.0	0	3597.9	2412.3	66.7	0.88	0.549	2.000	3.6	0.00
30	115.2	Unsaturated	Saturated	50	30	0.0	0	3713.1	2465.1	89.7	0.87	0.551	2.000	3.6	0.00
31	115.2	Unsaturated	Saturated	50	30	0.0	0	3828.3	2517.9	89.2	0.87	0.552	2.000	3.6	0.00
32	115.2	Unsaturated	Saturated	50	30	0.0	0	3943.5	2570.7	88.7	0.86	0.554	2.000	3.6	0.00
33	115.8	Unsaturated	Saturated	50	30	0.0	0	4059.3	2624.1	88.2	0.86	0.555	2.000	3.6	0.00
34	115.8	Unsaturated	Saturated	50	30	0.0	0	4175.1	2677.5	87.8	0.85	0.556	2.000	3.6	0.00
35	115.8	Unsaturated	Saturated	93	35	0.0	0	4290.9	2730.9	162.4	0.85	0.556	2.000	3.6	0.00
36	115.8	Unsaturated	Saturated	93	35	0.0	0	4406.7	2784.3	161.6	0.84	0.556	2.000	3.6	0.00
37	115.8	Unsaturated	Saturated	93	35	0.0	0	4522.5	2837.7	160.7	0.84	0.557	2.000	3.6	0.00
38	110.5	Unsaturated	Saturated	93	35	0.0	0	4633.0	2885.8	160.0	0.83	0.557	2.000	3.6	0.00
39	110.5	Unsaturated	Saturated	93	35	0.0	0	4743.5	2933.9	159.3	0.82	0.557	2.000	3.6	0.00
40	110.5	Unsaturated	Saturated	70	40	0.0	0	4854.0	2982.0	119.4	0.82	0.557	2.000	3.6	0.00
41	110.5	Unsaturated	Saturated	70	40	0.0	0	4964.5	3030.1	118.9	0.81	0.557	2.000	3.6	0.00
42	110.5	Unsaturated	Saturated	70	40	0.0	0	5075.0	3078.2	118.4	0.81	0.556	2.000	3.6	0.00
43	111.6	Unsaturated	Saturated	70	40	0.0	0	5186.6	3127.4	117.9	0.80	0.556	2.000	3.6	0.00
44	111.6	Unsaturated	Saturated	70	40	0.0	0	5298.2	3176.6	117.5	0.80	0.555	2.000	3.6	0.00
45	111.6	Unsaturated	Saturated	73	45	0.0	0	5409.8	3225.8	122.0	0.79	0.554	2.000	3.6	0.00
46	111.6	Unsaturated	Saturated	73	45	0.0	0	5521.4	3275.0	121.5	0.78	0.553	2.000	3.6	0.00
47	111.6	Unsaturated	Saturated	73	45	0.0	0	5633.0	3324.2	121.0	0.78	0.552	2.000	3.6	0.00
48	111.9	Unsaturated	Saturated	73	45	0.0	0	5744.9	3373.7	120.6	0.77	0.550	1.992	3.6	0.00
49	111.9	Unsaturated	Saturated	85	50	0.0	0	5856.8	3423.2	139.8	0.77	0.549	1.982	3.6	0.00
50	111.9	Unsaturated	Saturated	85	50	0.0	0	5968.7	3472.7	139.3	0.76	0.547	1.972	3.6	0.00
											Total Liquefaction Settlement, S =			**0.00 inches**	

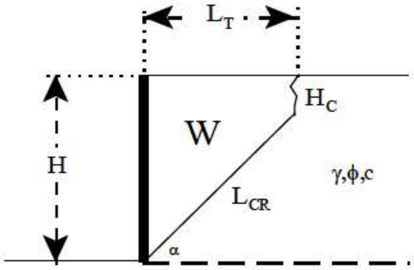
Geotechnologies, Inc.

Project: Catalina Fund, LLC
File No.: 21759
Description: Retaining Walls up to 6 feet

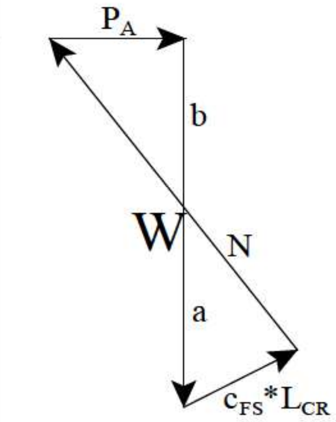
Retaining Wall Design with Level Backfill
(Vector Analysis)

Input:

Retaining Wall Height	(H)	6.00 feet
Unit Weight of Retained Soils	(γ)	120.0 pcf
Friction Angle of Retained Soils	(ϕ)	29.0 degrees
Cohesion of Retained Soils	(c)	185.0 psf
Factor of Safety	(FS)	1.50
Factored Parameters:	(ϕ_{FS})	20.3 degrees
	(c_{FS})	123.3 psf



Failure Angle (α) degrees	Height of Tension Crack (H_C) feet	Area of Wedge (A) $feet^2$	Weight of Wedge (W) lbs/lineal foot	Length of Failure Plane (L_{CR}) feet	a lbs/lineal foot	b lbs/lineal foot	Active Pressure (P_A) lbs/lineal foot
45	3.3	13	1522.2	3.9	1071.9	450.3	207.3
46	3.2	12	1493.3	3.9	1038.4	454.9	219.1
47	3.1	12	1461.2	3.9	1004.8	456.4	229.7
48	3.1	12	1426.5	3.9	971.4	455.1	239.1
49	3.1	12	1389.9	3.9	938.5	451.4	247.3
50	3.0	11	1351.6	3.9	906.2	445.5	254.3
51	3.0	11	1312.2	3.9	874.6	437.6	260.0
52	3.0	11	1271.7	3.8	843.7	428.0	264.5
53	3.0	10	1230.5	3.8	813.7	416.8	267.8
54	3.0	10	1188.8	3.8	784.5	404.3	269.8
55	3.0	10	1146.6	3.7	756.0	390.5	270.6
56	3.0	9	1104.0	3.7	728.3	375.7	270.2
57	3.0	9	1061.2	3.6	701.2	360.0	268.5
58	3.0	8	1018.2	3.6	674.8	343.4	265.6
59	3.0	8	975.0	3.5	648.9	326.1	261.4
60	3.0	8	931.7	3.4	623.5	308.2	256.0
61	3.0	7	888.3	3.4	598.5	289.8	249.4
62	3.1	7	844.7	3.3	573.8	270.9	241.6
63	3.1	7	801.0	3.2	549.3	251.8	232.5
64	3.2	6	757.2	3.1	524.8	232.4	222.2
65	3.2	6	713.2	3.0	500.3	212.8	210.7
66	3.3	6	668.9	2.9	475.7	193.2	198.1
67	3.4	5	624.3	2.8	450.7	173.6	184.3
68	3.5	5	579.4	2.7	425.3	154.1	169.5
69	3.6	4	534.0	2.6	399.1	134.9	153.7
70	3.7	4	488.0	2.5	372.0	116.0	136.9



Design Equations (Vector Analysis):

$a = c_{FS}*L_{CR}*\sin(90+\phi_{FS})/\sin(\alpha-\phi_{FS})$
$b = W-a$
$P_A = b*\tan(\alpha-\phi_{FS})$
$EFP = 2*P_A/H^2$

Maximum Active Pressure Resultant

$P_{A,\ max}$ 270.61 lbs/lineal foot

Equivalent Fluid Pressure (per lineal foot of wall)

$EFP = 2*P_A/H^2$
EFP 15.0 pcf

Design Wall for an Equivalent Fluid Pressure: 30 pcf

Date: 26-Feb-19
File No. 21759
File Name : Catalina Fund, LLC

Percolation Rate Calculation for Test Pit

Testing Pit Number	1	
Total Depth of Test Pit (Including Test Hole)	72	inches
Volume of Test Hole Excavated at Bottom	1	cubic foot
Ground surface elevation	0	feet
Bottom Elevation of Prop. Infiltration Unit	N.A.	feet
Elevation Bottom of Test Pit	-6	feet
Pre-soak Time	4	hours
Measured By	H.C.	

Terms

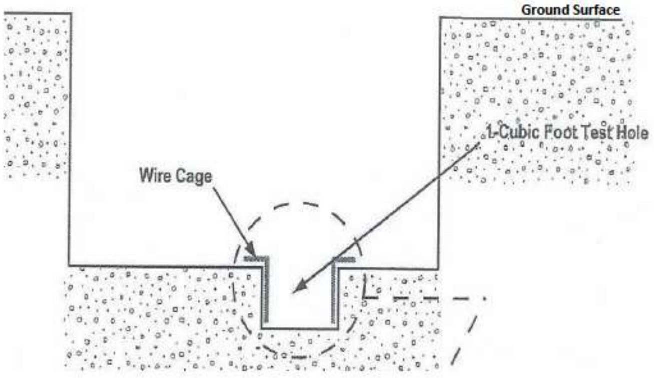
Initial water depth (d1) =dc-di
Water level drop (Δd) = di-df

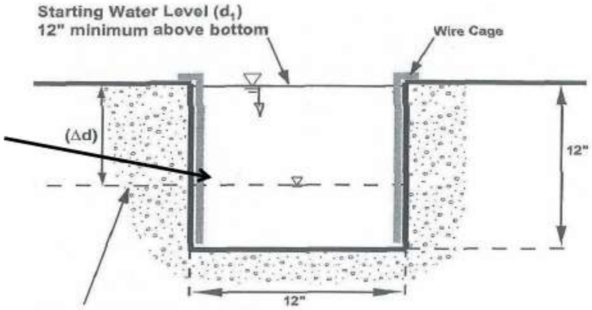
di and df are taken from ground surface

Reading Number	Clock Time	Elapsed Time	Water Measurement (d_i) and (d_f)	Measured Percolation Rate	Measured Percolation Rate	Starting Water Level	Water level Drop (Δd)	Reduction Factor (Rf)	Infiltration Rate	Infiltration Rate Variation
						d_1	$\Delta d = d_1 - d_f$	$Rf = (2d_1 - \Delta d/13.5)+1$	measured perc rate/Rf	
		Min	in	in/min	in/hour	in	in	Unitless	in/hour	Percent
1	11:55		59.75			12.25				
	12:25	30	61.25	0.05	3.00		1.50	2.7	1.1	
2										
	12:26		59.75			12.25				
	12:56	30	61.25	0.05	3.00		1.5	2.7	1.1	0.0
3										
	12:58		59.50			12.5				
	13:28	30	61.00	0.05	3.00		1.5	2.7	1.1	-1.4
4										
	13:33		59.50			12.5				
	14:03	30	61.00	0.05	3.00		1.5	2.7	1.1	0.0
5										
	14:05		59.00			13				
	14:35	30	60.50	0.05	3.00		1.5	2.8	1.1	-2.7
6										
	14:36		59.00			13				
	15:06	30	60.50	0.05	3.00		1.5	2.8	1.1	0.0
7										
8										

Final Percolation Rate = 1.1 in/hr

Note: *Calculation based on County of Los Angeles, Administrative Manual, Low Impact Development Best Management Practice Guidelines for Design, Investigation, and Reporting (Dated 6/30/17)
**LA County Minimum Design Infiltration 0.3 Inches per hour





Water Level Drop Readings
(For Reduction Factor use the Final Period or Stablized Level)

Infiltration Rate = Pre-adjusted Percolation Rate divided by Reduction Factor

Where reduction factor (Rf) is given by:

$$R_f = \left(\frac{2d_1 - \Delta d}{DIA}\right) + 1$$

With:
d1 = Initial Water Depth (in.)
Δd = Water Level Drop of Final Period or Stablized Level (in.)
DIA = 13.5 (Equivalent Diameter of the Boring)(in.)

LOS ANGELES DEPARTMENT OF PUBLIC WORKS

MONITORING WELL No. 715B

MEASUREMENT LOGS

(6 Pages)

WELL_ID	ACTIVE	STATE_WELL_ID	MEASURE_DATE	RP_TO_WS	GS_ELEV	RP_ELEV	GS_TO_WS	WATER_SURFACE_ELEVATION
715B	1	4S14W07F01	10/30/2008	54.5	65	64.8	54.7	10.3
715B	1	4S14W07F01	4/17/2008	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	10/29/2007	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/17/2007	56.8	65	64.8	57	8
715B	1	4S14W07F01	10/13/2006	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/25/2006	56.3	65	64.8	56.5	8.5
715B	1	4S14W07F01	4/29/2005	57.7	65	64.8	57.9	7.1
715B	1	4S14W07F01	4/22/1999	54.4	65	64.8	54.6	10.4
715B	1	4S14W07F01	10/26/1998	54.7	65	64.8	54.9	10.1
715B	1	4S14W07F01	4/28/1998	54.8	65	64.8	55	10
715B	1	4S14W07F01	10/20/1997	54.7	65	64.8	54.9	10.1
715B	1	4S14W07F01	4/1/1997	54.6	65	64.8	54.8	10.2
715B	1	4S14W07F01	10/31/1996	52.3	65	64.8	52.5	12.5
715B	1	4S14W07F01	4/26/1996	55	65	64.8	55.2	9.8
715B	1	4S14W07F01	10/31/1995	58.1	65	64.8	58.3	6.7
715B	1	4S14W07F01	10/25/1994	56.3	65	64.8	56.5	8.5
715B	1	4S14W07F01	4/29/1994	57.9	65	64.8	58.1	6.9
715B	1	4S14W07F01	10/20/1993	53.2	65	64.8	53.4	11.6
715B	1	4S14W07F01	5/11/1993	53.2	65	64.8	53.4	11.6
715B	1	4S14W07F01	11/5/1992	53.9	65	64.8	54.1	10.9
715B	1	4S14W07F01	4/9/1992	54.5	65	64.8	54.7	10.3
715B	1	4S14W07F01	10/29/1991	53.4	65	64.8	53.6	11.4
715B	1	4S14W07F01	4/9/1991	51.7	65	64.8	51.9	13.1
715B	1	4S14W07F01	12/11/1990	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	10/17/1990	55.1	65	64.8	55.3	9.7
715B	1	4S14W07F01	10/11/1989	46.1	65	64.8	46.3	18.7
715B	1	4S14W07F01	4/25/1989	54	65	64.8	54.2	10.8
715B	1	4S14W07F01	10/27/1988	60.5	65	64.8	60.7	4.3
715B	1	4S14W07F01	7/19/1988	57.5	65	64.8	57.7	7.3
715B	1	4S14W07F01	4/15/1988	59.5	65	64.8	59.7	5.3
715B	1	4S14W07F01	10/13/1987	58.3	65	64.8	58.5	6.5
715B	1	4S14W07F01	8/25/1987	59.4	65	64.8	59.6	5.4
715B	1	4S14W07F01	4/17/1987	58.8	65	64.8	59	6
715B	1	4S14W07F01	10/24/1986	60.3	65	64.8	60.5	4.5
715B	1	4S14W07F01	5/12/1986	63.1	65	64.8	63.3	1.7
715B	1	4S14W07F01	10/31/1985	64.3	65	64.8	64.5	0.5
715B	1	4S14W07F01	4/8/1985	54.8	65	64.8	55	10
715B	1	4S14W07F01	12/6/1984	58.2	65	64.8	58.4	6.6
715B	1	4S14W07F01	7/20/1984	57.9	65	64.8	58.1	6.9
715B	1	4S14W07F01	4/10/1984	56.2	65	64.8	56.4	8.6
715B	1	4S14W07F01	10/28/1983	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	5/11/1983	54	65	64.8	54.2	10.8

715B	1	4S14W07F01	10/26/1982	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	4/19/1982	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	10/23/1981	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	4/13/1981	Temporarily inaccessible	65	64.8	Temporarily inaccessible	Temporarily inaccessible
715B	1	4S14W07F01	10/14/1980	56.1	65	64.8	56.3	8.7
715B	1	4S14W07F01	4/11/1980	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	10/23/1979	58.9	65	64.8	59.1	5.9
715B	1	4S14W07F01	6/6/1979	60.1	65	64.8	60.3	4.7
715B	1	4S14W07F01	4/10/1979	58.4	65	64.8	58.6	6.4
715B	1	4S14W07F01	11/15/1978	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	10/18/1978	58.3	65	64.8	58.5	6.5
715B	1	4S14W07F01	4/21/1978	55.7	65	64.8	55.9	9.1
715B	1	4S14W07F01	4/18/1978	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	10/24/1977	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	7/11/1977	55.6	65	64.8	55.8	9.2
715B	1	4S14W07F01	4/13/1977	56	65	64.8	56.2	8.8
715B	1	4S14W07F01	2/22/1977	55.1	65	64.8	55.3	9.7
715B	1	4S14W07F01	11/2/1976	55.6	65	64.8	55.8	9.2
715B	1	4S14W07F01	5/10/1976	57.5	65	64.8	57.7	7.3
715B	1	4S14W07F01	4/19/1976	57.6	65	64.8	57.8	7.2
715B	1	4S14W07F01	10/16/1975	62.5	65	64.8	62.5	2.3
715B	1	4S14W07F01	4/8/1975	65.2	65	64.8	65.2	-0.4
715B	1	4S14W07F01	10/21/1974	63.9	65	64.8	64.1	0.9
715B	1	4S14W07F01	4/4/1974	59	65	64.8	59.2	5.8
715B	1	4S14W07F01	11/1/1973	60.2	65	64.8	60.2	4.6
715B	1	4S14W07F01	4/2/1973	62.1	65	64.8	62.1	2.7
715B	1	4S14W07F01	10/25/1972	63.7	65	64.8	63.7	1.1
715B	1	4S14W07F01	4/10/1972	63.7	65	64.8	63.7	1.1
715B	1	4S14W07F01	10/26/1971	62.2	65	64.8	62.2	2.6
715B	1	4S14W07F01	3/30/1971	61.2	65	64.8	61.2	3.6
715B	1	4S14W07F01	11/10/1970	59.9	65	64.8	59.9	4.9
715B	1	4S14W07F01	11/1/1970	61.2	65	64.8	61.2	3.6
715B	1	4S14W07F01	4/29/1970	62.8	65	64.8	63	2
715B	1	4S14W07F01	3/31/1970	63	65	64.8	63	1.8
715B	1	4S14W07F01	3/26/1970	62.5	65	64.8	62.7	2.3
715B	1	4S14W07F01	2/26/1970	64.3	65	64.8	64.5	0.5
715B	1	4S14W07F01	1/27/1970	61.4	65	64.8	61.6	3.4
715B	1	4S14W07F01	12/2/1969	60	65	64.8	60.2	4.8
715B	1	4S14W07F01	10/22/1969	60.3	65	64.8	60.3	4.5
715B	1	4S14W07F01	9/30/1969	59.2	65	64.8	59.4	5.6
715B	1	4S14W07F01	8/26/1969	59.3	65	64.8	59.5	5.5
715B	1	4S14W07F01	7/29/1969	59.3	65	64.8	59.5	5.5

715B	1	4S14W07F01	6/30/1969	59.5	65	64.8	59.5	5.3
715B	1	4S14W07F01	5/28/1969	59.1	65	64.8	59.1	5.7
715B	1	4S14W07F01	4/16/1969	58.3	65	64.8	58.3	6.5
715B	1	4S14W07F01	3/27/1969	58.5	65	64.8	58.5	6.3
715B	1	4S14W07F01	2/27/1969	58.4	65	64.8	58.4	6.4
715B	1	4S14W07F01	1/29/1969	59	65	64.8	59	5.8
715B	1	4S14W07F01	12/23/1968	59.1	65	64.8	59.1	5.7
715B	1	4S14W07F01	11/29/1968	59.6	65	64.8	59.6	5.2
715B	1	4S14W07F01	10/31/1968	60.1	65	64.8	60.1	4.7
715B	1	4S14W07F01	10/21/1968	60.5	65	64.8	60.5	4.3
715B	1	4S14W07F01	9/25/1968	59.3	65	64.8	59.3	5.5
715B	1	4S14W07F01	8/29/1968	57.2	65	64.8	57.2	7.6
715B	1	4S14W07F01	7/30/1968	57.1	65	64.8	57.1	7.7
715B	1	4S14W07F01	6/27/1968	56.9	65	64.8	57.1	7.9
715B	1	4S14W07F01	5/29/1968	57	65	64.8	57.2	7.8
715B	1	4S14W07F01	4/18/1968	57.1	65	64.8	57.3	7.7
715B	1	4S14W07F01	4/3/1968	57.5	65	64.8	57.5	7.3
715B	1	4S14W07F01	3/29/1968	56.7	65	64.8	56.9	8.1
715B	1	4S14W07F01	2/29/1968	56.2	65	64.8	56.4	8.6
715B	1	4S14W07F01	1/26/1968	57.6	65	64.8	57.8	7.2
715B	1	4S14W07F01	12/28/1967	56.9	65	64.8	57.1	7.9
715B	1	4S14W07F01	11/13/1967	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	10/27/1967	57.8	65	64.8	58	7
715B	1	4S14W07F01	10/23/1967	58	65	64.8	58.2	6.8
715B	1	4S14W07F01	9/29/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	8/25/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	7/26/1967	59.7	65	64.8	59.9	5.1
715B	1	4S14W07F01	6/28/1967	59.1	65	64.8	59.3	5.7
715B	1	4S14W07F01	5/26/1967	58.9	65	64.8	59.1	5.9
715B	1	4S14W07F01	4/17/1967	59	65	64.8	59.2	5.8
715B	1	4S14W07F01	4/10/1967	58.8	65	64.8	59	6
715B	1	4S14W07F01	4/3/1967	58.6	65	64.8	58.8	6.2
715B	1	4S14W07F01	2/28/1967	57.4	65	64.8	57.6	7.4
715B	1	4S14W07F01	1/26/1967	56.5	65	64.8	56.7	8.3
715B	1	4S14W07F01	1/3/1967	57.2	65	64.8	57.4	7.6
715B	1	4S14W07F01	12/8/1966	60	65	64.8	60.2	4.8
715B	1	4S14W07F01	11/28/1966	59.5	65	64.8	59.7	5.3
715B	1	4S14W07F01	11/1/1966	60.9	65	64.8	61.1	3.9
715B	1	4S14W07F01	10/28/1966	61	65	64.8	61.2	3.8
715B	1	4S14W07F01	9/29/1966	60.2	65	64.8	60.4	4.6
715B	1	4S14W07F01	8/31/1966	60.1	65	64.8	60.3	4.7
715B	1	4S14W07F01	7/29/1966	60.7	65	64.8	60.9	4.1
715B	1	4S14W07F01	6/21/1966	60.4	65	64.8	60.6	4.4
715B	1	4S14W07F01	5/25/1966	61.3	65	64.8	61.5	3.5
715B	1	4S14W07F01	4/19/1966	60.7	65	64.8	60.9	4.1
715B	1	4S14W07F01	3/30/1966	62.2	65	64.8	62.4	2.6
715B	1	4S14W07F01	2/25/1966	62.5	65	64.8	62.7	2.3

715B	1	4S14W07F01	1/27/1966	63.1	65	64.8	63.3	1.7
715B	1	4S14W07F01	12/30/1965	64	65	64.8	64.2	0.8
715B	1	4S14W07F01	12/1/1965	64.7	65	64.8	64.9	0.1
715B	1	4S14W07F01	11/29/1965	64.7	65	64.8	64.9	0.1
715B	1	4S14W07F01	10/29/1965	64.6	65	64.8	64.8	0.2
715B	1	4S14W07F01	9/30/1965	64.1	65	64.8	64.3	0.7
715B	1	4S14W07F01	8/30/1965	63.4	65	64.8	63.6	1.4
715B	1	4S14W07F01	8/5/1965	64.6	65	64.8	64.8	0.2
715B	1	4S14W07F01	7/29/1965	64.2	65	64.8	64.4	0.6
715B	1	4S14W07F01	5/26/1965	66.8	65	64.8	67	-2
715B	1	4S14W07F01	5/5/1965	68.1	65	64.8	68.3	-3.3
715B	1	4S14W07F01	4/14/1965	69.8	65	64.8	70	-5
715B	1	4S14W07F01	4/1/1965	70.6	65	64.8	70.8	-5.8
715B	1	4S14W07F01	3/1/1965	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	2/24/1965	74.6	65	64.8	74.8	-9.8
715B	1	4S14W07F01	2/1/1965	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	1/28/1965	76.2	65	64.8	76.4	-11.4
715B	1	4S14W07F01	1/11/1965	76.8	65	64.8	77	-12
715B	1	4S14W07F01	12/29/1964	77.6	65	64.8	77.8	-12.8
715B	1	4S14W07F01	12/21/1964	77.6	65	64.8	77.8	-12.8
715B	1	4S14W07F01	11/30/1964	75.3	65	64.8	75.5	-10.5
715B	1	4S14W07F01	11/17/1964	75.6	65	64.8	75.8	-10.8
715B	1	4S14W07F01	11/6/1964	76.2	65	64.8	76.4	-11.4
715B	1	4S14W07F01	10/26/1964	76.4	65	64.8	76.6	-11.6
715B	1	4S14W07F01	10/22/1964	76.5	65	64.8	76.7	-11.7
715B	1	4S14W07F01	10/5/1964	76.8	65	64.8	77	-12
715B	1	4S14W07F01	9/28/1964	77.1	65	64.8	77.3	-12.3
715B	1	4S14W07F01	9/1/1964	77.7	65	64.8	77.9	-12.9
715B	1	4S14W07F01	8/26/1964	77.5	65	64.8	77.7	-12.7
715B	1	4S14W07F01	8/4/1964	77.8	65	64.8	78	-13
715B	1	4S14W07F01	7/30/1964	78.2	65	64.8	78.4	-13.4
715B	1	4S14W07F01	7/6/1964	78.6	65	64.8	78.8	-13.8
715B	1	4S14W07F01	7/1/1964	78.4	65	64.8	78.6	-13.6
715B	1	4S14W07F01	6/9/1964	79.2	65	64.8	79.4	-14.4
715B	1	4S14W07F01	5/4/1964	80.1	65	64.8	80.3	-15.3
715B	1	4S14W07F01	4/6/1964	81.4	65	64.8	81.6	-16.6
715B	1	4S14W07F01	3/3/1964	83	65	64.8	83.2	-18.2
715B	1	4S14W07F01	2/3/1964	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	1/6/1964	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	12/9/1963	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	11/19/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	10/2/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	9/3/1963	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	8/5/1963	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	7/8/1963	83.8	65	64.8	84	-19
715B	1	4S14W07F01	6/4/1963	82.8	65	64.8	83	-18
715B	1	4S14W07F01	6/3/1963	83.8	65	64.8	84	-19

715B	1	4S14W07F01	5/6/1963	83.7	65	64.8	83.9	-18.9
715B	1	4S14W07F01	4/3/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	3/4/1963	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	2/5/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	1/7/1963	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	12/6/1962	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	12/5/1962	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	11/6/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	10/1/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	9/4/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	8/6/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	7/10/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	6/4/1962	83.8	65	64.8	84	-19
715B	1	4S14W07F01	5/7/1962	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	4/4/1962	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	3/7/1962	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	2/5/1962	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	1/9/1962	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	12/11/1961	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	11/15/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	10/9/1961	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	9/5/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	8/7/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	7/11/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/5/1961	84.8	65	64.8	85	-20
715B	1	4S14W07F01	5/9/1961	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	4/12/1961	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	4/4/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	3/6/1961	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	2/7/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	1/3/1961	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	12/13/1960	84.6	65	64.8	84.8	-19.8
715B	1	4S14W07F01	11/16/1960	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	11/2/1960	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	10/10/1960	84.9	65	64.8	85.1	-20.1
715B	1	4S14W07F01	9/13/1960	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	8/9/1960	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	7/5/1960	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/6/1960	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	5/16/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	4/11/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	3/7/1960	83.8	65	64.8	84	-19
715B	1	4S14W07F01	2/3/1960	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	1/11/1960	84.4	65	64.8	84.6	-19.6
715B	1	4S14W07F01	12/15/1959	84.7	65	64.8	84.9	-19.9
715B	1	4S14W07F01	11/16/1959	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	10/5/1959	83.7	65	64.8	83.9	-18.9

715B	1	4S14W07F01	9/1/1959	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	8/11/1959	83.9	65	64.8	84.1	-19.1
715B	1	4S14W07F01	7/7/1959	83.6	65	64.8	83.8	-18.8
715B	1	4S14W07F01	6/10/1959	83.7	65	64.8	83.9	-18.9
715B	1	4S14W07F01	5/11/1959	83.4	65	64.8	83.6	-18.6
715B	1	4S14W07F01	4/15/1959	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	4/7/1959	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	3/3/1959	82.7	65	64.8	82.9	-17.9
715B	1	4S14W07F01	2/3/1959	82.3	65	64.8	82.5	-17.5
715B	1	4S14W07F01	1/12/1959	82.9	65	64.8	83.1	-18.1
715B	1	4S14W07F01	12/15/1958	83.5	65	64.8	83.7	-18.7
715B	1	4S14W07F01	11/12/1958	84	65	64.8	84.2	-19.2
715B	1	4S14W07F01	10/14/1958	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	9/10/1958	84.1	65	64.8	84.3	-19.3
715B	1	4S14W07F01	8/4/1958	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	7/8/1958	84.2	65	64.8	84.4	-19.4
715B	1	4S14W07F01	6/11/1958	85	65	64.8	85.2	-20.2
715B	1	4S14W07F01	5/26/1958	84.3	65	64.8	84.5	-19.5
715B	1	4S14W07F01	4/16/1958	84.5	65	64.8	84.7	-19.7
715B	1	4S14W07F01	3/10/1958	84.6	65	64.8	84.8	-19.8
715B	1	4S14W07F01	2/10/1958	84.9	65	64.8	85.1	-20.1

Appendix I

Soil Vapor Extraction and Soil Treatment Workplan - Peer Review

Environmental
Engineering,
Consulting &
Remediation, Inc.

SOIL VAPOR EXTRACTION AND SOIL TREATMENT WORKPLAN

Former Catalina Cleaners
100 ~132 North Catalina Avenue
Redondo Beach, California 90277

Draft, 2020
Project Number 2131RV27

PREPARED FOR:
Beach City Capital
1240 Rosecrans Avenue.
Manhattan Beach, California 90266

PREPARED BY:
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TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 SITE DESCRIPTION 1
1.2 REMEDIATION GOALS 1
2.0 SITE CHARACTERIZATION 2
2.1 SITE CHARACTERIZATION 2
2.1.1 Site Investigations 2
2.1.2 Regional and Local Geology 4
2.1.3 Background Concentrations 4
2.2 NATURE AND EXTENT OF CONTAMINATION 4
2.2.1 Summary of Site Investigation Data 4
2.2.2 Conceptual Site Model 6
2.3 HUMAN HEALTH RISK ASSESSMENT 7
2.3.1 Chemicals of Potential Concern (COPCs) 7
2.3.2 Exposure Pathways 8
2.3.3 Estimated Risks 8
2.3.4 Summary of Risk Characterization Results 9
3.0 Soil vapor extraction WORKPLAN 10
3.1 LIAISON/PROJECT MANAGEMENT/PERMITTING 10
3.1.1 Liaison/Project Management 11
3.1.2 Permitting 11
3.2 WELL INSTALLATIONS 11
3.2.1 Site Visit to Mark Locations and Locate Utilities 11
3.2.2 Soil Borings and Well Installations 12
3.2.3 Loading and Disposal/Recycling of Drill Cuttings 13
3.2.4 Baseline Soil Vapor Monitoring 13
3.3 REMEDIATION SYSTEM INSTALLATION 16
3.3.1 Trenching, Plumbing, Backfilling 16
3.3.2 Equipment Installation 17
3.3.3 Mobilize and Install SVE Equipment 18
3.3.4 Laboratory Analysis of Vapor Influent and Effluent Samples 18
3.4 SVE OPERATION AND MAINTENANCE 19

3.4.1 Remediation System Operations and Maintenance 19
3.4.2 Carbon Change-outs 20
3.4.3 Chemical Analysis of Vapor Influent and Effluent Samples 20
3.4.4 SCAQMD Annual Inspection Testing 20
3.5 SYSTEM CYCLING AND CONFIRMATION SAMPLING 20
3.6 REMEDIATION SYSTEM DECOMMISSIONING 21
3.7 CONTINGENCY REMEDY 21
3.8 Land Use Covenant (LUC) 22
4.0 REPORTING 22
4.1 SVE REMEDIATION Quarterly STATUS REPORTS 22
4.2 SCAQMD STATUS REPORTS 23
4.3 REMEDIATION SYSTEM INSTALLATION REPORT 23
5.0 soil treatment WORKPLAN 24
6.0 soil excavation and OFF-Site disposal WORKPLAN 25
7.0 Transportation Plan 26
7.1 Characteristic and Destination of Soil To Be Transported 26
7.2 Truck Transportation 27
7.3 Site Traffic Control 27
7.4 Record Keeping 28
8.0 SCHEDULE 29
9.0 SAMPLING AND ANALYSIS PLAN 29
10.0 HEALTH AND SAFETY PLAN 29
11.0 LIMITATIONS AND WORKPLAN CERTIFICATION 31
12.0 REFERENCES 32

LIST OF FIGURES

Figure 1 Site Location Map
Figure 2 Site Plan
Figure 3 Proposed Well Construction Diagram
Figure 4 Soil Vapor Extraction System Schematic

LIST OF APPENDICES

Appendix A Site Data Tables and Distribution
Appendix B Conceptual Site Model
Appendix C Sampling and Analysis Plan
Appendix D Site Safety Plan

COMMON ABBREVIATIONS AND ACRONYMS

ATC	Authority To Construct
SCAQMD	South Coast Air Quality Management District
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
Cal/EPA	California Environmental Protection Agency
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
COPC	Contaminants of Potential Concern
CSM	Conceptual Site Model
DTSC	California Department of Toxic Substances Control
E_2C	E_2C Remediation
EPA	U.S. Environmental Protection Agency
GAC	Granulated Activated Carbon
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
HSC	California Health and Safety Code
LACFD	Los Angeles County Fire Department
mg/kg	milligrams per kilogram
MRLs	Method Reporting Limits
μg/kg	micrograms per kilogram
$\mu g/m^3$	micrograms per cubic meter
mg/L	milligrams per liter
mph	miles per hour
msl	mean sea level
NEPA	National Environmental Protection Act
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethene
PEA	Preliminary Endangerment Assessment
PPE	personal protective equipment
PTO	Permit To Operate
PT&R	Proven Technologies and Remedies
QA/QC	quality assurance/quality control
RA	removal action
RAOs	Removal Action Objectives
RAW	Removal Action Workplan
RSL	Regional Screening Level
scfm	standard cubic feet per minute
SVE	Soil Vapor Extraction
VOCs	Volatile Organic Compounds
USA	Underground Service Alert
$\mu g/m^3$	micrograms per cubic meter

1.0 INTRODUCTION

This Soil Vapor Extraction and Soil Treatment Remedial Action Workplan (SVE and ST Workplan) has been prepared by E_2C Remediation for the Former Catalina Cleaners Site (Site).

1.1 SITE DESCRIPTION

The subject property at 100-132 North Catalina in Redondo Beach, California is located on the east side of Catalina Avenue and the north side of Emerald Street. The site is bounded by Emerald Street to the south, by a one-story commercial structure to the north, by North Catalina Avenue to the west, and by one to two-story residential and commercial structures to the east.

The property consists of six Los Angeles County parcels with Parcel IDs of 7505-005-006, 7505-005-007, 7505-005-008, 7505-005-012, 7505-005-019 & 7505-005-021. See Figure 1 for a Site Location Map and Figure 2 for a Site Plan. The Site is approximately 1.19 acres and is currently developed with five single- and two-story commercial/industrial buildings and two sheds, which were constructed between 1904 and 1950. The subject property is currently occupied by 2 For 1 Frame Store and American International Stone & Tile Inc. (112 North Catalina Avenue), Pacifica Tile & Granite and His Life Woodworks (116 North Catalina Avenue), Catalina Cleaners (124 North Catalina Avenue), and Toy Box Rentals (132 North Catalina Avenue) for commercial and industrial use. On-site operations consist of dry cleaning, a movie rental/prop service, granite and tile fabricating and design, woodworking, picture framing developments, and stone and tile fabrication. The second floor of 112 North Catalina Avenue as well as the former coffee shop building are currently vacant. One shed is used for storage north of 132 North Catalina Avenue; while a second shed is used for painting, fabricating, and finishing of tile, granite, and wood materials east of 116 North Catalina Avenue. In addition to the current structures, the subject property is also improved with two asphalt-paved parking lot areas and associated landscaping.

1.2 REMEDIATION GOALS

Site-Specific Remediation Goals for indoor air and soil vapor are presented as follows:

Indoor Air Cleanup Goals

COC	**Future Residential* Scenario (µg/m^3)**
Tetrachloroethene (PCE)	0.46
Trichloroethene (TCE)	0.48

µg/m^3 – micrograms per cubic meter

Soil Vapor Cleanup Goals

COC	Future Commercial/Residential* Scenario (µg/m³)
Tetrachloroethene (PCE)	67
Trichloroethene (TCE)	100

µg/m³ – micrograms per cubic meter

> *Note: The site use will be a mixed use development with the first floor of any structure to be used either as parking garage or commercial purposes. The residential use portion of the development will be, at a minimum, on the second floor. Additionally, the residential heating and ventilation systems will not be connected to the first floor (garage) air space. The proposed indoor air goals are for the residential uses only and the soil vapor cleanup goals are for entire site with either commercial uses or parking garages.

Site-Specific Remediation Goals for arsenic contaminated soil is to reduce Soluble Threshold Limit Concentration (STLC) arsenic concentration to less than 5.0 milligrams per liter (mg/L). The direct contact Environmental Screening Level for arsenic soil concentration is 0.067 mg/kg. The natural background arsenic concentration in southern California Region is 12 mg/kg.

2.0 SITE CHARACTERIZATION

Site assessment and characterization activities including analytical results for work conducted in 2018 and 2019 are discussed in the sections below.

2.1 SITE CHARACTERIZATION

2.1.1 Site Investigations

Partner Engineering and Science, Inc. (Partner) in 2018 completed a Phase I Environmental Site Assessment (ESA) for the property located at 100 -132 North Catalina in the City of Redondo Beach, California. Partner's assessment revealed evidence of recognized environmental conditions and/or environmental issues in connection with the subject property. Dry cleaning operations occurred on a portion of the property as early as 1964 and prior to 2009 tetrachloroethylene (PCE) was used as the primary solvent. A railroad/trolley line spur, running north to south, was located on the subject property from as early as 1895 to at least 1924. The spur was used for trolley car repairs. Herbicides and arsenic were historically used to prevent pest infestation and control weeds along railroad tracks.

In September 2018, Partner advanced 12 soil borings (B1 through B12) for collection of soil and soil gas samples as part of a Phase II ESA. Soil samples were analyzed for total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), and volatile organic compounds (VOCs). None of the analyzed soil samples contained detectable concentrations of TPH or PCBs above their respective method reporting limits (MRLs). PCE was reported in 33 of the analyzed soil samples at concentrations ranging from 12.2 micrograms per kilogram (µg/kg) to 535 µg/kg. Trichloroethylene (TCE) was reported in two soil samples with concentrations of 1.1 µg/kg (B1-2) and 1.3 µg/kg (B2-2). PCE concentrations in soil were highest in the locations of the former dry cleaning unit and the current dry cleaning unit. Most of the reported soil PCE concentrations are below the environmental screening level of 80 µg/kg for residential land use. See Appendix A for summary tables of the analytical data.

The analytical laboratory reported concentrations of antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium, and zinc in the soil samples. Arsenic was reported in four soil samples with concentrations ranging from 19.4 mg/kg to 92.6 mg/kg.

Twelve (12) soil vapor samples were analyzed for VOCs. Reported PCE concentrations ranged from 1,420 µg/m^3 to 98,700 µg/m^3, which exceeded the DTSC's ESL of 67 µg/m^3 for commercial/industrial land use.

In January 2019, Optimal Technology collected 34 soil vapor samples from 16 locations from depths of 5 feet below ground surface (bgs) and 15 feet bgs. Reported soil vapor PCE concentration ranged from 130 µg/m^3 to 45,700 µg/m^3. In April, 2019, Optimal Technology collected 24 soil vapor samples from 15 locations at the site. All 24 samples had PCE concentrations ranging from 245 µg/m^3 to 171,900 µg/m^3. See Appendix A for a summary of the analytical data and the sample locations.

In April 2019, Landmark Engineering collected four groundwater samples from four groundwater monitoring wells converted from four soil borings. Groundwater analytical results showed that both TPH as gasoline and PCE were not reported at or above their respective laboratory method reporting limits. The groundwater analytical data indicated that groundwater at the site has not been impacted by the release of chlorinated solvents or by petroleum based solvents. The depth to water at the site is approximately 60 ~ 63 feet below ground surface.

From January 2019 to April 2019, Landmark Engineering collected soil samples at 39 locations and analyzed the samples for arsenic. The reported arsenic concentrations ranged from 0.495 mg/kg to 140 mg/kg. In addition, STLC extraction tests for three samples with the highest arsenic TTLC concentrations reported STLC concentrations of 3.0 mg/L, 6.75 mg/L, and 7.7 mg/L. See Appendix A for a summary table of the soil sample arsenic concentrations. In general, soil samples containing relatively higher arsenic concentrations were collected from shallow depths of 2 to 3.5 feet within the former railroad spur track footprint. Most of the reported arsenic concentrations are below the background concentration of 12 mg/kg for the southern California Region.

Soil samples from 23 locations were also analyzed for TPH and VOCs. Reported PCE concentrations ranged from 0.94 µg/kg to 414 µg/kg.

In April 2019, four sub-slab soil vapor samples were collected from four different buildings. PCE concentrations reported in the sub-slab samples ranged from 498 $\mu g/m^3$ to 28,750 $\mu g/m^3$.

2.1.2 Regional and Local Geology

Based on a review of the United States Geological Survey (USGS) Hermosa Beach, California Quadrangle topographic map, the subject property is situated at an elevation approximately 90 feet above mean sea level, and the local topography slopes gently to the west.

According to the California Geological Survey, the subject property is situated in the northern end of the Peninsular Ranges geomorphic province. The Peninsular Ranges are a series of mountain ranges separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault. The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks. The Los Angeles Basin and the island group (Santa Catalina, Santa Barbara, and the distinctly terraced San Clemente and San Nicolas islands), together with the surrounding continental shelf (cut by deep submarine fault troughs), are included in the province.

Based on borings advanced from the site investigations completed to date, fine- to medium grained silty sand (typically classified as SM) is present from the ground surface to approximately 2 to 5 feet bgs. From 5 to 50 feet bgs, the subsurface consists predominantly of fine- to medium grained sand (typically classified as SP).

Depths to groundwater at the Site in April 2019 ranged from 60.64 feet bgs to 63.94 feet bgs. The groundwater flow direction was towards the southwest.

2.1.3 Background Concentrations

PCE and TCE do not occur naturally in soils. Therefore, any detected concentrations of PCE and TCE came from human activities. Arsenic occurs naturally in soils. According to a DTSC publication (March 2008, *Determination of a Southern California Regional Background Arsenic Concentration*), the background concentration is 12 mg/kg.

2.2 NATURE AND EXTENT OF CONTAMINATION

2.2.1 Summary of Site Investigation Data

Site data including analytical data for soil, soil vapor, and groundwater obtained from previous investigations are summarized as follows:

Soil samples have been collected from 45 boring locations on the Site. The boring locations are shown on Figure 2. PCE was detected in the soil samples at concentrations ranging from 0.94 µg/kg to 535 µg/kg. Only six soil samples had reported PCE soil concentrations that exceeded the DTSC residential ESL of 80 µg/kg: B1-2, B2-2, B4-2, LE10-2, LW-13-2 and LE-21-10. All of these samples were collected from within or in the vicinity of the former dry cleaning unit at the Site and from 10 feet bgs or shallower.

TCE was detected in three of the soil samples at concentrations ranging from 1.1 µg/kg to 1.92 µg/kg. All the reported TCE concentrations were below the US EPA commercial RSL of 6,000 µg/kg (DTSC does not have a screening level for TCE) or the San Francisco Regional Water Quality Control Board's (SFRWQCB's) residential ESL of 85 µg/kg.

Reported arsenic concentrations in soil samples ranged from 0.495 mg/kg to 140 mg/kg. Most of the soil samples collected at shallow depths of 2 to 3.5 feet bgs in the former railroad spur track area had reported concentrations higher than the background concentration of 12 mg/kg and all the other soil samples collected outside of the rail spur area had reported arsenic concentrations lower than the background concentration of 12 mg/kg.

Soil vapor samples have been collected from 44 boring locations with probes at depths ranging from 5 feet bgs to 50 feet bgs.

- PCE was detected in almost all the soil vapor samples at concentrations ranging 245 µg/m^3 to 171,900 µg/m^3, with all detections exceeding the 67 µg/m^3 ESL.
- TCE was detected in eight samples at concentrations ranging from 12 µg/m^3 to 302 µg/m^3, with none of the detections exceeding the 3,000 µg/m^3 screening level (USEPA Regional Screening Levels, May 2019).

The data currently available for the horizontal and vertical extent of impacts to soil vapor are included in the Appendix A; and summarized below:

The lateral extent of PCE impacts to shallow soil vapor (i.e. 5 feet bgs) has been delineated by Landmark Engineering in 2019. The extent of shallow soil vapor impacts above the commercial screening level appears to be primarily limited to the Site with the center around the east half of the former dry cleaners unit. The extent may have expanded slightly offsite to the east and west.

The lateral extent of PCE impacts to deep soil vapor (i.e. 15 feet and 50 bgs) is currently substantially defined to the north and south. Similarly, to the east and west, soil vapor might have migrated slightly offsite.

A total of four sub-slab soil vapor samples have been collected from 4 different buildings on the Site. The sampling locations are shown on Figure 2.

- PCE was detected in all four sub-slab samples at concentrations ranging from 4,980 µg/m^3 to 28,750 µg/m^3, with all detections exceeding the 67 µg/m^3 sub slab screening level (using an attenuation factor of 0.03 for commercial use).

- TCE was not detected in any of the sub-slab soil vapor samples.

The highest sub-slab PCE concentration (28,750 µg/m^3) was found beneath the eastern portion of the former dry cleaners' unit.

2.2.2 Conceptual Site Model

Based on Site history and data from Site investigations, the contaminant transport can be conceptualized as follows.

The contaminants of potential concern (COPCs) at the Site are PCE, TCE and arsenic. The primary COPCs are PCE and arsenic.

The PCE source area is where the previous dry cleaning equipment and operational area was located. Contaminants were released to the floor or ground first, then migrated to subsurface soil. Once in soil, the contaminants migrated downwards into the vadose zone. PCE and TCE adsorbed onto soil particles and, at the same time, volatized into soil vapor which dispersed both vertically and horizontally in the subsurface beneath the Site and adjacent area. Contaminated soil vapor probably rises from the subsurface through cracks in concrete floor slabs into commercial building spaces, where human receptors are potentially exposed. Data from site investigations indicated that groundwater beneath the Site has not been impacted by the COPCs from the Site.

The arsenic-impacted soil source area is the former railroad spur track footprint in the northwestern portions of the site. Arsenic is not volatile and does not partition into soil vapor. The potential pathways for human health risk from arsenic exposure is through direct contact or through leachate impact to groundwater. Due to the shallow depths of the elevated arsenic concentrations (≤10 feet bgs), the measured depths to groundwater (≥60 feet bgs), and the pavement surface cover in the former spur area, the potential impact to groundwater from arsenic leachate is minimal to non-existent.

The primary source of PCE is the PCE impacted soil and the secondary source of PCE is the impacted soil vapor. The exposure pathways are outdoor air, indoor air, direct contact with impacted soil, and potentially groundwater. Site commercial workers, potential future residents, and construction workers are the current and future receptors. Potential human health risks include possible ingestion, inhalation, and dermal exposure routes to current and or future commercial/industrial workers, future construction workers, and future residents for the planned residential development.

A flow chart summarizing the Conceptual Site Model (CSM) is presented in Appendix B. The CSM presents the primary and secondary sources of the chemicals of concern, the transport mechanisms, exposure pathways and routes, and the receptors. Potential human health risks include possible ingestion, inhalation, and dermal exposure routes of the contaminants at the Site to current commercial/industrial workers and future construction workers and residents.

Based on this evaluation, the current on-Site commercial/industrial worker could possibly be exposed to COCs through inhalation of impacted soil vapor, while future residents and/or construction workers might be exposed through dermal contact or ingestion of impacted soil, and/or inhalation of contaminants in shallow (≤5 feet bgs) soil and/or soil gas during the installation of utilities or during underground maintenance or construction activities. Based on the exposure pathways identified by this CSM, both soil and soil vapor remediation are needed. It should be noted that a Soil Management Plan (SMP) should be prepared and implemented to limit exposure to impacted soils if construction activities are necessary during remediation activities. These areas are currently capped with asphalt or concrete which prevents current worker exposure.

Groundwater has not been impacted by VOCs or arsenic released at the Site. In addition, groundwater is not pumped from the Site for municipal/domestic use; therefore, on-Site commercial workers or future residents would not be exposed to contaminated groundwater through dermal contact or ingestion.

2.3 HUMAN HEALTH RISK ASSESSMENT

Laboratory analytical data from soil, soil vapor, groundwater, and indoor air samples collected at the Site during the Site investigations are summarized in Appendix A. Previously reported concentrations were compared to risk-based screening levels to assess chemicals of concern, possible source areas, and the vertical and lateral extent of impacted soil and soil vapor.

Soil risk-based screening level concentrations for the protection of future workers (from skin contact and dust inhalation) were evaluated using EPA Regional Screening Levels (RSLs) for Industrial Soils or the DTSC's modified screening levels, whichever was more stringent and/or available for a given COPC.

2.3.1 Chemicals of Potential Concern (COPCs)

The initial step of the baseline human health risk assessment process was to review all previous data to determine the COPCs. These constituents were identified as chemicals with reported concentrations that exceeded the method reporting limits. The COPCs for soil were arsenic, PCE, TCE, 1,1,2-trichloroethane, acetone, TPH as diesel and TPH as oil. Other COPCs in soil include: antimony, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, vanadium and zinc. The COPCs for soil vapor include: PCE, TCE, trichlorofluoromethane, 1,2,4-trimethylbenzene, benzene, toluene, ethylbenzene, xylenes, chloroform, and dichlorodifluoromethane. Groundwater was not impacted.

2.3.2 Exposure Pathways

The possible exposure pathways were evaluated for:

- The current on-Site commercial/industrial workers.
- The future Site residents/construction workers.
- The current off-Site commercial/industrial workers.
- The current off-Site residents.

The current on-Site workers have a potential for exposure to impacted vapors in indoor air and outdoor air through subsurface vapor intrusion. The current on-Site workers do not have a potential for exposure to impacted soil due to asphalt and concrete ground cover in impacted areas.

The future on-Site residents and/or construction workers have a potential exposure due to potential dermal contact with impacted soils, ingestion of impacted soil, and inhalation of impacted soil in the event that the current ground cover is removed. Similarly, future on-Site residents and/or construction workers have a potential exposure due to potential dermal contact with impacted soils, ingestion of impacted soil, and inhalation of impacted soil in outdoor dust in the event that the current ground cover is removed. Finally, future on-Site residents and/or construction workers have a potential for exposure to impacted vapors in indoor air through subsurface vapor intrusion, if soil vapor with high concentrations migrates to where the future residential buildings are located or future residential buildings may be located.

Current off-Site commercial/industrial workers and current off-Site residents have a potential for exposure to impacted vapors in indoor air and outdoor air through subsurface vapor intrusion. The current off-Site workers do not have a potential for exposure to impacted soil due to asphalt and concrete ground cover in impacted areas.

2.3.3 Estimated Risks

To determine whether a vapor intrusion risk was present, soil vapor concentrations were compared to commercial screening levels calculated using an attenuation factor of 0.03 for soil vapor and 0.03 for sub-slab soil vapor. Soil vapor PCE concentrations exceed the DTSC screening level for PCE in most of the Site soil vapor probe locations and sub-slab soil vapor PCE concentrations exceed the DTSC screening level for PCE at all sub-slab soil vapor probe locations.

To determine whether a dermal or ingestion risk was present, E2C compared the concentrations of VOCs in soil matrix to the DTSC screening levels and EPA RSLs. There were only six shallow soil samples, collected in the source area at depths less than 10 feet bgs, with PCE concentrations exceeding the screening level for commercial land uses.

The limited volume of soil containing concentrations of PCE exceeding the DTSC screening level will be indirectly influenced by the proposed removal activities (i.e. the operation of a soil vapor extraction (SVE) remediation system); therefore, it is expected that the residual concentrations of PCE in the soil matrix will not pose an immediate exposure risk to occupants or workers at the Site. In addition, the limited volume of soil containing concentrations of PCE exceeding the DTSC screening level is currently capped with asphalt or concrete which eliminates the dermal contact exposure route. If human exposure is anticipated (such as during underground utility installation), a SMP will need to be prepared and implemented to help guide these activities and limit COC exposure to construction workers.

For the area with elevated arsenic concentrations, dermal contact or ingestion risk is present if the impacted soil volume is exposed or disturbed. Protective measures should be implemented to avoid dermal contact and/or breathing of soil dust during construction activities. Soil treatment and/or removal are proposed to eliminate the potential risk of arsenic leaching to groundwater beneath the site.

2.3.4 Summary of Risk Characterization Results

Based on the results of the vapor intrusion evaluation, remedial action is warranted to reduce potential human health risks to acceptable levels for residential and commercial occupants and future construction workers.

PCE concentrations in some soil samples exceed the PCE screening levels for residential/commercial/industrial land uses. PCE concentrations in Site soil vapor and sub-slab soil vapor samples also exceed their respective screening levels based on attenuation factors of 0.03 and 0.03, respectively.

The concentrations of TCE and other COPC in soil and soil vapor are either reported as non-detect or are well below their respective screening levels; therefore, they do not pose significant human health risks.

Arsenic concentrations in shallow soil samples collected in the former footprint of the railroad spur track exceeded the arsenic ESL and pose a minimal risk to groundwater through leaching. Treatment to immobilize the arsenic in soil and further minimize the leaching of arsenic into the vadose zone is proposed, and barriers to avoid dermal contact and dust generation are necessary to minimize potential exposure to future Site residents and/or construction workers.

Groundwater has not been impacted and no COCs in groundwater pose any threat to human health through vapor intrusion.

Based on the risk evaluation, PCE is the only COC for soil vapor, sub-slab vapor, and indoor air at the Site. PCE and arsenic are the only COCs for the Site soil.

3.0 SOIL VAPOR EXTRACTION WORKPLAN

This section describes the methods and procedures that will be used to conduct a SVE remedial operation.

The proposed scope of work described in this soil vapor extraction (SVE) Workplan can be summarized as follows:

- Prior to soil vapor extraction operation, E_2C will conduct baseline sampling of all available soil vapor monitoring points (including sub-slab vapor monitoring points) to establish vadose zone baseline soil gas conditions;
- Ten (10) nested SVE wells will be installed to remediate the subsurface zone impacted by chemicals of concern (COCs);
- The SVE wells will be plumbed to the soil vapor treatment system using subsurface piping installed in trenches;
- A SVE system with a 20 horsepower motor and 500 standard cubic feet per minute (scfm) vacuum pump will be installed at the Site;
- The operation and maintenance of the soil vapor extraction and treatment system, including daily inspections for the first 5 days (Startup Testing period), and weekly inspections thereafter (based on the SCAQMD permit requirements); and
- Site vapor monitoring, including baseline sampling of permanent vapor probe points and on-going (monthly) system influent and effluent analytical testing.
- Periodic monitoring and sampling of the soil vapor probes during the SVE operations.

This scope of work will be implemented through the following tasks:

3.1 LIAISON/PROJECT MANAGEMENT/PERMITTING

An E_2C Principal will oversee and manage all activities relating to the tasks proposed in this Workplan. All activities discussed herein will be performed under the supervision of E_2C's Principal Geologist, a State of California Professional Geologist (P.G) or a principal-level California Professional Engineer (PE). This includes representing the Client in meetings and/or communications with the regulatory agencies (Los Angeles County Fire Department, Los Angeles Regional Water Quality Control Board, Los Angeles County Environmental Health, South Coast Air Quality Management District, and City of Redondo Beach), and subcontractors throughout the duration of the soil vapor extraction tasks, proposed herein.

This task also includes acquisition of all required permits from the regulatory agencies, and access authorization from property owners and property tenants with the assistance of the client. E_2C personnel will travel to the Site to speak with appropriate personnel to determine the logistics of the selected well placements, trenching locations, power supply logistics, and location of the equipment compound. The remediation system installation and operation will be closely coordinated with development activities planned for the site.

3.1.1 Liaison/Project Management

An E_2C Senior Project Manager will coordinate and oversee all activities relating to the tasks included in this SVE Workplan. This will include contacts, meetings, and oversight of the soil vapor remediation implementation by regulatory agencies. It will also include oversight of logistics associated with the workplan implementation with the regulatory agencies, City of Redondo Beach, and private property owners.

3.1.2 Permitting

For this task, E_2C will prepare, review and certify permit applications, including preparing an Authority-To-Construct from the South Coast Air Quality Management District (SCAQMD), well drilling permits from Los Angeles County Department of Public Health, Environmental Health Office, and construction permits from the City of Redondo Building Department for trenching, equipment compound, and electrical connection. E_2C, if necessary, will also obtain access authorization from Site property owners and City of Redondo Beach for installation of soil vapor wells, trenches, equipment, treatment compound, and for operating the removal systems and monitoring activities after installation (to the extent it is determined that trenches are necessary on private properties or City rights of way, if any).

3.2 WELL INSTALLATIONS

Based on the findings from the previous Site investigation and Site vapor plume extent, the following wells are proposed:

- Ten (10) new nested SVE wells with two 2-inch diameter polyvinyl chloride (PVC) casings: one well casing to a depth of 55 feet bgs with a 20-foot screen at the bottom and another well casing to a depth of 30 feet bgs with a 20-foot screen section.

The proposed well locations are shown on Figure 2 as soil vapor extraction wells SVE-1 through SVE-10. See Figure 3 for the proposed well construction diagram. Existing soil vapor probes (LE-1 through LE-16 and SS-1 through SS-4) will be utilized for soil vapor monitoring.

3.2.1 Site Visit to Mark Locations and Locate Utilities

E2C personnel will visit the Site to mark boring locations, trench locations, and utility lines. DigAlert will be notified a minimum of 48-hours before field work begins.

3.2.2 Soil Borings and Well Installations

Every boring location will be hand-augured to 5 feet bgs to verify utility line location prior to advancing the borings. Borings will be advanced, and wells will be constructed, by a State of California licensed C-57 drilling subcontractor. The soil borings for SVE wells will be advanced to the desired depth at each location using a truck-mounted hollow-stem auger drilling rig equipped with 10-inch or larger diameter hollow stem continuous flight augers. The augers will be steam cleaned prior to drilling each bore hole.

During drilling, the soil strata encountered and other pertinent data will be recorded on a boring log in general accordance with ASTM Method D 2488-84 for visual description and identification of soils. During drilling, a qualified professional will monitor the breathing zone for VOCs using a photoionization detector (PID), or a flame ionization detector (FID).

Since the Site has been adequately characterized and the extent of contamination is generally defined, no soil samples will be collected for laboratory analysis during the SVE well installations.

Well Installations

Each dual-casing SVE well set will be constructed inside a dedicated boring (see Figure 3 for the proposed well construction diagram). During drilling of each boring, field data will be evaluated by a professional geologist or professional engineer familiar with subsurface soil materials and permeable zones beneath the area proposed for soil vapor. The professional geologist or professional engineer will make appropriate field determinations for any adjustment as to exact depth and length of screen intervals for each nested well. All well installation work will be performed under the direct supervision of a California Professional Geologist or California Professional Engineer.

The soil boring for each vapor well will be advanced as described above. Each SVE well will utilize two separate 2-inch Schedule 40 PVC blank casings and well screen. The well screens will have 0.020-inch factory cut slots. Filter pack sand (Cemex Lapis Lustre #3, or equivalent) will be emplaced by gravity feed in the annular space from the bottom to approximately 2 feet above the lower screened interval to be followed by 3 feet of hydrated bentonite chips to seal the filter pack. Hydrated bentonite will fill the annular space to the bottom of the shallow casing depth interval. Filter pack sand will be again emplaced in the screened section of the shallow well to approximately 2 feet above the upper screened interval to be followed by 2 feet of hydrated bentonite chips to seal the filter pack. Neat cement-bentonite slurry or hydrated bentonite will fill the annular space to approximately 24 inches bgs.

The top five feet of the SVE well will be left open to allow plumbing of the well casings to the equipment compound if plumbing occurs prior to site grading or twenty four (24) inches of each SVE well will be left open to allow for plumbing of the well casings to the equipment compound if the plumbing occurs after site grading. Each wellhead will be equipped with a locking cap and an Emco-Wheaton Traffic-Rated steel well box set in concrete slightly above grade.

3.2.3 Loading and Disposal/Recycling of Drill Cuttings

This task includes handling, transport, and disposal (recycling) of drilling investigation derived wastes (IDW) (drill cuttings and rinseate water). As borings are advanced, drill cuttings will be placed in Department of Transportation-rated 55-gallon steel drums with sealed lids and stored at the Site with labels clearly showing the content and the date of generation. Decontamination water will be retained in polyethylene tanks, with a proper label identifying the contents and date of generation, and stored in a secured area and will be transported for recycling (see below).

All IDW will be securely stored and sampled to establish a waste disposal profile for disposal at permitted facilities. Within 5 days of the completion of drilling operations, a composite sample from the cuttings will be collected for disposal profiling. It is estimated that it will take 10 days to receive analytical data from the laboratory. The analytical report will be forwarded to the receiving facility to review and approve for acceptance. After approval for acceptance, the IDW will be disposed within approximately 2 weeks. If the profiling shows that the soil is contaminated and classified as a hazardous waste (it is expected to be non-hazardous based on all previous Site drilling in the source area), the IDW will be disposed of at Waste Management's Kettleman Hills (Hazardous Waste) facility in Kettleman City, California 93239. If the IDW is not contaminated, it will be disposed in Chiquita Canyon Landfill in Castaic, California. Decontamination water will be disposed at the East Bay Municipal Utility District recycling facility in Oakland, California, if it is non-hazardous. Otherwise, the decontamination water will be disposed of at California Asbury Environmental Services.

3.2.4 Baseline Soil Vapor Monitoring

E2C will mobilize to the Site and perform a baseline soil vapor monitoring event using the permanent vapor monitoring vapor probes (see Table below). Soil vapor sampling will be conducted as follows:

Soil Vapor Probe Purging and Sampling Method
Soil vapor probe purging and sampling will be conducted by following the DTSC's 2015 Active Soil Gas Investigations Advisory. Prior to purging or sampling, a shut-in test will be conducted to check for leaks in the above-ground sampling system with the valve to the sampling canister closed. Each soil vapor probe will be purged before sample collection in a clean 1-liter Summa canister. E_2C will purge three casing volumes from each vapor probe to ensure that stagnant and/or ambient air is removed from the sampling system, and to ensure that samples collected will be representative of subsurface conditions.

Leakage during soil vapor sampling may dilute samples with ambient air, producing results that underestimate actual Site concentrations or contaminate the sample with external contaminants. Leak tests will be conducted at each sampling soil vapor probe to determine whether leakage was present during the sampling. Isopropyl alcohol or isobutylene will be used as the leak check compound and will be included in the soil vapor sample analyses with a method reporting limit of 25 micrograms per cubic meter ($\mu g/m^3$). The leak check compound will be introduced at near-saturation concentrations within a tent-type structure that encloses each potential leak point throughout each test.

After each vapor well is adequately purged, a vapor sample will be collected using a 1-liter Summa canister with an in-line flow regulator. Summa canisters will be stored in such a way as to avoid exposure to sunlight. Prior to its use at the Site, each sample container will be assured clean by the analytical laboratory. E_2C personnel will connect new Teflon® or Nylaflow® tubing to the top of each vapor well tubing and utilize a purge pump (calibrated to pump 200 milliliters per minute) and a 3-way valve to purge the previously determined purge volume. The purge pump will not be used for sampling purposes. The purge volume is calculated based on 1 cubic centimeter per foot (cc/feet) for 1/8" outside diameter (OD) tubing and 5 cc/feet for ¼" OD tubing. The purge volumes for the probes are listed in the Table below.

Soil Vapor Probe ID	**Bore Hole Diameter (inches)**	**Sand Pack Height (feet)**	**Porosity**	**Probe Depth (feet)**	**Tubing Diameter (inches)**	**Purge Volume [(1)] (cubic centimeters)**
LE1-5	2.5	1	0.3	5	0.25	1005
LE1-15	2.5	1	0.3	15	0.25	1295
LE2-5	2.5	1	0.3	5	0.25	1005
LE2-15	2.5	1	0.3	15	0.25	1295
LE3-5	2.5	1	0.3	5	0.25	1005
LE3-15	2.5	1	0.3	15	0.25	1295
LE4-5	2.5	1	0.3	5	0.25	1005
LE4-15	2.5	1	0.3	15	0.25	1295
LE5-5	2.5	1	0.3	5	0.25	1005
LE5-15	2.5	1	0.3	15	0.25	1295
LE6-5	2.5	1	0.3	5	0.25	1005
LE6-15	2.5	1	0.3	15	0.25	1295
LE7-5	2.5	1	0.3	5	0.25	1005
LE7-15	2.5	1	0.3	15	0.25	1295
LE8-5	2.5	1	0.3	5	0.25	1005
LE8-15	2.5	1	0.3	15	0.25	1295
LE9-5	2.5	1	0.3	5	0.25	1005
LE9-15	2.5	1	0.3	15	0.25	1295
LE10-5	2.5	1	0.3	5	0.25	1005
LE10-15	2.5	1	0.3	15	0.25	1295
LE11-5	2.5	1	0.3	5	0.25	1005
LE11-15	2.5	1	0.3	15	0.25	1295

Soil Vapor Probe ID	Bore Hole Diameter (inches)	Sand Pack Height (feet)	Porosity	Probe Depth (feet)	Tubing Diameter (inches)	Purge Volume [(1)] (cubic centimeters)
LE12-5	2.5	1	0.3	5	0.25	1005
LE12-15	2.5	1	0.3	15	0.25	1295
LE13-5	2.5	1	0.3	5	0.25	1005
LE13-15	2.5	1	0.3	15	0.25	1295
LE14-5	2.5	1	0.3	5	0.25	1005
LE14-15	2.5	1	0.3	15	0.25	1295
LE15-5	2.5	1	0.3	5	0.25	1005
LE15-15	2.5	1	0.3	15	0.25	1295
LE16-5	2.5	1	0.3	5	0.25	1005
LE16-15	2.5	1	0.3	15	0.25	1295
SS-1	0.75	0.5	1	0.5	0.25	131
SS-2	0.75	0.5	1	0.5	0.25	131
SS-3	0.75	0.5	1	0.5	0.25	131
SS-4	0.75	0.5	1	0.5	0.25	131

Note: Sub-slab probes are installed as Vapor Pin™. Silicone Sleeves are used in place of sand packs and bentonite seals.

(1) Purge volume is calculated as three (3) times the total of sand pack void volume and tubing volume.

The leak check compound will be placed in tent-type structures at the connections on the sampling train, using a paper towel moistened with the leak check compound wrapped with plastic sheeting taped tightly at each end to seal the structure. The sampling procedure is then conducted as detailed above.

E2C personnel will document the vapor probe sampling, which will include the sample identification, the probe location, date and time of sample collection, sampling depth, identity of on-site personnel, sampling methods and devices, soil gas purge volumes, volume of soil gas extracted, vacuum of canisters before and after samples is collected, and chain-of-custody protocols. A chain-of-custody form will be completed to maintain the custodial integrity of samples. Sample collection times will be included on the chain-of-custody form.

All soil vapor samples will be analyzed at ProVera Analytical Laboratories in Roseville, California for VOCs using EPA Method TO-15 full list (see below) For indoor air analysis, EPA Method TO15 Single Ion Monitoring (SIM) method will be used with low reporting limits (below the removal goal(s) for the Site COCs.

Analyte	Reporting Limit (µg/m^3)	Analyte	Reporting Limit (µg/m^3)
Propylene	17	Trichloroethylene	5.4
Dichlorodifluoromethane (Freon 12)	50	1,2-Dichloropropane	46
1,2-Dichlorotetrafluoroethane(F-114)	70	1,4 Dioxane	36

Analyte	Reporting Limit (μg/m³)	Analyte	Reporting Limit (μg/m³)
Chloromethane	21	Bromodichloromethane	67
Vinyl Chloride	26	cis-1,3 Dichloropropene	45
1,3 Butadiene	22	MIBK (Methyl Isobutyl Ketone)	41
Bromomethane	39	Toluene	38
Chloroethane	26	trans-1,3 Dichloropropene	45
Trichlorofluoromethane (F 11)	56	1,1,2-Trichloroethane	55
Isopropyl alcohol	25	MBK	41
Freon 113	77	Tetrachloroethylene	6.8
1,1 Dichloroethene	40	Dibromochloromethane	85
Acetone	24	1,2-Dibromoethane (1,2 EDB)	77
Carbon Disulfide	31	Chlorobenzene	46
Methylene Chloride	35	Ethylbenzene	43
MTBE	36	m,p-Xylene	43
trans-1,2 Dicloroethene	40	o-Xylene	43
n-Hexane	35	Styrene	43
Vinyl acetate	35	Bromoform	103
1,1-Dichloroethane	41	1,1,2,2-Tetrachloroethane	69
Methyl Ethyl Ketone	30	4-Ethyltoluene	49
cis-1,2 Dichloroethene	40	1,3,5-Trimethylbenzene	49
Tetrahydrofuran	30	1,2,4-Trimethylbenzene	49
Chloroform	49	1,3-Dichlorobenzene	60
1,1,1-Tricloroethane	55	1,4-Dichlorobenzene	60
Cyclohexane	34	Benzyl chloride	52
Carbon Tetrachloride	63	1,2-Dichlorobenzene	60
Ethyl Acetate	36	1,2,4-Trichlorobenzene	74
Benzene	3.2	Hexachloro-1,3-butadiene	107
1,2-Dichloroethane	41	Naphthalene	52
n-Heptane	41	---	---

3.3 REMEDIATION SYSTEM INSTALLATION

3.3.1 Trenching, Plumbing, Backfilling

Upon completion of the well installations, trenching for piping installation will be performed. Conveyance piping will be laid in the trenches above approximately 6 inches of bedding sand; the trenches will then be backfilled with 2-sack cement slurry; and piping will be manifolded at the equipment compound. Trenches will be excavated from each SVE well to a trunk-line main trench, with an individual piping run for each SVE well. Each of the SVE lines will have an individual valve to allow operational control. The main trench will terminate at the equipment compound, which will be located in the parking area near the center of the Site.

Trenches will generally be constructed in the following manner (see Figure 2 for the proposed trench locations):

- A backhoe will be used to excavate an approximate 2-foot wide by 18-inch deep trench from each SVE well to a main line, which will terminate at the equipment compound;
- The trench will contain 6 inches of bedding sand that is compacted to approximately 90% relative density;

- Piping will be laid on the bedding sand and additional sand will be added to encase the piping; and
- The remaining space in the trench will be backfilled with 2-sack cement slurry to approximately 6 inches below grade. The trenches will be completed with either concrete or asphalt to match the existing grade.

The SVE remediation system will utilize 2-inch ID Schedule 40 PVC for the vacuum conveyance piping. Each piping run will be manifolded above ground at the equipment area. A control valve and sampling port will be installed on the manifold for each well so that the flow rate may be adjusted and vapor samples can be collected from individual SVE wells.

Equipment pad construction will not be necessary, as the equipment will be skid-mounted and placed on a paved parking area. Vacuum conveyance piping will run from each SVE well casing to the equipment area and the manifold will be constructed at that point.

The electrical supply service required for the system is three-phase 240 volts at 100 amps with appropriate earth ground, circuit breakers and shut-off. The electrical service is available at the Site and a direct activation or simple line drop will be procured. Final electrical connection will be completed by a licensed electrician in compliance with all City of Redondo Beach electrical codes.

3.3.2 Equipment Installation

The proposed SVE equipment consists of a Dresser Roots 59 U-RAI (or similar) blower and vapor phase carbon system. The unit is equipped with a 20-horsepower motor and a Dresser Roots 59 vacuum blower, which has a maximum flow capacity of approximately 500 standard cubic feet per minute (scfm). The equipment is skid mounted with the following major components: entrainment liquid separator, float switches and entrainment water pump, electrical control panel with main power switch and hour meter, vacuum pump and motor, two 1000-pound granular activated carbon (GAC) vessels inline filled with granulated activated carbon, influent and effluent sampling ports for each carbon vessel. The unit is designed to achieve 100% adsorption efficiency. All the SVE wells (SVE-1 through SVE-10) will be individually plumbed to the equipment compound with an individual control valve for each well.

Major components of the system (See Figure 4 for the system schematic) will include:

- One 500 SCFM vacuum blower
- Two 1,000-pound. GAC vapor-phase vessels
- One 1000-gallon poly-tank (includes tank, delivery and setup)
- Noise blanket and barriers
- Fence with slats around the equipment on three sides with gate opening to the west.

3.3.3 Mobilize and Install SVE Equipment

After completion of the plumbing runs, installation of the necessary utilities and the issuance of the required Authority-To-Construct from the SCAQMD, E_2C personnel will deliver the SVE equipment to the Site, connect the equipment to the manifold and utilities (See Figure 4 for a system schematic). This will be conducted over a 3-day period.

Equipment will be checked and tested at the E_2C warehouse prior shipping to the Site. All support equipment required for the SVE system installation will also be mobilized to the Site. Additionally, noise reducing elements will be installed, as warranted, to comply with local noise ordinances and as requested by the property owner. If the equipment noise exceeds acceptable levels or causes concerns, a shield with noise reduction enclosure over the equipment will be installed to reduce the noise level.

Startup testing will be conducted over a 5-day period or as specified in the SCAQMD permit. During the startup testing, a vacuum pressure gauge will be placed on each of the SVE wells and vapor monitoring points to measure the vacuum negative pressure at each location. The vacuum/pressure gauge to be employed will be capable of detecting pressure changes of 0.1 inches of water. Vacuum or backpressure will be recorded from each inlet well and will be plotted against distance from the extraction well. The distance-negative pressure curves thus generated will yield the empirical data necessary to estimate whether the well configuration will provide sufficient lateral coverage to effectively remediate the impacted vadose zone.

Measurements collected during the startup test will include: negative pressure at soil vapor probes to assess radius of influence based on the negative pressure readings greater than 0.1 inches of water column; flow rate; temperature; and, influent and effluent concentrations measured with a photoionization detector (PID). These measurements will be used to evaluate the effectiveness of the system. Note: Influent and effluent samples will be collected with 1-liter Summa canisters from the sampling ports with a small vacuum sampling pump during the testing to verify that the equipment will operate within SCAQMD permit conditions. In addition, the data can be used to estimate expected removal rates.

E_2C staff will conduct operation and maintenance (O&M) of the SVE system to verify efficient remediation of the Site. Equipment operating parameters will be monitored by E_2C during on-site inspections. It is E_2C's experience, from previous SVE operations, that maintenance schedules will be daily inspections for the first 5 days, or the Startup Testing period as specified by the SCAQMD and weekly thereafter.

3.3.4 Laboratory Analysis of Vapor Influent and Effluent Samples

During the first five days of SVE system start-up a minimum of one influent vapor sample and one effluent vapor sample will be collected in Summa canisters and submitted for laboratory analysis for VOCs using TO-15.

3.4 SVE OPERATION AND MAINTENANCE

Based on the data and parameters obtained during SVE system startup, field measurements will be evaluated to determine if the vapor extraction coverage is adequate, or if additional vapor extraction wells are warranted. SVE system startup data will be used to optimize system operation.

System operational optimization will be based on monitoring data of 1) vapor influent field PID readings from the overall system and individual extraction wells; 2) regular soil vapor monitoring data; and 3) equipment performance characteristics. Vacuum and soil vapor concentration monitoring, using field instruments, for individual extraction wells both at the well head and on the extraction manifold and the treatment system will be performed to ensure that the system functions as intended and the optimal mass removal is achieved. Each extraction well will have its own valve to control utilization from 0 to 100%.

The optimization is achieved by:

1) Evaluating the spatial soil vapor concentration distribution and the remediation needs, such as the source area and the soil vapor mitigation needs under buildings;
2) Adjusting valves of extraction wells to focus on area with high concentrations or high priority;
3) Re-evaluate the influent concentrations from the system and individual wells and the monitoring data regularly to repeat the optimization process; and
4) When the concentrations are reduced to such a low level to render that continuous operation of the system is not desired, then the system will be operated in a cycling mode with a period-on (e.g., two weeks on) and period-off (two weeks off).

The optimization valve configuration settings, field vacuum and PID readings will be recorded on field operational and monitoring (O&M) data sheets. The O&M data and the mass removal calculations will be summarized in tables to be presented in the regular remediation status reports.

3.4.1 Remediation System Operations and Maintenance

E_2C professional staff, experienced in SVE technology, will conduct operation and maintenance (O & M) of the SVE system equipment to achieve efficient remediation of the Site. Equipment operating parameters will be monitored by E_2C at on-site inspections conducted on a weekly basis. Maintenance and inspection schedules will ultimately comply with the Permit to Operate (PTO) (initially, Authority To Construct [ATC]) conditions set by the SCAQMD. The operations and maintenance of the system is to include all materials and supplies necessary to conduct normal operational activities such as field screening, system checks and adjustments, and regular lubrication and maintenance. The SVE equipment proposed will be equipped with flow and vacuum measurement gauges.

VOC vapors collected by the SVE system will be routed through a series of two 1,000-pound granular activated carbon (GAC) vessels. Due to the low to moderate concentrations of VOCs reported during the Site Investigation, it is estimated that only one carbon change-out will be needed during the SVE system startup period plus eighteen month full-scale SVE system operation. The extracted water, if any, will also be stored on-site and later transported for off-site disposal/recycling.

3.4.2 Carbon Change-outs

It is estimated that one change-out of the two 1,000-lb vapor-phase GAC vessels for the system will be required through the SVE system startup period plus eighteen month full-scale SVE system operation. When sampling of the first carbon indicates that breakthrough has occurred, the first vessel will be removed from service, the second vessel will move up one position and a new 1,000-lb carbon vessel will be placed in the second position.

3.4.3 Chemical Analysis of Vapor Influent and Effluent Samples

E_2C will collect influent/effluent SVE system vapor samples on a monthly basis to evaluate VOC removal rates and verify that the equipment is operating within SCAQMD PTO conditions. Samples will be analyzed at a State of California ELAP-certified analytical laboratory for chlorinated VOCs using modified EPA Method TO-15.

3.4.4 SCAQMD Annual Inspection Testing

An annual SCAQMD Inspection Test will be conducted for each year of SVE operation after the date of the Startup Inspection Test. A SCAQMD Inspector will visit the Site to verify that the machinery meets Permit (ATC/PTO) conditions. Influent and effluent samples will be collected. The influent and effluent vapor samples will be analyzed at a State of California-certified analytical laboratory for chlorinated VOCs using Modified EPA Method TO-15. Testing results and an estimate of annual emission will be submitted to the SCAQMD.

3.5 SYSTEM CYCLING AND CONFIRMATION SAMPLING

When COC concentrations in monitoring vapor probes, extraction wells, and extraction system influent meet the Remedial Action Objectives (RAOs) and mass removal has become negligible, the SVE system will be operated in cycling mode followed by transitioning to being shut down for a 3 month period (to allow subsurface conditions to re-equilibrate) and collecting soil vapor monitoring samples. If soil vapor concentration indicate a need for further SVE operation the SVE system will be restarted.

SVE operations will continue either on a full time mode or on a cycling mode until COC concentrations in vapor samples meet RAOs. The cycling mode will continue until soil vapor concentrations in the vapor monitoring wells and extraction wells remain below RAOs for 3 months, at which time, the SVE system will be permanently shutdown with concurrence from the Los Angeles County Fire Department (LACFD).

Confirmation soil vapor samples, from the soil vapor monitoring probes will be collected a minimum of 30 days after the conclusion of SVE operations to confirm the effectiveness of the remediation operation. Confirmation soil vapor samples will be chemically analyzed at ProVera for VOCs (full list) using modified EPA Method TO-15.

3.6 REMEDIATION SYSTEM DECOMMISSIONING

Subject to LACFD) approval, the SVE system will not be removed until rebound testing is performed and it is determined that the RAOs have been achieved or it is not feasible to continue to operate the SVE system. After LACFD's approval for the removal of the SVE system, all the equipment (including, SVE vacuum pump, vapor carbon vessels, water storage tank, electrical panel, and compound fences) will be removed from the Site.

The SVE wells and piping will be left in place to be properly abandoned at a later time when the completion of the removal action is certified as approved by LACFD. Once LACFD approval is obtained, the SVE wells will be pressure grouted with drill out of the top 5 feet under Los Angeles County permit and the conveyance piping will be plugged/grouted and left in place. Wellheads and manifold locations will be patched to match the existing grade.

3.7 CONTINGENCY REMEDY

If the SVE operations are not successful in reaching the Site RAOs, the following removal measures will be used as contingencies.

- Optimize SVE operation focusing extraction from a few wells with higher vapor concentrations;
- Add additional SVE wells a at locations where the concentrations remain above the removal goals;
- If vapor concentrations reach asymptotic levels at concentrations higher than the removal goals, institutional restrictions or physical barriers may be explored. However, the likelihood of this scenario is very low.
- If SVE reaches its practical limits and the remedial goals for soil vapor, indoor air or sub-slab vapor are still not achieved, quarterly indoor air sampling and sub-slab soil vapor sampling over 1 year will be conducted to see if any PCE is still migrating into indoor air above the remedial goal.
- If indoor air sampling events show PCE concentrations are below the remedial goal, annual indoor air monitoring and sub-slab sampling will be conducted as a long-term maintenance requirement. An Operation and Maintenance Agreement (OMA) will be required to cover long-term monitoring and financial assurance for long term monitoring shall be put in place.
- If indoor air sampling shows PCE concentrations are above the remedial goal, contingency measures such as sealing cracks and building floor or installation

of a sub-slab depressurization system may be required to prevent vapor intrusion into the building. Any vapor mitigation design will be submitted to LAFD for review and approval. An Operation and Maintenance Plan (O&M Plan) and OMA with financial assurance would be required for this contingency measure.

For existing buildings, if SVE cannot achieve the indoor air vapor concentrations goals, air exchanges through installation of appropriate heating ventilation and air conditioning (HVAC) system and/or installation of physical barriers such as sealant on the building floor, at wall joints, and at wall and foundation seams. For future buildings, vapor mitigation systems may be required. As demonstrated by the SVE operation conducted for similar sites in California, even if there is a possibility that SVE may not be able to achieve the final remediation goals, SVE will reduce the concentrations to low levels such that a physical barrier will be sufficient to ensure acceptable indoor air concentrations.

At this time, it is not certain that any of these contingencies will be necessary, nor where these measures will be needed. In the event a contingency becomes necessary, a detailed design will be developed.

3.8 LAND USE COVENANT (LUC)

After the SVE remediation has been completed and the Remedial Action Completion Report has been completed and approved by LACFD, if it is deemed necessary, a LUC will need to be prepared for the Site and executed and recorded with Los Angeles County. The LUC would include all the necessary restrictions.

4.0 REPORTING

Status reporting will include quarterly SVE Status Reports, SCAQMD Start-up Report and annual report, a Remediation System Installation Report, and electronic submittals of reports to the GeoTracker Database.

4.1 SVE REMEDIATION QUARTERLY STATUS REPORTS

E$_2$C will periodically prepare SVE remediation status reports to document SVE remediation system operations, permit compliance, VOC mass removal rates, and VOC mass removed and treated by GAC. SVE remediation status reports will include, but not necessarily be limited to the following:

- A narrative description of SVE remediation system operations;
- A table summarizing SVE remediation system operational data;
- SVE remediation system influent and effluent laboratory analytical reports;
- Tables summarizing influent and effluent sample laboratory analytical data;

- Tables summarizing vapor probe vapor concentrations;
- Tables summarizing SVE remediation system VOC mass removal rates and incremental and cumulative VOC mass removal estimates;
- A discussion of SVE remediation system effectiveness; and
- Conclusions and recommendations.

E_2C anticipates preparing SVE remediation status reports on a quarterly basis, unless a different reporting schedule is requested by the LACFD. The SVE remediation status reports will be prepared under the supervision of, will be reviewed by, and will be certified by a State of California registered Professional Geologist, or Professional Engineer.

4.2 SCAQMD STATUS REPORTS

SCAQMD Status Reports will be prepared to document compliance with the ATC/PTO. The reports will include the system operational records including operation hours, system influent/effluent concentrations, and emission mass estimates. It is expected that two reports will be prepared: one system startup report and one annual report.

4.3 REMEDIATION SYSTEM INSTALLATION REPORT

Upon completion of the above-described SVE startup, a report of findings will be prepared, which will document the installation of the vapor extraction wells, testing data including baseline and post-test soil vapor and groundwater analytical results.
This report will include, but not limited to, the following:

- Boring logs and well construction diagrams for the vapor extraction wells, and soil vapor probes;
- Description of testing methods and procedures;
- Description of vapor sampling methods and procedures;
- Tabular summaries of field data;
- Tabular summaries of vapor analytical data;
- Graphical representations of data as warranted;
- Tabular summaries of vapor extraction flow rates;
- Estimates of PCE mass removed from the vapor phase;
- Interpretation of testing results (including radii of influence, which will be determined by plotting vacuum measurements against distance to the extraction wells); and
- Conclusion and recommendations.

The Remediation System Installation Report will be prepared under the supervision of, will be reviewed by, and will be certified by a State of California Professional Geologist/Engineer.

5.0 SOIL TREATMENT WORKPLAN

E_2C proposes to treat arsenic impacted soil by immobilizing the arsenic using solidification/stabilization technologies. Solidification/stabilization is capable of reducing the leachability of arsenic to below 5.0 mg/L (as measured using the Toxicity Characteristic Leaching Procedure [TCLP]), which is a common treatment goal for soil and waste. Due to the relatively small to moderate quantity of impacted soil and the moderate arsenic concentrations, solidification/stabilization is deemed the most economical measure for treating arsenic in Site soil.

Typically, mixing soil with Portland cement and other pozzolanic materials will increase the soil density and strength, while immobilizing arsenic. For full-scale implementation, a mobile pug-mill will be set up at the site for soil mixing treatment, placement and compaction in coordination with site development activities. It is estimated that the onsite treatment may take 1 to 2 weeks.

Although solidification/stabilization is a proven technology for the treatment of arsenic impacted soil and waste, its application at the site needs to be verified through bench-scale testing and accepted by the regulatory agency (LACFD) and the LARWQCB. E_2C proposes the following steps are anticipated.

- The first step would involve discussions with a Geotechnical Engineering firm to determine the suitability of the treated soil to be used as compacted fill.
- The second step would be to discuss the specific solidification/stabilization methodology with the oversight agency (LACFD) and LARWQCB.
- After obtaining approval from the LACFD and LARWQCB, the third step would include an in-field treatability study where we would test various mixtures of soil and reagents to evaluate suitability for fill (strength) and arsenic concentration reductions (stabilization).
- If the treatability study is successful, the fourth step would be the full-scale implementation of solidification/stabilization of arsenic-impacted soil.

The details of the work to be performed within each task are described below.

Task 1: Permitting

Approvals or permits from the LACFD and LARWQCB will be obtained for the soil treatment by submitting the soil arsenic concentration data and distribution to the LACFD and LARWQCB and presenting the treatment testing data. Note: Discussions with the LARWQCB indicate that, depending upon the soil analytical data submitted, a full Waste Discharge Report (WDR) may not be necessary.

Task 2 Treatability Study (Chemical and Geotechnical)

This task involves conducting a bench scale test by mixing/treating soil samples with various Portland cement weight ratios (2%, 4%, 6%, and 8%), collecting samples of untreated (1 sample) and treated soil (4 samples) for TCLP tests and geotechnical tests (density and strength parameters: friction angle and cohesion). Approximately 8 cubic feet of soil would be used in the treatability study. A report documenting the test methods and test results will be prepared and submitted for review and evaluation.

Task 3 Soil Excavation

This task involves excavation of the arsenic impacted soil from the Site within the railroad spur track footprint up to 5 feet below ground surface. This excavation will be closely coordinated with other site development activities. The excavated soil will be staged on Site for soil mixing treatment and the treated soil will be placed in the excavation and compacted as needed for the planned development.

Task 4 Soil Mixing with Portland Cement

An estimated 2,200 cubic yards of arsenic impacted soil will be treated. The soil mixing sub-contractor will mix impacted soil with Portland cement using a mobile pug mill. The mixing ratio will be determined from the treatability study and approved by the LACFD and/or the LARWQCB. Due to the relatively low arsenic concentrations, it is expected that cement ratio by weight should be less than 10%.

Task 5 Volume Expansion Disposal

It is estimated that the soil mixing will probably result in an excess soil volume (up to 5%) due to the addition of Portland cement and water. The extra volume will be disposed off Site in a waste disposal facility as non-hazardous waste or used in a portion of the Site planned parking area when the site is prepared for development activities.

Task 6 Backfilling and Compaction

The treated soil will be placed back at the excavated area and compacted to specification to meet the site soil strength requirements. The use of extra treated soil, if any, can be coordinated with Site development activities. The extra treated soil will likely be suitable for use in parking lot areas or other areas outside of building footprints.

6.0 SOIL EXCAVATION AND OFF-SITE DISPOSAL WORKPLAN

If the process of permitting/obtaining a WDR for soil treatment takes longer than expected and soil treatment is not feasible, an alternative option for the arsenic impacted soil remediation will be utilized. The alternative for remediating the impacted soil will be excavation and transport of the impacted soil to a receiving disposal facility for disposal.

The details of the work to be performed, in this alternative, within each task are described below.

Task 1: Permitting

The excavation depth will be limited to 5 feet and excavation will be coordinated with site grading activities. The excavation will be performed under the site grading permit from City of Redondo Beach. Due to the limited disturbance area (less than 1 acre), an air quality control permit is not expected to be required; however, dust control measures such as lightly watering excavated soil and minimizing truck speed on-site will be implemented.

Task 2 Soil Excavation

This task involves excavation of the arsenic impacted soil from the Site within the railroad spur track footprint up to 5 feet below ground surface. This excavation will be closely coordinated with other site development activities. The excavated soil will be hauled offsite to a properly licensed landfill for disposal.

Task 3 Soil Sampling and Analysis

At least two soil samples from each side of the excavation walls and the bottom will be collected and submitted to a certified laboratory for arsenic analysis to confirm that impacted soil with concentration greater than the background concentration (12mg/Kg) was excavated. Composite soil samples will be collected from the excavated soil and analyzed for disposal profiling and classification.

Task 4 Backfilling and Compaction

The imported clean soil (meeting planned site engineering strength requirements) will be placed back at the excavated area and compacted to specification to meet the site soil strength requirements.

7.0 TRANSPORTATION PLAN

7.1 CHARACTERISTIC AND DESTINATION OF SOIL TO BE TRANSPORTED

Elevated levels of arsenic, up to 140 mg/kg of total arsenic and 7.7 mg/L of soluble arsenic, were detected in the site soil. The Total Threshold Limit Concentration (TTLC) for hazardous waste classification is 500 mg/kg for arsenic. The Soluble Threshold Limit Concentration (STLC) for hazardous waste classification is 5.0 mg/L for soluble arsenic. The Toxicity Characteristic Leaching Procedure (TCLP) limit for classifying arsenic-impacted soil as a hazardous waste under the Resource Conservation and Recovery Act of 1976 (and as amended) is 5.0 mg/L. As a result, any mixture of arsenic-impacted soils removed from the site is expected to be handled as a non-hazardous waste.

Soils classified as non-hazardous waste will probably be transported to Chiquita Canyon Landfill or to Scholl Canyon Landfill for disposal. These disposal facilities are licensed Class III landfills and are located at the following addresses:

Chiquita Canyon Landfill and EPA ID 110017973460
29201 Henry Mayo Drive
Castaic, CA, 91348

Phone: 661 257 3655

Scholl Canyon Landfill and EPA ID 110000781360
3001 Scholl Canyon Road
Glendale, CA, 91206
Phone: 818 243 9779

7.2 TRUCK TRANSPORTATION

Approximately 3000 tons of soil will be removed from the site. Assuming each truck carries 20 tons, up to 150 trucks will be needed to transport the impacted soil. All permitted disposal facilities operate a certified weight station at their facility. As such, each truck will be weighed before offloading its payload. Weight tickets or bills of lading will be provided to the removal action subcontractor after all the soil has been shipped off-site. Below is a summary of the truck route from the site to the disposal facilities listed above:

Chiquita Canyon Landfill
TRUKC Route: CA-1, I-105, I-405, CA-126 (approximately 52.1 miles)

Scholl Canyon Landfill
Truck Route: CA-1, I-105, I-110, CA-134 (Approximately 35.1 miles)

Truck transportation will occur during the time period from 9:00 am to 4:00 pm on normal business days.

Before leaving the site, each truck driver will be instructed to notify the site manager. Each truck driver will be provided with a Uniform Hazardous Waste Manifest, Non-Hazardous Waste Manifest, or bill-of-lading and the cellular phone number for the site manager. It will be the responsibility of the site manager to notify LACFD of any unforeseen incidences. Each truck driver will be instructed to use the freeway Call Box System (if available), a cellular telephone, and/or their radio dispatch system to call for roadside assistance and report roadside emergencies.

7.3 SITE TRAFFIC CONTROL

During soil transport activities, trucks will enter the site through site access located on North Catalina Avenue. A flag person will be located at the site to assist the truck drivers to safely drive onto the site. Transportation will be coordinated in such a manner that at any given time, on-site trucks will be in communication with the site trucking coordinator. In addition, all vehicles will be required to maintain slow speeds (i.e., less than 5 mph) for safety and for dust control purposes.

Prior to exiting the site, the vehicle will be swept to remove any extra soil from areas not covered or protected. This cleanup/decontamination area will be set up as close to the loading area as possible so as to minimize spreading the impacted soil. Prior to the off-site transport, the site manager will be responsible for inspecting each truck to ensure that the payloads are adequately covered, the trucks are cleaned of excess soil and properly placarded, and that the truck's manifest has been completed and signed by the generator (or its agent) and the transporter. As the trucks leave the site, the flag person will assist the truck drivers so that they can safely merge with traffic on Catalina Avenue..

7.4 RECORD KEEPING

The removal action contractor will be responsible for maintaining a field logbook, which will serve to document observations, personnel on site, equipment arrival and departure times, and other important project information. Logbook entries will be complete and accurate enough to permit reconstruction of field activities. Logbooks will be bound, with consecutively numbered pages and each page will indicate the date and time of the entry. All entries will be legible, written in black or blue ink, and signed by the author. Language will be factual and objective. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed.

If some portion of the excavated soil likely will be profiled as hazardous waste under California or EPA regulations, the Uniform Hazardous Waste Manifest (hazardous waste manifest) form will be used to track the movement of soil from the point of generation to the point of ultimate disposition. The hazardous waste manifests will include the following information:

- Name and address of the generator, transporter, and the destination facility
- United States Department of Transportation description of the waste being transported and any associated hazards
- Waste quantity
- Name and phone number of a contact in case of an emergency
- EPA Hazardous Waste Generator Number
- Other information required either by the EPA and/or the DTSC.

Any soil that is profiled as non-hazardous and sent off site for disposal will be documented using a Non-Hazardous Waste Manifest or Bill-of-Lading form. At a minimum, this form will include the following information:

- Generator name and address
- Transportation company
- Accepting facility name and address
- Waste shipping name and description
- Quantity shipped.

Prior to transporting the excavated soil off site, an authorized representative of the contractor will sign each hazardous and/or non-hazardous waste manifest. The removal action site manager will maintain one copy of all hazardous and/or non-hazardous waste manifests on site.

8.0 SCHEDULE

Upon approval of this SVE and Soil Treatment Workplan, E_2C will initiate the SCAQMD ATC and the SVE well installation permitting process. After approval of the permits (Los Angeles County Environmental Health, City of Redondo Beach and SCAQMD), installation of the SVE wells, trenching and piping to the SVE system, and installation of the treatment compound will be initiated. Construction activities are anticipated to be completed in approximately 6 weeks. A baseline soil vapor sampling and monitoring of vapor probes will be conducted prior to startup.

After startup, the SVE system will be tested for 5 days to verify efficient operation and that the SVE system is in compliance with the SCAQMD permit (ATC/PTO). The SVE system will then be operated on a continuous basis with weekly inspection visits. Approximately thirty days after system startup, the SCAQMD startup inspection test will be scheduled and conducted.

Field soil vapor monitoring of selected vapor probes will be conducted periodically. Status reports will be submitted as required by the LACFD and the SCAQMD.

E_2C expects that that only one carbon change-out will be needed during the SVE system startup period plus eighteen month full-scale SVE system operation. After the completion of SVE system operation, rebound vapor sampling and monitoring will be conducted approximately one month after shutdown. If rebound is within acceptable vapor concentrations, the system will be demobilized.

9.0 SAMPLING AND ANALYSIS PLAN

The proposed removal action will require the collection and analysis of soil vapor samples to confirm the cleanup of impacted soil vapor and soil and composite soil samples to determine the proper waste classification of investigation derived waste for disposal purposes. During the SVE operation, system influent and effluent samples will be collected and analyzed for compliance with SCAQMD permit requirements. All sampling will be conducted in general accordance with the Sampling and Analysis Plan (Appendix C).

10.0HEALTH AND SAFETY PLAN

All contractors will be responsible for operating in accordance with the most current requirements of State and Federal Standards for Hazardous Waste Operations and Emergency Response (Cal. Code Regs., tit. 8, section 5192; 29 CFR 1910.120). On-site personnel are responsible for operating in accordance with applicable regulations of the Occupational Safety and Health Administration (OSHA) outlined in the State General Industry and Construction Safety Orders (Cal. Code Regs., tit. 8) and Federal Construction Industry Standards (29 CFR 1910 and 29 CFR 1926), as well as other applicable federal, state and local laws and regulations. All personnel shall operate in compliance with California OSHA requirements.

In addition, California OSHA's Construction Safety Orders (especially Cal. Code Regs., tit. 8, sections 1539 and 1541) will be followed as appropriate.

A Site-specific HASP (see Appendix D) will be followed during field work at the Site in accordance with current health and safety standards as specified by the federal and California OSHA standards.

11.0LIMITATIONS AND WORKPLAN CERTIFICATION

This Workplan has been prepared under the professional supervision of the registered professional whose seal and signature appears herein. Conclusions in this Workplan are based solely on the Scope of Services outlined and the sources of information referenced in this Workplan. Any additional information that becomes available concerning the Site should be submitted to E_2C so that our conclusions may be reviewed and modified, if necessary. This Workplan was prepared for the sole use of Beach City Capital and/or its agent(s), the Los Angeles County Fire Department, the Los Angeles Regional Water Quality Control Board and the Los Angeles County Environmental Health Department.

E_2C Remediation will perform the elements of the Workplan in accordance with the generally accepted standards of care that exists in California at this time. It should be recognized that definition and evaluation of geologic conditions is a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with limited knowledge of subsurface conditions present. No warranty, expressed or implied, is made.

Prepared By:

Reviewed by:

12.0REFERENCES

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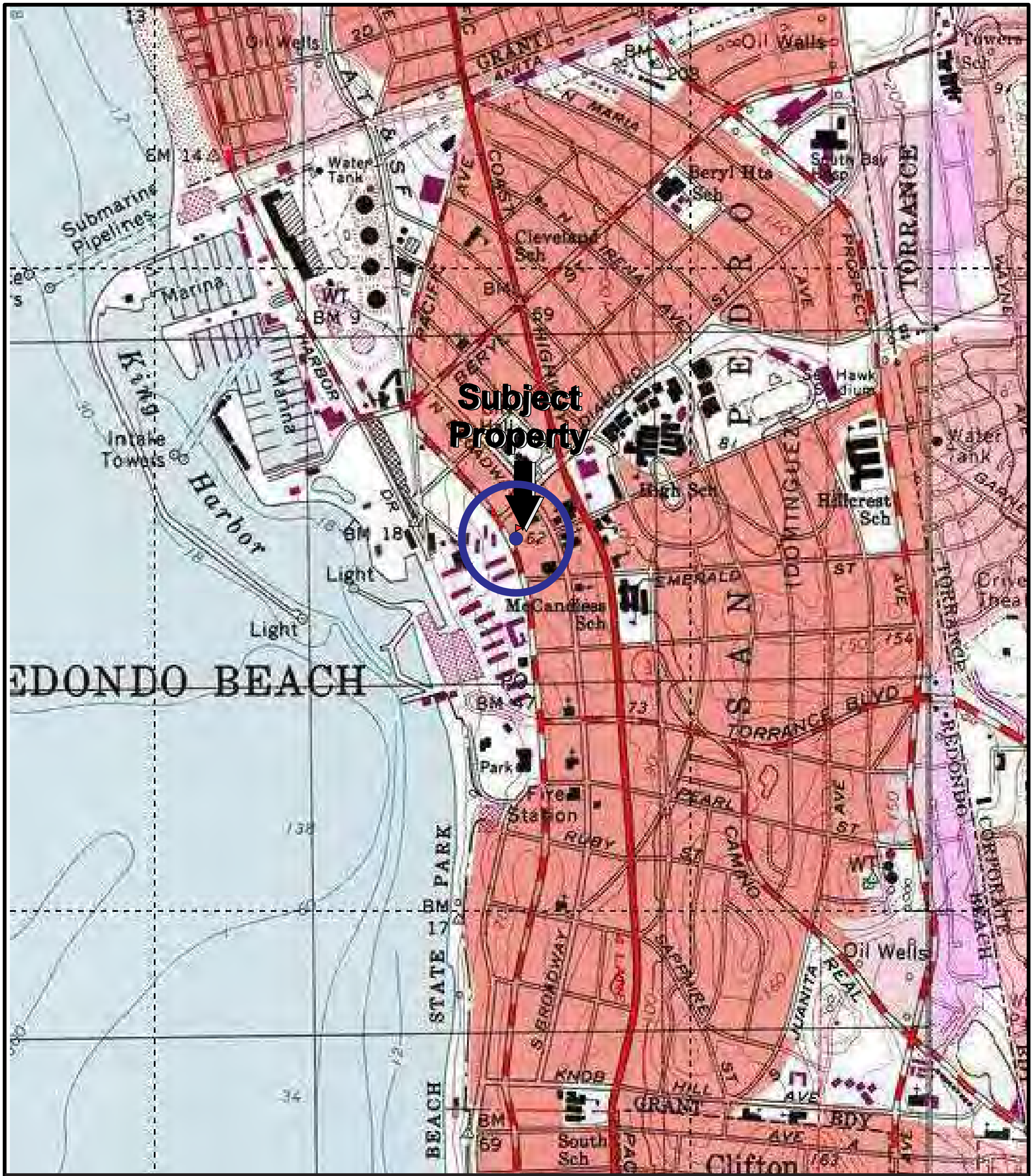
FIGURES

Figure 1 Site Location Map
Figure 2 Site Plan
Figure 3 Proposed Well Construction Diagram
Figure 4 Soil Vapor Extraction System Schematic



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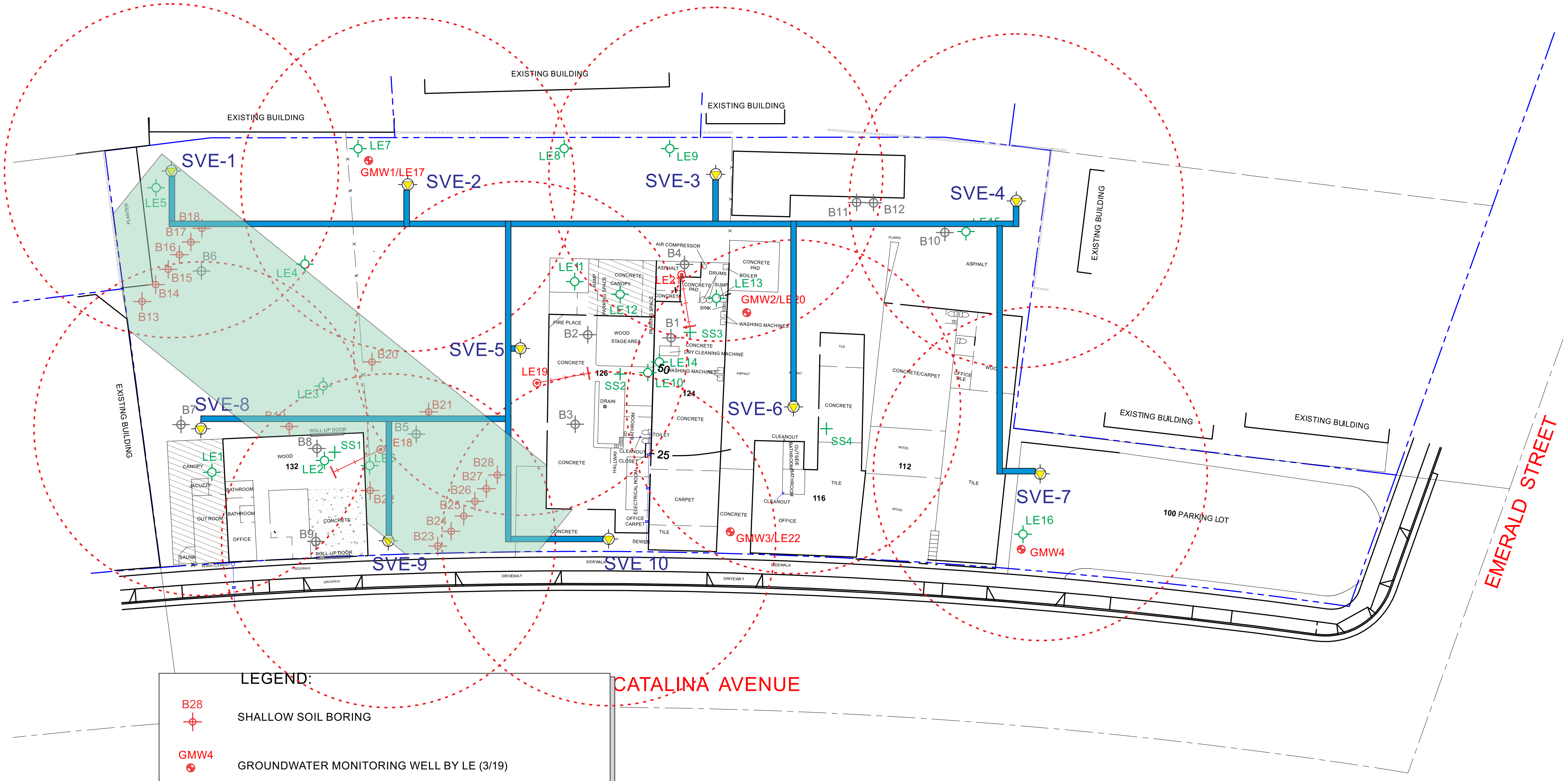
132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

SITE LOCATION MAP

FIGURE

1



LEGEND:

B28	SHALLOW SOIL BORING
GMW4	GROUNDWATER MONITORING WELL BY LE (3/19)
GMW3/LE22	GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)
LE21	ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)
	SURFACE TRACE OF ANGLED BORING VAPOR PROBE: -15' -30' -50'
SS4	SUB-SLAB VAPOR PROBE, BY LE (2019)
LE16	SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)
B12	SOIL BORING, BY PARTNER (2018)
s	SEWER LINE

SCALE: 1" = 40'

0" 1" 2"

0' 40' 80'

Note: Base map from Landmark Engineering

EXPLANATION

▼	Proposed Soil Vapor Extraction Well
▬	Proposed Trench/Piping Location
🟩	Proposed Shallow Soil Treatment Area

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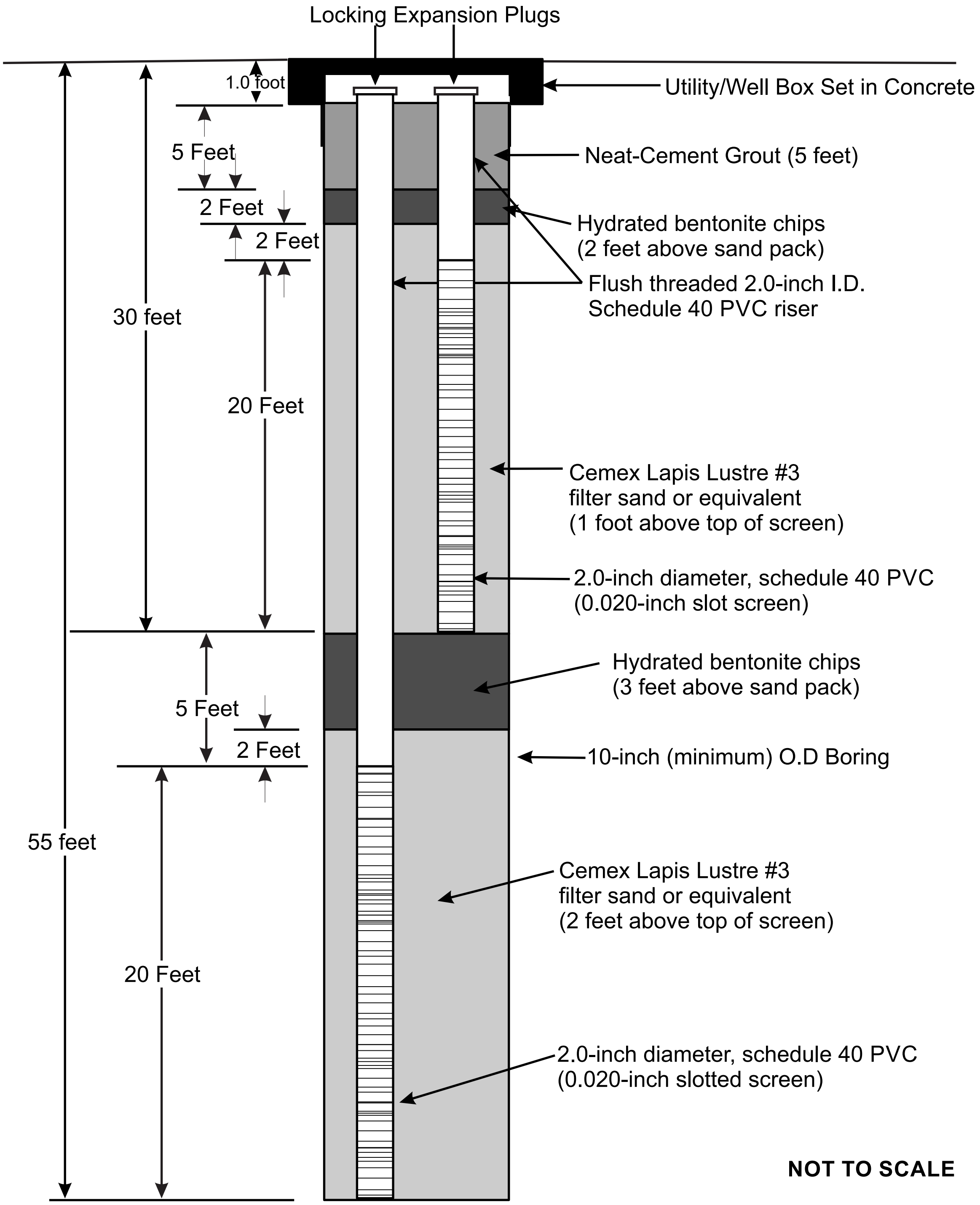
100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

SITE PLAN

FIGURE
2



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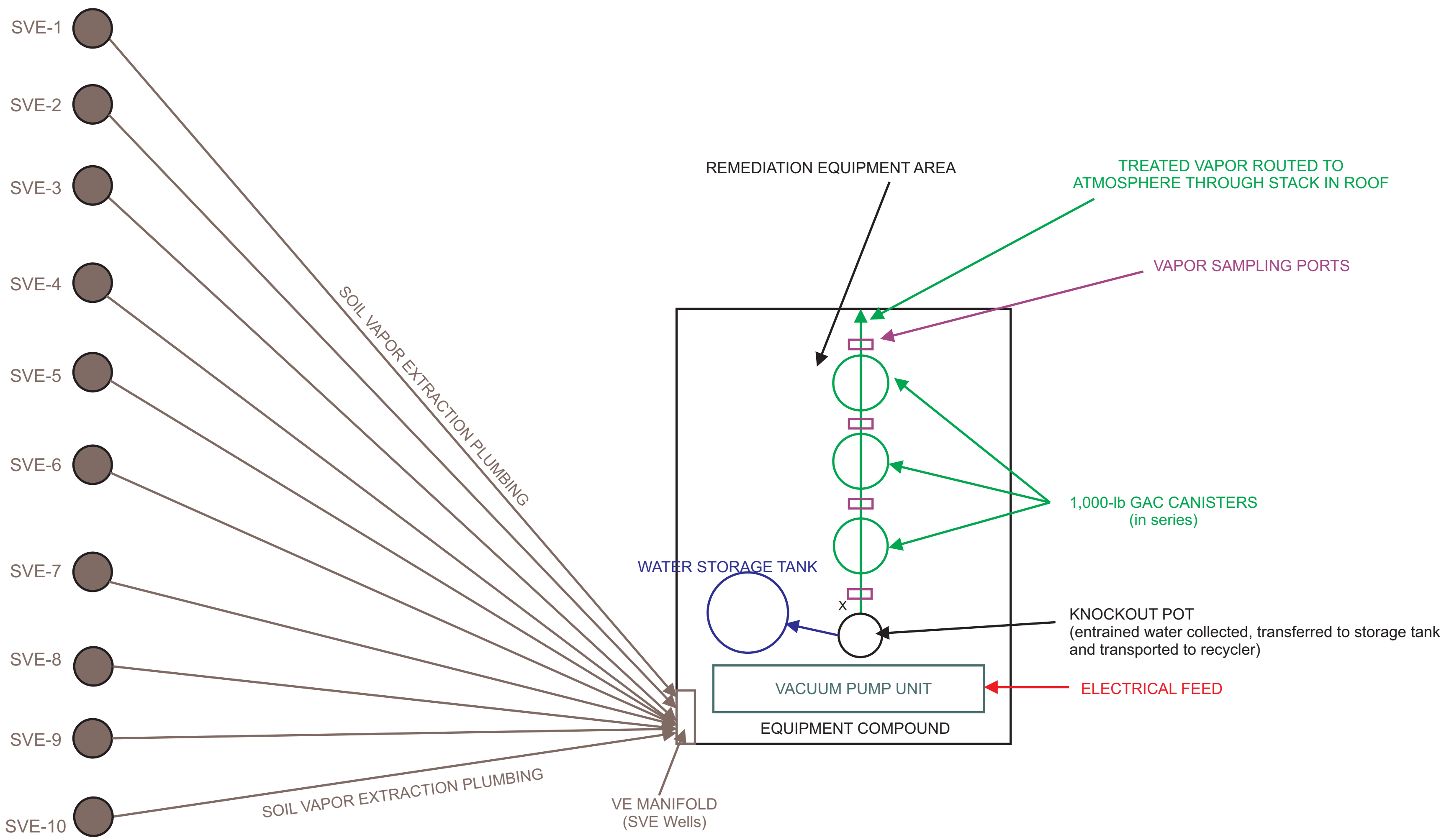
132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

PROPOSED SVE WELL
CONSTRUCTION DIAGRAM

FIGURE

3



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132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

SOIL VAPOR EXTRACTION SYSTEM SCHEMATIC

FIGURE
4

APPENDICES

Appendix A	Site Data Tables and Distribution
Appendix B	Conceptual Site Model
Appendix C	Sampling and Analysis Plan
Appendix D	Site Safety Plan

APPENDIX A

Site Data Tables and Distribution

Table 2: Soil Sample VOCs Laboratory Results
132 North Catalina Avenue
Redondo Beach, California 90277
Partner Project Number 18-222821.3
September 2018

EPA Method	**VOCs via 8260B**		
Units	**(µg/kg)**		
Sample Identification	**PCE**	**TCE**	**Other VOCs**
B1-2	**535**	**1.1**	ND
B1-5	**48.1**	<1.0	ND
B1-10	**38.2**	<1.0	ND
B2-2	**509**	**1.3**	ND
B2-5	**25.4**	<1.0	ND
B2-10	**37.0**	<1.0	ND
B3-2	**87.5**	<1.0	ND
B3-5	**43.1**	<1.0	ND
B3-10	**33.3**	<1.0	ND
B4-2	**219**	<1.0	ND
B4-5	**50**	<1.0	ND
B4-10	**51.9**	<1.0	ND
B5-2	**32.5**	<1.0	ND
B5-5	**21.1**	<1.0	ND
B6-2	**29.8**	<1.0	ND
B6-5	**23.3**	<1.0	ND
B7-2	**32.4**	<1.0	ND
B7-5	**22.7**	<1.0	ND
B7-10	**25.8**	<1.0	ND
B8-2	**70.7**	<1.0	ND
B8-5	**22.8**	<1.0	ND
B8-10	**21.8**	<1.0	ND
B9-2	**67.5**	<1.0	ND
B9-5	**25.5**	<1.0	ND
B9-10	**22.4**	<1.0	ND
B10-2	**20.0**	<1.0	ND
B10-5	<1.0	<1.0	ND
B10-10	**16.9**	<1.0	ND
B11-2	**23.4**	<1.0	ND
B11-5	<1.0	<1.0	ND
B11-5	**12.2**	<1.0	ND
B12-2	**25.1**	<1.0	ND
B12-5	<1.0	<1.0	ND
B12-10	**14.9**	<1.0	ND
Residential RSL	**550**	**910**	**Varies**
Commercial/ Industrial RSL	**2,600**	**6,400**	**Varies**

Notes:

VOCs = volatile organic compounds

EPA = United States Environmental Protection Agency

µg/kg = micrograms per kilogram

RSL = June 2018 Department of Toxic Substances Control (DTSC) Regional Screening Levels (RSLs). If DTSC RSLs do not exist, May 2018 EPA RSLs were utilized.

PCE = tetrachloroethylene

TCE= trichloroethene

< = not detected above indicated laboratory Reporting Limit (RL)

ND = not detected above laboratory RLs

Values in **bold** exceed laboratory RLs

Table 3: Soil Sample CAM 17 Metals Laboratory Results (mg/kg)
132 North Catalina Avenue
Redondo Beach, California 90277
Partner Project Number 18-222821.3
September 2018

Element	Residential Soil RSL	Commercial/ Industrial Soil RSL	Background Concentrations*	B5-2	B5-5	B6-2	B6-5
Antimony (Sb)[1]	**31**	**470**	**0.21 - 0.99**	NA	**2.8**	**2.4**	NA
Arsenic (As)	**0.067**	**0.25**	**12****	**92.6**	**38.2**	**87.7**	**19.4**
Barium (Ba)[1]	**15,000**	**220,000**	**299 - 719**	NA	**63.3**	**67.8**	NA
Beryllium (Be)	**1,600**	**6,900**	**0.76 - 1.8**	NA	<0.5	<0.5	NA
Cadmium (Cd)	**2,100**	**9,300**	**0.05 - 0.67**	NA	<0.5	**0.6**	NA
Chromium (Cr)	**36,000**	**170,000**	**0 - 345**	NA	**18.7**	**14.8**	NA
Cobalt (Co)[1]	**23**	**350**	**5.7 - 24.1**	NA	**4.4**	**4.1**	NA
Copper (Cu)[1]	**3,100**	**47,000**	**9.4 - 48**	NA	**6.5**	**9.2**	NA
Lead (Pb)	**80**	**320**	**10.1 - 37.7**	NA	**3.2**	**2.2**	NA
Mercury (Hg)	**1**	**4.5**	**0.05 - 0.47**	NA	**0.058**	**0.084**	NA
Molybdenum (Mo)	**390**	**5,800**	**0 - 2.8**	NA	<0.5	<0.5	NA
Nickel (Ni)	**15,000**	**64,000**	**0 - 137**	NA	**9.9**	**6.8**	NA
Selenium (Se)[1]	**390**	**5,800**	**0 - 0.142**	NA	<0.5	<0.5	NA
Silver (Ag)	**390**	**1,500**	**0 - 2.23**	NA	<0.5	<0.5	NA
Thallium (Tl)[1]	**0.78**	**12**	**0.37 - 0.75**	NA	<0.5	<0.5	NA
Vanadium (V)	**390**	**1,000**	**59 - 165**	NA	**20.8**	**20.2**	NA
Zinc (Zn)[1]	**23,000**	**350,000**	**117 - 181**	NA	**19.8**	**23.6**	NA

Notes:

*From Kearney Foundation of Soil Science March 1996 report *Background Concentrations of Trace and Major Elements in California Soils.* Background concentrations of metals are considered to be within one standard deviation from the mean metal concentrations determined by the study. Concentrations indicated in milligrams per kilogram (mg/kg).

**From Department of Toxic Substance Control (DTSC) March 2008 report *Determination of a Southern California Regional Background Arsenic Concentration in Soil*.

CAM = California Administrative Manual

RSL = June 2018 DTSC Regional Screening Levels (RSLs). If DTSC RSLs do not exist, May 2018 United States Environmental Protection Agency (EPA) RSLs were utilized, as denoted by [1].

< = not detected above indicated laboratory Reporting Limit (RL)

NA = not analyzed

Values in **bold** exceed laboratory RLs

Highlighted values exceed both the residential and commercial/industrial regulatory guideline

Table 4: Soil Gas Sample VOCs Laboratory Results
132 North Catalina Avenue
Redondo Beach, California 90277
Partner Project Number 18-222821.3
September 2018

EPA Method	**VOCs via 8260B**											
Units	**(µg/m^3)**											
Sample Identification	**PCE**	**TCE**	**TCFM**	**1,2,4-TMB**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Chloroform**	**DCDFM**	**m,p-Xylene**	**o-Xylene**	**Other VOCs**
SG1-5	**23,500**	**48**	**11**	**22**	<8	**24**	<8	<8	<8	**24**	<8	ND
SG2-5	**29,500**	**76**	**18**	**19**	<8	**21**	<8	<8	<8	**16**	<8	ND
SG3-5	**28,000**	**90**	**11**	**17**	<8	**15**	<8	<8	**9**	**16**	<8	ND
SG4-5	**38,400**	**302**	<8	**18**	<8	**27**	<8	<8	**9**	**29**	**13**	ND
SG7-5	**6,750**	**40**	<8	**18**	**9**	**50**	<8	**49**	**8**	**32**	**11**	ND
SG8-5	**11,100**	**34**	<8	**18**	**18**	**68**	<8	<8	<8	**31**	**12**	ND
SG9-5	**98,700**	**19**	<8	**11**	<8	**26**	**16**	<8	**10**	**72**	**26**	ND
SG10-5	**1,780**	<8	<8	**17**	**16**	**79**	**66**	<8	<8	**261**	**71**	ND
SG11-5	**2,600**	**12**	<8	**13**	**9**	**50**	<8	<8	<8	**32**	**10**	ND
SG12-5	**1,420**	<8	<8	**16**	<8	**23**	**59**	<8	<8	**262**	**71**	ND
Residential SGSL^	**230**	**240**	**NA**	**31,500**	**49**	**155,000**	**550**	**60**	**NA**	**50,000**	**50,000**	**Varies**
Commercial/ Industrial SGSL^	**2,000**	**3,000**	**NA**	**260,000**	**420**	**1,300,000**	**4,900**	**530**	**NA**	**440,000**	**440,000**	**Varies**

Notes:

^Calculated soil gas screening levels (SGSLs) for soil gas concentrations were derived by dividing the June 2018 Department of Toxic Substances Control (DTSC) or May 2018 United States Environmental Protection Agency (EPA) Regional Screening Level (RSL) for each compound with an attenuation factor of 0.002 for residential settings and 0.001 for commercial/industrial settings for soil gas samples deeper than sub-slab samples. DTSC RSLs are provided in the June 2018 DTSC Human and Ecological Risk Office (HERO) Human Health Risk Assessment (HHRA) Note 3. Where DTSC RSLs were not available, EPA RSLs were utilized.

VOCs = volatile organic compounds
EPA = United States Environmental Protection Agency
µg/m^3 = micrograms per cubic meter
PCE = tetrachloroethylene
TCE= trichloroethene
TCFM = trichlorofluoromethane
TMB = trimethylbenzene
DCDFM = dichlorodifluoromethane
< = not detected above indicated laboratory Reporting Limit (RL)
ND = not detected above laboratory RLs
Values in **bold** exceed laboratory RLs
Yellow highlighted values exceed residential guideline
Orange highlighted values exceed residential and commercial/industrial guidelines

Table 5: Soil PCE Concentrations and Associated Site-Specific SSLs
132 North Catalina Avenue
Redondo Beach, California 90277
Partner Project Number 18-222821.3
September 2018

Depth (feet bgs)	AF	Site-Specific SSL*	Boring with Peak Concentration	Peak Concentration (µg/kg)	Samples Exceeding Site-Specific SSLs	Samples At Depth
2	15.8	79	**B1**	**535**	**4**	12
5	12.0	60	**B4**	50	1	12
10	11.0	55	**B4**	51.9	1	10

Notes:

*The Maximum Contaminant Level (MCL) of tetrachloroethylene (PCE) is 5 parts per billion (ppb)

SSL = Soil Screening Level

AF = Attenuation Factor

µg/kg = micrograms per kilogram (equivalent to ppb)

Table 1
TPH and VOCs in Soil Samples from Borings
100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	**Depth (ft. bgs)**	**Date Sampled**	**TPH by EPA Method 8015M (mg/kg)**			**VOCs by EPA Method 8260B (µg/kg)**		
			Gasoline Range	**Diesel Range**	**Oil Range**	**Acetone**	**PCE**	**All Other VOCs**
LE1-2	2	1/30/2019	NA	NA	NA	**19.6J**	**11.3**	ND
LE1-5	5	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE1-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE1-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE2-2	2	1/30/2019	NA	NA	NA	ND<50.0	**33.9**	ND
LE2-5	5	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE2-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE2-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE3-2	2	1/30/2019	NA	NA	NA	**13.1J**	**29.7**	ND
LE3-5	5	1/30/2019	NA	NA	NA	ND<50.0	**1.32J**	ND
LE3-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE3-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE4-2	2	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	**1.72J**	ND
LE4-5	5	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	ND<10.0	ND
LE4-10	10	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	ND<10.0	ND
LE4-15	15	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	ND<10.0	ND
LE5-2	2	1/30/2019	NA	NA	NA	**14.8J**	**0.940J**	ND
LE5-5	5	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE5-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE5-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE6-2	2	1/29/2019	NA	NA	NA	ND<50.0	**45.0**	ND
LE6-5	5	1/29/2019	NA	NA	NA	ND<50.0	**1.52J**	ND
LE6-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE6-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE7-2	2	1/29/2019	NA	NA	NA	ND<50.0	**1.30J**	ND
LE7-5	5	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE7-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE7-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE8-2	2	1/29/2019	NA	NA	NA	**22.6J**	**3.74J**	ND
LE8-5	5	1/29/2019	NA	NA	NA	**17.7J**	ND<10.0	ND
LE8-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE8-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE9-2	2	1/29/2019	NA	NA	NA	ND<50.0	**9.86J**	ND
LE9-5	5	1/29/2019	NA	NA	NA	ND<50.0	**1.32J**	ND
LE9-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE9-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE10-2	2	1/30/2019	NA	NA	NA	ND<50.0	**183**	TCE = 1.92J
LE10-5	5	1/30/2019	NA	NA	NA	ND<50.0	**1.00J**	ND
LE10-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE10-15	15	1/30/2019	NA	NA	NA	ND<50.0	**1.10J**	ND
LE11-2	2	1/30/2019	NA	NA	NA	**18.1J**	**10.7**	ND
LE11-5	5	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE11-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE11-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE12-2	2	1/30/2019	NA	NA	NA	**19.9J**	**30.4**	ND
LE12-5	5	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE12-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE12-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE13-2	2	1/30/2019	ND<0.250	**162**	**490**	**14.0J**	**300**	ND
LE13-5	5	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	**6.42J**	ND
LE13-10	10	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	**2.72J**	ND
LE13-15	15	1/30/2019	ND<0.250	ND<1.00	ND<17.0	ND<50.0	**1.50J**	ND
LE14-2	2	1/30/2019	NA	NA	NA	ND<50.0	**28.3**	ND
LE14-5	5	1/30/2019	NA	NA	NA	ND<50.0	**2.22J**	ND
LE14-10	10	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE14-15	15	1/30/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE15-2	2	1/29/2019	NA	NA	NA	ND<50.0	**8.36J**	ND
LE15-5	5	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE15-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE15-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE16-2	2	1/29/2019	NA	NA	NA	ND<50.0	**8.54J**	ND
LE16-5	5	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE16-10	10	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE16-15	15	1/29/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-35	35	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-40	40	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-45	45	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-50	50	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-55	55	3/20/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW1/LE17-60	60	3/20/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-10	9.4	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-15	14.1	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-20	18.8	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND

Table 1
TPH and VOCs in Soil Samples from Borings
100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	Depth (ft. bgs)	Date Sampled	TPH by EPA Method 8015M (mg/kg)			VOCs by EPA Method 8260B (µg/kg)		
			Gasoline Range	Diesel Range	Oil Range	Acetone	PCE	All Other VOCs
LE18-25	23.5	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-30	28.2	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-35	32.9	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-40	37.6	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-45	42.3	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-50	47.0	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE18-55	51.7	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE19-30	28.2	3/19/2019	NA	NA	NA	ND<50.0	**5.26J**	ND
LE19-35	32.9	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE19-40	37.6	3/19/2019	NA	NA	NA	ND<50.0	**1.18J**	ND
LE19-45	42.3	3/19/2019	NA	NA	NA	ND<50.0	**2.72J**	ND
LE19-50	47.0	3/19/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE19-55	51.7	3/19/2019	NA	NA	NA	NA	NA	ND
LE20-2	2	2/18/2019	ND<0.250	ND<1.00	**150**	**60.4**	**58.2**	ND
LE20-5	5	2/18/2019	ND<0.250	ND<1.00	ND<17.0	**37.3J**	**4.98J**	1,1,2-TCA = 3.00J
LE20-10	10	2/18/2019	ND<0.250	ND<1.00	ND<17.0	**37.1J**	**3.88J**	ND
LE20-15	15	2/18/2019	NA	NA	NA	**31.6J**	**0.940J**	ND
LE20-20	20	2/18/2019	NA	NA	NA	**20.2J**	**1.24J**	ND
GMW2/LE20-25	25	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-30	30	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-35	35	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-40	40	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-45	45	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-50	50	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-55	55	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW2/LE20-60	60	3/21/2019	NA	NA	NA	ND<50.0	**69.7**	ND
LE21-10	9.4	3/21/2019	NA	NA	NA	ND<50.0	**414**	ND
LE21-15	14.1	3/21/2019	NA	NA	NA	ND<50.0	**2.24J**	1,1,2-TCA = 21.3
LE21-20	18.8	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE21-25	23.5	3/21/2019	NA	NA	NA	ND<50.0	**1.92J**	ND
LE21-30	28.2	3/21/2019	NA	NA	NA	ND<50.0	**4.26J**	ND
LE21-35	32.9	3/21/2019	NA	NA	NA	ND<50.0	**1.46J**	ND
LE21-40	37.6	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE21-45	42.3	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE21-50	47.0	3/21/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
LE21-55	51.7	3/21/2019	NA	NA	NA	ND<50.0	**7.36J**	ND
GMW3/LE22-35	35	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW3/LE22-40	40	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW3/LE22-45	45	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW3/LE22-50	50	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW3/LE22-55	55	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW3/LE22-60	60	3/22/2019	NA	NA	NA	ND<50.0	ND<10.0	ND
GMW4-60	60	3/18/2019	NA	NA	NA	ND<50.0	ND<10.0	ND

Notes:
TPH = Total Petroleum Hydrocarbons
VOCs = Volatile Organic Compounds
ft. bgs = Feet Below Ground Surface
mg/kg = Milligrams Per Kilogram
µg/kg =Micrograms Per Kilogram
PCE = Tetrachloroethylene
TCE = Trichloroethylene
MTBE = Methyl tert-Butyl Ether
NA = Not analyzed
ND = Not detected above the method detection limit
NS = Not sampled
J-flagged values are estimated between the method detection limit and the practical quantitation limit

Table 2
Arsenic and Chromium in Soil Samples from Borings
100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	Depth (ft. bgs)	Date Sampled	Metals by 1060B (mg/kg)			STLC (mg/L)
			Arsenic	Total Chromium	Hexavalent Chromium	Arsenic
LE1-2	2	1/30/2019	**0.627**	**8.82**	NA	NA
LE1-5	5	1/30/2019	**1.27**	**11.7**	NA	NA
LE2-2	2	1/30/2019	**0.984**	**10.4**	NA	NA
LE2-5	5	1/30/2019	**1.51**	**13.7**	NA	NA
LE3-2	2	1/30/2019	**40.1**	**6.89**	NA	NA
LE3-5	5	1/30/2019	**2.83**	**14.2**	NA	NA
LE3-10	10	1/30/2019	**0.669**	NA	NA	NA
LE4-2	2	1/30/2019	**0.698**	NA	NA	NA
LE4-5	5	1/30/2019	**6.21**	NA	NA	NA
LE5-2	2	1/30/2019	**4.04**	NA	NA	NA
LE5-5	5	1/30/2019	**1.28**	NA	NA	NA
LE6-2	2	1/29/2019	**51.4**	NA	NA	**3.00**
LE6-5	5	1/29/2019	**0.884**	NA	NA	NA
LE6-10	10	1/29/2019	**1.43**	NA	NA	NA
LE7-2	2	1/29/2019	**2.13**	NA	NA	NA
LE7-5	5	1/29/2019	**0.495**	NA	NA	NA
LE8-2	2	1/29/2019	**2.78**	NA	NA	NA
LE8-5	5	1/29/2019	**1.49**	NA	NA	NA
LE9-2	2	1/29/2019	**1.68**	NA	NA	NA
LE9-5	5	1/29/2019	**0.548**	NA	NA	NA
LE10-2	2	1/30/2019	**0.802**	NA	NA	NA
LE10-5	5	1/30/2019	**0.914**	NA	NA	NA
LE11-2	2	1/30/2019	**0.728**	NA	NA	NA
LE11-5	5	1/30/2019	**0.83**	NA	NA	NA
LE12-2	2	1/30/2019	**0.956**	NA	NA	NA
LE12-5	5	1/30/2019	**1.01**	NA	NA	NA
LE13-2	2	1/30/2019	**1.39**	NA	NA	NA
LE13-5	5	1/30/2019	**0.796**	NA	NA	NA
LE14-2	2	1/30/2019	**1.40**	NA	NA	NA
LE14-5	5	1/30/2019	**1.22**	NA	NA	NA
LE15-2	2	1/29/2019	**0.796**	NA	NA	NA
LE15-5	5	1/29/2019	**0.779**	NA	NA	NA
LE16-2	2	1/29/2019	**2.68**	NA	NA	NA
LE16-5	5	1/29/2019	**0.636**	NA	NA	NA
GMW1/LE17-2	2	3/19/2019	**0.574**	NA	NA	NA
GMW1/LE17-5	5	3/19/2019	**0.940**	NA	NA	NA
LE18-2	1.9	3/19/2019	**1.95**	NA	NA	NA
LE18-5	4.7	3/19/2019	**13.5**	NA	NA	NA
LE19-2	1.9	3/19/2019	**2.79**	NA	NA	NA
LE19-5	4.7	3/19/2019	**1.64**	NA	NA	NA
LE20-2	2	2/18/2019	**1.28**	NA	NA	NA
LE20-5	5	2/18/2019	**0.574**	NA	NA	NA
GMW3/LE22-2	2	3/22/2019	**1.24**	NA	NA	NA
GMW3/LE22-5	5	3/22/2019	**1.14**	NA	NA	NA
GMW4-2	2	3/18/2019	**1.57**	NA	NA	NA
GMW4-5	5	3/18/2019	**0.956**	NA	NA	NA
B13-2	2	4/3/2019	**77.4**	NA	NA	NA
B13-3.5	3.5	4/3/2019	**31.6**	NA	NA	NA
B13-5	5	4/3/2019	**26.2**	NA	NA	NA
B14-2	2	4/3/2019	**67.8**	NA	NA	NA
B14-3.5	3.5	4/3/2019	**76.5**	NA	NA	NA
B14-5	5	4/3/2019	**50.6**	NA	NA	NA
B15-2	2	4/3/2019	**119**	NA	NA	**6.75**
B15-3.5	3.5	4/3/2019	**109**	NA	NA	NA
B15-5	5	4/3/2019	**103**	NA	NA	NA
B16-2	2	4/3/2019	**65.4**	NA	NA	NA
B16-3.5	3.5	4/3/2019	**38.0**	NA	NA	NA
B16-5	5	4/3/2019	**31.9**	NA	NA	NA
B17-2	2	4/3/2019	**84.5**	NA	NA	NA
B17-3.5	3.5	4/3/2019	**32.2**	NA	NA	NA
B17-5	5	4/3/2019	**7.29**	NA	NA	NA
B18-2	2	4/3/2019	**5.24**	NA	NA	NA
B18-3.5	3.5	4/3/2019	**0.798**	NA	NA	NA
B18-5	5	4/3/2019	**2.02**	NA	NA	NA
B19-2	2	4/3/2019	**23.1**	NA	NA	NA
B19-3.5	3.5	4/3/2019	**1.84**	NA	NA	NA
B19-5	5	4/3/2019	**1.23**	NA	NA	NA
B20-2	2	4/3/2019	**69.5**	NA	NA	NA

Table 2
Arsenic and Chromium in Soil Samples from Borings
100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	Depth (ft. bgs)	Date Sampled	Metals by 1060B (mg/kg)			STLC (mg/L)
			Arsenic	Total Chromium	Hexavalent Chromium	Arsenic
B20-3.5	3.5	4/3/2019	**11.9**	NA	NA	NA
B20-5	5	4/3/2019	**18.5**	NA	NA	NA
B21-2	2	4/3/2019	**140**	NA	NA	**7.77**
B21-3.5	3.5	4/3/2019	**58.8**	NA	NA	NA
B21-5	5	4/3/2019	**8.36**	NA	NA	NA
B22-2	2	4/3/2019	**40.8**	NA	NA	NA
B22-3.5	3.5	4/3/2019	**7.69**	NA	NA	NA
B22-5	5	4/3/2019	**2.59**	NA	NA	NA
B23-2	2	4/3/2019	**37.9**	NA	NA	NA
B23-3.5	3.5	4/3/2019	**41.1**	NA	NA	NA
B23-5	5	4/3/2019	**8.07**	NA	NA	NA
B24-2	2	4/3/2019	**96.7**	NA	NA	NA
B24-3.5	3.5	4/3/2019	**1.72**	NA	NA	NA
B24-5	5	4/3/2019	**1.85**	NA	NA	NA
B25-2	2	4/3/2019	**7.03**	NA	NA	NA
B25-3.5	3.5	4/3/2019	**3.07**	NA	NA	NA
B25-5	5	4/3/2019	**2.04**	NA	NA	NA
B26-2	2	4/3/2019	**1.41**	NA	NA	NA
B26-3.5	3.5	4/3/2019	**1.16**	NA	NA	NA
B26-5	5	4/3/2019	**1.76**	NA	NA	NA
B27-2	2	4/3/2019	**29.0**	NA	NA	NA
B27-3.5	3.5	4/3/2019	**0.964**	NA	NA	NA
B27-5	5	4/3/2019	**1.56**	NA	NA	NA
B28-2	2	4/3/2019	**31.0**	NA	NA	NA
B28-3.5	3.5	4/3/2019	**1.71**	NA	NA	NA
B28-5	5	4/3/2019	**1.83**	NA	NA	NA

Notes:
ft. bgs = Feet Below Ground Surface
mg/kg = Milligrams Per Kilogram
mg/L = Milligrams Per Liter
NA = Not analyzed
ND = Not detected above the method detection limit

Table 3

PCBs in Soil Matrix

100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	Date Sampled	Depth (ft)	PCBs in Soil Matrix by EPA Method 8082 (µg/kg)						
			Aroclor 1016	**Aroclor 1221**	**Aroclor 1232**	**Aroclor 1242**	**Aroclor 1248**	**Aroclor 1254**	**Aroclor 1260**
LE13-2	1/30/2019	2	ND< 33.0	ND< 67.0	ND< 33.0	ND< 33.0	ND< 33.0	ND< 33.0	ND< 33.0

Notes:

µg/kg = micrograms per kilogram

ND = Not detected above laboratory detection limit

NA = Not analyzed

Table 4
Groundwater Elevations
100 - 132 N. Catalina Avenue, Redondo Beach

Date	Top of Casing Elevation (ft AMSL)	Depth to Groundwater (ft)	Potentiometric Groundwater Elevation (ft AMSL)	Notes
GMW1				
04/03/19	67.26	60.64	6.62	
GMW2				
04/03/19	69.06	62.62	6.44	
GMW3				
04/03/19	69.38	63.28	6.10	
GMW4				
04/03/19	70.12	63.94	6.18	

Notes:

AMSL = Above mean sea level

Table 5
Summary of Groundwater Quality and Analytical Results
100 - 132 N. Catalina Avenue, Redondo Beach

Well ID	Date	TPH as Gasoline (µg/L)	PCE (µg/L)	Salinity ppt	Chloride (mg/L)	Hexavalent Chromium (µg/L)
GMW1	04/03/19	ND<50.0	ND<1.00	0.20	75.1	3.34
GMW2	04/03/19	ND<50.0	ND<1.00	0.30	90.4	5.59
GMW3	04/03/19	ND<50.0	ND<1.00	0.10	50.4	3.05
GMW4	04/03/19	ND<50.0	ND<1.00	0.30	90.6	4.65
MDL			0.421			—
PQL			1.00			—
Cal MCL			5.00			—

Notes:

Cal MCL = California Department of Health Services Maximum Contaminant Level

PQL = Practical quantitation limit

MDL = Method detection limit

µg/L = Micrograms per liter

ND = Not detected at or above stated PQL

PCE = Tetrachloroethene

ppt = Parts per Thousand

Table 6

PCE in Soil Vapor

100 - 132 N. Catalina Avenue, Redondo Beach

Sample ID	Ft. bgs	1/31/2019	4/3/2019
SS-1	0.5	--	**21.30**
SS-2	0.5	--	**17.10**
SS-3	0.5	--	**28.75**
SS-4	0.5	--	**4.98**
LE1-5	5	**5.46**	--
LE1-15	15	**6.87 (6.70)**	--
LE2-5	5	**6.21**	--
LE2-15	15	**17.39**	**13.37**
LE3-5	5	**4.49**	--
LE3-15	15	**9.57**	--
LE4-5	5	**5.19**	--
LE4-15	15	**7.26**	--
LE5-5	5	**7.89**	--
LE5-15	15	**7.07**	**5.82**
LE6-5	5	**1.11**	--
LE6-15	15	**14.89**	--
LE7-5	5	**1.12**	--
LE7-15	15	**3.16**	**5.76**
LE8-5	5	**0.13**	--
LE8-15	15	**1.92**	--
LE9-5	5	**0.82**	--
LE9-15	15	**3.42**	--
LE10-5	5	**15.95**	--
LE10-15	15	**18.13**	--
LE11-5	5	**3.3**	--
LE11-15	15	**16.06 (15.98)**	--

Sample ID	Ft. bgs	1/31/2019	4/3/2019
LE12-5	5	**9.4**	--
LE12-15	15	**34.72**	**29.66**
LE13-5	5	**29.88**	--
LE13-15	15	**45.7**	**44.73**
LE14-5	5	**34.04**	--
LE14-15	15	**26.92**	--
LE15-5	5	**0.45**	--
LE15-15	15	**1.07**	--
LE16-5	5	**3.68**	--
LE16-15	15	**5.37**	--
LE17-30	30	--	**3.67**
LE17-50	50	--	**2.45**
LE18-30	28	--	**15.77**
LE18-50	47	--	**22.18**
LE19-15	14	--	**22.83**
LE19-30	28	--	**23.27**
LE19-50	47	--	**23.20**
LE20-30	30	--	**19.84**
LE20-50	50	--	**7.50**
LE21-15	14	--	**171.90**
LE21-30	28	--	**53.77**
LE21-50	47	--	**25.41 (24.83)**
LE22-5	5	--	**9.89**
LE22-15	15	--	**11.56**

Notes:

-- = No sample
bgs = Below Ground Surface
µg/L Micrograms per Liter
Duplicated sample in parentheses

Table 7

Evaluation of Building-Specific Attenuation Factors

100 - 132 N. Catalina Avenue, Redondo Beach

Radon-Based Attenuation Factor

Building	Radon Indoor (pCi/L)	Radon Subslab (pCi/L)	AF
Bld. 112	0.04	220	0.0002
Bld. 116	0.09	220	0.0004
Bld. 124	0.29	327	0.0009
Bld. 126	0.11	292	0.0004
Bld. 132	0.11	349	0.0003

AF = $C_{indoor}/C_{subslab}$

Subslab to Indoor Air Calculations

Building	Soil Gas (PCE in µg/m^3)	Indoor Air (PCE in µg/m^3)
Bld. 112*	4,980	0.905
Bld. 116	4,980	2.037
Bld. 124	28,750	25.497
Bld. 126	17,100	6.442
Bld. 132	21,300	6.713

Indoor air = Soil Gas * AF

Cancer Risk

Building	Cancer Risk PCE
Bld. 112	4.36E-07
Bld. 116	9.80E-07
Bld. 124	1.23E-05
Bld. 126	3.10E-06
Bld. 132	3.23E-06

$$\text{Cancer Risk} = \frac{\text{URF x ET x ED x } C_{building}}{AT_c \text{ x 365 days/year}}$$

Where:

URF = Unit Risk Factor µg/m^3 (PCE = 5.9×10^{-6}; TCE = 4.1×10^{-6})
ET = exposure time = 8 hours/24 hours
EF = exposure frequency = 250 days/year
ED = exposure duration = 25 years
$C_{building}$ = indoor air concentration µg/m^3
AT_c = averaging time for carcinogens; default is 70

Hazard Quotient

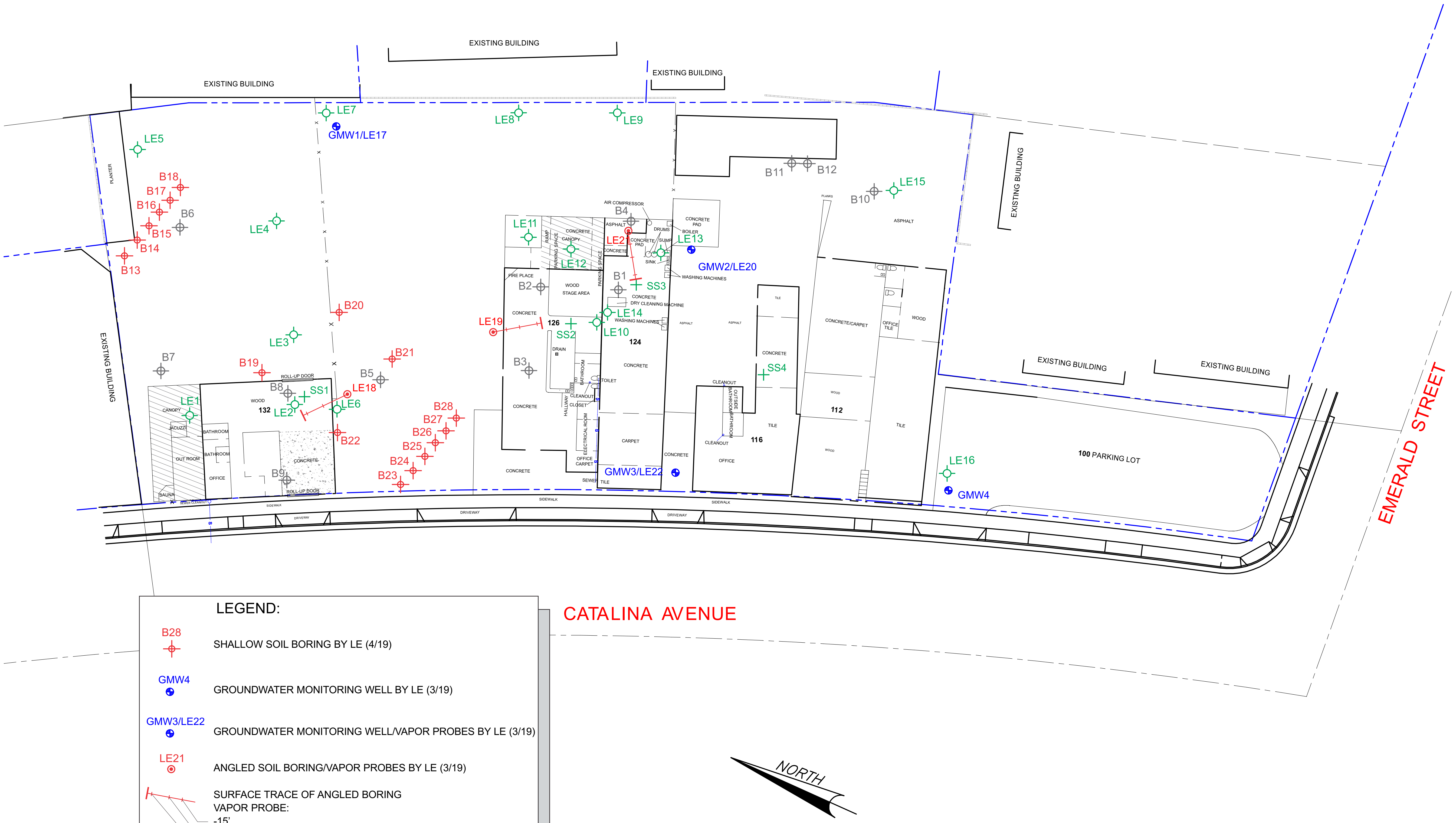
Building	PCE Hazard
Bld. 112	5.91E-03
Bld. 116	1.33E-02
Bld. 124	1.66E-01
Bld. 126	4.20E-02
Bld. 132	4.38E-02

$$\text{Hazard Quotient} = \frac{\text{URF x ET x ED x 1/RfC x } C_{building}}{AT_{nc} \text{ x 365 days/year}}$$

Where:

RfC = Reference Concentration mg/m^3 (PCE = 3.5×10^{-2}; TCE = 2.0×10^{-3})
ET = exposure time = 8 hours/24 hours
EF = exposure frequency = 250 days/year
ED = exposure duration = 25 years
$C_{building}$ = indoor air concentration µg/m^3
AT_{nc} = averaging time for noncarcinogens; default is 25

* No subslab probe in 112 N. Catalina Avenue. The result for 116 N. Catalina Avenue is conservatively used.



LEGEND:

B28	SHALLOW SOIL BORING BY LE (4/19)
GMW4	GROUNDWATER MONITORING WELL BY LE (3/19)
GMW3/LE22	GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)
LE21	ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)
	SURFACE TRACE OF ANGLED BORING VAPOR PROBE: -15' -30' -50'
SS4	SUB-SLAB VAPOR PROBE, BY LE (2019)
LE16	SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)
B12	SOIL BORING, BY PARTNER (2018)
s	SEWER LINE

SCALE: 1" = 40'

0" 1" 2"

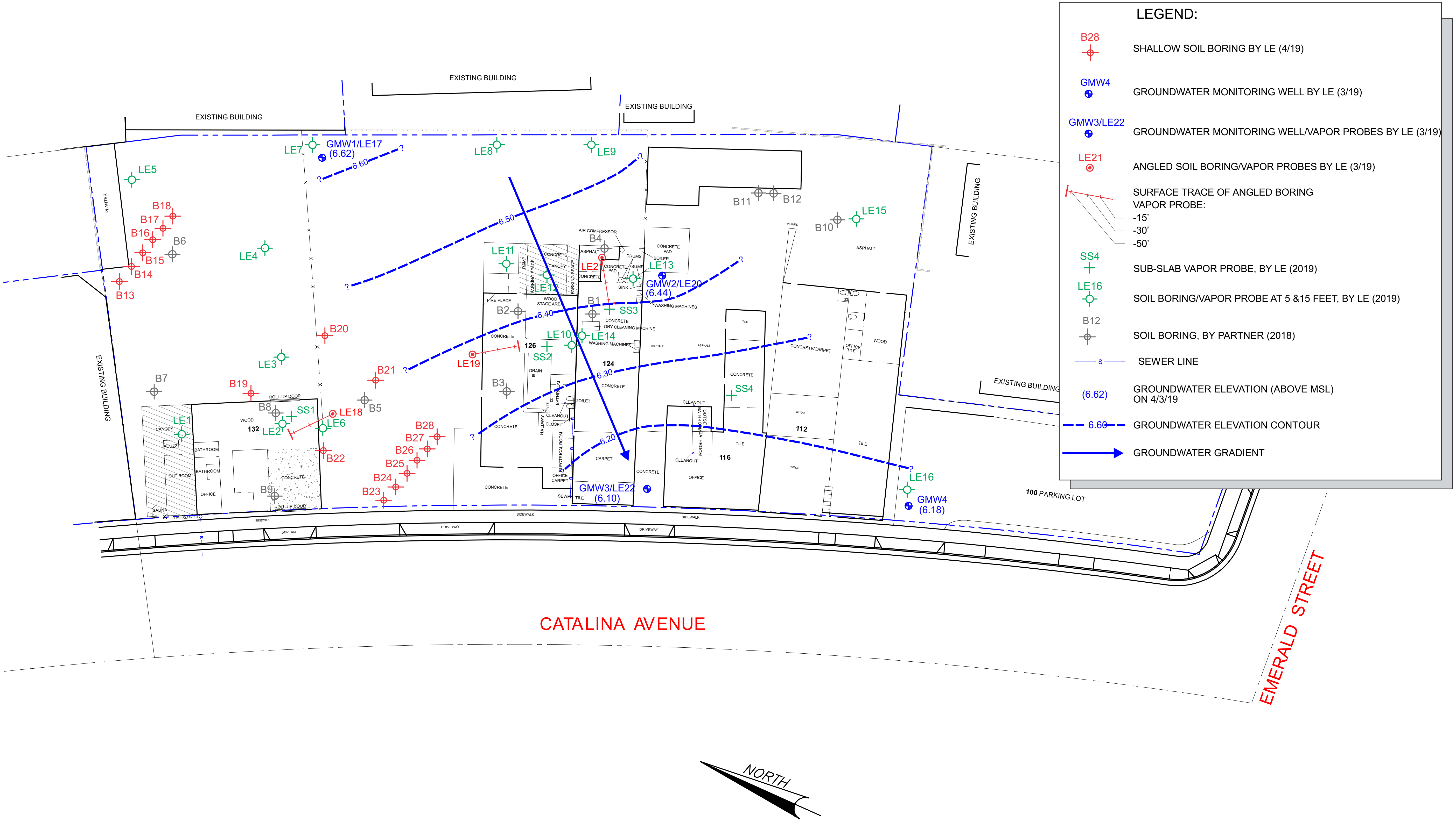
0' 40' 80'

LINDMARK ENGINEERING

100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

SOIL BORINGS, VAPOR PROBES,
AND GROUNDWATER MONITORING WELLS

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	3/19	2



SCALE: 1" = 40'

0" 1" 2"

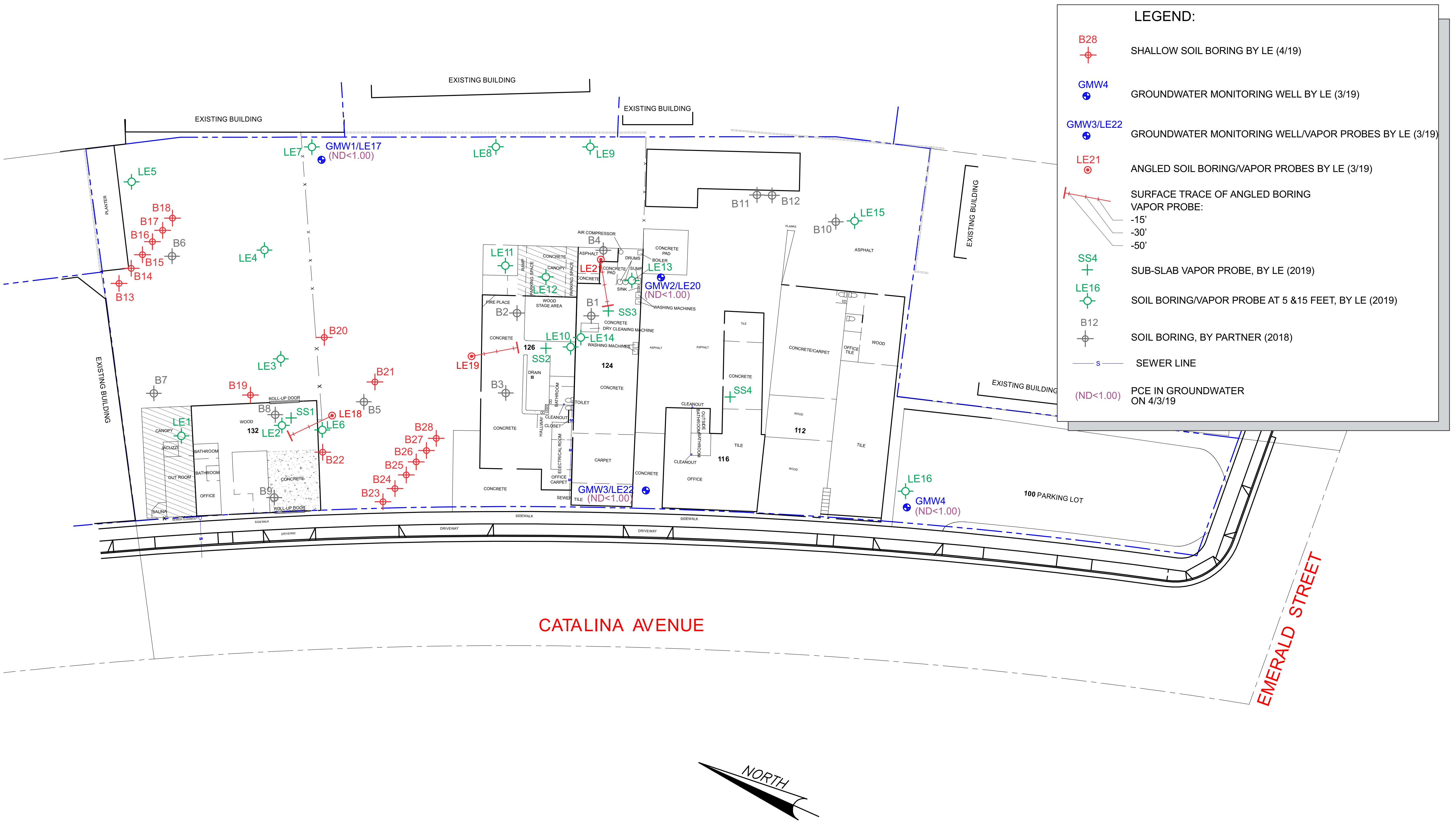
0' 40' 80'

LINDMARK ENGINEERING

100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	5



SCALE: 1" = 40'

0" 1" 2"

0' 40' 80'

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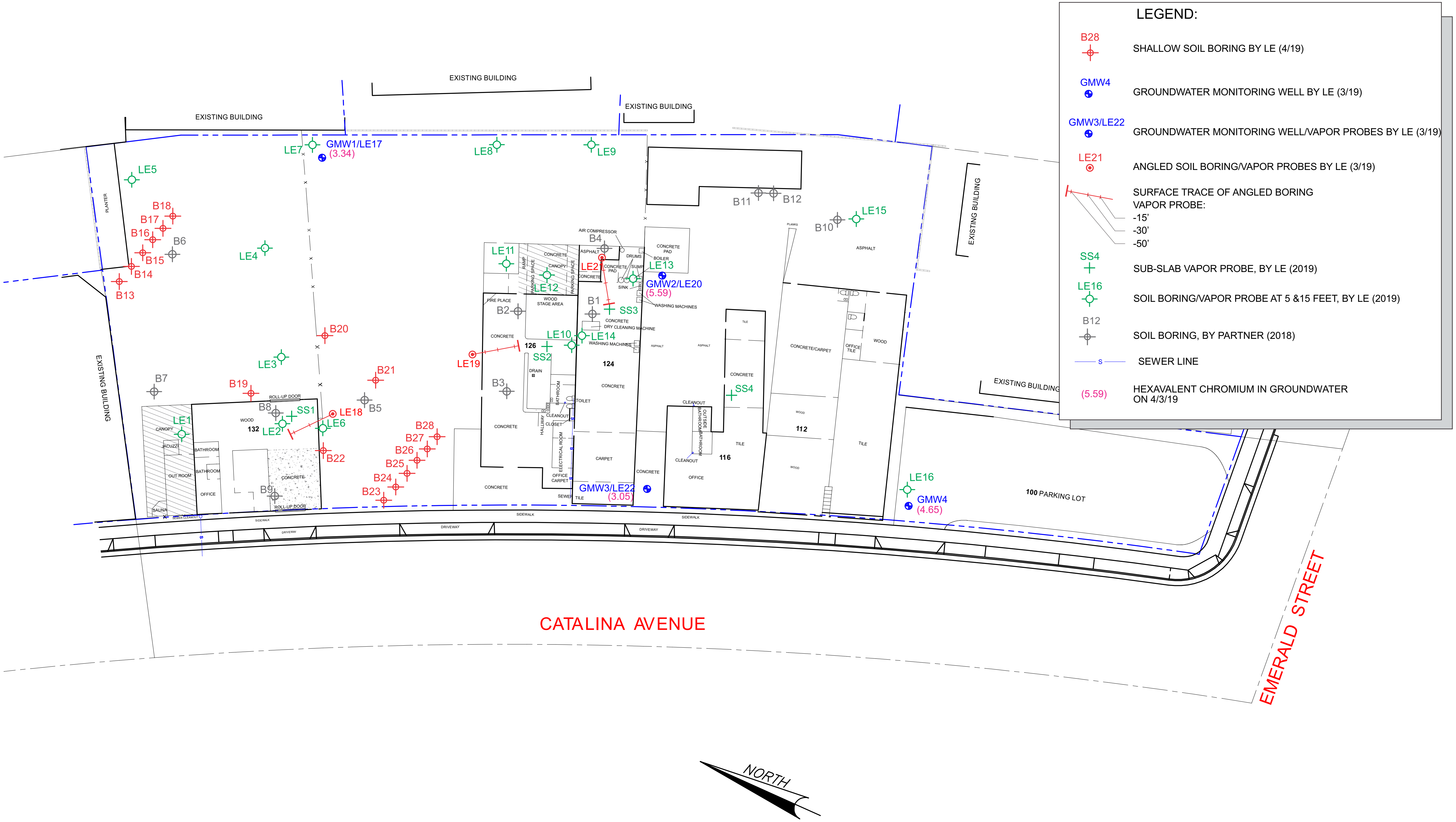
100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

PCE CONCENTRATION IN GROUNDWATER (µg/L)

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	6



LEGEND:

B28	SHALLOW SOIL BORING BY LE (4/19)
GMW4	GROUNDWATER MONITORING WELL BY LE (3/19)
GMW3/LE22	GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)
LE21	ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)
	SURFACE TRACE OF ANGLED BORING VAPOR PROBE: -15' -30' -50'
SS4	SUB-SLAB VAPOR PROBE, BY LE (2019)
LE16	SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)
B12	SOIL BORING, BY PARTNER (2018)
——s——	SEWER LINE
(5.59)	HEXAVALENT CHROMIUM IN GROUNDWATER ON 4/3/19

SCALE: 1" = 40'

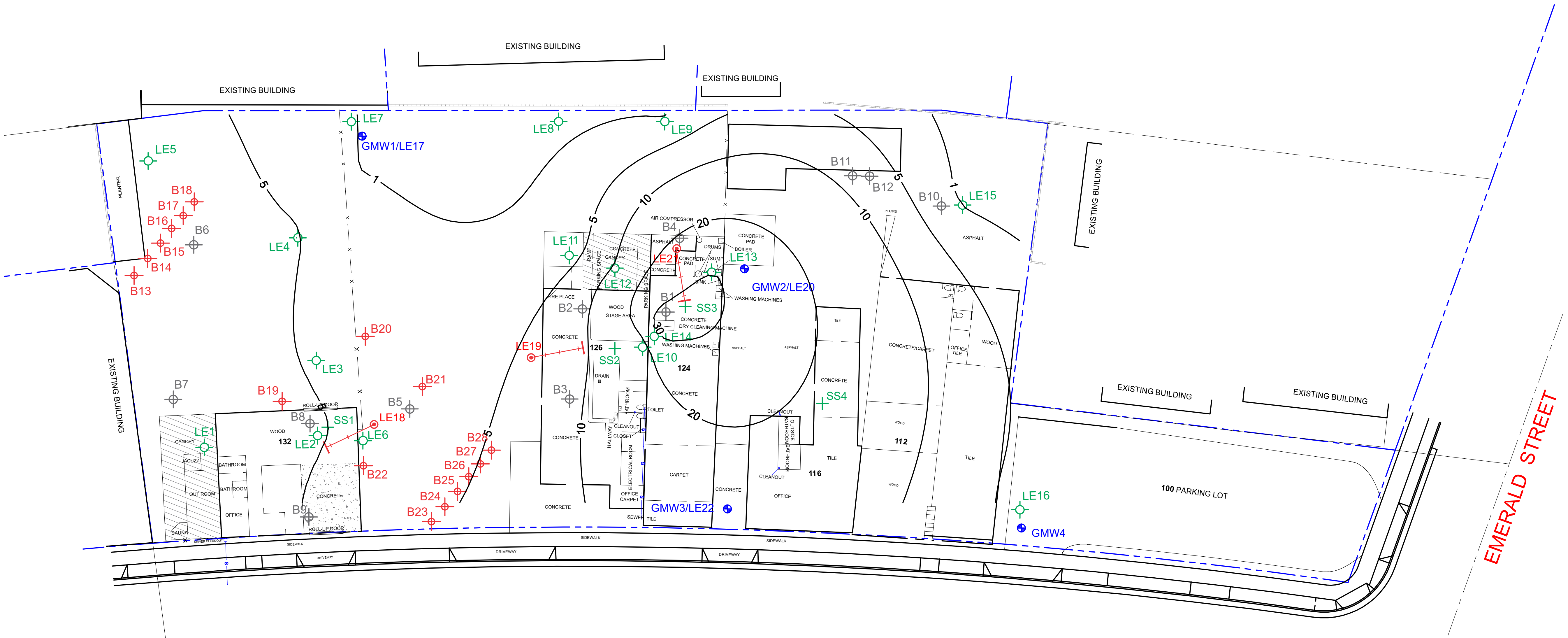
0" 1" 2"
0' 40' 80'

LINDMARK ENGINEERING

100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

HEXAVALENT CHROMIUM IN GROUNDWATER
(μg/L)

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	7



CATALINA AVENUE

LEGEND:

B28 — SHALLOW SOIL BORING BY LE (4/19)

GMW4 — GROUNDWATER MONITORING WELL BY LE (3/19)

GMW3/LE22 — GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)

LE21 — ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)

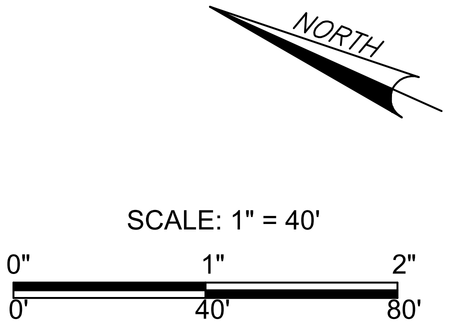
SURFACE TRACE OF ANGLED BORING
VAPOR PROBE:
-15'
-30'
-50'

SS4 — SUB-SLAB VAPOR PROBE, BY LE (2019)

LE16 — SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)

B12 — SOIL BORING, BY PARTNER (2018)

s — SEWER LINE



SCALE: 1" = 40'

LINDMARK ENGINEERING

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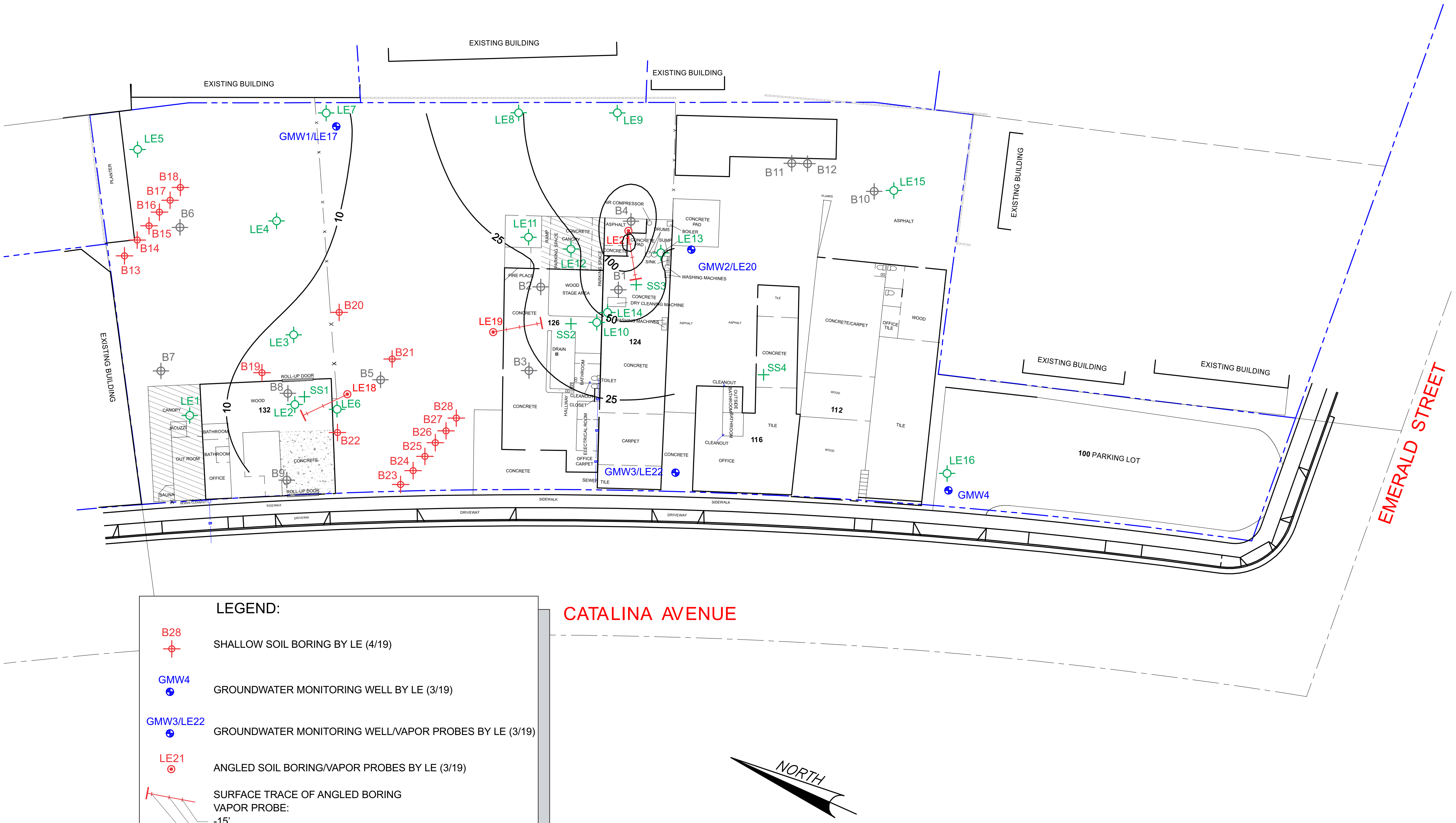
REDONDO BEACH, CALIFORNIA

CONTOURS OF PCE IN SOIL VAPOR
5 FT BGS ON 1/30/19 (in µg/L)

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	12



LEGEND:

B28	SHALLOW SOIL BORING BY LE (4/19)
GMW4	GROUNDWATER MONITORING WELL BY LE (3/19)
GMW3/LE22	GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)
LE21	ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)
	SURFACE TRACE OF ANGLED BORING VAPOR PROBE: -15' -30' -50'
SS4	SUB-SLAB VAPOR PROBE, BY LE (2019)
LE16	SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)
B12	SOIL BORING, BY PARTNER (2018)
s	SEWER LINE

SCALE: 1" = 40'

0" 1" 2"
0' 40' 80'

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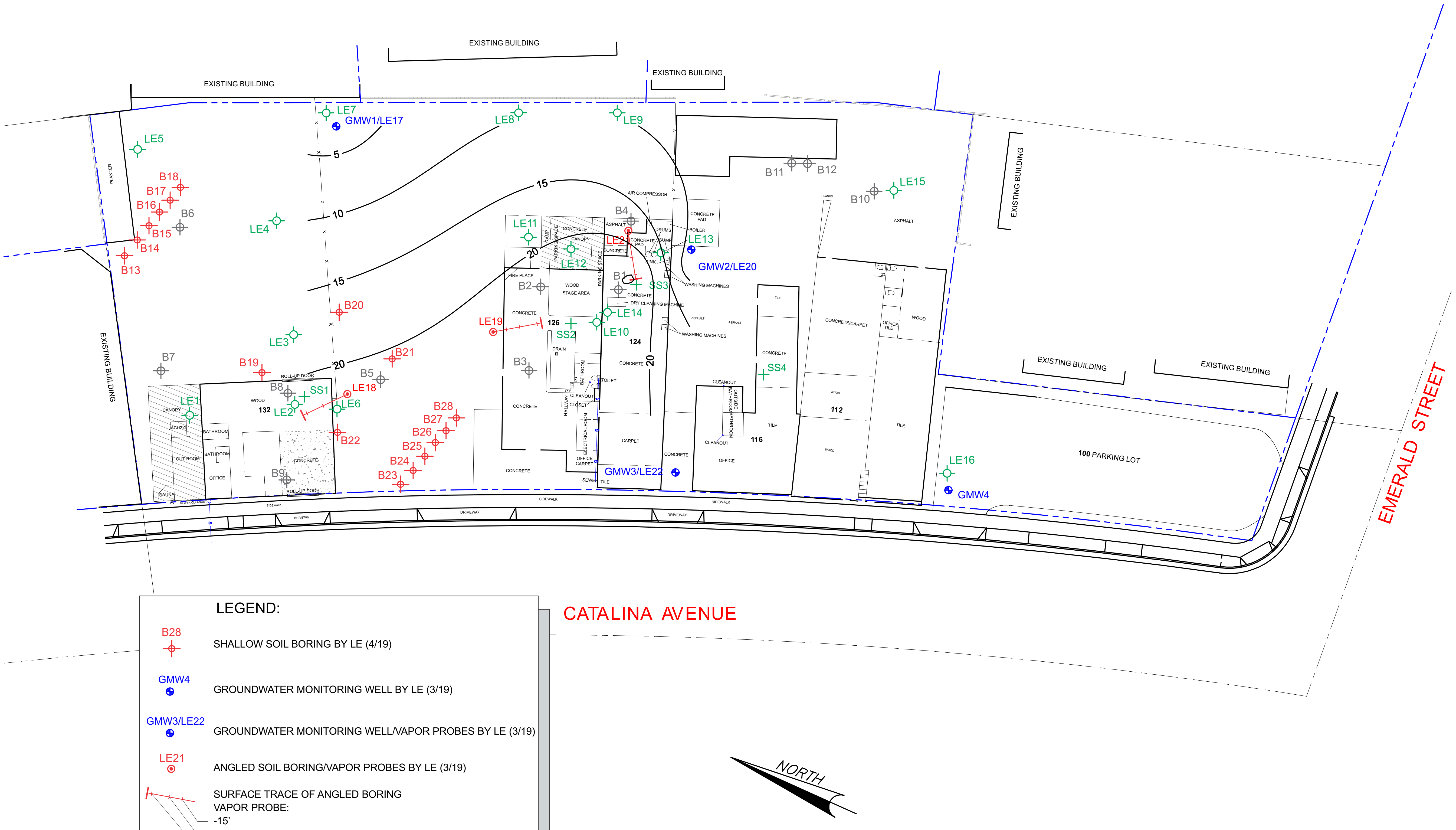
100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

CONTOURS OF PCE IN SOIL VAPOR
15 FT BGS ON 4/3/19 (in µg/L)

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	13



CATALINA AVENUE

LEGEND:

B28 — SHALLOW SOIL BORING BY LE (4/19)

GMW4 — GROUNDWATER MONITORING WELL BY LE (3/19)

GMW3/LE22 — GROUNDWATER MONITORING WELL/VAPOR PROBES BY LE (3/19)

LE21 — ANGLED SOIL BORING/VAPOR PROBES BY LE (3/19)

SURFACE TRACE OF ANGLED BORING
VAPOR PROBE:
-15'
-30'
-50'

SS4 — SUB-SLAB VAPOR PROBE, BY LE (2019)

LE16 — SOIL BORING/VAPOR PROBE AT 5 &15 FEET, BY LE (2019)

B12 — SOIL BORING, BY PARTNER (2018)

s — SEWER LINE

SCALE: 1" = 40'

0" 1" 2"
0' 40' 80'

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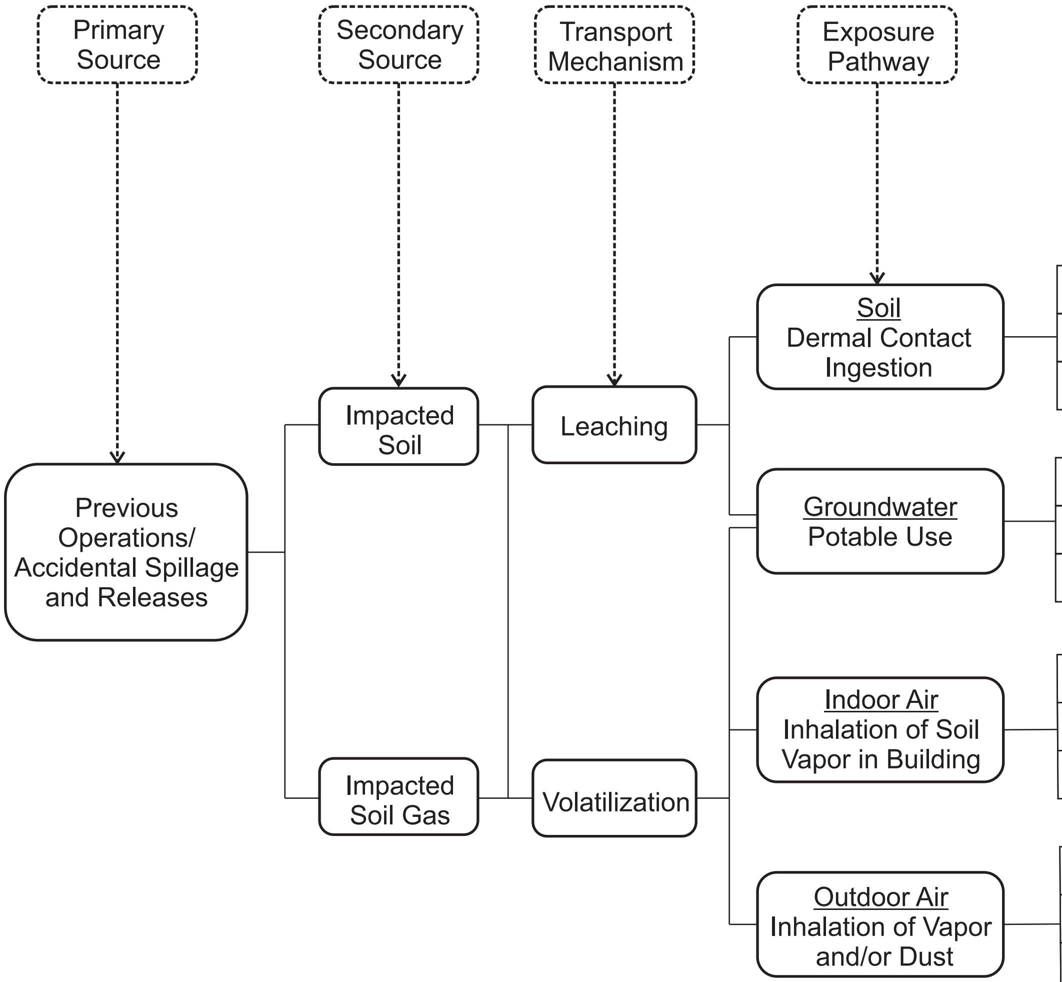
100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

CONTOURS OF PCE IN SOIL VAPOR 50 FT BGS ON 4/3/19 (in µg/L)

Drafted by:	Approved By:	Date:	Figure No.:
DS	UL	5/19	15

APPENDIX B

Conceptual Site Model



Potential Receptors

		Current On-Site Commercial Workers	Future On-Site Residents Construction Workers	Current Off-Site Commercial Workers	Current Off-Site Residents
Soil	Ingestion	No	Yes	No	No
	Inhalation	No	Yes	No	No
	Dermal	No	Yes	No	No
Groundwater	Ingestion	No	No	No	No
	Inhalation	No	No	No	No
	Dermal	No	No	No	No
Indoor Air	Ingestion	No	No	No	No
	Inhalation	Yes	Yes	Yes	Yes
	Dermal	No	No	No	No
Outdoor Air	Ingestion	No	Yes	No	No
	Inhalation	Yes	Yes	No	No
	Dermal	No	Yes	No	No

Environmental Engineering, Consulting & Remediation, Inc.
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132 NORTH CATALINA AVENUE
REDONDO BEACH, CALIFORNIA

CONCEPTUAL SITE MODEL

APPENDIX
B

APPENDIX C

Sampling and Analysis Plan

APPENDIX C

SAMPLING AND ANALYSIS PLAN

Former Catalina Cleaners
100 ~132 North Catalina Avenue
Redondo Beach, California 90277

Draft, 2020
Project Number 2131RV27

Prepared For:

Beach City Capital
1240 Rosecrans Avenue.
Manhattan Beach, California 90266

PREPARED BY:

E$_2$C Remediation
Environmental Engineering Consulting & Remediation, Inc.
1020 Winding Creek Road, Suite 110
Roseville, California 95678

TABLE OF CONTENTS

1.0 INTRODUCTION 3
2.0 FIELD PROGRAM 3
  2.1 Field Activities Summary 3
  2.2 Site Reconnaissance, Preparation, and Restoration 3
  2.3 Drilling and Logging Techniques 3
  2.4 Decontamination Activities 4
    2.4.1 Field Equipment Decontamination 4
    2.4.2 Sampling Equipment Decontamination 4
    2.4.3 Field Instrument Decontamination 4
  2.5 Waste Handling 5
3.0 ENVIRONMENTAL SAMPLING 5
  3.1 Soil Vapor Sampling 5
  3.2 Vapor Extraction Stream Sampling 6
    3.2.1 Tedlar® Bag PID Measurements 7
  3.3 Negative Pressure Measurements 7
  3.4 Soil Sampling 7
  3.5 Sample Handling 8
    3.5.1 Sample Labels 8
    3.5.2 Sample Identification 9
    3.5.3 Handling and Shipping 9
    3.5.4 Sample Size, Preservation, Holding Time 9
  3.6 Sample Control 10
    3.6.1 Chain-of-Custody Record 10
    3.6.2 Custody Seals 11
  3.7 Quality Control Samples 11
    3.7.1 Trip Blanks 11
    3.7.2 Duplicate/Replicate Samples 11
    3.7.3 Matrix Spike/Matrix Spike Duplicate 11
4.0 FIELD QUALITY CONTROL PROGRAM 11
  4.1 Control Parameters 11
  4.2 Corrective Actions 12
5.0 RECORD KEEPING 12

ATTACHMENT

Attachment A: Field Forms

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared for the work associated with the Soil Vapor Extraction and Soil Treatment Remedial Action Workplan (SVE and ST Workplan) for Former Catalina Cleaner Site located at 100-132 North Catalina Avenue, Redondo Beach, California (Site). E_2C Remediation (E_2C) will implement this SAP in conjunction with the SVE and ST Workplan. This SAP contains a discussion of the field and laboratory activities associated with the implementation of the SVE and Soil Treatment Workplan at the Site.

2.0 FIELD PROGRAM

2.1 FIELD ACTIVITIES SUMMARY

The SVE and ST Workplan summarizes the process by which soil vapor extraction (SVE) will be used to complete mitigation and remediation of impacted soil and soil vapor at the Site. The proposed scope of work is as follows.

1) Installation of ten (10) shallow SVE wells to address the need to remediate the subsurface zone impacted by chemicals of concern (COCs);
2) Trenching and plumbing of the SVE wells to the soil vapor treatment system;
3) Installation of a SVE system with a 20 horse power motor and 500 standard cubic feet per minute (scfm) vacuum pump;
4) Extraction and treatment system operation monitoring and maintenance including daily inspections for the first five (5) days, or the Startup Testing period (first five days), weekly thereafter based on the SCAQMD permit requirements; and
5) Site vapor monitoring including baseline sampling of permanent vapor probe points and on-going (monthly) system influent and effluent analytical testing. Monitoring and sampling of the soil vapor probes during the SVE operations

2.2 SITE RECONNAISSANCE, PREPARATION, AND RESTORATION

A Site reconnaissance will be conducted to locate and mark drilling locations. Drilling locations in areas with soil or vegetative ground surface will be marked using wooden survey stakes. Drilling locations in paved areas will be marked using white paint. The drilling locations shall also be evaluated for drill rig or other access restrictions.

As required, traffic control procedures will be implemented at borings located in the public parking areas. Site preparation will include clearing the proposed boring locations of underground utilities and other obstructions. The proposed boring locations may be adjusted, if necessary to avoid underground or overhead utilities or other obstructions.

Upon completion of field sampling activities, disturbed areas will be restored to a level that, as closely as practical, approximates the conditions immediately prior to the field work.

2.3 DRILLING AND LOGGING TECHNIQUES

All drilling activities shall conform to state and local regulations and will be coordinated and directed by a Professional Geologist or Professional Engineer. Soil boring and well installation procedures are included in the SVE and ST Workplan.

2.4 DECONTAMINATION ACTIVITIES

All equipment that may directly or indirectly contact samples will be decontaminated prior to use. A temporary decontamination station shall be set up at the Site to contain decontamination water. Decontamination water will be containerized in DOT-rated drums, or equivalent. Waste handling is discussed in Section 2.7.

2.4.1 Field Equipment Decontamination

To the extent practical, drilling will be performed from the "least" to "most" contaminated areas. The following procedures will be used to decontaminate all large pieces of equipment, such as drill rods:

1. External surfaces of equipment will be washed with high-pressure hot water. In some cases, more vigorous decontamination procedures, such as scrubbing, may be required if visible material remains on the downhole drilling tools after high-pressure washing.
2. Equipment will be thoroughly rinsed with potable water. This decontamination procedure will be performed before equipment is used and between each boring location.
3. Decontamination solutions will be accumulated and containerized in DOT-rated drums, or equivalent, for further characterization and proper disposal.

2.4.2 Sampling Equipment Decontamination

The following procedures will be used to decontaminate the non-dedicated downhole soil sampling equipment (i.e., split-barrel samplers):

1. New disposable gloves will be used for each decontamination procedure to prevent cross-contamination of equipment.
2. Equipment will be scrubbed with brushes using a solution of non-phosphate detergent and potable water. Equipment will be rinsed with potable water.
3. If the sampling device is not going to be used immediately, it will be wrapped in oil free aluminum foil with the shiny side out. Sampling equipment used to collect samples for organic analyses will not be allowed to come into direct contact with plastic.
4. Sampling equipment that is not readily decontaminated will be discarded after each use. Discarded decontamination solutions, will be accumulated and containerized in DOT-rated drums, or equivalent, for further characterization and disposal.

2.4.3 Field Instrument Decontamination

The following procedure will be used to decontaminate any field parameter testing equipment and/or organic vapor analyzers (PIDs):

1. Equipment, or portions of equipment, which are water resistant will be scrubbed with a solution of non-phosphate detergent and potable water. Equipment will be rinsed with potable water .

2. Equipment, or portions of equipment, which are not water resistant will be repeatedly wiped with a paper towel moistened with a solution of non-phosphate detergent and potable water until clean.
3. Discarded decontamination solutions will be accumulated and containerized in DOT-rated drums, or equivalent, for further characterization and disposal.

2.5 WASTE HANDLING

Investigation-derived wastes (IDW) such as soil cuttings, excess sample material, decontamination rinsate, disposable personal protective equipment, sampling equipment, and other waste solids and liquids will be properly stored in DOT-rated 55-gallon drums, pending waste characterization and classification. The drums will be labelled, with indelible ink marker, indicating the exact contents of the drum including date and time of accumulation. Within 30 days following receipt of all waste analytical data, a request for disposal will be submitted to an appropriate landfill or other disposal facility in accordance with the waste classification. Within two weeks following receipt of written authorization of waste acceptance, all IDW will be transported to the appropriate off- site disposal facility by a transporter meeting all certification and licensing requirements of the State of California.

3.0 ENVIRONMENTAL SAMPLING

This section contains a discussion of the program planned for collecting samples for laboratory analysis – including regulatory requirements, sample collection procedures, and the procedures to be followed to maintain sample integrity.

3.1 SOIL VAPOR SAMPLING

Soil vapor samples will be collected in accordance with the guidelines in California Environmental Protection Agency, Department of Toxic Substances Control's *Advisory – Active Soil Gas Investigations, July 2015.*

Soil vapor probes will be sampled a minimum of 48 hours after installation. Prior to sampling, the system will be purged of 3 volumes of air (1 volume represents the pore space in the sand pack and dry bentonite plus the volume of the tubing and sampling apparatus up to the summa canister) to remove atmospheric gases so that the sample will be representative of undisturbed soil vapor. A liquid tracer compound (isopropyl alcohol or another leak detection compound) will be applied to clean towels and placed around the sampling apparatus during purging and sampling to evaluate the potential for atmospheric leaks. Towels with liquid trace compound will also be placed in the ground adjacent to soil vapor probe well vaults to evaluate soil column and probe construction breakthrough.

All soil vapor samples will be analyzed for VOC's and isopropyl alcohol by EPA Method TO-15. Soil vapor samples will be collected using 1 liter summa canisters supplied by the laboratory with a vacuum of approximately 28-30 inches of mercury and fitted with a flow restrictor to regulate vapor flow into the canister. A sampling rate of 100 to 200 milliliters per minute ("mL/min") will be used and vacuums less than 100 inches of water should be maintained during purging and sampling to minimize stripping (partitioning of vapors from pore water to soil vapor), to prevent ambient air from diluting the soil vapor samples. A vacuum gauge should be used between the soil vapor sample tubing and the soil vapor purging device to verify that 100 inches of water or less is maintained during sampling. The extracted soil vapor will be allowed to flow into the canister through the flow restrictor until the vacuum is reduced to 5-inches or less of mercury.

To minimize the potential for cross-contamination between soil vapor sampling locations, all external probe parts will be cleaned prior to insertion. New inert tubing will be used at each sampling location. If water, dirt, or any material is observed in the tubing, the tubing will be discarded and replaced with new tubing.

The table below lists the reporting limits for the VOCs included in the TO-15 analysis of soil vapor samples.

VOC Reporting Limits for EPA Method TO-15 (µg/m3)

Analyte	Reporting Limit	Analyte	Reporting Limit
Propylene	17	Trichloroethylene	5.4
Dichlorodifluoromethane (Freon 12)	50	1,2-Dichloropropane	46
1,2-Dichlorotetrafluoroethane (F-114)	70	1,4 Dioxane	36
Chloromethane	21	Bromodichloromethane	67
Vinyl Chloride	26	cis-1,3 Dichloropropene	45
1,3 Butadiene	22	MIBK (Methyl Isobutyl Ketone)	41
Bromomethane	39	Toluene	38
Chloroethane	26	trans-1,3 Dichloropropene	45
Trichlorofluoromethane (F 11)	56	1,1,2-Trichloroethane	55
Isopropyl alcohol	25	MBK	41
Freon 113	77	Tetrachloroethylene	6.8
1,1 Dichloroethene	40	Dibromochloromethane	85
Acetone	24	1,2-Dibromoethane (1,2 EDB)	77
Carbon Disulfide	31	Chlorobenzene	46
Methylene Chloride	35	Ethylbenzene	43
MTBE	36	m,p-Xylene	43
trans-1,2 Dicloroethene	40	o-Xylene	43
n-Hexane	35	Styrene	43
Vinyl acetate	35	Bromoform	103
1,1-Dichloroethane	41	1,1,2,2-Tetrachloroethane	69
Methyl Ethyl Ketone	30	4-Ethyltoluene	49
cis-1,2 Dichloroethene	40	1,3,5-Trimethylbenzene	49
Tetrahydrofuran	30	1,2,4-Trimethylbenzene	49
Chloroform	49	1,3-Dichlorobenzene	60
1,1,1-Tricloroethane	55	1,4-Dichlorobenzene	60
Cyclohexane	34	Benzyl chloride	52
Carbon Tetrachloride	63	1,2-Dichlorobenzene	60
Ethyl Acetate	36	1,2,4-Trichlorobenzene	74
Benzene	3.2	Hexachloro-1,3-butadiene	107
1,2-Dichloroethane	41	Naphthalene	52
n-Heptane	41	---	---

3.2 VAPOR EXTRACTION STREAM SAMPLING

Summa Canisters and/or Tedlar® bag samples will be collected from the extraction wells and various points along the SVE system during the SVE operation. Prior to sampling, tubing will be connected to the sampling port and coupled to a diaphragm air pump. The sampling port will then be opened and the tubing and pump purge for approximately one minute to remove any atmospheric gases. Once purging is complete, a Summa canister or a Tedlar® bag will be coupled to the still running diaphragm pump, opened, and filled to 90% capacity. All vapor extraction stream samples will be analyzed for VOCs by EPA Method TO-15.

3.2.1 Tedlar® Bag PID Measurements

The sampling procedures for Tedlar® bags are outlined in Section 3.2. Once the Tedlar® bags are filled to 90% capacity, a PID will be attached to the Tedlar® bag. The PID measurement will be noted on the Field Sampling Data Forms (Attachment A) once PID reading have stabilized.

3.3 NEGATIVE PRESSURE MEASUREMENTS

Negative pressure measurements will be made at several points along the SVE system; at extraction well heads; in sub-slab soil vapor probes; and in semi-permanent soil vapor probes. Negative pressure measurements will be made using Magnehelic® gauges. Prior to the measurement, the gauge will be placed in a vertical position and the gauge measurement needle set to zero. The negative pressure measurement port of the gauge will then be attached to the sampling apparatus (sampling port, soil vapor tube, etc.) and allowed to equilibrate for approximately 1 minute. After equilibration the negative pressure measurement will be noted in inches of water column (“inH_2O”) on the Field Sampling Data Forms (Attachment A).

3.4 SOIL SAMPLING

Select soil samples will be analyzed by a California Department of Public Health Environmental Laboratory Accreditation Program (ELAP) certified laboratory for VOCs. Soil samples will be collected using EPA Method 5035 field preservation methods and analyzed by a laboratory using EPA Method 8260B.

Soil samples will be collected using a California-modified split-spoon sampler containing three (3) 2-inch diameter by 6 inches long brass or stainless steel liners. After screening in the field, if determined to be retained for analysis, then, soil samples will be collected from the center section of the sampler using an En Core™ sampler. Immediately after the split-spoon sampler section is open, the En Core™ sampler will be pushed into the core at the selected depth. A minimum of three, 5 gram En Core™ samples will be collected per depth. The sampler will be capped to form an airtight seal, placed in a sealed bag provided with the sampler, and cooled to 4°C until analysis. All soil samples will be analyzed for VOCs using EPA Method 8260B.

Soil samples will be extracted within 48 hours of collection and will be analyzed with 14 days after extraction. The tables below lists the reporting limits for the VOCs included in the 8260B.

Compound Reporting Limits for EPA Method 8260B (mg/kg)

Analyte	Reporting Limit	Analyte	Reporting Limit
Dichlorodifluoromethane	0.20	Ethlybenzene	0.20
Chloromethane	0.20	1,2-Dibromoethane	0.20
Vinyl Chloride	0.20	Total Xylenes	0.20
Bromomethane	0.20	Dibromochloromethane	0.20
Chloroethane	0.20	Chlorobenzene	0.20

Analyte	Reporting Limit	Analyte	Reporting Limit
Trichlorofluoromethane	0.20	2,2 Dichloropropane	0.20
Trans-1,2-Dichloroethene	0.20	Cis-1,3-Dichloropropane	0.20
1,1-Dichloroethene	0.20	1,1,1,2-Tetrachloroethane	0.20
Methyl Tert-Butyl Ether (MTBE)	0.20	Styrene	0.20
Methylene Chloride	0.20	Isopropylbenzene	0.20
Diisopropyl Ether (DIPE)	0.20	Propylbenzene	0.20
1,1-Dichloroethane	0.20	1,3,5-Trimethylbenzene	0.20
Ethyl Tert-Butyl Ether (ETBE)	0.20	2-Chlorotoluene	0.20
Tert-Butyl Alcohol (TBA)	2.0	Bromobenzene	0.20
1,1,1-Trichloroethane	0.20	Bromoform	0.20
1,3-Dichloropropene	0.20	4-Chlorotoluene	0.20
1,1-Dichloropropene	0.20	Tert-Butylbenzene	0.20
Carbon Tetrachloride	0.20	1,2,4-Trimethylbenzene	0.20
Tert-Amyl Methyl Ether (TAME)	0.20	1,2,3-Trichloropropane	0.20
Chloroform	0.20	Sec-Butylbenzene	0.20
Benzene	0.20	1,1,2,2-Tetrachloroethane	0.20
Bromochloromethane	0.20	4-Isopopyltoluene	0.20
1,2-Dichloroethane	0.20	1,3-Dichlorobenzene	0.20
Trichloroethene	0.20	Butylbenzene	0.20
1,2-Dichlorpropane	0.20	1,4-Dichlorobenzene	0.20
Dibromomethane	0.20	1,2-Dichlorobenzene	0.20
Bromodichloromethane	0.20	1,2-dibromo-3-chloropropane	0.20
Toluene	0.20	1,1,2,3,4,4-hexachloro-1,3-butadi	0.20
Trans-1,3-Dichloropropene	0.20	1,2,4-Trichlorobenzene	0.20
Tetrachloroethene	0.20	Napthalene	0.20
1,3-Dichloropropane	0.20	1,2,3-Trichlorobenzene	0.20
1,1,2-Trichloroethane	0.20	Cis-1,2-Dichloroethene	0.20

Soil samples for Arsenic treatment area and for soil excavation verification will be collected for analysis of arsenic by EPA Method 6010B with a method reporting limit of 0.25 mg/kg. Treatment samples with various weight ratios of cement mixtures will also be tested with Soluble Threshold Limit Concentration (STLC) sample extraction/preparation method and be analyzed by EPA Method 6010B with a method reporting limit of 0.500 mg/L.

3.5 SAMPLE HANDLING

3.5.1 Sample Labels

A sample label will be completed and attached to each sample container. Labels are made of a waterproof material backed with a water-resistant adhesive. Labels will be filled out using indelible ink and will contain the following information.

1. Sample Number;
2. Sample Date;
3. Start and End Times for the Sample;
4. Site Name and Location;
5. Initial and Final Canister Pressures;
6. Sample Preservative; and

7. Sampler's Initials.

The sample labels will be placed on the canisters so as not to obscure any QA/QC data. Field identification must be sufficient to allow easy cross-reference with the field logbook.

3.5.2 Sample Identification

Each primary, duplicate/replicate, or split sample collected will be identified with E2C's project number and site name and a sample ID.

A sample will be identified by the sampling location and media type of the sample as follows:

Sample Type Code	Sample Type
VP-1	Soil Vapor sample from location 1

In addition, a sampling date and/or time will differentiate any repetitive samples.

Field Quality Control samples may include duplicate/replicate samples, trip blanks, and equipment blanks. The following is the labeling criteria for these samples.

> Duplicate/Replicate Samples – Duplicate/replicate samples will be blind-labeled to conceal the actual sample location. Duplicate/replicate samples will be documented as such on the field data forms.

3.5.3 Handling and Shipping

The labeled and sealed sample containers will be placed into the shipping containers, which will be sealed. Chain-of-Custody Records will be sealed in plastic bags and placed into the shipping container with the samples.

The shipping container will be taped shut and sealed with two custody seals. Samples shall be shipped directly to the laboratory by overnight courier on the day they were collected, hand-delivered to the laboratory by E_2C personnel, or picked up daily by a laboratory courier. If samples are shipped, the laboratory will be notified by telephone or fax or email of the sample shipment schedule, air bill number, and anticipated arrival time. Samples will be shipped to the laboratory within a time frame to allow for extraction and analysis to be performed within acceptable holding times. No samples will be held on-site for more than 24 hours.

Soil and soil vapor samples will be shipped to:

ProVera Laboratories
1020 Winding Creek Road, Suite 110
Roseville, California 95678

3.5.4 Sample Size, Preservation, Holding Time

The following sample containers, preservatives, and holding times will be used for the various matrices and constituents.

Environmental Samples

Constituent	Media	Sample Container	Sample Quantity	Preservative	Holding Time
VOC	Soil Vapor	Summa canister	1 L	none	30 days
VOC	Soil Vapor	Tedlar® Bag	0.5 - 1 L	none	6 hours
VOC	Soil	En CoreTM Sampler Or Sample Tubes	5 grams (sample in triplicate) Or 500 grams in tubes	Ice, cool to 4°C	14 days after extraction, extraction within 48 hours
Arsenic	Soil	Sample Tubes	500 grams	Ice, cool to 4°C	4 months after digestion

3.6 SAMPLE CONTROL

3.6.1 Chain-of-Custody Record

All samples submitted to the analytical laboratory will be accompanied by a Chain-of-Custody document to record points of sample handing. Chain-of-Custody forms will be prepared for groups of samples collected at a given location on a given day. Each form will be prepared in triplicate, and two of the three copies will accompany the samples to the laboratory. One copy will be retained in the project file. The Chain-of-Custody form makes provision for documenting sample integrity and the identity of any personnel involved in sample transfer. Information on the Chain-of-Custody includes the following:

- Project name and number
- Chain-of-Custody serial number
- Project location
- Sample numbers
- Sampler/recorder's signature
- Date and time of collection of each sample
- Sample type
- Analyses requested
- Name of person receiving the sample
- Date of receipt of sample
- Name, address, and telephone number of laboratory

Sample shipping containers will be sealed in the field with the completed Chain-of-Custody document inside and the express shippers (e.g., Federal Express) shipment forms filled out in the field and attached to the container at that time. The Chain-of-Custody record will have the signature of the relinquishing field geologist and the shipper's form document tracking number written on the comment line.

The completed Chain-of-Custody form will be placed in a plastic bag and placed inside of the shipping container. The container will be tightly bound with filament tape.

Custody seals will be signed by the individual relinquishing custody and affixed in such a way that the shipping container cannot be opened without breaking the seals.

3.6.2 Custody Seals

Custody seals will be preprinted, adhesive-backed seals with security slits designed to break if disturbed. Custody Seal Numbers will be assigned in the field and will consist of a unique four digit number which will be legibly printed on the seal using permanent waterproof ink. Field personnel will maintain a record of the Custody Seal Numbers to assure that no numbers are used more than once. Sample shuttles (i.e., coolers) shall be sealed with two custody seals. Seals will be signed and dated before use. Upon receipt by the laboratory, the Laboratory Sample Custodian will check and certify, by completing logbook entries, that the seals are intact.

3.7 QUALITY CONTROL SAMPLES

Quality Control samples are collected and analyzed for the purpose of assessing the quality of the sampling effort and the analytical data. Quality Control samples may include trip blanks, equipment blanks, and field duplicates/replicates.

3.7.1 Trip Blanks

Soil Vapor

USEPA Method TO-15 for soil vapor does not have specific trip blank requirements. Therefore, trip blanks are not needed if samples are collected in passivated stainless steel canisters.

Soil

One trip blank will be included in each sample transport container for soil samples and will be analyzed for VOCs using USEPA Method 8260B.

3.7.2 Duplicate/Replicate Samples

Field duplicates will be labelled so that laboratory personnel are unable to distinguish them from field samples. Duplicate samples will be collected at a frequency of 1 per every 10 or fewer (10%) field samples per matrix; with a minimum of one duplicate sample collected per sampling day. Duplicate samples are to be analyzed utilizing the same types of analyses as their associated field samples.

3.7.3 Matrix Spike/Matrix Spike Duplicate

Samples (i.e., soil) will be prepared by the testing laboratory for Matrix Spike/Matrix Spike Duplicates at a frequency of 1 per 20 or fewer field samples (5%).

4.0 FIELD QUALITY CONTROL PROGRAM

Field quality control will be provided through strict adherence to sampling protocol and decontamination procedures.

4.1 CONTROL PARAMETERS

Control parameters of the field procedures consist of the same controls that govern analytical data. These parameters are controlled through the assessment of data by precision, accuracy, representativeness, and completeness. Control parameters consist of the decontamination of field equipment and the strict adherence to sampling protocol.

4.2 CORRECTIVE ACTIONS

Specific corrective actions for field measurements will be documented in the field notes and reported to the Project Geologist.

5.0 RECORD KEEPING

All pertinent Project information shall be recorded on a Field Notes form (see Attachment A), which are then placed in a project binder. At the beginning of each day, the start time, weather, field personnel present, level of personnel protection, and name of the person making the entry will be recorded. All information pertinent to the sampling event will be recorded. Entries into the field logbook will include the minimum, as appropriate to the activity:

- Description of the sampling location
- Name(s) and title(s) of the field crew
- Name(s) and title(s) of site visitors
- Type of media being sampled or measured
- Sample/groundwater depth
- Sample collection or measurement method
- Volume of water purged (if appropriate)
- Number and volume of sample(s) collected
- Description of sample (i.e., grain size, sorting, color, turbidity etc.)
- Date and time of collection
- Unique sample identification number
- Duplicate/replicate sample cross-reference identification
- Sample preservative
- References to maps
- Field measurements
- References to all pertinent data collection forms

Field personnel will complete other records of field activities, as appropriate. A list of the appropriate forms, as well as a brief summary of information to be recorded follows:

- Boring Log Form – description of subsurface conditions at boring locations
- Field Sampling Data Form – record of field measured parameters
- Chain-of-Custody Record – instructions to the laboratory as to the appropriate analytical method(s) for each sample

Recorded information shall summarize, organize, and clarify data. If corrections are necessary, these shall be made by drawing a single line through the original entry (in such a manner that the original entry can still be read). The corrected entry shall be written alongside the corrections and shall be initialed and dated. Completed forms will be provided in the draft and final Site Investigation reports.

ATTACHMENT A

Field Forms

TAILGATE SAFETY MEETING FORM

DATE:_________ TIME: ________ CONDUCTED BY: ____________________________

TOPICS COVERED:

HAZARDS:

____

____

____

SAFETY/PERSONNEL PROTECTIVE ISSUES:

____

____

____

ATTENDEES SIGNATURES:

________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
________________________________	____________________________
_______________________________	____________________________

FIELD LOCATION OF BORING:

PAGE ___ OF ___

PROJECT NUMBER: ________________

DATES DRILLED: ________________

CLIENT: ________________

DRILLER: ________________

SITE ADDRESS: ________________

____

____

LOGGED BY: ________________

DRILLING METHOD AND EQUIPMENT: ________________

BORING DIAMETER: ________ (inches) BORING DEPTH: ________ (feet)

WATER LEVEL			
DATE			
TIME			

Depth (Feet)	**SAMPLE NAME**	**Blow Count**	**PID**	**WELL/ BORING DIAGRAM**	**USCS Symbol**	**SOIL DESCRIPTION**

Well Construction Details:

Well Depth: ______ (feet); PVC I.D.: _______ (inches); PVC Schedule: _______ ;
Screen Interval: ______ to ______ feet, bgs; Slot Size ______ (inch);
Sand (Type: ______); Placed ______ to ______ feet, bgs;
Bentonite (Type: ______); Placed _______ to _______feet, bgs;
Cement Grout tremied: ______ to ______ feet, bgs.

COMMENTS:

____

____

____

BORING/WELL NAME:

Daily Field Sheet

Date: ____________________ **Project Name:** ____________________

General Objective of Work Scope: ____________________

Professional Services:

Employee's Name	Title	Hours	Travel Time	Mileage	Per Diem

Analytical Services:

No. of Samples	Water	Soil	Air	Duplicates	Trip Blank	Analysis Requested

Sub Contractor Services:

Name	Description of Services Provided	Hours	Rate	Markup

Equipment:

Description	Units	Hours
FID / PID		
Air Compressor		
Discrete Zone Sampler		
Generator		
Oxidizer Trailer		

Equipment:

Description	Units	Hours
Water Level Indicator		
Water/Oil Interface Probe		
pH, Co / Temp Meter		
Purge Pump		
Steam Cleaner		
Hand Auger		

Sampling Supplies:

Alconox			Gloves		
Tedlar Bag			Glassware		
Bailers (Qty Used ________)					

PROVERA ANALYTICAL LABORATORIES

Chain of Custody Form

Client Name: E2C Remediation

Project Name

Client Address: 1020 Winding Creek Road Ste.110 Roseville CA

Project Manager: Phil Goalwin

Sampler Name:

Sample Matrix

☐ Air

☐

☐

			Analysis Requested											
Sample Date	Sample Time	Sample Description and Container Type	BTEX (EPA TO-15)	TPH Gasoline (TO-3)	MTBE (EPA TO-15)	METHANE (EPA TO-3)	FULL VOC (EPA TO-15)	8010 VOLATILE LIST (EPA TO-15)	EDB	Naphthalene	1,1-Difluoroethane			Comments

Sampling Event: ______________________ EDF Type: ____________ Other ____________

Turnaround Time Requested: 24 Hour _____ 48 Hour ____ 5-Day ____ Standard _____

Relinquished By:	Date:	Relinquished By:	Date:
Received By:	Date:	Received By:	Date:

SOIL GAS ASSESSMENT FIELD SHEET

SITE: ______________________

ADDRESS: ______________________

____

DATE: ______________________

SAMPLE ID: ______________________

SAMPLE DEPTH: ______________________

FIELD CREW: ______________________

____

WEATHER CONDITIONS: ______________________

PURGE DATA

Purge Method ______________________

Purge Duration ______________ min ____

Purge Volume ______________________

SAMPLING

Summa Canister Serial # ______________________

Initial Vacuum in Canister ______________________

Leak Check Constituent ______ Isopropyl Alcohol ______

Was sampling tented Yes No

Sampling Duration ______________________

Final Vacuum in Canister ______________________

FIELD NOTES

SITE:	DATE:
COMMENTS:	NAME:

SVE - HVE FIELD DATA LOG

Site ______________________

Date of Test ______________________

Extraction Well ______________________

Initial Water Depth

Personnel ______________________

Time	Vacuum (in-Hg)	Flow (SCFM or ins H2O)	Oxygen (%)	Influent (ppmV)	Stinger Depth (feet BTOC)	H2O Extracted (gallons)	NOTES
							Total Extraction Time:
							Total Water Extracted:

Initial Water Level, Pressure

Time

Well	Depth	Pressure

TIME	Obs. Well		Obs. Well		Obs. Well		Obs. Well		Obs. Well		Obs. Well	
	Pressure	**Depth**	**Pressure**	**Depth**	**Pressure**	**Depth**	**Pressure**	**Depth**	**Pressure**	**Depth**	**Pressure**	**Depth**

VAPOR EXTRACTION SYSTEM DATA LOG
GENERAL MAINTENANCE LOG

DATE:

TECH:

SITE:

TIME:

SERIAL #:

SYSTEM RUNNING UPON ARRIVAL? ☐ **YES / NO** ☐ ***IF NO:***

RUNNING UPON DEPARTURE? ☐ **YES / NO** ☐ ***IF NO:***

DESCRIPTION	UNITS	UPON ARRIVAL	UPON DEPARTURE
STACK TEMPERATURE	(F °)		
LEL	(%)		
FLOW RATE	(CFM)		
CHAMBER TEMPERATURE	(F °)		
EXCHANGER TEMPERATURE	(F °)		
OPERATING TIME	(hr:mm)		
ELECTRICAL USAGE	(#)		
VACUUM	("H$_2$0)		

VAPOR CONCENTRATIONS	OVA Instrument used: ☐PID / FID☐		Calibrated: ☐YES / NO☐
INFLUENT (PRE-OXIDIZER)	(ppmv)		
EFLUENT (STACK)	(ppmv)		
SYSTEM SAMPLED	INFLUENT (PRE-OXIDIZER): ☐ YES / NO ☐		EFFLUENT (STACK): ☐ YES / NO ☐
OTHER (SPECIFY)			

WEEKLY SERVICE RENDERED	YES	NO	% OUT	COMMENTS
CALIBRATED LEL SENSOR	☐	☐		
CALIBRATED FLOW METER	☐	☐		
CHECK RECORDER PAPER	☐	☐		
CHECK RECORDER RIBBON	☐	☐		
CLEAN UP COMPOUND	☐	☐		
CHART RECORDER DISK CAPACITY	☐	☐		
OTHER (SPECIFY)	☐	☐		
	☐	☐		

MONTHLY SERVICE RENDERED	YES	NO	COMMENTS
BUTTERFLY VALVES CHECKED & LUBED	☐	☐	
ACTUATOR LINKAGE CHECKED & LUBED	☐	☐	
BLOWER/MOTOR BELT CHECKED	☐	☐	
CLEANED AIR FILTER	☐	☐	
CHECK HIGH WATER FLOAT	☐	☐	
OTHER (SPECIFY)	☐	☐	
	☐	☐	

QUARTERLY SERVICE RENDERED	YES	NO	COMMENTS
BLOWER LUBED	☐	☐	
BLOWER OIL CHANGED	☐	☐	
BLOWER MOTOR LUBED	☐	☐	
CONTROL PANEL INSPECTED/CLEANED	☐	☐	
TEST HIGH WATER FLOAT	☐	☐	
OTHER (SPECIFY)	☐	☐	
	☐	☐	

COMMENTS:

RADIUS OF INFLUENCE DATA LOG

Job Number:__________________ Date:______________________

Recorded By:_________________ Instrument Used:_____________

Time	Well Number	Vacuum	DTW	Comments

APPENDIX D

Site Safety Plan

APPENDIX D

SITE SAFETY PLAN

Introduction:

This Site Safety Plan (SSP) has been designed to address safety provisions needed during soil vapor extraction and soil treatment activities to be performed at and in the vicinity of the Former Catalina Cleaners' Site located at 100-132 North Catalina Avenue in Redondo Beach, California. Its purpose is to provide established procedures to protect all on-site personnel from direct skin contact, inhalation, or ingestion of potentially hazardous materials that may be encountered at the site. The SSP establishes personnel responsibilities, personal protective equipment standards decontamination procedures, and emergency action plans.

The SSP describes means for protecting all on-site personnel from deleterious contamination or personal injury while conducting on-site activities. As described below all requirements promulgated by the California Department of Health Services will be met.

Scope of Services

E_2C seeks to enter property described above for the purpose of drilling, well installation, soil vapor sampling, trenching, and soil vapor extraction system installation and operation and soil excavation and treatment activities. Drilling equipment will be brought to the Site and operated by a subcontractor:

J&H Drilling, Inc.
7431 Walnut Avenue
Buena Park, CA 90620
(714) 994-0402
C-57 # 740854

During drilling operations, soil samples will be collected at intervals described in the soil vapor extraction workplan during vapor extraction well installation using hollow stem auger drilling equipment and soil vapor probes installation using a direct push equipment. All possible efforts will be made to collect undisturbed samples. Each sample to be chemically analyzed will be collected in an En Core™ sampler, or in a brass sleeve or plastic liner, capped with lined plastic lids, sealed with tape, and placed on ice in a cooler immediately. All Chain-of-Custody protocol will be followed.

Responsibilities of Key Personnel:

All personnel on site will have assigned responsibilities. Mr. Aiguo Xu, P.E. of E_2C Remediation will be the Project Manager and serve as the Site Safety Officer (SSO). As SSO, Mr. Xu will distribute copies of the SSP to on-site personnel. Personnel will be required to document their full understanding of the SSP before admission to the site. Compliance with the SSP will be monitored at all times by the SSO. Appropriate personnel will conduct a training session to assure that all are aware of safe work practices. In the training session, personnel will be made aware of hazards at the site and will utilize Material Safety Data Sheets for information on compounds to be encountered.

Mr. Xu will also be responsible to verify that field personnel keep proper field notes, collect and secure samples, and assure sample integrity by adherence to Chain-of-Custody protocol.

On-site employees will take reasonable precautions to avoid unforeseen hazards. After documenting understanding of the SSP, each on-site employee will be responsible for strict adherence to all points contained herein. Any deviation observed will be reported to the SSO and corrected. On-site employees are held responsible to perform only those tasks for which they believe they are qualified. Provisions of this SSP are mandatory and personnel associated with on-site activities will adhere strictly hereto.

Job Hazard Analysis:

Hazards likely to be encountered on site include those commonly encountered when operating any mechanical equipment, such as the danger of falling objects or moving machinery and potential excessive noise. Simple precautions will reduce or eliminate risks associated with operating such equipment. Noise control will comply with local ordinances and personnel will wear ear plugs and/or other hearting protection when working adjacent (within 3 feet) to the system.

Qualified personnel only will have any contact with this equipment. All on-site personnel, including the drilling contractor and his employees, are required to wear hard hats and steel-toed shoes when in close proximity to drilling equipment. Latex or nitrile gloves will be worn by persons collecting or handling samples to prevent exposure to contaminants. Gloves will be changed between samples, and used glove will be discarded, to avoid cross-contamination. Proper respiratory equipment will be worn if vapor contamination levels on site exceed action levels as determined using a PID or FID. Action levels requiring respiratory apparatus will be 5 ppm, in the breathing zone. Furthermore, no on-site smoking, open flame, or sparks will be permitted in order to prevent accidental ignition.

Risk Assessment Summary**:**

Exposure to chemicals anticipated on site includes solvents such as tetrachloroethene (PCE) and arsenic, a heavy metal. According to previous investigations, the range in concentration of the anticipated chemicals of concern and the associated matrix are as follows.

Reported Compounds	**Matrix**	**Reported Range in Concentration (µg/m^3)**	
		Minimum	**Maximum**
PCE	Soil Vapor	Non-detect	171,900
TCE	Soil Vapor	Non-detect	302
		(µg/kg)	
PCE	Soil	Non-detect	535
TCE	Soil	Non-detect	1.92
Arsenic	Soil	0.495	140

Notes: µg/m^3 = micrograms per cubic meter
µg/kg = micrograms per kilogram

Pathways of exposure for these contaminants for field personnel include dermal contact with contaminated soil, or inhalation of contaminated dust or vapors. Use of personal protective equipment (PPE) planned for this project and following decontamination procedures of the SSP can mitigate dermal contact. Inhalation hazards can be reduced through the use of dust control measures, if warranted, and by observing action levels described in the SSP. Soil vapor extraction effluent discharge point will be plumbed directly to the atmosphere at least 13 feet above ground.

The chemicals anticipated on site are tetrachloroethene (PCE), trichloroethene (TCE), and arsenic.

Tetrachloroethene (PCE) and Arsenic

Exposure to chemicals anticipated on site includes solvents such as tetrachloroethene (PCE) and trichloroethene (TCE). Arsenic, a heavy metal, has also been identified at the site. According to past investigations, the range in concentration of the anticipated chemicals of concern and the associated matrix are as follows.

Compounds	Matrix	Exposure Standards
TCE	Soil Vapor (Breathing Zone)	**ACGIH**: TLV/TWA = 50 ppm; STEL = 100 ppm **NIOSH**: 10-hour TWA = 25 ppm **OSHA**: 8-hour PEL = 100 ppm; 5-minute peak in any 2-hour period = 300 ppm
PCE	Soil Vapor (Breathing Zone)	**OSHA**: 8-hour PEL = 100 ppm; 5-minute peak in any 3-hour period = 300 ppm
Arsenic	Air (Breathing Zone)	**Cal/OSHA**: 8-hour PEL = 10 μg/m^3;

<u>Exposure Monitoring Plan:</u>

A hydrogen Flame-Ionization Detector (FID), or Photoionization Detector (PID) will be used to monitor vapor concentrations around the site. Should concentrations exceed TLV's, protective measures will be taken.

<u>Personal Protective Equipment:</u>

Personnel on site will have access to respirators with organic vapor and particulate cartridges. Replacement cartridges will be available on site as needed. When handling samples, the on-site personnel will wear latex or nitrile gloves. Hard hats, safety vests and steel-toed shoes will be worn by all personnel when at the Site.

<u>Work Zones and Security Measures</u>**:**

Access to the site will be restricted to authorized personnel. A set of cones, placards, or wide yellow tape, surrounding the site will define the perimeter. The On-Site Task Manager will be responsible for work area security.

Decontamination Measures:

Avoidance of contamination whenever possible is the best method for protection. Common sense dictates that on-site personnel avoid breathing possible vapors at well heads and avoiding impacted groundwater. All personnel will be advised to wash their hands, neck, and face with soap and water before taking a break or leaving the site. Respirators will be washed with soap and water following each day's use.

Drilling and sampling equipment will be decontaminated before each use by washing the equipment in a Liquinox and water solution and double-rinsing with potable water.

General Safe Work Practices:

Equipment operators and other on-site personnel will be briefed each day in "tailgate" meetings as to the day's goals and equipment to be used. Anticipated contaminants and emergency procedures will be reviewed. Appropriate personal protective equipment will be put on and verified correct by SSO, including respirator fit.

Training Requirements:

The SSO will conduct a pre-site training session which will include all points of MSDS forms, contaminant properties, warning signs, health hazard data, risk from exposure, and emergency first aid. The SSO will assure that everyone fully understands site hazards.

Medical Surveillance Program:

According to CFR 29, 1910.120, Paragraph (f), employees who wear respirators 30 days or more during one year or who have been exposed to hazardous substances or health hazards above established permissible exposure limits are required to be monitored medically.

Record Keeping:

Documentation will be kept on personnel exposed to contaminant hazards on the job site according to OSHA regulations. These will include documentation that employees received training on the SSP, respiratory protection, MSDS forms, and all emergency procedures. These will be reviewed during the pre-site training meeting.

Contingency Plans:

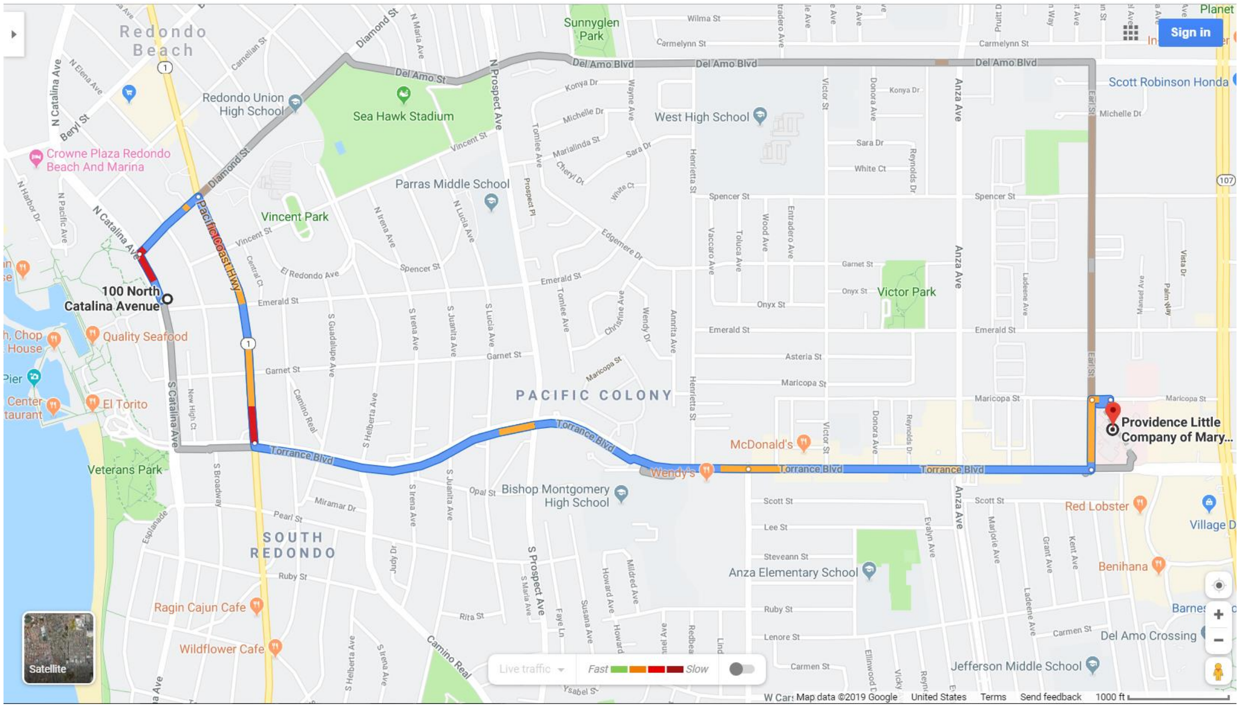
In the event of accident, injury, or other emergency, the Task Manager, Project Manager, or other person will notify appropriate government agencies or individuals as follows:

Police, Fire, or Ambulance Emergency 911

Providence Little Company of Mary Medical Center
4101 Torrance Boulevard
Torrance, CA 90503
(310) 540-7676

Nearest Emergency Hospital (Head north on N Catalina Ave (0.1 mi); turn right onto Diamond St (0.2 mi); turn right on CA-1 S (0.5 mi); turn left onto Torrance Blvd (1.0 mi); continue straight to stay on Torrance Blvd (0.6 mi); Turn left onto Earl

St (0.1 mi); turn right onto Maricopa St (180 ft) (Providence Little Company of Mary Medical Center is on the right).



<u>Emergency Numbers for E_2C Remediation Personnel:</u>

Mr. Aiguo Xu, P.E. of E_2C will serve as Project Manager. He may be contacted by calling the following number: Cell Phone: (916) 580-9113.

In case of an emergency, you may contact Mr. Phil Goalwin, P.G. (President) of E_2C at the following numbers: Office Phone: (916) 782-8700 or Cell Phone: (661) 599-1470.

Attachment A

Safety Plan Acceptance Form

_______________________, I certify that I have been furnished a copy of Site Safety Plan. I have read the safety plan and understood the contents of the plan and requirements before any field work at the site.

____(Signature)

Environmental
Engineering,
Consulting &
Remediation, Inc.

ADDENDUM TO SOIL VAPOR EXTRACTION AND SOIL TREATMENT WORKPLAN

Former Catalina Cleaners
100 ~132 North Catalina Avenue
Redondo Beach, California 90277

July 21, 2020
Project Number 2131RV27

PREPARED FOR:
Beach City Capital
1240 Rosecrans Avenue.
Manhattan Beach, California 90266

PREPARED BY:
E2C Remediation
Environmental Engineering Consulting & Remediation, Inc.
1020 Winding Creek Road, Suite 110
Roseville, California 95678

TABLE OF CONTENTS

TABLE OF CONTENTS i
LIST OF FIGURES i
1.0 INTRODUCTION 1
2.0 VAPOR BARRIER AND PASSIVE SUBSLAB VENTILATION 2
3.0 VAPOR BARRIER SYSTEM MAINTENANCE 3
  3.1 Vapor Barrier Liner 3
  3.2 Passive Ventilation Piping 3
4.0 LIMITATIONS AND REPORT CERTIFICATION 4

LIST OF FIGURES

Figure 1 Site Plan with Proposed Soil Vapor Intrusion Control
Figure 2 Proposed Soil Vapor Intrusion Control HDPE Installation Details

1.0 INTRODUCTION

A “Soil Vapor Extraction and Soil Treatment Workplan” dated May 7, 2020 was submitted to the Los Angeles County Fire Department for review and approval. In the workplan, one of the contingency measures for preventing soil vapor intrusion is the installation of physical barriers. In the process of obtaining environmental permitting, the project proponent has come the conclusion that for the proposed residential development portion of the project, it is prudent to install a soil vapor barrier with passive soil vapor ventilation.

This addendum proposes the installation of soil vapor barrier and passive soil vapor ventilation. The next sections present the proposed vapor barrier and passive ventilation design.

The proposed vapor barrier and passive sub-slab ventilation design and maintenance specifications are to be included on construction and engineering drawings.

2.0 VAPOR BARRIER AND PASSIVE SUBSLAB VENTILATION

The proposed soil vapor barrier will be 30 mil or thicker HDPE membrane (double textured) or equivalent membrane and 30-mil (minimum) thick layer of Liquid Boot® 500, a spray on "chloroprene modified asphalt emulsion." The barrier extent will be extended 3 feet beyond all the proposed residential units. See Figure 1 for the proposed barrier coverage.

The vapor barrier will be installed directly under the concrete slab. Individual barrier pieces will be fused together with overlap. The proposed installation details are illustrated in Figure 2. After installation, smoke tests will be conducted to ensure that there are no leaks. Any detected leaks will be repaired or corrected before spraying the proposed emulsion layer and the construction of concrete slabs.

Low-profile sub-slab passive ventilation piping will be installed beneath the soil vapor membrane barrier, within the sub-slab gravel bedding in one foot by one foot trenches. See Figure 1 for the proposed trench locations. These proposed trenches are to be located 10 feet apart on centers. The pipes will consist of 2-inch perforated schedule 40 PVC pipe with 0.02' slots or equivalent. The perforated pipes will be placed at the center of the sand trenches. The individual perforated pipes will be connected to a 2-inch blank schedule 40 PVC pipe on one side of the buildings. The blank pipe will extend three feet above the nearest roof top at both ends of the horizontal conveyance pipe. Filter fabric will be placed over the sub-slab gravel bedding, followed by a 30-mil thick HDPE membrane. Membrane seams will overlap by a minimum of 6 inches and membrane penetrations for piping and electrical conduits will be sealed with a 3-inch wide collar or boot. The membrane will then be covered with a 30-mil (minimum) thick layer of Liquid Boot® 500, a spray on "chloroprene modified asphalt emulsion."

After installation of both the membrane and the spray layer, the vapor barrier will be subjected to a smoke test by pumping a mineral oil-based smoke into the passive ventilation piping and observing any smoke leaking through the vapor barrier. Leaks observed during the smoke test will be corrected with additional application of Liquid Boot® 500. The leak test will end after no additional leakage of mineral oil smoke is observed.

Subsequent to vapor barrier membrane installation and testing, a Liquid Boot® UltraShield G-1000 geotextile will be placed over the vapor barrier. The concrete floor slab will then be constructed over this geotextile layer.

3.0 VAPOR BARRIER SYSTEM MAINTENANCE

The proposed soil vapor barrier has two essential elements: the vapor barrier system and the passive ventilation system. Both of these vapor barrier system elements are passive and typically require no regular maintenance. The following sections describe precautions and recommended inspection procedures for the proposed vapor barrier system.

3.1 Vapor Barrier Liner

The vapor barrier liner is designed to function throughout the life of the proposed residential building. The vapor barrier liner is located immediately under the concrete slab-on-grade basement floor; therefore, the vapor barrier liner is not accessible for visual inspection.

The primary maintenance concern regarding vapor barrier integrity is post-construction modifications to the residential ground concrete floor. Modifications, such as drilling, saw-cutting, or any other penetration of the concrete floor must not be allowed to puncture the liner system. Anchor bolts, for example, should be installed within the concrete slab.

If penetration of the concrete slab occurs, then a qualified vapor barrier contractor will need to be retained to reseal the vapor barrier liner and retest the integrity of the vapor barrier. Any penetration and repair of the vapor barrier liner should be fully documented by the property owners.

3.2 Passive Ventilation Piping

Low-profile ventilation piping is located in the sand or gravel layer underlying the vapor barrier liner. Passive ventilation pressure gradients draw soil vapors toward two (2) 2-inch riser pipes that vent above the roofline of the proposed residential buildings. The risers will be routed along the exterior walls. All the riser lines will be clearly labelled.

The primary maintenance concerns regarding passive ventilation piping integrity are inadvertent damage to exposed piping and weather-related damage to discharge piping. Exposed riser pipe should be periodically inspected for incidental damage. The passive ventilation discharge locations should be inspected for weather-related damage after each winter season.

Periodic inspection of exposed riser pipe and piping discharge locations should be documented in the building records. Any damage to riser piping, including discharge locations, should be fully documented. Any repairs made to riser or discharge piping should be fully documented by the property owners.

4.0 LIMITATIONS AND REPORT CERTIFICATION

E$_2$C has prepared this soil vapor barrier and passive sub-slab soil vapor ventilation workplan addendum in accordance with generally accepted standards of care existing in California at this time. It should be recognized that definition and evaluation of geologic conditions is a difficult and inexact science. Judgments leading to conclusions and recommendations are generally made with limited knowledge of surface conditions present. No warranty expressed or implied is made.

This work plan addendum has been prepared under the professional supervision of the registered professionals whose seals and signatures appear herein. The conclusions of this report are based solely on the Scope of Services outlined and the sources of information referenced in this report. Any additional information that becomes available concerning the Site should be submitted to E$_2$C so that our conclusions may be reviewed and modified, if necessary. This Workplan was prepared for the sole use of Beach City Capital and/or its agent(s), the Los Angeles County Fire Department, the Los Angeles Regional Water Quality Control Board and the Los Angeles County Environmental Health Department.

Prepared By:

Aiguo Xu

Aiguo Xu, Ph.D.
Principal Engineer
C.E. # 72685

REGISTERED PROFESSIONAL ENGINEER
AIGUO
XU
No. 72685
Exp. 6/30/2022
CIVIL
STATE OF CALIFORNIA

Reviewed By:

Philip Goal

Philip Goalwin, P.G. #4779
Principal Geologist

PROFESSIONAL GEOLOGIST
PHILIP GOALWIN
Exp. 11/30/2020
No. 4779
STATE OF CALIFORNIA

FIGURES

Figure 1 Site Plan with Proposed Soil Vapor Intrusion Control
Figure 2 Proposed Soil Vapor Intrusion Control HDPE Installation Details

LEGEND:

▲ ACCESS TO BEDROOM*

▪▪▪▪▪▪ 150' FIRE HOSE

* ALL BEDROOMS ARE LOCATED AT 1ST AND 2ND LEVELS

SOIL VAPOR MITIGATION EXPLANATION

— 2" Perforated Schedule 40 PVC Pipe (with 0.02" slots or equivalent) At the both ends of the eastside horizontal pipe, a vertical vent (blank 2" Sch. 40 PVC) extending 3 ft above the nearest roof top is specified. The pipes are placed at the center of the sand trenches.

▨ Sand Trench (1 ft x 1ft) filled with Lonestar #3 sand pack) Immediately below HDPE liner.

🟨 30 mil. HDPE textured (both side) liner with joints welded extending 3 ft beyond all enclosed areas. Placed immediately below concrete slab.

LEVEL 1 BUILDING PLAN

BEACH CITY CAPITAL

100-132 North Catalina Avenue, Redondo Beach - California

N

scale: 1/16" = 1'-0"

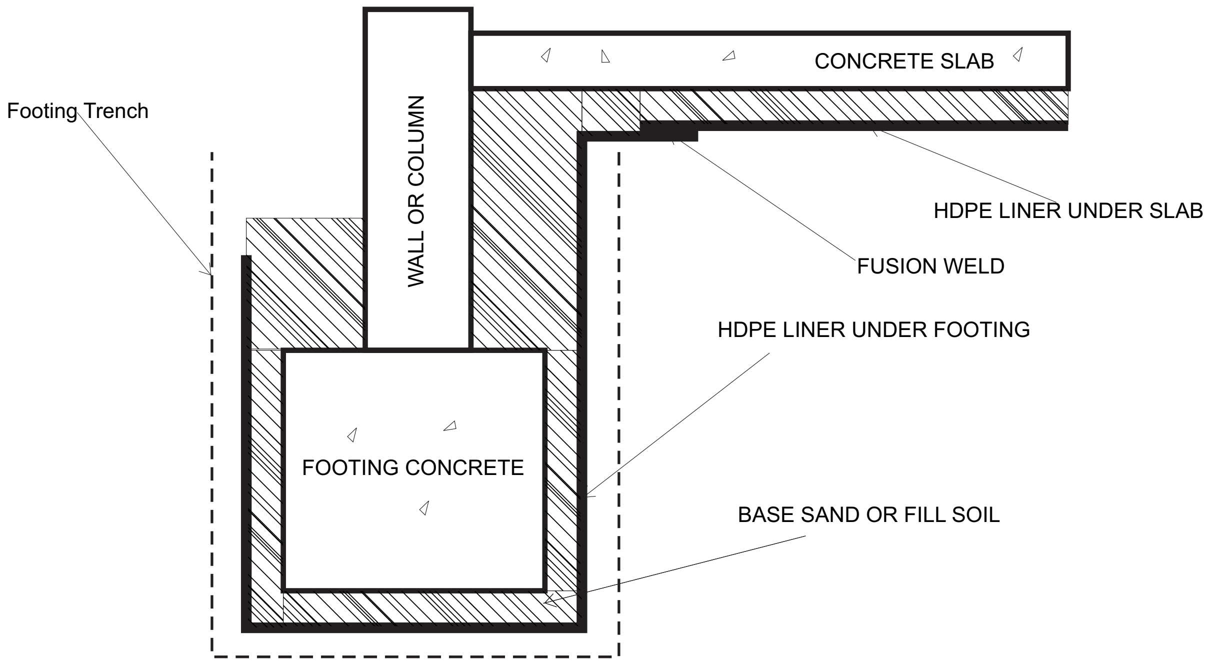
0 16 32 48 64

100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

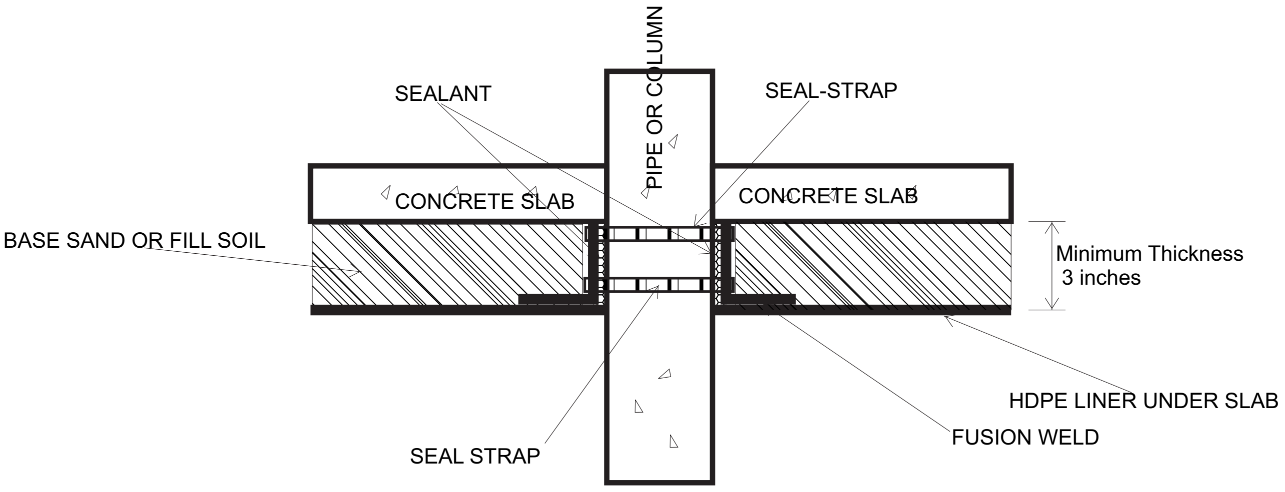
E2C REMEDIATION
Environmental Engineering, Consulting & Remediation, Inc.
233 Technology Way, #7, Rocklin, CA 95765
Phone: (916) 782-8700 Fax: (916) 782-8750

FIGURE 1

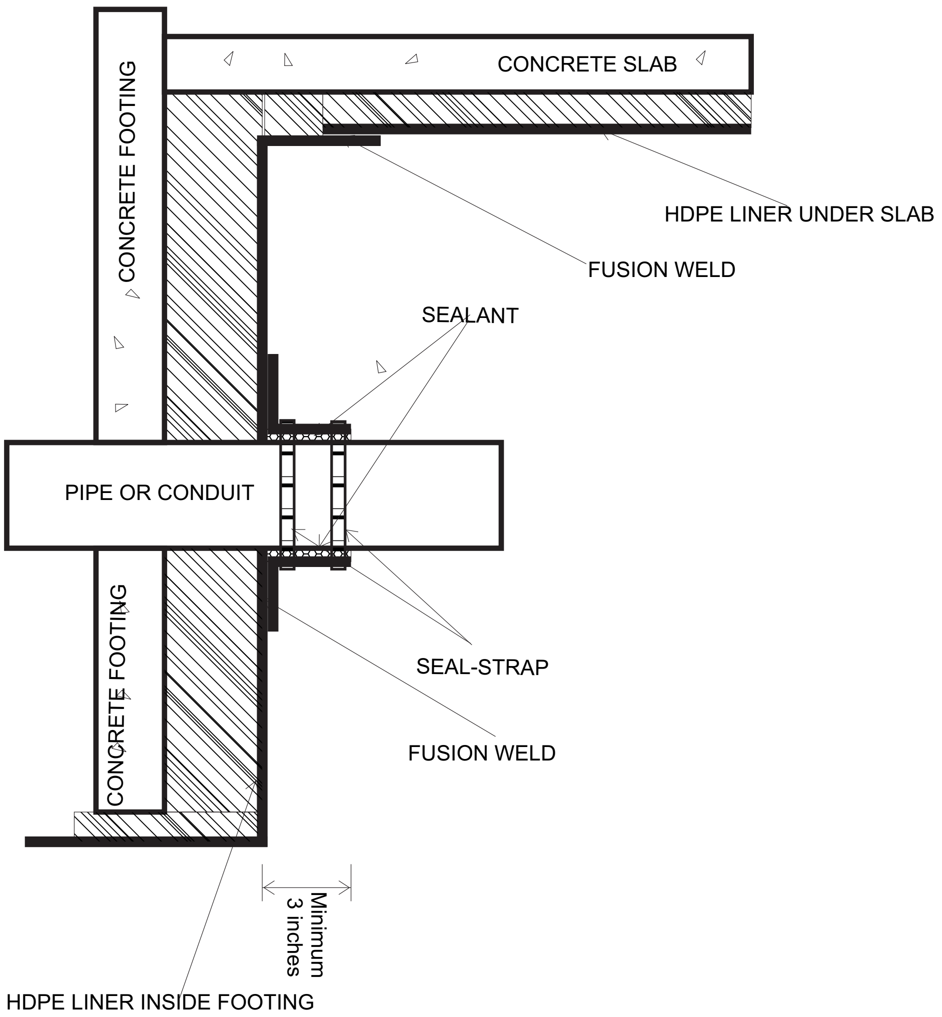
SITE PLAN WITH PROPOSED SOIL VAPOR INTRUSION CONTROL



HDPE UNDER FOOTING INSTALLATION DETAILS



HDPE LINER COLUMN/PIPE PENETRATION DETAILS



HORIZONTAL PIPE PENETRATION DETAILS

E2C REMEDIATION

Environmental
Engineering,
Consulting &
Remediation, Inc.

233 Technology Way, #7, Rocklin, CA 95765
Phone: (916) 782-8700 Fax: (916) 782-8750

100-132 NORTH CATALINA AVE.
REDONDO BEACH, CALIFORNIA

PROPOSED
SOIL VAPOR INTRUSION CONTROL
HDPE INSTALLATION DETAILS

FIGURE

2

Rincon Consultants, Inc.

250 East 1st Street, Suite 1400
Los Angeles, California 90012

213 788 4842
FAX 908 2200

info@rinconconsultants.com
www.rinconconsultants.com

December 8, 2020
Project 19-07402

Antonio Gardea, Community Development Department
415 Diamond Street, Door 2
Redondo Beach, California 90277

Via email: Antonio.gardea@redondo.org

Subject: **Follow Up to the Peer Review of Hazardous Materials Studies for 100-132 North Catalina Avenue Project, Redondo Beach, California 90277**

Dear Mr. Gardea:

Rincon Consultants, Inc. (Rincon) prepared a letter summarizing a peer review performed on the Addendum to Soil Vapor Extraction and Soil Treatment Workplan (Workplan) for the Former Catalina Cleaners located at 100-132 North Catalina Avenue in Redondo Beach (Site), prepared by Environmental Engineering Consulting & Remediation, Inc. (E2C), dated July 29, 2020.

In this letter, Rincon identified the following items that required additional discussion:

1. Description of the sub-slab vapor barrier, including:
    a. The minimum thickness of the spray-applied gas vapor barrier;
    b. Application of the spray-applied gas vapor barrier;
    c. Specific detailed engineering plans for the spray-applied gas vapor barrier;
    d. Vent riser design;
    e. Pipe spacing design;
    f. Base soil to be used beneath the sub-slab vapor barrier;
    g. Horizontal pipe design;
    h. The extent of the sub-slab vapor barrier;
    i. An Operation and Maintenance Plan; and
    j. Information for Occupants.
2. Design considerations, including:
    a. Existing buildings;
    b. Parking garage; and
    c. Proposed soil vapor extraction system.

On November 17, 2020, Rincon received a PDF prepared by Methane Specialists showing a cross-section of the proposed vapor barrier design. Based on a review of this cross-section, Rincon understands that the proposed vapor barrier will include the use of EPRO vapor barrier, or equivalent, that is chemically resistant to contaminants of concern (COCs) present at the site.

At this time, please provide letter and figure describing where the vapor barrier will be applied throughout the site. In particular, please provide details regarding how the vapor barrier system will be applied to the lodge building (112 North Catalina Avenue). This information will be important in describing the project components of the proposed vapor mitigation system in the Environmental Impact Report that is being prepared by Rincon.

If you have any questions about the contents of this memo, please feel free to contact Lindsay Ellingson at 760-517-9136 or lellingson@rinconconsultants.com.

Sincerely,

Rincon Consultants, Inc.

Lindsay Ellingson, MS, EIT
Environmental Engineer
lellingson@rinconconsultants.com

Torin Snyder, PG, CHG
Principal
tsnyder@rinconconsultants.com

Appendix J

Noise Calculations and Manufacturers' Specifications

```
                        Roadway Construction Noise Model (RCNM),Version 1.1

Report date:            01/21/2021
Case Description:       100-132 Catalina Avenue Project

                                **** Receptor #1 ****

                                           Baselines (dBA)
Description                        Land Use        Daytime    Evening    Night
-----------                        --------        -------    -------    -----
Church/ Multi-Family Residences    Residential        65.0       65.0     65.0

                                     Equipment
                                     ---------
                               Spec    Actual    Receptor    Estimated
              Impact  Usage    Lmax    Lmax      Distance    Shielding
Description   Device   (%)     (dBA)   (dBA)      (feet)       (dBA)
-----------   ------  -----    -----   -----     --------    ---------
Dozer             No     40             81.7         25.0          0.0
Excavator         No     40             80.7         25.0          0.0
Jackhammer       Yes     20             88.9         25.0          0.0


                                     Results
                                     -------
                                                            Noise Limits (dBA)
                    Noise Limit Exceedance (dBA)

----------------------------------------------
----------------------------------------------
                        Calculated (dBA)         Day           Evening
Night              Day           Evening         Night
                        ----------------   --------------   -------------

--------------    --------------  --------------  --------------
Equipment                  Lmax    Leq        Lmax    Leq      Lmax    Leq     Lmax
  Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq
----------------------  ------  ------     ------  ------  ------  ------  ------
------    ------  ------  ------  ------  ------  ------
Dozer                     87.7    83.7        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Excavator                 86.7    82.8        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Jackhammer                94.9    87.9        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
               Total      94.9    90.2        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A

                                **** Receptor #2 ****

                                           Baselines (dBA)
```

```
Description                Land Use        Daytime    Evening    Night
-----------                --------        -------    -------    -----
Multi-Family Residences    Residential        65.0       65.0     65.0

                                     Equipment
                                     ---------
                               Spec    Actual    Receptor    Estimated
              Impact  Usage    Lmax    Lmax      Distance    Shielding
Description   Device   (%)     (dBA)   (dBA)      (feet)       (dBA)
-----------   ------  -----    -----   -----     --------    ---------
Dozer             No     40             81.7        100.0           0.0
Excavator         No     40             80.7        100.0           0.0
Jackhammer       Yes     20             88.9        100.0           0.0


                                     Results
                                     -------
                                                            Noise Limits (dBA)
                    Noise Limit Exceedance (dBA)

----------------------------------------------
----------------------------------------------
                        Calculated (dBA)         Day           Evening
Night              Day           Evening          Night
                        ----------------   --------------   -------------
--------------    --------------  --------------  --------------
Equipment                  Lmax    Leq        Lmax    Leq     Lmax    Leq     Lmax
  Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq
----------------------  ------  ------     ------  ------  ------  ------  ------
------    ------  ------  ------  ------  ------  ------
Dozer                     75.6    71.7        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Excavator                 74.7    70.7        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Jackhammer                82.9    75.9        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
               Total      82.9    78.1        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A

                                **** Receptor #3 ****

                                           Baselines (dBA)
Description                Land Use        Daytime    Evening    Night
-----------                --------        -------    -------    -----
Multi-Family Residences    Residential        65.0       65.0     65.0

                                     Equipment
                                     ---------
                               Spec    Actual    Receptor    Estimated
              Impact  Usage    Lmax    Lmax      Distance    Shielding
```

```
Description   Device   (%)     (dBA)   (dBA)      (feet)       (dBA)
-----------   ------  -----    -----   -----     --------    ---------
Dozer             No     40             81.7        150.0          0.0
Excavator         No     40             80.7        150.0          0.0
Jackhammer       Yes     20             88.9        150.0          0.0


                                     Results
                                     -------
                                                            Noise Limits (dBA)
                    Noise Limit Exceedance (dBA)

----------------------------------------------
----------------------------------------------
                        Calculated (dBA)          Day           Evening
Night              Day            Evening          Night
                        ----------------   --------------   -------------
--------------    --------------  --------------  --------------
Equipment                  Lmax    Leq        Lmax    Leq     Lmax    Leq     Lmax
  Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq
----------------------  ------  ------     ------  ------  ------  ------  ------
------    ------  ------  ------  ------  ------  ------
Dozer                     72.1    68.1        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Excavator                 71.2    67.2        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Jackhammer                79.3    72.4        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
               Total      79.3    74.6        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A

                                **** Receptor #4 ****

                                           Baselines (dBA)
Description Land Use        Daytime    Evening    Night
----------- --------        -------    -------    -----
Churches    Residential        65.0       65.0     65.0

                                     Equipment
                                     ---------
                               Spec    Actual    Receptor    Estimated
              Impact  Usage    Lmax    Lmax      Distance    Shielding
Description   Device   (%)     (dBA)   (dBA)      (feet)       (dBA)
-----------   ------  -----    -----   -----     --------    ---------
Dozer             No     40             81.7        275.0          0.0
Excavator         No     40             80.7        275.0          0.0
Jackhammer       Yes     20             88.9        275.0          0.0


                                     Results
```

```
                                     -------
                                                            Noise Limits (dBA)
                    Noise Limit Exceedance (dBA)

----------------------------------------------
----------------------------------------------
                        Calculated (dBA)         Day           Evening
Night              Day           Evening         Night
                        ----------------   --------------   -------------
--------------    --------------  --------------  --------------
Equipment                  Lmax    Leq        Lmax    Leq     Lmax    Leq     Lmax
  Leq       Lmax    Leq     Lmax    Leq     Lmax    Leq
----------------------  ------  ------     ------  ------  ------  ------  ------
------    ------  ------  ------  ------  ------  ------
Dozer                     66.9    62.9        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Excavator                 65.9    61.9        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
Jackhammer                74.1    67.1        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
               Total      74.1    69.4        N/A     N/A     N/A     N/A     N/A
  N/A       N/A     N/A     N/A     N/A     N/A     N/A
```

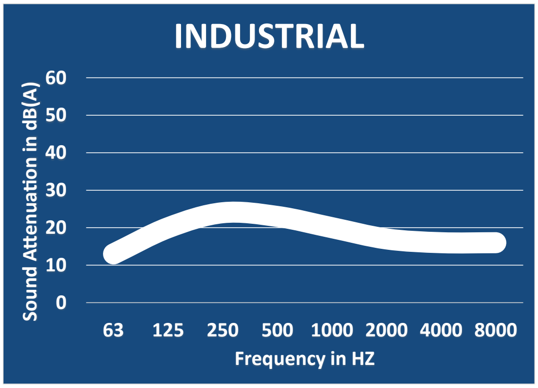
NETT® TECHNOLOGIES INC.

www.nettinc.com sales@nettinc.com +1 (905) 672-5453

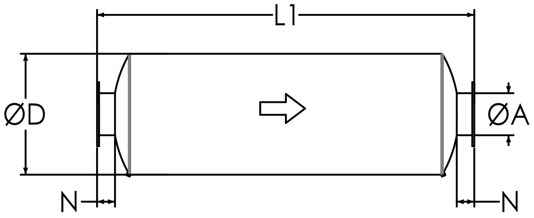
Industrial Grade Silencers

Model NTIN-C (Cylindrical), 15-20 dBA

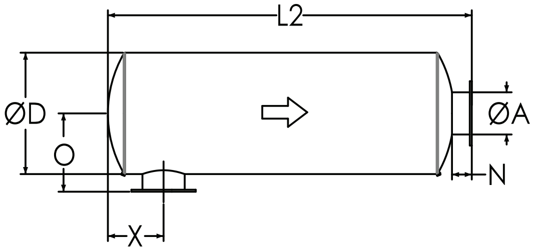
TYPICAL ATTENUATION CURVE



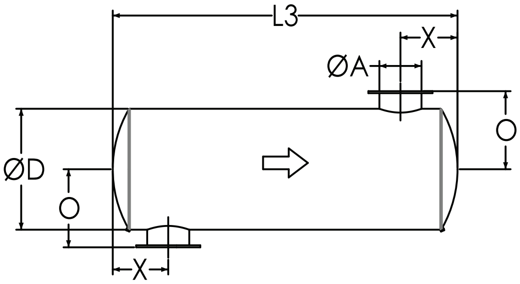
TYPICAL CONFIGURATIONS



END IN END OUT (EI-EO)



SIDE IN END OUT (SI-EO)



SIDE IN SIDE OUT (SI-SO)

Nett Technologies' Industrial Grade Silencers are designed to achieve maximum performance with the least amount of backpressure.
The silencers are Reactive Silencers and are typically used for reciprocating or positive displacement engines where noise level regulations are low.

FEATURES & BENEFITS

- Over 25 years of excellence in manufacturing noise and emission control solutions
- Compact modular designs providing ease of installations, less weight and less foot-print
- Responsive lead time for both standard and custom designs to meet your needs
- Customized engineered systems solutions to meet challenging integration and engine requirements

Contact Nett Technologies with your projects design requirements and specifications for optimized noise control solutions.

OPTIONS

- Versatile connections including ANSI pattern flanges, NPT, slip-on, engine flange, schedule 40 and others
- Aluminized Steel, Stainless Steel 304 or 316 construction
- Horizontal or vertical mounting brackets and lifting lugs

ACCESSORIES

- Hardware Kits
- Flexible connectors and expansion joints
- Elbows
- Thimbles
- Raincaps
- Thermal insulation: integrated or with thermal insulation blankets
- Please see our accessories catalog for a complete listing

PRODUCT DIMENSIONS (in)

Model*	A	D	L1	L2	L3	X**	X	N	O
	Outlet	Dia	EI-EO	SI-EO	SI-SO	Min	Max	Nipple	O
NTIN-C1	1	4	20	18	16	3	7	2	4
NTIN-C1.5	1.5	6	22	20	18	3	8	2	5
NTIN-C2	2	6	22	19	16	3	8	3	6
NTIN-C2.5	2.5	6	24	21	18	4	9	3	6
NTIN-C3	3	8	26	23	20	5	10	3	7
NTIN-C3.5	3.5	9	28	25	22	5	11	3	8
NTIN-C4	4	10	32	29	26	5	12	3	8
NTIN-C5	5	12	36	33	30	6	14	3	9
NTIN-C6	6	14	40	36	32	7	16	4	11
NTIN-C8	8	16	50	46	42	8	21	4	12
NTIN-C10	10	20	52	48	44	11	21	4	14
NTIN-C12	12	24	62	58	54	12	26	4	16
NTIN-C14	14	30	74	69	64	15	31	5	20
NTIN-C16	16	36	82	77	72	18	35	5	23
NTIN-C18	18	40	94	89	84	18	42	5	25
NTIN-C20	20	40	110	105	100	19	52	5	25
NTIN-C22	22	48	118	113	108	22	56	5	29
NTIN-C24	24	48	130	125	120	24	62	5	29

* Other models and custom designs are available upon request. Dimensions subject to change without notice. All silencers are equipped with drain ports on inlet side. The silencer is all welded construction and coated with high heat black paint for maximum durability.

** Standard inlet/outlet position.

Acoustical Surfaces, Inc.
We Identify and
S.T.O.P.
Your Noise Problems
Sound Transmission Obscuring Products
Soundproofing, Acoustics, Noise & Vibration Control Specialists
TM

Acoustical Surfaces, Inc.

SOUNDPROOFING, ACOUSTICS, NOISE & VIBRATION CONTROL SPECIALISTS

123 Columbia Court North • Suite 201 • Chaska, MN 55318
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Email: sales@acousticalsurfaces.com
Visit our Website: www.acousticalsurfaces.com

We Identify and S.T.O.P. Your Noise Problems

Echo Barrier™

The Industry's First Reusable, Indoor/ Outdoor Noise Barrier/Absorber

- Superior acoustic performance
- Industrial durability
- Simple and quick installation system
- Lightweight for easy handling
- Unique roll-up design for compact storage and transportation
- Double or triple up for noise 'hot spots'
- Ability to add branding or messages
- Range of accessories available
- Weatherproof – absorbs sound but not water
- Fire retardant
- 1 person can do the job of 2 or 3 people

Why is it all too often we see construction sites with fencing but no regard for sound issues created from the construction that is taking place? This is due to the fact that there has not been an efficient means of treating this type of noise that was cost effective ***until now.***

Echo Barrier temporary fencing is a reusable, outdoor noise barrier. Designed to fit on all types of temporary fencing. Echo Barrier absorbs sound while remaining quick to install, light to carry and tough to last.

BENEFITS: Echo Barrier can help reduce noise complaints, enhance your company reputation, extend site operating hours, reduce project timescales & costs, and improve working conditions.

APPLICATIONS: Echo Barrier works great for construction & demolition sites; rail maintenance & replacement; music, sports and other public events; road construction; utility/maintenance sites; loading and unloading areas; outdoor gun ranges.

DIMENSIONS: 6.56' × 4.49'.

WEIGHT: 13 lbs.

ACOUSTIC PERFORMANCE: 10-20dB noise reduction (greater if barrier is doubled up).

INSTALLATION: The Echo Barrier is easily installed using our quick hook system and specially designed elastic ties.

Echo Barrier Transmission Loss Field Data

	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Single Layer	6	12	16	23	28	30	30
Double Layer	7	19	24	28	32	31	32

• Soundproofing Products • Sonex™ Ceiling & Wall Panels • Sound Control Curtains • Equipment Enclosures • Acoustical Baffles & Banners • Solid Wood & Veneer Acoustical Ceiling & Wall Systems • Professional Audio Acoustics • Vibration & Damping Control • Fire Retardant Acoustics • Hearing Protection • Moisture & Impact Resistant Products • Floor Impact Noise Reduction • Sound Absorbers • Noise Barriers • Fabric Wrapped Wall Panels • Acoustical Foam (Egg Crate) • Acoustical Sealants & Adhesives • Outdoor Noise Control • Assistive Listening Devices • OSHA, FDA, ADA Compliance • On-Site Acoustical Analysis • Acoustical Design & Consulting • Large Inventory • Fast Shipment • No Project too Large or Small • Major Credit Cards Accepted

ELECTRICAL DATA

38HDR UNIT SIZE	V–PH–Hz	VOLTAGE RANGE*		COMPRESSOR		OUTDOOR FAN MOTOR			MIN CKT AMPS	FUSE/ HACR BKR AMPS
		Min	Max	RLA	LRA	FLA	NEC Hp	kW Out		
018	208/230–1–60	187	253	9.0	48.0	0.80	0.125	0.09	12.1	20
024	208/230–1–60	187	253	12.8	58.3	0.80	0.125	0.09	16.8	25
030	208/230–1–60	187	253	14.1	73.0	1.45	0.25	0.19	19.1	30
036	208/230–1–60	187	253	14.1	77.0	1.45	0.25	0.19	19.1	30
	208/230–3–60	187	253	9.0	71.0	1.45	0.25	0.19	12.7	20
	460–3–60	414	506	5.6	38.0	0.80	0.25	0.19	7.8	15
048	208/230–1–60	187	253	21.8	117.0	1.45	0.25	0.19	28.7	50
	208/230–3–60	187	253	13.7	83.1	1.45	0.25	0.19	18.6	30
	460–3–60	414	506	6.2	41.0	0.80	0.25	0.19	8.6	15
060	208/230–1–60	187	253	26.4	134.0	1.45	0.25	0.19	34.5	60
	208/230–3–60	187	253	16.0	110.0	1.45	0.25	0.19	21.5	35
	460–3–60	414	506	7.8	52.0	0.80	0.25	0.19	10.6	15

* Permissible limits of the voltage range at which the unit will operate satisfactorily

FLA – Full Load Amps
HACR – Heating, Air Conditininng, Refrigeration
LRA – Locked Rotor Amps
NEC – National Electrical Code
RLA – Rated Load Amps (compressor)

NOTE: Control circuit is 24–V on all units and requires external power source. Copper wire must be used from service disconnect to unit. All motors/compressors contain internal overload protection.

SOUND LEVEL

Unit Size	Standard Rating (dB)	Typical Octave Band Spectrum (dBA) (without tone adjustment)						
		125	250	500	1000	2000	4000	8000
018	68	52.0	57.5	60.5	63.5	60.5	57.5	46.5
024	69	57.5	61.5	63.0	61.0	60.0	56.0	45.0
030	72	56.5	63.0	65.0	66.0	64.0	62.5	57.0
036	72	65.0	61.5	63.5	65.0	64.5	61.0	54.5
048	72	58.5	61.0	64.0	67.5	66.0	64.0	57.0
060	72	63.0	61.5	64.0	66.5	66.0	64.5	55.5

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE–VOLTAGE, SERIES	REQUIRED SUBCOOLING °F (°C)
018	12 (6.7)
024	12 (6.7)
030	12 (6.7)
036	12 (6.7)
048	12 (6.7)
060	12 (6.7)

Groundborne Noise and Vibration Modeling

Notes

The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Large bulldozer	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

	Vibration Level at Receiver			
Equipment	**Distance (feet)**	**PPV_x (in/sec)**	**Lv_x (VdB)**	**RMS_x (in/sec)**
Large bulldozer	15	0.1561	92	0.039
Loaded trucks	15	0.1333	88	0.025
Jack hammer	15	0.0614	84	0.016
Small bulldozer	15	0.0053	63	0.001

Source

California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April 2020. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf
Last Updated: 4/24/2020

Groundborne Noise and Vibration Modeling

Notes

The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Large bulldozer	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

	Vibration Level at Receiver			
Equipment	**Distance (feet)**	**PPV_x (in/sec)**	**Lv_x (VdB)**	**RMS_x (in/sec)**
Large bulldozer	75	0.0266	77	0.007
Loaded trucks	75	0.0227	73	0.004
Jack hammer	75	0.0105	69	0.003
Small bulldozer	75	0.0009	48	0.000

Source

California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April 2020. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf
Last Updated: 4/24/2020

Groundborne Noise and Vibration Modeling

Notes

The reference distance is measured from the nearest anticipated point of construction equipment to the nearest structure.

	Reference Level Inputs			
Equipment	**PPV_{ref} (in/sec)**	**Lv_{ref} (VdB)**	**RMS_{ref} (in/sec)**	**Reference Distance**
Large bulldozer	0.089	87	0.022	25
Loaded trucks	0.076	83	0.014	25
Jack hammer	0.035	79	0.009	25
Small bulldozer	0.003	58	0.001	25

	Vibration Level at Receiver			
Equipment	**Distance (feet)**	**PPV_x (in/sec)**	**Lv_x (VdB)**	**RMS_x (in/sec)**
Large bulldozer	125	0.0152	72	0.004
Loaded trucks	125	0.0129	68	0.002
Jack hammer	125	0.0060	64	0.002
Small bulldozer	125	0.0005	43	0.000

Source

California Department of Transportation (Caltrans). 2020. Transportation and Construction Vibration Guidance Manual. April 2020. Available at: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tcvgm-apr2020-a11y.pdf
Last Updated: 4/24/2020