Redondo Beach Avenue A Access Ramp Project
Draft Initial Study/Mitigated Negative Declaration

Prepared by:

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February 5, 2026

Table of Contents

Acronyms and Abbreviations **4**

Section 1. Introduction **6**

1. CEQA Purpose and Process 6
2. Organization of the Initial Study 7

Section 2. Executive Summary **8**

1. Environmental Factors Potentially Affected 10
2. Evaluation of Environmental Impacts 11

Section 3. Project Description **12**

Section 4. Evaluation of Environmental Effects **17**

1. Aesthetics 17
2. Agriculture/Forest 19
3. Air Quality 21
4. Biological Resources 24
5. Cultural Resources 32
6. Energy 35
7. Geology and Soils 36
8. Greenhouse Gas Emissions 41
9. Hazards and Hazardous Materials 43
10. Hydrology and Water Quality 47
11. Land Use and Planning 51
12. Mineral Resources 53
13. Noise 54
14. Population and Housing 58
15. Public Services 59
16. Recreation 61
17. Transportation 62
18. Tribal Cultural Resources 64
19. Utilities and Service Systems 65
20. Wildfire 67
21. Mandatory Findings of Significance 69

Section 5. References **71**

List of Figures, Tables and Appendices

Figures

Figure 1. Project Location. 15
Figure 2. Project Site 16

Tables

Table 3-1. Daily Construction Criteria Pollutant Emissions……..23
Table 4-1. Species with Potential to Occur within the Project Site……26
Table 8-1. Annual Construction Greenhouse Gas Emissions……41
Table 13-1. Typical Construction Equipment Noise Levels……..55
Table 13-2. Human Response to Vibration……...57
Table 13-3. Typical Construction Equipment Vibration Levels……57

Appendices

A – Conceptual Design Plan
B – Air Quality and Greenhouse Gas Report
C – Biological Resources Assessment
D – Beach Bluffs Restoration Project Master Plan
E – Geotechnical Report

Acronyms and Abbreviations

AB	Assembly Bill
ADA	Americans with Disabilities Act
APN	Assessor's Parcel Number
AQMP	Air Quality Management Plan
BMP	Best Management Practices
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
City	City of Redondo Beach
County	County of Los Angeles
dB	decibel
dBA	A-weighted decibel
CDOC	California Department of Conservation
FEMA	Federal Emergency Management Agency
FHSZ	Fire Hazard Severity Zone
IS/MND	Initial Study/Mitigated Negative Declaration
LACoMC	Los Angeles County Municipal Code
LID	low impact development
L_{MAX}	maximum reference noise level
MBTA	Migratory Bird Treaty Act
MT	metric ton

NAHC	Native American Heritage Commission
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ROG	reactive organic gas
RTP/SCS	Regional Transportation Plan/Sustainable Communities Strategy
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
sf	square foot/feet
SO_x	sulfur oxides
SWPPP	Stormwater Pollution Prevention Plan

Section 1. Introduction

1. CEQA PURPOSE AND PROCESS

The California Environmental Quality Act (CEQA) (California Public Resources Code, Sections 21000, et seq.) was enacted in 1970 with several basic purposes: (1) to inform government decision makers and the public about the potentially significant environmental effects of proposed projects; (2) to identify ways that environmental damage can be avoided or significantly reduced; (3) to prevent significant, avoidable damage to the environment by requiring changes in projects through the use of feasible alternatives or mitigation measures; and (4) to disclose to the public the reasons behind a project's approval even if significant environmental effects are anticipated.

This Initial Study/Mitigated Negative Declaration (IS/MND) has been prepared in accordance with the Guidelines for Implementation of CEQA (State CEQA Guidelines, California Code of Regulations [CCR], Title 14, Sections 15000 et seq.). In compliance with CEQA, the City of Redondo Beach (City), as the Lead Agency for the proposed Redondo Beach Avenue A Access Ramp Project (Project), is obligated to provide opportunities for participation in the environmental review process, including informing, contacting, and soliciting input on the Project from various government agencies and the general public, including stakeholders and other interested parties. County of Los Angeles, Department of Beaches and Harbors, as a Responsible Agency, would implement the Project. This Draft IS/MND, which is available for public review as outlined below is intended as an informational document.

The 30-day public review of this Draft IS/MND is from **February 5, 2026** to **March 6, 2026** and the document is available at **Redondo Beach Community Development Department, Planning Division at 415 Diamond Street, Redondo Beach CA 90277**. Additionally, the document is available on the City's website at https://www.redondo.org/departments/community_development/planning/current_projects.php. Comments on the Draft IS/MND may be submitted to Senior Planner, **Steven Giang, at Steven.Giang@Redondo.org.** All comments should be submitted by 5:00 pm PST by **March 6, 2026**.

After the close of the public review period, the City will prepare a Final IS/MND that will include the comments received in the Draft IS/MND, responses to comments (those based on content) on the Draft IS/MND, the final document in strikeout/underline form indicating any changes to the Draft IS/MND as a result of comments received, and the Mitigation Monitoring and Reporting Program.

If the City adopts the Final IS/MND and subsequently approves the Project, the City shall file a Notice of Determination (NOD) with the County Clerk within five days of Project approval. The NOD shall be publicly posted by the County Clerk within 24 hours of receipt and remain posted for 30 days. This filing begins a 30-day statute of limitations on legal challenges to the approval under CEQA. The ability to challenge the approval in court may be limited to those persons who objected to the approval of the Project, and to issues that were presented to the Lead Agency by any person, either orally or in writing, during the public comment period between February 5, 2026 to March 6, 2026.

2. ORGANIZATION OF THE INITIAL STUDY

This Initial Study is organized into four sections as follows:

Section 1. Introduction. This Section provides introductory information, such as the Project title and the Project Applicant, and identifies the lead agency for the Project.

Section 2. Executive Summary. This Section provides Project information, identifies key areas of environmental concern, and includes a determination of whether the project may have a significant effect on the environment.

Section 3. Project Description. This Section provides a description of the environmental setting and the Project, including Project characteristics, related Project information, and a list of requested discretionary actions.

Section 4. Evaluation of Environmental Impacts. This Section contains the completed CEQA Initial Study Checklist and a discussion of the environmental factors that would be potentially affected by the Project.

Section 5. References. A list of sources consulted in the preparation of this document.

Section 2. Executive Summary

Project title:
Redondo Beach Avenue A Access Ramp Project

Lead agency name and address:
City of Redondo Beach, 415 Diamond Street Door 2, Redondo Beach, CA 90277
Contact person and phone number:
Steven Giang, Senior Planner, (310) 697-3696

Project sponsor's name and address:
Los Angeles County Department of Beaches and Harbors, 13837 Fiji Way, Marina del Rey, CA 90292

Project location:
Address: 1109 Esplanade and 811 Esplanade, Redondo Beach, CA 90277
APN: 7509-001-900 and 7509-005-900
USGS Quad: Redondo Beach, California

Gross Acreage: 1.64 acres

General Plan designation: Public or Institutional (P)

Community/Area wide Plan designation: General Plan of the City of Redondo Beach

Zoning: Parks, Recreation, and Open Space (P-PRO)

Description of project: The proposed Redondo Beach Avenue A Access Ramp Project (Project) is a series of improvements and modernization to the existing access ramp and associated infrastructure along Esplanade in Redondo Beach, California. The Project can be found at the western terminus of Avenue A and includes the removal of the existing access path, retaining wall, and pedestrian railing, and new construction of an Americans with Disabilities Act (ADA)-accessible concrete path, and a concrete staircase on the north side of the newly constructed access path. Additionally, the Project would include the general grading of the bluff, removal and replacement of existing landscaping and irrigation, and installation of a bicycle rack, bollard lighting, bench seating, guardrails and handrails, drainage swales, and miscellaneous drainage improvements. The complete Project description is included in Section 3, Project Description of this IS/MND.

Note: Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process. (See Public Resources Code section 21080.3.2.) Information may also be available from the California Native American Heritage Commission's (NAHC) Sacred Lands File per Public Resources Code section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that Public Resources Code section 21082.3(c) contains provisions specific to confidentiality.

The City sent "request for consultation" letters to **eight** Native American tribes: Cahuilla Band of Indians, Gabrieleno Band of Mission Indians – Kizh Nation, Gabrieleno Tongva San Gabriel Band of Mission Indians, Gagbrielino Tongva Indians of California Tribal Council, Gabrielino Tongva Nation, and Gabrielino-Tongva

Tribe) on **September 5**, 2025**,** initiating Assembly Bill (AB) 52 consultation. Staff did not receive any responses to the "request for consultation" letters sent to the tribes.

Other public agencies whose approval may be required (e.g., permits, financing approval, or participation agreement):

Public Agency	*Approval Required*
California Coastal Commission	Coastal Development Permit or Exemption/Wavier (only on appeal)
City of Redondo Beach	Coastal Development Permit
County of Los Angeles Board of Supervisors	Capital Project Approval

Major projects in the area:

Project/Case No.	*Description and Status*
None within ½ mile of the Project	

Reviewing Agencies:

Responsible Agencies

☐ None
Regional Water Quality Control Board:
- ☐ Los Angeles Region
- ☐ Lahontan Region

☒ Coastal Commission
☐ Army Corps of Engineers
☐ LAFCO
☒ County of Los Angeles, Beaches and Harbors

Special Reviewing Agencies

☐ None
☐ Santa Monica Mountains Conservancy
☐ National Parks
☐ National Forest
☐ Edwards Air Force Base
- ☐ Resource Conservation District of Santa Monica Mountains Area

☐ City of Culver City
☐ City of Los Angeles

Regional Significance

☐ None
☐ SCAG Criteria
☐ Air Quality
☐ Water Resources
☐ Santa Monica Mtns. Area

Trustee Agencies

☐ None
☐ State Dept. of Fish and Wildlife
- ☐ State Dept. of Parks and Recreation

☐ State Lands Commission
- ☐ University of California (Natural Land and Water Reserves System)

County Reviewing Agencies

☐ DPW
☐ Fire Department
-Planning Division
- Land Development Unit
- Health Hazmat

☐ Sanitation District
☐ Public Health/ Environmental Health Division: Land Use Program (OWTS), Drinking Water Program (Private Wells), Toxics Epidemiology Program (Noise)
☐ Sheriff Department
☐ Parks and Recreation
☐ Subdivision Committee
☐ Regional Planning
☒ Beaches and Harbors

1. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact," as indicated by the checklist on the following pages.

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

DETERMINATION: (To be completed by the Lead Department.)
On the basis of this initial evaluation:

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

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

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

☐ I find that the Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" 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 Project could have a significant effect on the environment, because all potentially 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 Project, nothing further is required.

Steven Giang
Print Name

Steven Giang
Signature

February 5, 2026
Date

2. EVALUATION OF ENVIRONMENTAL IMPACTS

1) A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources the Lead Agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).

2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3) Once the Lead Agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4) "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level. (Mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced.)

5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA processes, an effect has been adequately analyzed in an earlier EIR or negative declaration. (State CEQA Guidelines § 15063(c)(3)(D).) In this case, a brief discussion should identify the following:

6) Earlier Analysis Used. Identify and state where they are available for review.

    a) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of, and adequately analyzed in, an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    b) Mitigation Measures. For effects that are "Less than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

    c) Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

7) The explanation of each issue should identify: the significance threshold, if any, used to evaluate each question, and; mitigation measures identified, if any, to reduce the impact to less than significant. Sources of thresholds include the General Plan, other planning documents, and ordinances. Some thresholds are unique to geographical locations.

Section 3. Project Description

The proposed Redondo Beach Avenue A Access Path Project (Project) includes a series of improvements and modernization to the existing access ramp and associated infrastructure at 811 and 1109 Esplanade in the incorporated community of Redondo Beach, California (see Figure 1, Project Location and Figure 2, Project Site). In 2021, the County of Los Angeles Department of Beaches and Harbors (DBH) requested the closure of the ramp following an engineering study that found the existing access path, railing, top and bottom landings, and concrete masonry unit (CMU) wall that compose the ramp to be in very poor condition. The report recommended closure for public safety, and in response the City of Redondo Beach (City), approved emergency coastal development permit (eCDP) No. CDP-2-21-12 authorizing closure of the Avenue A access ramp. In January 2024, the City issued the last eCDP extension for the access ramp closure, to allow DBH time to prepare construction drawings for the access ramp repair project. The Project includes staging as well as infrastructure removal, repair, and replacement associated with efforts to improve public safety associated with the access path to Redondo Beach at Avenue A.

Construction of the Project is anticipated to start in Winter 2026. Project construction is anticipated to take approximately 12 months to complete. Construction activities would consist of demolition, site preparation, grading, path construction, paving, architectural coating, and dune/bluff restoration. Project construction would import approximately 730 cubic yards (cy) of soil to support the foundations of the new access path and remove all demolished material, including retaining wall cement and old metal railing. Excavations associated with the Project would not exceed 5 feet in depth. Construction equipment would include two (2) cement and mortar mixers, two (2) concrete/industrial saws, two (2) crawler tractors, two (2) dumpers, two (2) excavators, two (2) pavers, four (4) plate compactors, one (1) rough terrain forklift, one (1) loader, one (1) surfacing equipment, one (1) sweeper, one (1) tractor, and one (1) trencher. Construction equipment and materials would be staged onsite in a designated staging area on the beach. Construction activities would be limited to five (5) days per week between 7:00 am to 3:30 pm. The Project crew would be comprised of 8 workers and each day the required crew members would drive themselves to and from the site for the duration of the Project. The total number of vehicle trips for the crew members is approximately 4,160, including all trips to and from the Project site.

Initial site preparation would include installation of a 50-foot-wide by 100-foot-long temporary contractor staging area on the beach, which would not be paved. A temporary bike path, measuring approximately 528 feet long by 20 feet wide, would be installed west of the existing bike path to redirect pedestrians around the work area. The temporary bike path would be constructed of concrete pavement and remain in place for the duration of the construction period. The beach area beneath the temporary bike path would be returned to its original condition following Project completion. To ensure public safety, two (2) temporary chain link fences would be installed along the western edge of the work area. One (1) chain link fence would surround the 50-foot-wide by 100-foot-long contractor staging area, and one (1) chain link fence would sit along the edge of the existing bike path, to prevent pedestrian access into the active Project work area.

Construction of the new access ramp includes removal of the old access ramp and development of new ADA accessible infrastructure. Specifically, the Project would remove the existing 4.5-foot-wide by 267-foot-long access path, a 267-foot-long CMU wall that varies from 36 inches to 60 inches high, a 267-foot-long pedestrian railing, and existing vegetation and irrigation. This would be followed by site grading and preparation. This work would be followed by construction of a new 6-foot-wide, 812-foot-long, ADA-accessible concrete path following a zig-zag pattern with two (2) switchbacks to the beach. The path includes three drainage swales running along the upslope side of the entire path to convey runoff away from the path, each leading to a six-inch drainage pipe at the switchback turn. The retaining wall along the upslope side of the concrete path would

also be constructed with a French drain feature below grade to convey water runoff away from the wall footing during storm events. The new path would have a 6-foot-wide concrete staircase running east to west, on the north end of the access ramp. The Project would include a bicycle rack, bollard lighting, bench seating, guardrails and handrails, and miscellaneous drainage improvements.

The final stage of Project construction would include restoration of the dune/bluff habitat at the Project site. Landscaping would be planted within the newly graded bluff area of the Project footprint to promote erosion control and enhance protected species habitat. Following completion of the access path and associated infrastructure, the bluff site would be prepared, and plant species would be installed consistent with the species listed and guidelines presented in Table 2 of the *Beach Bluffs Restoration Project Master Plan* (2005) (Appendix D) as well as those requested by California Coastal Commission staff (e.g. Eriogonum and Dudleya). Any remaining unplanted areas would be covered with coyote brush (*Baccharis pilularis*) set at 3-foot spacings until the Project site is covered. Temporary irrigation would be installed and monitored until plants are established. It would be connected to the existing 2-inch water supply line at the northern boundary at the top of the bluff and would be operated by an automatic control located at the top of the bluff. Low voltage electricity would also be provided via a new panel at the top of the bluff containing the irrigation controls and lighting controls. Please see Appendix A, Conceptual Design Plan for more detailed information.

Surrounding Land Uses and Setting: Redondo Beach, a coastal city in Los Angeles County, has a diverse array of land uses including but not limited to hotels, restaurants, offices and commercial centers, residential uses, public parks, beaches, and bike paths. Regionally, the City of Los Angeles and its suburbs surround Redondo Beach to the north, east, and south with the community of Hermosa Beach to the north, the neighborhood of West Torrance to the immediate east, and the neighborhood of Torrance Beach to the south. The Pacific Ocean borders Redondo Beach to the west. Los Angeles International Airport is located approximately 6.2 miles north of Redondo Beach.

The Project site is within a Public or Institutional (P) General Plan land use designation and Parks, Recreation, and Open Space Zoning designation. This land use and Zoning designation comprises a combination of land uses for the public, including governmental facilities, parks, schools, libraries, hospitals and public open space, utility easements, and other public uses. Specifically, the approximately 1.6-acre beach front area is bordered to the east by multi-family residential properties, and bordered by public areas to the north, west, and south.

Construction Best Management Practices (BMP): The following general construction best management practices would be implemented to avoid and minimize environmental impacts during construction.

- **Construction Hours**. Construction activities would be limited to daylight hours. If nighttime construction is necessary, all project lighting (e.g., staging areas, equipment storage sites, roadway, construction footprint) would be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields would be used to reduce the extent of illumination into sensitive habitats. If the work area is located near surface waters, the lighting would be shielded such that it does not shine directly into the water.
- **Prevent Spread of Invasive Species**. The spread or introduction of non-native, invasive plant and animal species by arriving vehicles, equipment, imported gravel, and other materials, will be avoided. Non-native invasive plants within the Project Site will be removed and properly disposed of in a manner that would not promote their spread. Equipment would be cleaned to remove any sediment or vegetation at designated wash stations before entering or leaving the Project Site to avoid spreading pathogens or non-native invasive species. Wash sites would be in confined areas that limit run-off to any surrounding habitat and on a flat grade.
- **Equipment Maintenance and Materials Storage.** Vehicle traffic would be confined to existing roads and the proposed access route(s) shown on Project plans. All machinery would be in good working condition and show no signs of fuel or oil leaks. Oil, grease, or other fluids would be washed

off at designated wash stations, prior to entering the construction site. Equipment would be inspected and evaluated daily during construction for potential fluid leakage. No equipment refueling or fuel storage would take place within 100 feet of a body of water. All fuel and chemical storage, servicing, and refueling would be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent spills from traveling to surface water or drains. Staging areas would be established for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in coordination with resource agencies. Staging areas would have a stabilized entrance and exit and be located at least 100 feet from bodies of water unless site-specific circumstances do not provide such a setback, in which case the maximum setback possible would be used. Fluids would be stored in appropriate containers with covers and properly recycled or disposed of off-site. Machinery stored on site would have pans or absorbent mats placed underneath potential leak areas.

- **Material Disposal.** All refuse, debris, unused materials, and supplies that cannot reasonably be secured would be removed daily from the project work area and deposited at the appropriate disposal or storage site. All construction debris would be removed from the work area immediately upon project completion.
- **Trash Removed Daily.** During project activities all trash, especially food-related refuse that may attract potential predators or scavengers, would be properly contained within sealed containers, removed from the work site, and disposed of daily.
- **Project Cleanup after Completion**. Work pads, temporary false work, and other construction items would be removed from the 100-year floodplain by the end of the construction window. Removal of materials would not result in discharge to waterbodies.

Figure 1. Project Location

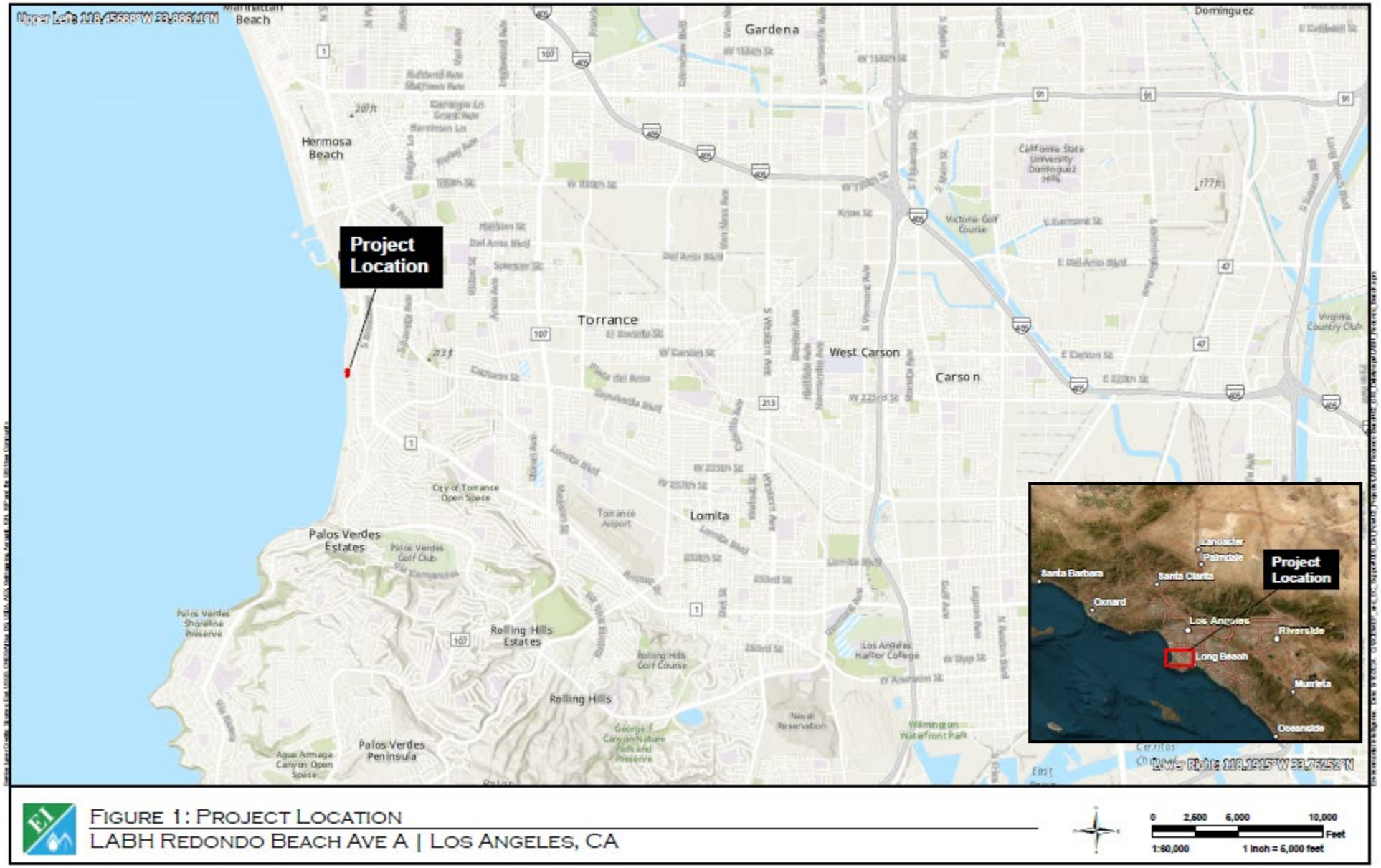
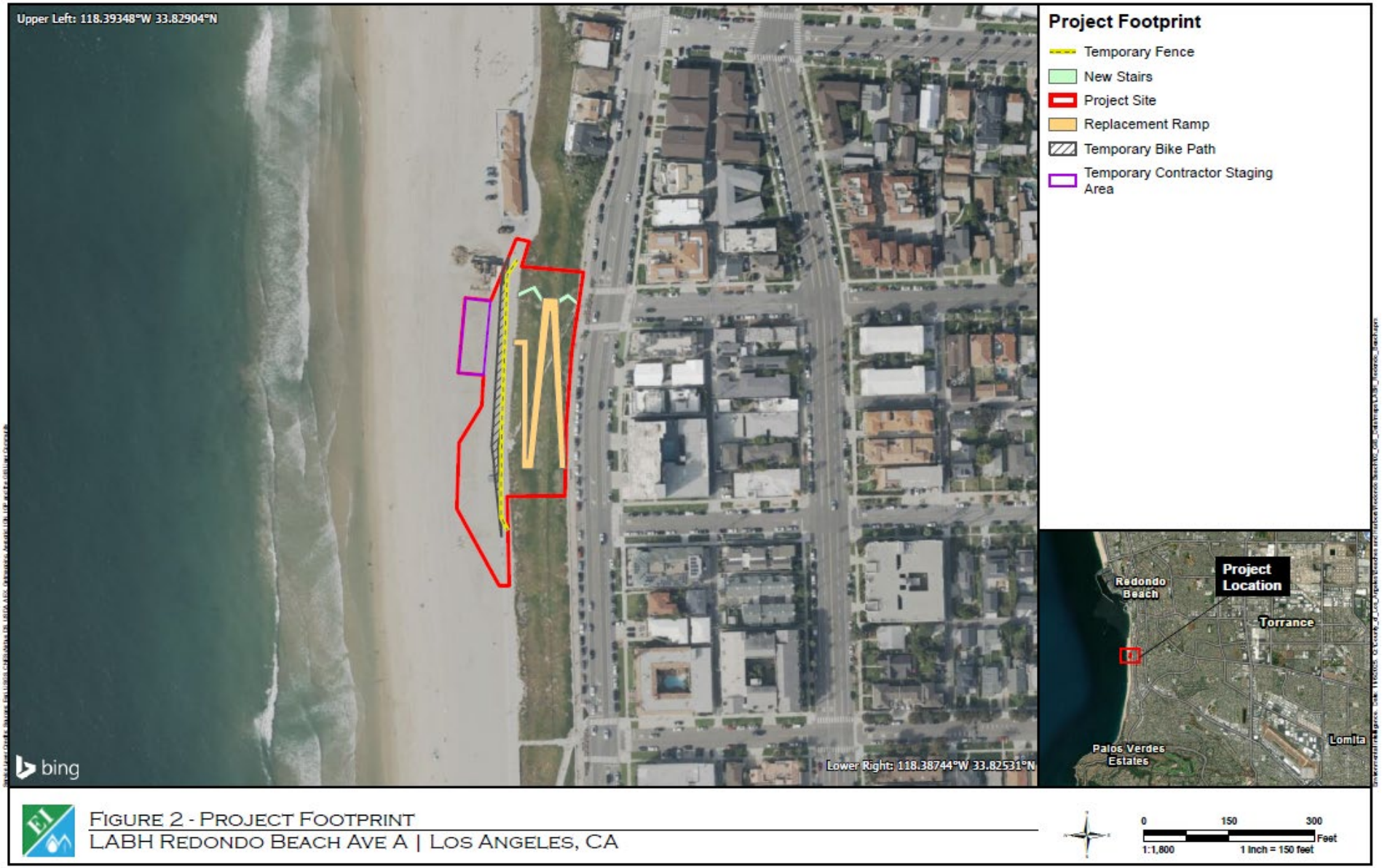


Figure 2. Project Site



Section 4. Evaluation of Environmental Effects

1. AESTHETICS

	Potentially Significant Impact	*Less Than Significant Impact 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?	☐	☐	☒	☐

Less Than Significant Impact. A scenic vista is generally defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public.

Temporarily, during the construction period, equipment would be visible while in use and in staging areas and views would be altered as structures are demolished and new ones are erected. Post construction, views would be largely the same as the existing environment. As discussed in Section 3, Project Description, the Project improvements involve the replacement of aging facilities with new facilities that will serve the same purpose and remain within the same general footprint of the existing structures. Overall, the Project would result in visible improvements that would replace the deteriorating infrastructure. The new lighting is intended for ambience and security and would adhere to the City of Redondo Beach standards pertaining to shielding, light spillage, and illumination (see response to 1. e) below).

The Project would improve an existing deteriorated beach amenity; thus, the Project would not adversely affect a scenic vista. A less than significant impact would occur.

b) Be visible from or obstruct views from a regional riding, hiking, or multi-use trail?	☐	☐	☐	☒

No Impact. As discussed in Section 3, Project Description, the new access path, staircase, lighting, and vegetation would be visible from the existing beach front multi-use path and from Esplanade. The existing infrastructure would be replaced with similar features of comparable height. Thus, post construction views would be similar in relation to massing, bulk, and height. The Project would not obstruct any views. Moreover, improvements would include landscaping features, which would be a visual benefit as discussed in response to 1. a), above. No impact would occur.

c) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

No Impact. The Project is not located along a state scenic highway (Caltrans 2024). Therefore, no impact would occur.

d) Substantially degrade the existing visual character or quality of public views of the site and its surroundings because of height, bulk, pattern, scale, character, or other features and/or conflict with applicable zoning and other regulations governing scenic quality? (Public views are those that are experienced from publicly accessible vantage point)	☐	☐	☒	☐

Less Than Significant Impact. The existing access path would be demolished and replaced with an upgraded path, new staircase, lighting, and improved vegetated landscaping. They would generally be replaced in kind and maintain the existing bulk and scale. The improvements would enhance the existing visual character and quality of public views at the site. The pattern of development would not be altered as improvements are mostly replacements of deteriorating or inadequate facilities, which would likely improve the aesthetics of the area.

The Project would not conflict with applicable zoning and other regulations governing scenic quality. The impacts would be less than significant.

e) Create a new source of substantial shadows, light, or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Less Than Significant Impact. The Project includes lighting improvements. An estimated 32 LED 20 lighting bollards would be provided along the improved path and staircase. The introduction of light can be a nuisance by affecting adjacent areas and diminishing the view of the clear sky depending on the location of the light sources and its proximity to nearby light-sensitive areas.

The Project is in an area that has multiple sources of nighttime lighting. Currently there are numerous sources of light along the pedestrian walkways, adjacent street - Esplanade – beach restrooms, and the existing beach bicycle path. Due to the developed nature of the Project site and surrounding land uses any new sources of light would be absorbed into the existing lit environment and would not spill over into adjacent land uses at a level that would be obtrusive or substantially varied from the existing environment.

The Project would be required to comply with lighting design standards, policies, permitting requirements, etc., as set forth by the City of Redondo Beach and the State of California. It would be designed in compliance with the City of Redondo Beach's Public Review Draft General Plan (Redondo Beach 2024a) *Policy OS-3.5 Light Pollution. Preserve skyward nighttime views and lessen glare by requiring outdoor fixtures on public and private property be fully-shielded, located only where necessary, designed to provide the correct amount of light, and use long-wavelength fixtures minimizing lighting level.*

Glare impacts can occur because of artificial light or sunlight reflecting off a surface. Glare can create discomfort or present safety concerns. As discussed in the Project Description in Section 3 of this Initial Study, the Project is to be constructed with non-reflective materials**.** Such architectural elements are not a source of glare. Vehicles traveling to and from the site could be a source of daytime glare; however, the Project would not include a substantial number of added cars visiting the site compared to the surrounding community (see Section 17, Transportation of this Initial Study). Additionally, nighttime lighting would be shielded and directed downward onto the park and park features for security and ambience. Less than significant impact would occur.

2. AGRICULTURE/FOREST

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

	Potentially Significant Impact	*Less Than Significant Impact 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 the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

No Impact. The Project site is in an urbanized area where there is no farmland or agricultural resources. According to the California Department of Conservation (CDOC) Important Farmland Map, the Project site as Urban and Built-Up Land (CDOC 2022a). Urban and Built-Up Land is land occupied by structures with a building density of at least 1 unit to 1.5 acres, or approximately 6 structures to a 10-acre parcel and does not contain agricultural uses or areas designated as Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. Therefore, the Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use. No impact would occur.

b) Conflict with existing zoning for agricultural use, with a designated Agricultural Resource Area, or with a Williamson Act contract?	☐	☐	☐	☒

No Impact. The Williamson Act applies to parcels within an established agricultural preserve consisting of at least 20 acres of Prime Farmland or at least 40 acres of land not designated as Prime Farmland. The purpose of the act is to preserve agriculture and open space lands by discouraging premature and unnecessary conversion to urban uses. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land for use as agricultural or related open space.

The Project site is zoned as Parks and Open Space (P-Pro) according to the City's Zoning Map. No portion of the site is zoned for agricultural use or under a Williamson Act Contract (CDOC 2022a, CDOC 2022b). As such, there would be no conflict with zoning for agricultural use, a designated Agricultural Resource Area, or a Williamson Act contract. No impact would occur.

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code § 12220 (g)), timberland (as defined in Public Resources Code § 4526), or timberland zoned Timberland Production (as defined in Government Code § 51104(g))?	☐	☐	☐	☒

No Impact. Forest land is defined by Public Resources Code Section 12220(g) as land that can support 10-percent native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits. There is no forest land within the Project work area.

Timberland is defined by Public Resources Code Section 4526 as land, other than land owned by the federal government and land designated by the California Department of Forestry (CAL FIRE) Board of Forestry as experimental forestry land, which is available for, and capable of, growing a crop of trees of a commercial species used to produce lumber and other forest products, including Christmas trees. There are no timberlands within the Project work area.

Timberland zoned Timberland Production is defined by Public Resources Code Section 51104(g) as an area which has been zoned pursuant to Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses. There are no timberland zoned Timberland Production located within the Project work area.

The Project site is zoned P-Pro and there are no lands zoned for forest land, timberland, or timberland production within in area. No impact would occur.

d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

No Impact. The Project is in an urbanized area where there are no forestry resources. Its location is designated as Urban and Built-Up Land by the CDOC (CDOC 2022a). Please see 2. c) above. No impact would occur.

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

No Impact. Implementation of the Project would have no impact on agriculture and/or forestry resources. The Project location is classified as Urban and Built-Up Land, which does not contain any agricultural uses or areas designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (CDOC 2022a). Furthermore, there are no Williamson Act contracts or forest lands in the vicinity of the Project. Implementation of the Project would not involve changes to the existing land uses or result in the conversion of Farmland to non-agricultural use or forest land to non-forest use. Please see responses to 2. a) through 2. d). No impact would occur.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Conflict with or obstruct implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD) or the Antelope Valley AQMD (AVAQMD)?	☐	☐	☐	☒

No Impact. The Project is located within the South Coast Air Basin (SCAB) under the jurisdiction of the South Coast Air Quality Management District (SCAQMD) and the SCAQMD Air Quality Management Plan (AQMP 2022). The AQMP provides actions and strategies aimed at reducing air pollution emissions in order to bring the SCAB into attainment for all criteria pollutants. Construction activities will comply with applicable SCAQMD rules and regulations and are expected to have minimal air quality impacts. The Project is a beach access ramp for pedestrians, therefore once the construction phase is completed, the Project will generate minimal air quality impacts and will not conflict with any SCAQMD air quality plans.

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?	☐	☐	☒	☐

Less Than Significant Impact. The SCAB is a federal and/or state nonattainment area for ozone, particulate matter less than 10 microns in diameter (PM_{10}) and particulate matter less than 2.5 microns in diameter ($PM_{2.5}$). If a project conflicts with the AQMP, that project can be considered cumulatively considerable. Additionally, if the mass emissions calculated for a project exceed the applicable SCAQMD daily significance thresholds that are designed to assist the region in attaining the applicable state and national ambient air quality standards, that project can be considered cumulatively considerable. As discussed in response 3.a) above, the Project would not conflict with or obstruct implementation of the AQMP. The Project would not exceed the construction emission thresholds and there would be a negligible increase in long-term operational emissions, therefore the Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard, indicating less than significant impact. Additional details are discussed below and in Appendix B.

Construction

Construction-generated emissions are temporary and short term. Two basic sources of short-term emissions would be generated through construction of the Project: operation of the construction vehicles and the creation of fugitive dust during clearing and grading.

Criteria pollutant emissions were calculated using the California Emissions Estimator Model (CalEEMod) Version 2022.1.1.26. CalEEMod is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions associated with both construction and operations from a variety of land use projects. The model was developed for the California Air Pollution

Control Officers Association (CAPCOA) in collaboration with the California air districts. CalEEMod allows for the use of default data (e.g., emission factors, trip lengths, meteorology, source inventory) provided by the various California air districts to account for local requirements and conditions, and/or user-defined inputs. **Table 3-1** summarizes the maximum daily construction emissions from the Project compared to the SCAQMD significance thresholds (SCAQMD 2023); Project emissions during construction would not exceed the significance thresholds, indicating less than significant impact.

Table 3-1. Daily Construction Criteria Pollutant Emissions

Pollutant[1]	SCAQMD Significance Threshold (lbs/day)	Maximum Daily Emissions (lbs/day)	Significant Impact?
ROG[1]	75	1.48	**No**
NO_x	100	9.24	**No**
CO	550	9.68	**No**
SO_X	150	0.02	**No**
PM_{10}	150	56.2	**No**
$PM_{2.5}$	55	6.07	**No**

Notes:
[1] ROG = reactive organic gas; NO_X = nitrogen oxides; CO = carbon monoxide; SO_X = sulfur oxides; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

Operation
Typically, post-project emission increases are associated with mobile emissions, specifically new vehicle trips associated with a project. As discussed in Section 17, Transportation, the Project would not introduce any new vehicle trips; therefore, there would be no increase in long-term project-related emissions. Potential emissions calculated by CalEEMod include pesticide/fertilizer use and energy consumption for irrigation infrastructure or lighting fixtures. However, the Project would replace existing vegetation with drought tolerant landscaping, which would reduce the demand upon water for irrigation, and overall emissions from site occupancy are expected to be negligible.

c) Expose sensitive receptors to substantial pollutant concentrations? ☐ ☐ ☒ ☐

Less than Significant Impact. Sensitive receptors are individuals considered to be at a heightened risk of negative health outcomes due to exposure to air pollution. Sensitive receptors include residences such as private homes, condominiums, apartments, and living quarters; schools; preschools; daycare centers; health care facilities and long-term care hospitals; prisons; and dormitories or similar live-in housing. The nearest school is Alta Vista Elementary School (at 815 Knob Hill Ave in Redondo Beach), located over 2,000 feet east of the Project site. The nearest residential receptor is located approximately 95 feet east of the Project site; and the nearest commercial receptor is located approximately 248 feet east of the Project site. As discussed in response 3.b), construction emissions are temporary and are below the SCAQMD significance thresholds, and operational emissions are negligible. Additional details are in Appendix B. Less than significant impacts would occur.

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

Less than Significant Impact. The State of California Health and Safety Code Sections 41700 and 41705 (HSC 2024) prohibit emissions from any source whatsoever in such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to the public health or damage to property. The

Project could produce odors during construction activities resulting from construction equipment exhaust, application of concrete, and/or the application of architectural coatings. However, odors emitted during construction would be temporary, short-term, and intermittent in nature, and the sources would be in different locations across the site as construction progresses. Further, these sources would cease upon the completion of the respective phase of construction. California Air Resources Board (CARB) Air Quality and Land Use Handbook includes a list of the most common sources of odor complaints received by local air districts. Typical sources of odor complaints include facilities such as sewage treatment plants, landfills, recycling facilities, petroleum refineries, and livestock operations (CARB 2005). The Project consists of improvements to an existing pedestrian access ramp, which is not anticipated to generate substantial odors. Therefore, the Project would not result in emissions leading to odors that would adversely affect a substantial number of people. Less than significant impact would occur.

4. BIOLOGICAL RESOURCES

	Potentially Significant Impact	*Less Than Significant Impact 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 (CDFW) or U.S. Fish and Wildlife Service (USFWS)?	☐	☒	☐	☐

Less than Significant Impact with Mitigation Incorporated. Under the California Endangered Species Act, the California Department of Fish and Wildlife (CDFW) designates plant and animal species as threatened or endangered. Similarly, the United States Fish and Wildlife Service (USFWS) designates species as threatened or endangered under the Federal Endangered Species Act. Plant and animal species may also be afforded special protection under regional and local planning documents. All special-status species, protected under federal, state, and local ordinances and with potential to occur and be impacted by the Project, must be analyzed under CEQA.

A search of the CDFW California Natural Diversity Database, the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants (CNPS), and the USFWS Information for Planning and Consultation (IPaC) (CDFW 2024, USFWS 2024, and CNPS 2024) was conducted in August 2024 for the Project site and a 10-mile buffer (Project Study Area) in order to identify the potential for special status species to occur at the Project site. In addition, an on-site flora and faunal assessment of the Project site and immediate vicinity was performed in August 2024, and results were presented in a *Biological Resources Assessment for the Redondo Beach Avenue Access Path Project* (Montrose 2024). The combined review of online sources and field investigation indicates there is potential for nine (9) sensitive plant species and six (6) sensitive animal species to occur at the Project site[1]. **Table 4-1** presents a list of the species with historic potential to occur in the Project Study Area and a determination of each species' current potential to occur at the Project site based upon known life-history requirements and results of the site-specific survey. The Project Study Area is not located within U.S. Fish and Wildlife Service (USFWS)-designated critical habitat for any species. The nearest terrestrial designated critical habitat unit is for western snowy plover (*Charadrius nivosus nivosus*) and is located 1.7 miles south of the Survey Area. The nearest marine designated critical habitat unit is for green sea turtle (*Chelonia mydas*) and is located immediately offshore of Redondo Beach to the west. Three (3) species were observed in or within the vicinity of the Project site during 2024 surveys. These include the globose dune beetle, Trask shoulderband, and the El Segundo blue butterfly.

[1] Species deemed "absent" and "does not occur" in the *Biological Resources Assessment for the Redondo Beach Avenue Access Path Project* were excluded from this initial study analysis. For more detail on all species reviewed, please refer to the Biological Resources Assessment in Appendix C (Montrose 2024).

Table 4-1. Species with Potential to Occur within the Project Site

Species Name (Common Name)	Protection Status[1]	Potential to Occur in the Project Site
Plants		
Abronia maritima sticky sand verbena	CRPR 4.2	**Low potential.** Species not recorded in area in CDFW's California Natural Diversity Database (CNDDB) or CCH2 recently. A number of individuals are documented 860 feet from the Project's southern perimeter. This occurrence was confirmed as present during July's site visit (adjacent to public restroom at the foot of the Avenue C beach access ramp). Species is easily observed throughout the year and was not observed within the survey area.
Aphanisma blitoides aphanisma	CRPR 1B.2	**Low potential.** Record in CNDDB and CCH2 from bluff and rocky area immediately abutting the coast. Dense cover of ice plant (*Carpobrotus edulis*) over most of the Project Site limits potential occupancy. Species is readily apparent during the summer months and was not observed during July's visit.
A. pacifica south coast saltscale	CRPR 1B.2	**Low potential.** Recorded in CCH2 (2017) 2 miles south of the Project Site in the Malaga cove area of Palos Verdes Estates. Species documented at numerous locations in bluff habitat on the Palos Verdes Peninsula by PVPLC and others (pers comm Neil Uelman, South Coast Chapter of CNPS Conservation Chair). As for all Atriplex species discussed, this species is readily apparent during the summer months and not easily overlooked. Species was not observed during July's field visit.
A. serenana var. *davidsonii* Davidson's saltscale	CRPR 1B.2	**Low potential.** Species most recently recorded in 2020 (CCH2) 2.5 miles south at toe of coastal bluffs Rancho Palos Verdes. Other populations exist on the Palos Verdes Peninsula but data not publicly available (pers comm Neil Uelman, South Coast Chapter of CNPS Conservation Chair, J. George pers obs.). As for all Atriplex species discussed, this one is also readily apparent during the summer months and not easily overlooked. Species was not observed during July's field visit.
Calochortus catalinae Catalina mariposa lily	CRPR 4.2	**Low potential.** Soils questionable for species occupancy, usually found in clay or other heavy soils. Species occurs at numerous locations on the Palos Verdes Peninsula (CCH2). Closest records are from the Bluff cove area of Palos Verdes Estates 2.7 miles south of Project Site, documented in 2022. July's site visit was late in the season to survey for this species; however, no senescent plants were observed.
Camissoniopsis lewisii Lewis' evening-primrose	CRPR 3	**Low potential.** Soils suitable, dense cover of *Carpobrotus edulis* over most of the Project Site limits potential occupancy. Species recorded in CNDDB and CCH2 in region. Closest record is from CCH2, 1.75 miles south of the Project Site at "Malaga cove dune" documented in 2002. None were observed, however this species is usually desiccated and easily missed by July.
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	CRPR 1B.1	**Low potential.** Very limited habitat available onsite due to dense cover of ice plant (*Carpobrotus edulis*). Species recorded in CNDDB and CCH2 in region. Closest recent record is from a small back-dune habitat fragment 4.5 miles north in the city of Manhattan Beach, documented in 2009.
Dudleya virens ssp. *insularis* bright green dudleya	CRPR 1B.2	**Low potential.** Limited habitat onsite due to dense cover of *Carpobrotus edulis*. Species is observably throughout the year; however, none observed during the 2024 field survey.
Erysimum suffrutescens suffrutescent wallflower	CRPR 4.2	**Low potential.** Very limited habitat onsite due to dense cover of ice plant (*Carpobrotus edulis*). Closest record is 2 miles south at "Malaga cove dune" documented in 2002. Species is visible throughout the year; however, none were observed during 2024 field survey.
Animals		
Anniella stebbinsi Southern California legless lizard	SSC	**Moderate Potential.** Appropriate habitat is present. Recent nearby records are documented 0.4 miles north and 0.8 miles south of the Project Site. Both records are from the coastal bluff and habitat is contiguous with the Project Site.
Bombus crotchii Crotch's bumble bee	SC	**Moderate Potential**. Species documented 0.8 miles south of project site in bluff habitat restoration area in April 2024. Limited existing habitat due to the dense cover of *Carpobrotus edulis;* however, gopher and ground squirrel burrows that provide nesting habitat were observed.
Charadrius nivosus western snowy plover	FT	**Moderate Potential.** The species is known from beach sand the vicinity; however, the project site does not contain suitable nesting habitat, and therefore the species is assumed to use the site for incidental foraging and movement.

Coelus globosus globose dune beetle	SSC	**High Potential.** It remains unknown which *Coelus* species are present. Mixed populations of *C. globosus* and *C. ciliates* are known.
Euphilotes battoides allyni El Segundo blue butterfly	FE	**Moderate potential.** No host plant occurs within the Project Site boundaries or within a 500-foot buffer. Nearest host plant occurs approximately 900 feet south in an area undergoing habitat restoration; however, species was observed flying near the project site during surveys in 2024.
Helminthoglypta traskii Trask shoulderband	SSC	**Present.** A number of shells from recently deceased members of this species were documented in 2024 on the Project Site.

[1] Protection Status:

Federal Listing Status

FE – federally endangered; **FT** – federally threatened; **FC** – federal candidate; **BCC** – USFWS Bird of Conservation Concern

State Listing Status (California)

SE – state endangered; **ST** – state threatened; **SC** – state candidate for listing; **FP** – Fully Protected; **SSC** – CDFW Species of Special Concern

California Rare Plant Rank (CRPR)

1B.1 - Plants Rare, Threatened, or Endangered in California and Elsewhere. Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat).

1B.2 - Plants Rare, Threatened and Endangered in California and Elsewhere. Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat)

The Project site has been occupied by the existing concrete access ramp since the 1960's and survey results from 2024 indicate that the only vegetated area in the Project footprint is disturbed sand dune covered Ice Plant Mats (*Mesembryanthemum* spp. - *Carpobrotus* spp. Herbaceous Semi-Natural Alliance) (Montrose 2024). During floral surveys in 2024, a few native plant species were observed, including beach evening-primrose (*Camissoniopsis cheiranthifolia*), which was restricted to the narrow band of aeolian sand deposited at the foot of the bluff; alkali mallow (*Malvella leprosa*) found localized to two individuals at the top of the bluff; and cliff aster (*Malacothrix saxatilis*) present in a number of open areas at the top of the bluff. The remainder of the undeveloped Project site includes a narrow strip of unvegetated beach at the base of the access ramp, extending out to the position of the temporary bike path. The floral survey in 2024 did not identify individuals or suitable habitat for any of special status plant species with historic potential to occur in the Project site. Due to the low likelihood of occurrence, Project construction and operations (use of the new access ramp) are not anticipated to impact sensitive plant species. With the removal of the existing access ramp and completion of the Project, the area of vegetated land on the Project site is anticipated to decrease from 37,170 to 30,778, a loss of 6,392 square feet; however, during Project construction, on-site habitat would be transformed from non-native ice plant mat, with little ecosystem value, to high value coastal bluff habitat composed of native plants. The loss of some vegetated area would be more than compensated for by the increase in habitat value in the remaining area.

Migratory birds, including raptors and passerine species, are protected under the federal Migratory Bird Treaty Act (MBTA) and entities are prohibited from harming or harassing migratory birds, particularly while they are nesting. Moderately suitable foraging habitat for raptor and passerine species is present in the Project work area. Direct impacts to migratory bird species could include injury, mortality, loss of young, and nest failure; and indirect impacts from the Project could include loss of foraging habitat, increase in noise and human activities, and potential introduction of invasive/nonnative species. Project construction activities including grading and clearing the site, as well as loud noises associated with large machinery construction, have the potential to cause significant direct and indirect impacts to migratory birds, through disturbance of foraging habitat. Implementation of **Mitigation Measure BIO-1** (below) would reduce potential impacts to migratory birds to less than significant through identification and subsequent avoidance of nesting migratory birds in the Project disturbance footprint in advance of construction.

El Segundo Blue Butterfly (*Euphilotes battoides allyni*; ESB), a federally endangered species, is endemic to the coastal dune ecosystem extending from the Ballona Wetlands near Santa Monica, south to the Palos Verdes Peninsula, and the primary threats to the species include loss of their dune ecosystem habitat (through development and invasion by exotic species) and associated obligate larval foodplant, seacliff buckwheat. Despite the location of the Project site within the historic range of the ESB, dune habitat at the Project site

does not currently support the species due to dominance of exotic ice plant and the absence of the ESB larval foodplant. The closest location of potentially occupied ESB habitat, based on the presence of seacliff buckwheat, is approximately 1,400 feet (0.27 mile) south of the Project site on the contiguous bluff face between the Esplanade and Redondo beach. Seacliff buckwheat was re-established at this location as part of ongoing habitat restoration activities, and positive sightings of ESB have not yet been recorded but are anticipated. Older well-established restoration areas further south along the bluff have been occupied by ESB continuously for almost 20 years. As a result, ESB is unlikely to be present in the Project site but has some limited potential to occur as wandering individuals. Direct impacts to the species from Project construction are unexpected; however temporary, indirect impacts could occur if increased human activity and construction work create dust and trash that attract non-native species to the area and lead to invasive species introductions south of the Project site, in habitat restoration areas. Project plans include planting seacliff buckwheat within the restored dune area at the Project site to increase ESB habitat connectivity and population within the species' historic range. As a result, Project operations are not anticipated to negatively impact the ESB. Rather, habitat restoration efforts would more than compensate for any temporary, indirect impacts to the species during construction. No significant impacts to the species are anticipated.

Trask Shoulderband (*Helminthoglypta traskii traskii*), a CDFW Species of Special Concern (SSC), is one of a number of native air breathing land snails in the subfamily Helminthoglyptinae. Trask shoulderband is restricted to coastal Southern California and northwestern Baja California and is inactive most of the year in aestivation; active exclusively during the rainy season. The species are most active when the humidity is highest in the early evening, night, and early morning hours. Food items include plant detritus, fungi, and lichens. Trask shoulderband select opportunistic locations for aestivation which can vary from native and non-native plants on lower protected outer branches of shrubs and at the base of shrubs associated with accumulations of leaf litter and grass, dense clumps of native and non-native grass, ice plant mats, cactus (*Opuntia* spp.), protected crevices in rock formation, mammal burrows, and anthropogenic features and debris such as stockpiled materials (i.e., wood piles and rock or concrete rubble) (Montrose 2024). Four shells of the species were found during surveys of the Project site in 2024, and therefore species presence is assumed. Project construction activities, including ground clearing and grading within the dune area currently covered in ice plant will remove suitable habitat and potentially cause mortality of individuals. The species is also present within the stretch of bluff extending north and south beyond the edges of the Project site, where existing habitat conditions will remain unchanged. Although the Project may impact a portion of the local population, the overall impact of the Project will be positive for the species, as it includes the restoration of the area to native habitat which will include more diverse food sources and native shrubs for cover, providing a highly suitable area for recolonization by adjacent populations. As a result, improved habitat created by the Project will reduce the overall impact of Project construction on the regional population by creating suitable native habitat for recolonization. Impacts to the local population of Trask shoulderband will be less than significant.

Globose dune beetle (*Coelus globosus*), a California SSC, is a fossorial flightless beetle, restricted to sand dunes or sandy substrates. These conditions are found at the base of the bluffs in the Project site and extend south to the Torrance Beach area. Female beetles lay eggs in the sand, which develop into a fossorial larva which co-occur with adult beetles. Adult beetles are typically found underground associated with spotty foredune or beach vegetation. Adults produce a very characteristic track when tunneling just below the surface; however Globose dune beetle and ciliate dune beetle (*C. ciliates,* not listed), can co-occur and are superficially similar in appearance. Threats to the species include removal of habitat through development and regular disturbance such as beach clearing. Signs of one or the other species of dune beetle was observed during site surveys in 2024, at the base of the bluffs. The Project does not include new structures within existing habitat and therefore permanent removal of suitable habitat for Globose dune beetle is not anticipated. Project construction activities that result in the placement of materials (spoils, trash, equipment) between the existing bike path and bluff edge could temporarily disrupt existing habitat for the species and cause mortality of individuals. Placement of spoils, trash, and other construction debris in Globose dune beetle habitat is not

proposed as part of the Project but could occur inadvertently when large equipment operates on the steep slope in the Project site. The placement of construction debris in beetle habitat would be avoided and minimized through best management construction practices required by the City and County of Los Angeles, such as regular trash removal, offsite fueling, and erosion control fencing. Project operations would not impact the species, as the area between the bluff base and the bike path alignment would be retained in its current condition. Despite the potential for equipment and spoils to temporarily disrupt Globose dune beetle habitat, construction activities would be periodic and short lived in the area, and recovery of the species by the completion of construction is anticipated due to the extent of the species range south along the bluff edge. Impacts to the local population of Globose dune beetle would be less than significant.

Southern legless lizard (*Anniella stebbinsi*), a CDFW species of special concern, and **Crotch's bumblebee (*Bombus crotchii*)**, a Candidate for state endangered, have moderate to low potential to occur in the Project site based upon the presence of suitable foraging habitat for the lizard, in the form of sandy coastal dunes with leaf litter, and suitable nesting habitat for the bee in the form of gopher and ground squirrel burrows. No records of either species occur within the Project site; however, they are both known from the vicinity, in similar habitat. As with the sensitive beetle and snail species described above, impacts to the southern legless lizard and Crotch's bumble bee could occur during ground disturbance and grading; however, impacts would be temporary, as both species are highly mobile, suitable habitat for both species exists immediately adjacent to the Project site, and the Project site would be re-vegetated with high quality native habitat elements that would benefit the populations of both species during the subsequent Project operation period. BMPs implemented as part of Project construction would further deter the species from re-establishing during the active construction period by removing equipment and storing materials in designated staging areas at the completion of each workday. Therefore, the Project would have less than significant impacts on both species.

Western snowy plover (*Charadrius nivosus nivosus*) is a small shorebird in the family Charadriidae. The Pacific coast population of the species breeds primarily on coastal beaches, nesting in sand spits, dune-backed beaches, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Nests typically occur upon flat, open sandy areas with sparse beach debris and vegetation. The species is well documented foraging, roosting, and wintering on the sandy beaches in the greater Santa Monica Bay Area, and CNDDB records list many recent observations within 1 mile of the Project site. The beach in the Project area is narrow and suitable nesting habitat does not exist on the Project site or nearby based on levels of beach utilization; however, foraging individuals may wander through the Project site from adjacent occupied Habitat. Potential direct impacts to the species, including direct mortality and nest destruction, could occur if construction of the temporary bike path and movement of equipment and vehicles within beach habitat occurs during nesting season for the species, when birds remain close to the ground on and near their nests. Implementation of **Mitigation Measure BIO-1** and **Mitigation Measure BIO-2** would reduce potential impacts to the Western snowy plover to less than significant through identification and subsequent avoidance of nesting plovers in the Project disturbance footprint in advance of construction.

> **Mitigation Measure BIO-1: Pre-Construction Nesting Bird Survey**. If construction or other Project activities are scheduled to occur during the bird breeding season (February 1 through August 31 for raptors and March 15 through August 31 for the majority of passerine migratory bird species), a pre-construction nesting-bird survey shall be conducted by a qualified avian biologist to ensure that active bird nest will not be disturbed or destroyed. The survey will be completed no more than three days prior to initial ground disturbance. The nesting-bird survey will include the Project Area and adjacent areas where Project activities have the potential to affect active nests, either directly or indirectly due to construction activity or noise. If an active nest is identified, the biologist will establish an appropriately sized construction-avoidance buffer around the nest using flagging or staking. Construction activities will not occur within a construction-avoidance buffer area until the nest is deemed inactive by a qualified biologist.

Mitigation Measure BIO-2: Snowy Plover Avoidance. A qualified environmental avian biologist will conduct a visual survey of the Project site, to determine presence and behavior of the Western Snowy Plover, prior to any excavation, construction, reconstruction, maintenance, or removal activities. Prior to any Project activities, the biologist shall examine the beach area to preclude impacts to the federally listed Western Snowy Plover. No excavation, construction, reconstruction, maintenance, or removal activities within the beach area shall occur until any and all Western Snowy Plovers have left the Project area or its vicinity. In the event that the Western Snowy Plover exhibit reproductive or nesting behavior, DBH will cease work and immediately notify the appropriate resource agencies to coordinate appropriate protection measures before re-initiation of construction.

Impacts to sensitive biological resources from Project construction and operations would be less than significant with mitigation incorporated.

b) Have a substantial adverse effect on any sensitive natural communities (e.g., riparian habitat, coastal sage scrub, oak woodlands, non-jurisdictional wetlands) identified in local or regional plans, policies, regulations or by CDFW or USFWS? ☐ ☒ ☐ ☐

Less than Significant with Impact Mitigation Incorporated. The Project site itself is disturbed and developed land which has accommodated the existing access ramp and adjacent non-native plant vegetation since the 1960's. The Project site contains one sensitive natural community identified in local or regional plans, policies, or regulations by CDFW or USFWS.

Bluff habitat at the site meets the definition of an environmentally sensitive habitat area (ESHA) presented in the Local Coastal Plan. Section 30240 of the Coastal Act specifies that ESHAs "shall be protected against any significant disruption of habitat values and only uses dependent on those resources shall be allowed within those areas." Significant impacts to coastal bluffs could occur through poor planning and execution of restoration actions taken to restore the bluff after the new access path is constructed. In order to prevent impacts that would significantly degrade coastal bluff ESHA, Mitigation Measure BIO-3 would be implemented. With implementation of Mitigation Measure BIO-3, no impact would occur.

Mitigation Measure BIO-3 Restoration Planning and Reporting. Restoration of bluff habitat within the Project site following Project construction will follow established guidelines (including planting palette, planting design, monitoring and reporting guidelines) found in the *Beach Bluffs Restoration Project Master Plan* (2005). Specifically, the El Segundo blue butterfly host plant species (Eriogonum and Dudleya) are required plants to be included in the restoration planting palette.

With implementation of Mitigation Measure BIO-3, potential impacts to bluff habitat would be less than significant.

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marshes, vernal pools, coastal wetlands, etc.) through direct removal, filling, hydrological interruption, or other means? ☐ ☐ ☐ ☒

No Impact. As discussed above in (b), the Project site is entirely covered by developed concrete access path and disturbed upland ice plant vegetation. The 2024 field survey investigated the Project site and vicinity and did not identify any protected water resources or wetlands (Montrose 2024). No impact would occur.

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?	☐	☐	☐	☒

No Impact. Wildlife corridors are areas that allow wildlife room to roam for access to food, territory, and mating. A broad range of habitat is necessary for the dispersal of plants and animals to ensure the viability of such corridors. Similarly, a native wildlife nursery site should provide food, water, cover, and places to raise young for wildlife. The Project site does not exhibit characteristics to support a wildlife corridor or nursery site: vegetation on the site is composed entirely of a non-native ice plant monoculture that offers limited to no forage value for native species. The Project includes restoration of native dune habitat, with the aim of increasing connectivity with adjacent habitat for the federally protected El Segundo blue butterfly, and would therefore improve rather than negatively impact wildlife movement corridors in the region. No impact would occur.

e) Convert oak woodlands (as defined by the state, oak woodlands are oak stands with greater than 10% canopy cover with oaks at least 5 inch in diameter measured at 4.5 feet above mean natural grade) or other unique native woodlands (juniper, Joshua, southern California black walnut, etc.)?	☐	☐	☐	☒

No Impact. The Project site does not contain any oak woodlands or other unique native woodlands. No impact would occur.

f) Conflict with any local policies or ordinances protecting biological resources, including Wildflower Reserve Areas (L.A. County Code, Title 12, Ch. 12.36), the Los Angeles County Oak Tree Ordinance (L.A. County Code, Title 22, Ch. 22.174), the Significant Ecological Areas (SEAs) (L.A. County Code, Title 22, Ch. 102), Specific Plans (L.A. County Code, Title 22, Ch. 22.46), Community Standards Districts (L.A. County Code, Title 22, Ch. 22.300 et seq.), and/or Coastal Resource Areas (L.A. County General Plan, Figure 9.3)?	☐	☐	☐	☒

No Impact. The Project site is not within a County-designated Wildflower Reserve Area, Significant Ecological Area, or a Coastal Resource Area. Further, according to the field survey conducted at the site, there are no oak trees present onsite (Montrose 2024). The Project site falls under the jurisdiction of both Los Angeles County and the City of Redondo Beach, and as the Project site is considered a critical environmental resource to the City of Redondo Beach, it is addressed in the City of Redondo Beach Public Review Draft General Plan (Redondo Beach 2024a).The City Conservation and Open Space Unit, designates the coastal bluff and

Esplanade portion of the Project site as "public Spaces and Other Open Spaces", which are City-managed areas (Redondo Beach 2024a). Project plans are consistent with City Public Review Draft General Plan Policy OS-2.10 "Conservation", which encourages the conservation of natural resources such as coastal resources, wildlife habitats, and native vegetation during development of high-quality open spaces and recreational facilities such as the access path from Avenue A to Redondo Beach. In addition, the Project is consistent with all of the relevant policies in the City Public Review Draft General Plan Goal OS-8 "Biological Resources" related to the protection of sensitive biological resources, which include protecting and expanding critical habitats, re-introducing native species, continuing current restoration efforts and re-introducing native habitats (OS 8.1, 8.2, 8.5 and 8.6). Proposed native species planting for the Project would also be consistent with Policy LU5.7 of the Public Review Draft City General Plan which specifically prioritizes expansion of ESB habitat and connectivity with existing ESB populations along the dunes of Torrance and Hermosa Beach (Redondo Beach 2024a).

Review of the L.A. County General Plan, the City of Redondo Beach Public Review Draft General Plan and associated ordinances indicates that Project would not conflict with the provisions of local policies or ordinances protecting biological resources. No impact.

g) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved state, regional, or local habitat conservation plan?	☐	☐	☐	☒

No impact. The Project site is not located within an area subject to the provisions of an adopted habitat conservation plan. No impact would occur. Although the City of Redondo Beach has not adopted a habitat conservation plan that covers the project site, the *Beach Bluffs Restoration Project Master Plan* (2005) funded, developed, and approved by a by regional and local conservation organizations does prescribe a bluff restoration planting pallet. The *Beach Bluffs Restoration Project Master Plan* is attached to this Draft IS/MND and is required to be followed as part of the replanting of the project site post project development. Specifically, the El Segundo blue butterfly host plant species (Eriogonum and Dudleya) are identified in the *Beach Bluffs Restoration Project Master Plan* and are required plants to be included in the restoration planting palette.

5. CULTURAL RESOURCES

	Potentially Significant Impact	*Less Than Significant Impact 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 CEQA Guidelines § 15064.5?	☐	☐	☐	☒

No Impact. A records search was conducted at the South Central Coastal Information Center of the California Historical Resources Information System at California State University, Fullerton in order to identify the presence of any previously recorded cultural resources within the Project site, as well as within a 0.25-mile buffer around the Project site, and to determine whether any portions of the Project site had been surveyed for cultural resources. The record search did not identify any built environment historical resources listed or eligible for listing in the California Register of Historical Resources (CRHR) within the Project site. Furthermore, a review of the County of Los Angeles public GIS-Net database and the Los Angeles Geohub did not identify any historical resources within a 0.25-mile buffer of the Project site (Los Angeles County Planning Department. 2024a; Los Angeles Geohub 2024c). A historic maps review revealed no evidence for historical resources of concern within the Project site (United States Geological Survey 1896, 1924, 1944, 1951, 1963, 2021). As a result, the proposed Project would not have a significant effect to built environment historical resources according to per CEQA Guidelines § 15064.5. For the reasons listed above, the Project would not cause any adverse changes to built environment historical resources within the vicinity of the Project. No impact would occur.

However, unknown archaeological sites that may be uncovered during construction, could be determined significant and eligible for listing in the CRHR. Impacts to archaeological resources that are historical resources are addressed below in item 5(b).

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to CEQA Guidelines § 15064.5?	☐	☒	☐	☐

Less than Significant Impact with Mitigation Incorporated. As noted above a records search was conducted in order to identify the presence of any previously recorded cultural resources within the Project site, as well as within a 0.25-mile buffer around the Project site, and to determine whether any portions of the Project site had been surveyed for cultural resources. The record search revealed that there are no known archaeological sites within the Project site and that one previously recorded pre-colonial Native American archeological site had been identified within the 0.25-mile buffer. Additionally, the records search revealed that six previous surveys had been conducted within 0.25 mile of the Project site, including one survey that overlapped the Project site.

No archaeological resources, as defined in § 15064.5 of the CEQA Guidelines, have been identified within the Project site; however, the fully developed character of the Project site precluded a pedestrian archaeological survey, and cultural materials may be buried at the location. The Project is the demolition of existing structures on the property and located within the boundaries of the existing facility. All of these areas have been previously disturbed in association with construction of the existing facility. As such, the Project improvements are considered second generation development (i.e., development occurring on previously developed land and

non-native soils) and do not include mass excavation. However, since the Project involves ground disturbance, there is the potential for unknown resources to be unearthed during earth moving activities. If archaeological remains are discovered that are determined eligible for listing in the CRHR, and Project activities would affect them in a way that would render them ineligible for such listing, a significant impact would result. The implementation of the **Mitigation Measure CR-1** would ensure that the Project would treat eligible archaeological resources in a manner that would reduce impacts to archaeological resources to less than significant with mitigation.

> **Mitigation Measure CR-1: Immediately Halt Construction If Cultural Resources Are Discovered, Evaluate All Identified Cultural Resources for Eligibility for Inclusion in the NRHP/CRHR, and Implement Appropriate Mitigation Measures for Eligible Resources.** If any cultural resources, such as structural features, unusual amounts of bone or shell, flaked or ground stone artifacts, historic-era artifacts, human remains, or architectural remains, are encountered during any Project construction activities, work shall be suspended immediately at the location of the find and within a radius of at least 50 feet and the Los Angeles County Department of Beaches and Harbors will be contacted.
>
> All cultural resources accidentally uncovered during construction within the Project site will be evaluated for eligibility for inclusion in the CRHR. Resource evaluations will be conducted by individuals who meet the U.S. Secretary of the Interior's professional standards in archaeology. If any of the resources meet the eligibility criteria identified in Pub. Res. Code Section 5024.1 or Pub. Res. Code Section 21083.2(g), mitigation measures will be developed and implemented in accordance with CEQA Guidelines Section 15126.4(b) before construction resumes.
>
> For resources eligible for listing in the NRHP/CRHR that would be rendered ineligible by the effects of Project construction, additional mitigation measures will be implemented. Mitigation measures for archaeological resources may include (but are not limited to) avoidance; incorporation of sites within parks, greenspace, or other open space; capping the site; deeding the site into a permanent conservation easement; or data recovery excavation. Mitigation measures for archaeological resources will be developed in consultation with responsible agencies and, as appropriate, interested parties such as Native American tribes. Native American consultation is required if an archaeological site is determined to be a Tribal Cultural Resource. Implementation of the approved mitigation will be required before resuming any construction activities with potential to affect identified eligible resources at the site.

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature? ☐ ☐ ☐ ☒

No Impact. As shown on the Geologic Map of the Palos Verdes Peninsula and Vicinity (Dibblee et al. 1999), the Project site is underlain by beach sediments (Qs), primarily sand. Based on the age of deposition (Holocene), the sediments (Qs) are considered to have low sensitivity for paleontological resources. Holocene-era beach sediments may overlie older, Pleistocene-era sediments (Qos) which are considered to have moderate to high sensitivity for paleontological resources. The Project is located on a heavily disturbed slope between Redondo Beach and Esplanade, which has been previously modified and landscaped. Ground disturbance for the Project consists of excavation for footings for a pedestrian path and accessible trail, and will not exceed five feet in depth. As such, excavation is not anticipated to occur within older, native sediments that have potential to contain paleontological resources. Therefore, the Project would not directly or indirectly destroy a unique paleontological resource or site or unique geologic feature. No impact would occur.

d) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

Less than Significant Impact with Mitigation Incorporated. There is no evidence that human remains are present within the Project site and no dedicated cemeteries are within the vicinity. Although the Project site has been previously disturbed by development, it is possible that human remains could be discovered during excavation activities. Impacts on accidentally discovered human remains would be considered a significant impact. Should any such remains be discovered during construction, implementation of **Mitigation Measure CR-2** would be required. Implementation of **Mitigation Measure CR-2** and compliance with California Health and Safety Code Section 7050.5 and California Public Resources Code 5097.98 would reduce potential impacts on human remains to a level that is less than significant with mitigation incorporated.

> **Mitigation Measure CR-2: Immediately Halt Construction if Human Remains Are Discovered and Implement Applicable Provisions of the California Health and Safety Code.** If human remains are accidentally discovered during Project construction activities, the requirements of California Health and Human Safety Code Section 7050.5 will be followed. Potentially damaging excavation will halt in the vicinity of the remains, with a minimum radius of 100 feet, and the County Coroner will be notified. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery (California Health and Safety Code Section 7050.5[b]). If the Coroner determines that the remains are those of a Native American, they must contact the NAHC by phone within 24 hours of making that determination (California Health and Safety Code Section 7050[c]). Pursuant to the provisions of Pub. Res. Code Section 5097.98, the NAHC will identify a Most Likely Descendent (MLD). The MLD designated by the NAHC will have at least 48 hours to inspect the site, once access is granted, and propose treatment and disposition of the remains and any associated grave goods.

6. ENERGY

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐

Less Than Significant Impact. Energy consumed for Project construction would primarily consist of fuels in the form of diesel and gasoline. Fuel consumption would result from: the use of on-road trucks for the transportation of construction materials and water; and from the use of off-road construction equipment.

While construction activities would consume petroleum-based fuels, consumption of such resources would be temporary and would cease upon the completion of construction. The petroleum consumed during Project construction would be typical of similar projects and would not require the use of new petroleum resources beyond those generally consumed in California annually for construction activities. Additionally, increasingly stringent state and federal regulations on engine efficiency combined with state regulations limiting engine idling times and requiring recycling of construction debris, would further reduce the amount of transportation fuel demand during Project construction. During long-term operation of the Project, energy would be consumed in the form of diesel and gasoline used by vehicles traveling to and from the Project site for as needed maintenance and electricity used directly by the Project (i.e. streetlights, irrigation pumps). While energy would be consumed during the operation phase, the Project site would operate similarly to previous conditions. Therefore, the Project would not result in any unusual characteristics that would result in excessive short-term construction or long-term operational energy consumption. Energy consumption associated with the Project would not be considered inefficient, wasteful, or unnecessary in comparison to other similar developments in the region. A less than significant impact would occur.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

No Impact. California Building Standards Code (CCR, Title 24) California Building Code (CBC 2022) includes provisions applicable to all buildings, which are mandatory requirements for efficiency and design. The Project would be consistent with the requirements of Title 24 through implementation of energy-reduction measures, such as energy efficient lighting, water efficient plumbing fixtures, and water efficient landscaping and irrigation. Therefore, the Project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. No impact would occur.

7. GEOLOGY AND SOILS

	Potentially Significant Impact	*Less Than Significant Impact 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:				
i) Rupture of a known earthquake fault, as delineated on the most recent issued by the State Geologist for the area or based on other substantial evidence of a known active fault trace? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒

No Impact. Seismically induced surface or ground rupture occurs when movement on a fault deep within the earth breaks through to the surface as a result of seismic activity. Fault rupture almost always follows pre-existing faults, which are zones of weakness. Sudden displacements are more damaging to structures because they are accompanied by shaking. Under the Alquist-Priolo Earthquake Fault Zoning Act (Act), which was passed in 1972, the California State Geologist identifies areas in the State that are at risk from surface fault rupture. The Act's main purpose is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act also requires the State Geologist to establish regulatory zones, known as Alquist-Priolo Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps that identify these zones.

The project site is located in the western portion of the Los Angeles Basin known as the West Coast Basin at the northwest extension of the Peninsular Ranges geomorphic province. The basin's alluvial plain is underlain by several thousand feet of recent to mid-Tertiary-age sediments that rest unconformably on metamorphic basement rock. Structurally, the Los Angeles basin is divided into sections by 4 major fault systems; the basin sections are referred to as the northwest, northeast, central, and southwest structural blocks. The project site is situated west of the major Newport-Inglewood Fault Zone in the southwest structural block of the basin (Tetra Tech 2023). Accordingly, the CDOC, California Geological Survey's (CGS) California Earthquake Hazards Zone Application ("EQ Zapp") (CDOC 2024c) reports no active faults crossing the Project site, and no portion of the Project site is within an Alquist Priolo Earthquake Zone. Additionally, the Project includes no habitable structures.

Included within Appendix E of this initial study checklist is a Geotechnical Report prepared by Tetra Tech dated May 30, 2023. The report includes a comprehensive analysis of the seismology and other potential geologic hazards in proximity to and at the Project Site. Concerning earthquake faults the Report confirms that there are no active faults crossing the Project Site the and the site is not located within a designated Earthquake Fault Zone for fault surface rupture hazard. Therefore, Project implementation would not expose people or structures to potential substantial adverse effects involving rupture of a known earthquake fault. No impact would occur.

ii) Strong seismic ground shaking?	☐	☐	☒	☐

Less Than Significant Impact. As part of a seismically active region, there is a risk of strong seismic ground shaking. There are no known active faults that traverse the Project site. However, there are a number of known seismically active faults within approximately 33 miles of the Project site and three (3) of those faults are within five miles of the Project; the Compton, Palos Verdes and Redondo Canyon faults. The Project would not result in the construction of any habitable structures. In addition, the Project would comply with the Los Angeles County Building and Fire Codes. Both the CBC and the Fire Code contain provisions for earthquake safety based on factors including occupancy type, the types of soil and rock onsite, and the strength of ground motion with specified probability of occurring at the site. In addition, the Los Angeles County Building and Safety Division would review the plans through building plan checks, issuance of a building permit, and inspection during construction, which would ensure that all required seismic safety measures are incorporated. Compliance with the CBC and the County's review process, permit application, and inspection would reduce impacts related to strong seismic ground shaking.

Included within Appendix E of this initial study checklist is a Geotechnical Report prepared by Tetra Tech dated May 30, 2023. The report includes a comprehensive analysis of the potential for ground shaking at the project site and based on the presented research, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low. Therefore, a less than significant impact would occur.

iii) Seismic-related ground failure, including liquefaction and lateral spreading?	☐	☐	☒	☐

Less than Significant Impact. Liquefaction is a phenomenon in which a saturated cohesionless soil causes a temporary transformation of the soil to a fluid mass, resulting in a loss of support. Liquefaction occurs when loose sand and silt that is saturated with water behaves like a liquid when shaken by an earthquake. Earthquake waves cause water pressures to increase in the sediment and the sand grains to lose contact with each other, causing the sediment to lose strength and behave like a liquid. The soil can lose its ability to support structures, flow down even very gentle slopes, and erupt to the ground surface to form sand boils. Lateral spreading is a hazard associated with liquefactions where a body of compacted fill moves laterally upon the failure of surrounding liquefaction prone soils, and is a hazard for sites where liquefaction takes place and there is sloping ground or free faces (Tetra Tech 2023)

Maps of seismic hazard zones are issued by the California Geological Survey (CGS, formerly California Department of Conservation, Division of Mines and Geology (CDMG)) in accordance with the Seismic Hazards Mapping Act enacted in April 1997, the intent of which is to provide for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in developing compliance requirements to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes. Based on the review of the Redondo Beach Quadrangle Official Map of Seismic Hazard Zones issued March 25, 1999, the Project slope is not located within an area identified as subject to the hazard of liquefaction. It is noted, however, that the beach level at the toe of the slope is mapped as an area that is subject to the hazard of liquefaction. Given the nature of the project, liquefaction is not considered a hazard to be considered in the design of the proposed Project (Tetra Tech 2023). Further, given the nature of the Project site and Project activities, liquefaction and lateral spreading are not considered hazards for the Project site (Tetra Tech 2023).

The Project entails improvements to an existing pedestrian path and would not introduce any new land uses or habitable structures. As discussed in response to 7. A ii), the Project would comply with the CBC, which has been adopted as part of the Los Angeles County Building Code, and outlines the engineering and building standards to reduce and prevent potential hazards associated with both liquefaction and lateral spreading. Compliance with the CBC and the County's review process, permit application, and inspection would reduce

impacts associated with seismic-related ground failure, including liquefaction and lateral spreading. A less than significant impact would occur.

iv) Landslides? ☐ ☐ ☐ ☒

No Impact. This site is not located in an Earthquake-Induced Landslide Hazard Zone designated by the State of California. No evidence of landsliding was observed on or in the immediate vicinity of any of the sites. Therefore, the occurrence of an earthquake-induced landslide is not considered to be a hazard to the site (Tetra Tech 2023). No impact would occur.

b) Result in substantial soil erosion or the loss of topsoil? ☐ ☐ ☒ ☐

Less Than Significant Impact. Erosion can be initiated by wind or water. Silt-sized particles are most easily eroded due to their size and low cohesiveness. Site soils are susceptible to wind erosion, especially during the spring and fall months when winds increase. Sporadic, torrential rains can cause major flash flood events that create significant erosion in the region.

According to the Natural Resources Conservation Service Web Soil Survey the Project site soils have a moderate potential for erosion (Natural Resources Conservation Service 2019).

Construction of the Project would involve a variety of heavy equipment associated with earthwork, structural, and paving phases. Soil exposed by construction activities via excavation, could be subject to erosion if exposed to heavy rain, winds, or other storm events. Wind erosion would be minimized through soil stabilization measures required by the SCAQMD Rule 403 (Fugitive Dust) such as daily watering. The Project applicant would be required to comply with the National Pollutant Discharge Elimination System (NPDES) Construction General Permit and submit a Notice of Intent to the Los Angeles Regional Water Quality Control Board (RWQCB) for the preparation of a Stormwater Pollution Prevention Plan (SWPPP). Generally, a SWPPP demonstrates how water quality during, and post construction would be maintained in accordance with mandated objectives. Often this is achieved by employing BMPs (see Section 10, Hydrology and Water Quality). Many BMPs designed to protect water quality also serve to reduce soil erosion and loss of topsoil.

Specific BMPs may include, but are not limited to, the following:

- Temporary preservation of some existing vegetation where feasible.
- Covering stockpiled, excavated, and/or fill materials to reduce potential off-site sediment transport.
- Use of erosion control devices, such as straw wattles, mulch, mats, and/or geotextiles.
- Use of sediment controls to protect the site perimeter and prevent off-site sediment transport, including measures such as silt fencing, fiber rolls, gravel bags, temporary sediment basins, street sweeping, stabilized construction access points and sediment stockpiles, and use of properly fitted covers for sediment transport vehicles.
- Compliance with local dust control measures.
- Daily backfill, compaction, and/or covering of excavated pipeline trenches to minimize erosion potential.
- Regular inspection and maintenance of all erosion control and sediment catchment facilities to ensure proper function and effectiveness.

Further, required adherence to the provisions of City of Redondo Beach Code of Ordinances, Title 5 Sanitation and Health, Chapter 7 STORMWATER MANAGEMENT AND DISCHARGE CONTROL, and Appendix J of Chapter 99, Title 26 of Los Angeles County Municipal Code (LACoMC) ensures that certain measures or

conditions, such as those that prevent erosion and siltation are included prior to the issuance of a grading permit.

Project design includes construction of three one-foot wide and six-inch deep drainage swales and a below-ground French drain at the foot of the retaining walls, features that are designed to control drainage of stormwater runoff to prevent erosion and maintain slope stability, such that rates of runoff would meet applicable engineering design standards. The swales are designed to run along the upslope edge of the concrete path and drain into six-inch diameter pipes at each switchback. Similarly, the French drain is designed to run beneath the foot of each retaining wall and convey stormwater offsite. These features will prevent substantial soil erosion and the loss of topsoil during operation of the new path by slowing runoff and removing surface water from the slope at intervals designed to address the site's slope and project components.

With implementation of required standard erosion control measures and stormwater construction BMPs, construction-related erosion and sedimentation impacts would be less than significant. Additionally, once constructed, the Project site would not include expansive areas of exposed soils and runoff would be managed through water capture in the drainage swales and French drains. Similar to existing conditions, the site would provide for a combination of landscaped and paved areas. A less than significant impact would occur.

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?	☐	☐	☒	☐

Less Than Significant Impact. As discussed in Checklist Response to 7. a iii) a small portion of the Project is in an area of potential liquefaction, and the Project Geotechnical Report concluded that as lateral spreading is a hazard for sites where liquefaction takes place and there is a gentle sloping ground or free faces, liquefaction is not considered a hazard to be considered in the design of the proposed Project (Tetra Tech 2023). As discussed in Checklist Response 7.a iv, the Project site is not located in an area subject to on- or off-site landslides.

Land subsidence is the gradual settling or sinking of the ground surface with little or no horizontal movement. Subsidence may be caused by liquefaction or associated with the extraction of fluids (water and/or petroleum) from subsurface sediments. During large earthquakes, it is possible for subsidence or seismically induced settlement to occur as a result of strong ground shaking. The site is not mapped within an area of land subsidence in California (https://ca.water.usgs.gov), due to groundwater pumping, does not include habitable structures, and the new replacement structures would be constructed in adherence with the most recent edition of the CBC. Impacts related to an unstable geological unit or soil resulting in on-or off-site landslide, lateral spreading, subsidence, liquefaction or collapses would be less than significant.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☐	☒

No Impact. Expansive soils are distinguished by the presence of swelling clay minerals that when unsaturated and exposed to moisture can absorb a significant amount of water causing them to expand and swell. Likewise, when expansive soils lose moisture through desiccation, they begin to shrink. The sandy soils at the site contain almost no fines content and are therefore not considered to be susceptible to the hazard of swelling or shrinkage (Tetra Tech 2023). Because the site lacks expansive soils, and construction of the Project would comply with applicable County building codes, CBC design requirements, and standard engineering practices, impacts related to expansive soils are anticipated to be less than significant.

e) Have soils incapable of adequately supporting the use of onsite wastewater treatment systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

No Impact. The Project would connect to the municipal wastewater system and does not involve an onsite wastewater treatment system. No impact would occur.

f) Conflict with the Hillside Management Area Ordinance (L.A. County Code, Title 22, Ch.22.104)?	☐	☐	☐	☒

No Impact. As shown on the County's public GIS-Net database, the Project site is not within an area that is subject to the Hillside Management Area Ordinance (County 2024a).
No impact would occur.

8. GREENHOUSE GAS EMISSIONS

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project: **a) Generate greenhouse gas (GHGs) emissions, either directly or indirectly, that may have a significant impact on the environment?**	☐	☐	☒	☐

Less Than Significant Impact. Global climate change refers to changes in average climatic conditions on earth including temperature, wind patterns, precipitation, and storms. Global temperatures are moderated by atmospheric gases. These gases are commonly referred to as GHGs because they function like a greenhouse by letting sunlight in but preventing heat from escaping, thus warming the earth's atmosphere.

GHGs are emitted by natural processes and human (anthropogenic) activities. Anthropogenic GHG emissions are primarily associated with: (1) the burning of fossil fuels during motorized transport, electricity generation, natural gas consumption, industrial activity, manufacturing, and other activities; (2) deforestation; (3) agricultural activity; and (4) solid waste decomposition. The GHGs defined under California's AB 32 include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

GHGs have long atmospheric lifetimes that range from one year to several thousand years. Long atmospheric lifetimes allow for GHG emissions to disperse around the globe. Because GHG emissions vary widely in the power of their climatic effects, climate scientists have established a unit called global warming potential (GWP). The GWP of a gas is a measure of both potency and lifespan in the atmosphere as compared to CO_2. For example, a gas with a GWP of 10 is 10 times more potent than CO_2 over 100 years. Carbon dioxide equivalent (CO_2e) is a quantity that enables all GHG emissions to be considered as a group despite their varying GWP. The GWP of each GHG is multiplied by the prevalence of that gas to produce CO_2e. By applying the GWP ratios, Project-related CO_2e emissions can be tabulated in metric tons (MT) per year.

GHG emissions were calculated using CalEEMod Version 2022.1.1.26. **Table 8-1** summarizes the maximum annual construction emissions from the Project compared to the SCAQMD significance threshold (SCAQMD 2010); Project emissions during construction would not exceed the significance thresholds, indicating less than significant impact.

Table 8-1. Annual Construction Greenhouse Gas Emissions

Pollutant	SCAQMD Significance Threshold (MT CO_2e/yr)	Maximum Annual Emissions (MT CO_2e/yr)	Significant Impact?
GHGs (CO_2e)	10,000	73.4	**No**

b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gasses?	☐	☐	☐	☒

No Impact. There are numerous State plans, policies, and regulations adopted for the purpose of reducing GHG emissions. The primary State policy targeting GHG emissions is AB 32, the California Global

Warming Solutions Act of 2006. The quantitative goal of AB 32 is to reduce GHG emissions to 1990 levels by 2020. Subsequently, Senate Bill (SB) 32 requires further reductions of 40 percent below 1990 levels by 2030. The Project's operational year is after 2020, so the Project aims to reach the quantitative goals set by SB 32. Statewide plans and regulations such as GHG emissions standards for vehicles, the low carbon fuel standards, and regulations requiring an increasing fraction of electricity to be generated from renewable sources are being implemented at the statewide level; as such, compliance at the project level is not addressed. The Project is a beach access ramp for pedestrians, once the construction phase is completed, the Project will generate minimal GHG emissions and will not conflict with any applicable GHG plan, policy, or regulation.

9. HAZARDS AND HAZARDOUS MATERIALS

	Potentially Significant Impact	*Less Than Significant Impact 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, storage, production, use, or disposal of hazardous materials?	☐	☐	☒	☐

Less Than Significant Impact. Materials and waste are generally considered hazardous if they are poisonous (toxicity), can be ignited by open flame (ignitability), corrode other materials (corrosivity), or react violently, explode, or generate vapors when mixed with water (reactivity). The term "hazardous material" is defined in the State Health and Safety Code (Chapter 6.95, Section 25501[o]) as any material that, because of quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment. Hazardous waste is defined as any hazardous material that is abandoned, discarded, or recycled, as defined in the State Health and Safety Code (Chapter 6.95, Section 25125). The transportation, use, and disposal of hazardous materials, as well as the potential releases of hazardous materials to the environment, are closely regulated through many state and federal laws.

Construction activities associated with the Project would require transportation and use of limited quantities of fuel, oil, sealants, and other hazardous materials related to construction. The use of these materials could potentially result in significant impacts through accidental discharge associated with use and storage of hazardous materials. The transport, use, and disposal of hazardous materials and/or wastes would be conducted in accordance with applicable local, state, and federal laws. In addition, implementation of the Project would require conformance with the NPDES Construction General Permit, as described in Section 7, Geology and Soils. Specifically, this would entail implementation of a SWPPP to address the use of hazardous materials and the potential discharge of contaminants including construction-related hazardous wastes through the installation of appropriate BMPs. While specific BMPs would be determined during the SWPPP process, the suite of BMPs would include standard industry measures and guidelines contained in the NPDES Construction Permit and Stormwater Best Management Practices Construction Handbook (California Stormwater Quality Association [CASQA] 2024). Typically, day to day activities at the Project site would not involve the routine transport, use, or disposal of hazardous materials. Potentially, regular maintenance such as landscape care could use herbicides and pesticides. No special permits would be required for such limited transport, use and/or disposal of these common products. A less than significant impact would occur.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials or waste into the environment?	☐	☐	☒	☐

Less Than Significant Impact. As with most construction, there is the possibility of accidental release of hazardous substances during typical construction activities. Specifically, site development could involve a range of activities that would include the use of common hazardous materials, substances, or chemicals such as fuels, oils, lubricants, paints, and solvents. Construction activities would be short term, and the use of these materials would cease once construction is complete. The hazardous substances used during construction would be required to comply with existing federal, state and local regulations regarding the use and disposal of these materials. In the event of an accidental release during construction containment and clean up would be in

accordance with existing applicable regulatory requirements. Project operation would involve the routine transport, use, or disposal of hazardous materials. Regular maintenance such as landscape care could use herbicides and pesticides. No special permits would be required for use and/or disposal of these common products, and any accidental release of these materials would not create a significant hazard to the public or the environment. A less than significant impact would occur.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of sensitive land uses?	☐	☐	☒	☐

Less Than Significant Impact Sensitive land uses are defined to include residences, schools, hospitals, and daycare centers. The nearest sensitive land uses are the residences across the street, east of the site, and within one-quarter mile. As discussed in responses to 9. a) and 9. b), the Project does not involve the use of acutely hazardous materials or any materials that would require special permits. As discussed in Section 3, Air Quality, although the Project would generate air emissions in the short term from the operation of construction equipment, air emissions would remain below established significance levels. A less than significant impact would occur.

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒

No Impact. Government Code 65962.5 stipulates that the Department of Toxic Substances Control (DTSC), the Department of Health Services, the State Water Resources Control Board (SWRCB), and any local enforcement agency, as designated by Section 18051, Title 14 of the CCR, identify and update annually a list of sites that have been reported to have certain types of contamination. The DTSC EnviroStor (DTSC 2024), California Environmental Protection Agency (CALEPA) Cortese List, and SWRCB GeoTracker (SWRCB 2024) databases were consulted to determine if the Project site or any surrounding nearby properties are on any list compiled pursuant to Government Code 65962.5. The Project site and surrounding properties are not on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5. No impact would occur.

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

No impact. The Project site is not within an airport land use plan or within two miles of a public airport or public use airport. The Project is located approximately 2.8 miles from the Torrance Municipal Airport - Zamperini Field, and seven miles from the Los Angeles International Airport. A review of the L.A. County's Airport Land Use Commission Site indicates that the site is not within an airport influence area, runway protection zone, safety zone, noise contour, supplemental area, etc. (County 2024b). No impact would occur.

f) Impair implementation of, or physically interfere with, an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐

Less than Significant Impact. The City details its safety plan via the *City of Redondo Beach Local Hazard Mitigation Plan* (Redondo Beach 2020). Emergency evacuation access to the Project site is via Esplanade, which is not a designated evacuation route per the City's plans or disaster route per Los Angeles County. During construction, heavy construction vehicles could interfere with emergency response activities or emergency evacuation procedures; this could occur from vehicles traveling behind a slow-moving truck. However, such trips would be brief and infrequent. Although traffic may temporarily need to be directed around Project construction activities, it would not require road closures. Public roadways would remain open for standard traffic and emergency response vehicles for the duration of construction. City requirements for temporary traffic controls, land/street closures, and detours indicate that emergency vehicles must have access at all times. They also define procedures to reduce construction-related impacts and maintain traffic flow on streets and the Project conditions of approval would require that emergency access be maintained during construction. Once operational, the Project site would be returned to conditions similar to existing, there would be no changes to the circulation system, and as discussed in Section 17 Transportation, the Project would not add additional trips to the site. A less than significant impact would occur.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving fires, because the project is located:				
i) within a high fire hazard area with inadequate access?	☐	☐	☐	☒

No Impact. According to the City's Local Hazard Mitigation Plan, Redondo Beach is not in a wildfire hazards zone identified by the California Board of Forestry and Fire Protection. Furthermore, the Project does not include habitable structures and would not result in denser development; new transportation infrastructure (pedestrian) would be replacing older infrastructure. The new structures would be designed in accordance with the most recent CBC and Fire Code. No impact would occur.

ii) within an area with inadequate water and pressure to meet fire flow standards?	☐	☐	☐	☒

No Impact. See response to 9. g, i) above. The City Fire Department is responsible for assuring that there is adequate water and pressure to meet fire flow standards and compliance is verified through annual tests and inspections The Project site is an existing walkway, and the improvements would not alter the existing service capabilities nor create a need for increased fire flow (see Section 15), Public Services). In accordance with the Fire Code any new water mains shall be designed to meet or exceed the total flow requirements determined for fire flow for this development. No impact would occur.

iii) within proximity to land uses that have the potential for dangerous fire hazard?	☐	☐	☐	☒

No Impact. The Project site is located in a developed area consisting of residential to the east and a beach to the west – uses that do not have the potential for dangerous fire hazards. Dangerous fire hazards are primarily a product of a combination of fuels, terrain, weather and are typically associated with areas of open space with unmaintained vegetation, slopes, dry climates, and wind. The surrounding land uses do not contain these elements, thus do not pose a potential for a dangerous fire hazard. No impact would occur.

h) Does the proposed use constitute a potentially dangerous fire hazard?	☐	☐	☐	☒

No Impact. The Project entails the improvement of an existing walkway by replacing it with a new walkway. There would be no intensification of land uses and new structures would be replacing older deteriorating structures. The improvements – primarily made up of non-combustible hardscape - would not include elements that would contribute to creating a potentially dangerous fire hazard. New landscaping would be maintained and drought tolerant and the irrigation and water delivery system would also be upgraded to prevent fires. No impact would occur.

10. HYDROLOGY AND WATER QUALITY

	Potentially Significant Impact	*Less Than Significant Impact 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 groundwater quality?	☐	☐	☒	☐

Less Than Significant Impact. There is the potential for water pollutants to be generated in the short-term during construction activities and in the long term. Construction activities have a potential to cause erosion, sedimentation, and the discharge of construction debris from the Project site. For example, clearing of vegetation including removal of trees and grading activities would lead to exposed or stockpiled soils susceptible to peak stormwater runoff flows. Also, the compaction of soils by heavy equipment may minimally reduce the infiltration capacity of soils (exposed during construction) and increase stormwater runoff and erosion potential. If uncontrolled, these materials could lead to water quality problems, including sediment-laden runoff, prohibited non-stormwater discharges, and ultimately the degradation of downstream receiving water bodies. Consequently, if unabated, short-term impacts to surface waters during construction activities could violate water quality standards or waste discharge requirements and could result in a potentially significant impact. In the long-term, Project features, such as the reconstructed ramp and new staircase could alter the hydrological patterns of the site and the distribution of pollutants and runoff. Landscaped areas can also generate water pollutants such as fertilizers and weed control agents, as well as green waste from landscape maintenance cuttings.

The Project is within the jurisdiction of the LARWQCB, which is tasked with protecting the region's water quality objectives that meet the standards set forth in the Section 303 of the federal Clean Water Act (CWA) as well as the state's Porter-Cologne Water Quality Act. The LARWQCB, sets qualitative and quantitative water quality objectives and develops implementation programs to protect the regional water resources through its Water Quality Control Plan for the Los Angeles Region Basin Plan for Coastal Watersheds (the Basin Plan).

As part of the NPDES Construction General Permit, a NOI would be submitted to the LARWQCB and the County would submit a SWPPP that outlines the intended practices to reduce pollutants in the stormwater to the maximum extent practicable during construction. The SWPPP must include erosion-control and sediment-control BMPs. Additionally, the SWPPP is also required to contain waste management and non-stormwater control BMPs that reduce the potential for construction-related stormwater pollutants. Typical construction related BMPs might include temporary soil stabilization (e.g., straw mulch, wood mulch, drainage swales), temporary sediment control (e.g., silt fence, sediment track, fiber rolls, sandbag barrier), de-watering, vehicle equipment maintenance and cleaning, and tire cleaning. Further discussion of potential BMPs is included in response to 7. b). The Project is subject to compliance with the applicable Standard Urban Storm Water Mitigation Plan (SUSMP). A less than significant impact would occur.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒

Less Than Significant Impact. According to the Urban Water Management Plan (UWMP) prepared by California Water Service, Redondo Beach falls within the Rancho Dominguez / Hermosa-Redondo District. Water demand has been accounted for in the UWMP (Cal Water 2020). The Project would not increase the amount of water used over the existing condition.

The Project involves rehabilitation and upgrades to an existing beach access area. The upgraded pedestrian ramp and new staircase would increase the amount of impervious surface by a small amount; however, due to the very small increase in impervious surface, and the Project design's intention to capture all runoff on-site and continue to infiltrate the ground in a similar fashion to the existing condition, there would be a less than significant impact.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of a Federal 100-year flood hazard area or County Capital Flood floodplain; 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?	☐	☐	☒	☐

Less than Significant Impact. There are no on-site drainage courses and no nearby off-site drainage courses that would be altered by the Project. Additionally, according to the Federal Emergency Management Agency (FEMA), FEMA Flood Map Service Center online mapping website the Project site is not located in a 100-year flood area and the Los Angeles County's Flood Zone Determination Website does not identify the Project site as within a flood zone (FEMA 2024; County 2024d).

As discussed, the Project would be required to adhere to the NPDES Construction General Permit, which would require the preparation of a SWPPP that would outline construction related BMPs to be employed to reduce the amount of siltation and erosion during Project construction. Post construction, the Project site would be similar to existing conditions. The expanded access ramp and new staircase would result in a slight increase in impervious surfaces, but runoff would be directed to the three drainage swales and French drain features that have been designed per the City's standards to handle runoff. Less than significant impact would occur.

ii) Substantially increase the rate, amount, or depth of surface runoff in a manner which would result in flooding on- or offsite?	☐	☐	☒	☐

Less than Significant Impact. As discussed above, the Project will generally replace structures in kind. There would be a minimal increase in impervious surfaces as a result of the expanded access ramp and new staircase. Regardless, runoff would be directed to the three drainage swales and other drainage features, which are designed to meet applicable engineering design standards. A less than significant impact would occur.

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?	☐	☐	☒	☐

Less than Significant Impact. The Project would not 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. During construction, BMPs for stormwater pollution control would be implemented. The Project includes improvements to existing infrastructure and does not introduce new land uses that would create a new source of pollutants. As discussed above, the expanded access ramp and new staircase would result in an increase in impervious surfaces that would increase the amount of runoff. However, the Project includes a swale that has been designed to accommodate all Project runoff and meet applicable engineering design standards. Thus, the proposed improvements would not exceed the capacity of the downstream stormwater drainage systems or provide additional substantial sources of polluted runoff. Less than significant impact would occur.

iv) Impede or redirect flood flows which would expose existing housing or other insurable structures in a Federal 100-year flood hazard area or County Capital Flood floodplain to a significant risk of loss or damage involving flooding?	☐	☐	☐	☒

No Impact. The Project is not within a 100-year flood hazard area or County Capital Flood floodplain (FEMA 2024; County 2024d). Further, the Project does not include housing or any habitable structures. No impact would occur.

d) Otherwise place structures in Federal 100-year flood hazard or County Capital Flood floodplain areas which would require additional flood proofing and flood insurance requirements?	☐	☐	☐	☒

No Impact. The Project is not within a 100-year flood hazard area or County Capital Flood floodplain (FEMA 2024; County 2024d). No impact would occur.

e) Conflict with the Los Angeles County Low Impact Development Ordinance (L.A. County Code, Title 12, Ch. 12.84)?	☐	☐	☐	☒

No Impact. The swale and drainage features have been designed to meet applicable engineering design standards consistent with the Los Angeles County Low Impact Development Ordinance, and prior to the issuance of building permits DBH shall demonstrate that appropriate BMPs are incorporated into the Project in accordance with the County LID Ordinance. Proposed LID treatment control BMPs could include: street sweeping, straw and wood mulch, sandbag, and straw waddle barriers. As these strategies and BMPs would meet LID Ordinance requirements, no impact would occur.

f) Use onsite wastewater treatment systems in areas with known geological limitations (e.g. high groundwater) or in close proximity to surface water	☐	☐	☐	☒

(including, but not limited to, streams, lakes, and drainage course)?

No Impact. The Project does not involve the installation of new wastewater treatment systems; however, infrastructure would be upgraded. Upgrades to infrastructure would not alter the overall design of the wastewater delivery system as no new connections would be installed and no new or greater sources of wastewater would occur that would require larger lines or trunks. Upgrades to the deteriorating infrastructure is considered a benefit. No impact would occur.

g) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒

Less than Significant Impact. The Project is not within a 100-year flood hazard area a County Capital Flood floodplain, or seiche zone. Although the project is located within an area mapped by the California Department of Conservation as subject to tsunami hazard (California Geological Survey 2022)., tsunami-caused inundation of the Project site would not risk the release of pollutants, as pollutants are not anticipated to be stored on-site during Project construction or regularly transported through the Project site during Project operations. No impact would occur.

h) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Less than Significant Impact. Please see response to items 10 a) and 10 b). Less than significant impacts would occur.

11. LAND USE AND PLANNING

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒

No Impact. The physical division of an established community typically refers to the construction of a linear feature, such as an interstate highway or railroad tracks, or removal of a means of access, such as a local road or bridge that would impact mobility within an existing community or between a community and outlying area. The Project proposes replacements and improvements to existing infrastructure of a public beach access location that is intended to serve the existing community. The Project would not physically divide an established community. No impact would occur.

b) Cause a significant environmental impact due to a conflict with any local land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

No Impact. The Project would not result in any change to established land uses; the Project would be maintained consistent with the City of Redondo Beach zoning and Public Review Draft General Plan designations of "P-PRO" Parks, Recreation, and Open Space, and "OS" Parks and Open Space, respectively (Redondo Beach 2024a). The Project is consistent with Public Review Draft Policy LU-4.4 "New Open Space and Parkland Opportunities" and with Policy LU-4.6 "Connectivity" by updating and increasing accessibility associated with a dilapidated and unsafe access path, allowing increased public access to adjacent public beach spaces for active and passive recreation and increasing connectivity from Esplanade to the beach. Further the Project is consistent with Public Review Draft GOAL LU-5 Environmental Sustainability, particularly Policy LU-5.1 which encourages environmental sustainability, which is addressed through design elements intended to increase native species and mitigation measures proposed to avoid potential impacts to sensitive species (for more detail please refer to Section V. Biological Resources. The Project is also consistent with the Redondo Beach Local Coastal Plan (LCP), as amended (2012). The Project is within an area zoned "public or institutional" and the old Avenue A and Esplanade access path is identified as one of the thirteen (13) public access paths that provide the public access from urban Redondo Beach to the beach and Pacific Ocean. The Coastal Land Use Plan within the LCP, which establishes the resource protection and development policies to accomplish Coastal Act objectives, presents recreation and access policies for public access paths in Redondo Beach. These include Recreation Policies 1 and 2 which state that all existing public recreational and visitor-serving facilities will be maintained, enhanced, preserved and where possible expanded, and that lower-cost visitor-serving and recreational facilities will be protected and encouraged. The Project is consistent with both policies as it is an existing facility that, both serves low-cost recreation activities such as beach play and ocean swimming, and for it to be preserved the pathway has to be rehabilitated with an expanded, modern bike and pedestrian-friendly access path (Section V (E) of the Redondo Beach LCP) (Redondo Beach 2019). Therefore, the Project is consistent with local plans, including County and City Plans as well as the LCP, and would not conflict with an adopted plan intended to avoid or mitigate environmental effects. No impact would occur.

c) Conflict with the goals and policies of the General Plan related to Hillside Management Areas or Significant Ecological Areas?	☐	☐	☐	☒

No Impact. According to the County public GIS-Net database (County 2024) and the City of Redondo Beach *Development Environmental Hazards* on-line mapping application (City 2024e), the Project is not located in or near a Hillside Management Area, area of development hazards concern, or near a Significant Ecological Area. Thus, implementation and operation of the Project will not conflict with the goals and policies associated with Significant Ecological Areas or Hillside Management Areas. No impact would occur.

12. MINERAL RESOURCES

	Potentially Significant Impact	*Less Than Significant Impact 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?	☐	☐	☒	☐

Less than Significant Impact. The Surface Mining and Reclamation Act of 1975 (SMARA) classifies and maps regionally significant mineral resources zones (MRZs) and requires cities and counties to preserve known resources in order to meet future needs. The State focused the required mapping and mineral classification efforts in urban areas, like Redondo Beach, on construction aggregate resources that were particularly vulnerable to urbanization. Nearly all of Redondo Beach is classified as Mineral Resource Zone 3 (MRZ-3), as is this Project site, for construction aggregate under the California Mineral Land Classification System (CDOC 2024d). An MRZ-3 classification means that construction aggregate is either known or likely present, but the significance of the mineral deposit is undetermined because no mining activities have occurred. Because most of the City was fully developed prior to the State's MRZ classification, any potential mineral resources were unavailable for extraction. Existing land uses and development patterns are not compatible with mining operations. As such, introducing new mining operations would be infeasible.

No mineral resources that would be of value to the region or residents of the state have been identified at or near the Project site. The Project is located within an urban area and is not identified in the City of Redondo Beach Public Review Draft General Plan Open Space and Conservation Element (Redondo Beach 2024a 2024a) as having any known mineral resource value or as being located within any mineral resource recovery site. A less than significant impact would occur.

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☒	☐

Less than Significant Impact. Please refer to the response to 12. a) above. The City of Redondo Beach relies upon the SMARA in their Public Review Draft General Plan concerning mineral resources. A less than significant impact would occur.

13. NOISE

	Potentially Significant Impact	*Less Than Significant Impact 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 General Plan or noise ordinance (City of Redondo Beach, Chapter 24), or applicable standards of other agencies?	☐	☐	☒	☐

Less Than Significant Impact. The Project site is situated in a busy urban area of Los Angeles County, in the city of Redondo Beach, where ambient conditions reflect many sources of noise including automobile and truck traffic on Esplanade. The nearest receptors sensitive receptors are the existing single-family and multi-family residential uses across the street from the Project site, on Esplanade and people using the adjacent beach for passive and active recreation. Noise-sensitive receptors include land uses where an excessive amount of noise would interfere with normal operations or activities. Examples include residential areas, schools, and hospitals. Recreational areas may also be considered noise-sensitive where quiet and solitude may be important as part of the recreational experience. The City of Redondo Beach states that certain land uses are more sensitive to noise and vibration. Residential uses, schools, health care centers, libraries, senior housing, places of worship, and recreational areas are more sensitive to noise than commercial and industrial uses (Redondo Beach 2024a).

The City's Municipal Code (City 2024b), under Chapter 24 Noise Regulation, is the established local ordinance that provides community noise levels exposure and regulations. This ordinance acts as Redondo Beach's primary instrument to enforce and regulate general and specific types of noise within in the City such as to protect residences, businesses, institutional uses, and parks, recreation and conservations areas from excessive levels of noise and limit unnecessary, excessive, and annoying sounds emanating from all areas of the City.
The City of Redondo's Public Review Draft General Plan (Redondo Beach 2024a) Noise Element Policy N-1.10 states, "Minimize the impacts of construction noise on adjacent uses through the enforcement of mitigation requirements established in the City's Noise Ordinance, such as legal hours of operation, advance noticing of construction operations, incorporating physical barriers as necessary, and using tools and equipment properly outfitted with sound-dampeners."

According to the City's Municipal Code, Section 4-24.503, all construction activity shall be prohibited, except between hours of 7:00 a.m. and 6:00 p.m. on Monday through Friday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday (Redondo Beach 2024b). No construction activity shall be permitted on Sunday, or the days on which the holidays designated as Memorial Day, the Fourth of July, Labor Day, Thanksgiving Day, Christmas Day, and New Year's Day are observed.

Project Construction Noise

Construction of the Project would involve temporary and periodic noise increases associated with the demolition of the existing path and excavation/grading activities. The magnitude of the noise impact would fluctuate depending on the type of construction activities, equipment, duration, and the distance between the noise source and receiver and intervening structures. Construction equipment would not operate all at one time or at one location. Furthermore, construction equipment would not be constant during the workday.

Construction of the Project is anticipated to take 130 days with project completion occurring within a twelve month period starting in Spring 2026. Construction activities would consist of demolition, site preparation, grading, path construction, paving, architectural coating, and dune restoration. Construction activities would be limited to five (5) days per week between 7:00 am to 3:30 pm. The Project crew would be comprised of 8 workers and each day the required crew members would drive to and from the site for the duration of the Project.

Short-term impacts would occur during construction activities. **Table 13-1** summarizes representative equipment and typical noise levels produced by construction equipment that are commonly used. During construction of the proposed Project, noise from construction activities may intermittently dominate the existing environment in the immediate vicinity of the construction area but would cease upon completion of construction activities. Direct noise impacts would result from construction activities occurring near sensitive receptors, such as residential and recreation areas, but this noise would be short term and would occur during daylight hours, Monday through Friday

As depicted in **Table 13-1**, noise levels generated by typical construction equipment range from approximately 75 A-weighted decibel (dBA) to 101 dBA maximum reference noise level (L_{MAX}) at 50 feet. Construction equipment noise levels would be reduced over distance at a rate of approximately 6 dBA with each doubling of distance from the source (City of Redondo Beach 2024). Noise levels for the proposed project would vary for different construction tasks, but the maximum anticipated noise levels would be limited to rock drilling and pile driving, which would occur during demolition of the existing path and then during construction of the piers for the new path.

Table 13-1. Typical Construction Equipment Noise Levels

Equipment	Typical Noise Level 50 ft from Source, dBA
Air Compressor	80
Backhoe	80
Compactor	82
Concrete Mixer	85
Concrete Pump	82
Concrete Vibrator	76
Crane, Derrick	88
Crane, Mobile	83
Dozer	85
Generator	82
Grader	85
Impact Wrench	85
Jack Hammer	88
Loader	80
Paver	85
Pile-driver (Impact)	101
Pile-driver (Sonic)	95
Pneumatic Tool	85
Pump	77
Rail Saw	90
Rock Drill	95
Roller	85
Saw	76
Scarifier	83
Scraper	85
Shovel	82
Truck	84

Source: Federal Transit Administration, FTA 2018.

The Project would comply with the City's Municipal Code, Section 4-24-503 which ensures that noise limitations are imposed to minimize temporary noise impacts associated with construction by restricting construction activities to the daytime hours. The Project would also comply with the Public Review Draft General Plan Policy N-1.10, requiring construction noise limits, including limiting construction hours, consistent with the City Municipal Code. Therefore, the proposed Project would result in a less than significant impact related to on-site short-term construction noise.

Project Operational Noise

Post construction, the Project would operate similar to existing conditions. No new land uses are proposed, and the improvements are not intended to create greater visitor attendance; rather the improvements would increase the enjoyment and safety of current visitors. Additionally, as discussed further in Section 17, Transportation, the Project would not result in an increase in traffic. No impact would occur.

b) Generation of excessive ground borne vibration or ground borne noise levels? ☐ ☐ ☒ ☐

Less than Significant Impact. Vibration from operation of heavy equipment can potentially result in effects ranging from annoyance of people to damage of structures. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance soil particles move is a fraction of an inch. The rate, or velocity at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the "peak particle velocity" (PPV) and expressed in units of inches per second. Variations in geology over an area result in differing vibration amplitudes by frequency, **a**nd propagation of vibration with distance. As with noise, vibration levels decrease (or attenuate) as distance from the source of vibration increases.

Section 4-24.504 of the City of Redondo Beach Code of Ordinances, Vibration states: The operation or permitting the operation of any device which creates vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way, shall be prohibited. For the purposes of this section, "vibration perception threshold" shall mean the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or the visual observation of moving objects. The perception threshold shall be presumed to be 0.001 "g's" in the frequency range from zero to 30 Hz and 0.003 "g's" in the frequency range between 30 and 100 Hz.

Receptors sensitive to vibration include structures (especially older masonry structures), people (especially residents, the elderly, and the sick), and equipment (e.g., magnetic resonance imaging equipment, high resolution lithographic, optical and electron microscopes). Regarding the potential effects of ground borne vibration to people, except for long-term occupational exposure, vibration levels rarely affect human health.

Table 13-2 below presents the California Department of Transportation (Caltrans 2020) vibration guideline thresholds for the average human response.

Table 13-2. Human Response to Vibration

Average Human Response	PPV (in/sec)
Severe	2.0
Strongly perceptible	0.9
Distinctly perceptible	0.24
Barely perceptible	0.035

Source: Caltrans 2020

Project construction would have the potential to result in varying degrees of temporary ground borne vibration. Construction-related ground vibration is normally associated with impact equipment such as jackhammers, and the operation of some heavy-duty construction equipment, such as trucks. **Table 13-3** presents typical ground borne vibration levels associated with common construction equipment. The equipment shown in **Table 13-3** is used to illustrate the "worst-case" scenario.

Table 13-3. Typical Construction Equipment Vibration Levels

Equipment	PPV (in/sec) at 25 feet
Vibratory roller	0.210
Large bulldozer	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration, FTA 2018

As shown in **Table 13-3**, a vibratory roller is the greatest source of construction related ground borne vibration. Thus, using the vibration levels presented in Table 5, under a worst-case scenario, ground vibration generated by construction equipment would be approximately 0.210 ppv at 25 feet. Further, using a distance of 150 feet from the source (per Section 4-24.504 of the City of Redondo Beach Code of Ordinances), a vibratory roller would have a 0.014 ppv. This is less than the barely perceptible human response. Less than significant impact would occur.

Common sources of ground borne vibration and noise includes trains and construction activities associated with blasting, pile driving, and operating heavy earth moving equipment. Construction of the proposed Project would involve site preparation and grading/excavation activities. However, construction activities are not expected to involve the use of construction equipment that would result in substantial ground borne vibration or noise to sensitive residential receptors. No pile drive or blasting is proposed. While there will be site grading, it is not expected to result in significant perceptible human response as illustrated in **Table 13-3**. Therefore, the Project would not result in exposure of person to or generation of excessive ground bone noise and vibration. Less than significant impact would occur.

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

No Impact. The Project site is not within an airport land use plan or within two miles of a public airport or public use airport. The closest airport is Torrance Municipal Airport - Zamperini Field, which is 2.8 miles away. A review of the L.A. County's Airport Land Use Commission Site (County 2024b) indicates that the site is not within an airport land use planning area. Furthermore, the Project would not expose additional people residing or working at the Project site. No impact would occur.

14. POPULATION AND HOUSING

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
Would the project:				
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒

No Impact. The Project, located in urban city of Redondo Beach, entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. There is a sufficient local workforce available for construction. Further, the Project would not involve the construction of new homes, businesses, or other infrastructure that would induce population growth. No impact would occur.

b) Displace substantial numbers of existing people or housing, especially affordable housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

No Impact. The Project is completely within the boundaries of an existing beach access area; construction and operation activities would not result in the removal or displacement of housing that would warrant replacement housing to be constructed elsewhere. No impact would occur.

15. PUBLIC SERVICES

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project create capacity or service level problems, or result in substantial adverse physical impacts associated with the provision of 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:				
Fire protection?	☐	☐	☐	☒

No Impact. The Project entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. As discussed in Section 14, Population and Housing, the Project would not directly or indirectly introduce any new residents or employees to the Project site. Therefore, it would not increase the demand for fire protection. No existing facilities would be physically altered. Construction accidents could require fire service calls to the Project site; however, such accidents could be handled with existing resources. Post construction, the site would operate similar to existing conditions. No impact would occur.

Police/Sheriff protection?	☐	☐	☐	☒

No Impact. The Project entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. As discussed in Section 14, Population and Housing, the Project would not directly or indirectly introduce any new residents or employees to the Project site. Therefore, it would not increase the demand for police/sheriff protection. No existing facilities would be physically altered. Construction accidents could require police/sheriff service calls to the Project site; however, such accidents could be handled with existing resources. Post construction, the site would operate similar to existing conditions. No impact would occur.

Schools?	☐	☐	☐	☒

No Impact. The Project entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. As discussed in Section 14, Population and Housing, the Project would not directly or indirectly introduce any new residents to the Project site. Therefore, it would not increase the demand for schools. No existing facilities would be physically altered. Post construction, the site would operate similar to existing conditions. No impact would occur.

Parks?	☐	☐	☐	☒

No Impact. The Project entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. As discussed in Section 14, Population and Housing, the Project would not directly or indirectly introduce any new residents to the Project site. Therefore, it would not increase the demand for parks. No existing facilities would be physically altered. Post construction, the site would operate similar to existing conditions. No impact would occur.

Libraries? ☐ ☐ ☐ ☒

No Impact. The Project entails the rehabilitation and upgrades to existing beach access infrastructure and is intended to provide increased safety, ADA access, and a better experience for users. As discussed in Section 14, Population and Housing, the Project would not result in an increase in housing or population. The improvements are not intended to increase beach attendance, thereby bringing more visitors to the area. Therefore, there would be no increase in demand for library services. No existing facilities would be physically altered. No impact would occur.

Other public facilities? ☐ ☐ ☐ ☒

No Impact. Other public facilities may include senior centers, community centers, and pools, all of which are intended to serve the public. The Project would serve the existing population and would not directly or indirectly introduce any new residents that would require additional public facilities. No existing facilities would be physically altered. No impact would occur.

16. RECREATION

	Potentially Significant Impact	*Less Than Significant Impact 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?	☐	☐	☐	☒

No Impact. The Project includes the improvements to an existing recreational facility, a public beach access ramp, to increase safety and accessibility for beach visitors. Currently, the access ramp at Avenue A is closed to patrons, thus limiting access to beach visitors and causing an increase in the use of surrounding access ramps. With the improvements associated with the Project, the Avenue A access ramp would allow for easier, safer access to the existing patronage and would reduce the impact on the surrounding access ramps to Redondo Beach. Implementation of the Project would not increase the use of the facility to a point that would cause substantial physical deterioration. No impact would occur.

b) Does the project include neighborhood and regional parks or other recreational facilities or require the construction or expansion of such facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐

Less Than Significant Impact. The Project is a recreational and safety improvement at an existing beach access ramp. The environmental impacts of construction and operation of the Project are discussed within this Initial Study, which finds that all impacts would be less than significant. A less than significant impact would occur.

c) Would the project interfere with regional trail connectivity?	☐	☐	☒	☐

Less Than Significant Impact. During construction, the Project would temporarily change the course of the existing path, but not to a significant degree. A temporary bike path, measuring approximately 500 feet long by 20 feet wide, would be installed for the entirety of the Project and removed following completion allowing users to safely pass the Project work areas without interruption. This temporary change would not significantly affect trail connectivity.

17. TRANSPORTATION

	Potentially Significant Impact	*Less Than Significant Impact 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, roadways, bicycle and pedestrian facilities?	☐	☐	☒	☐

Less than Significant Impact. The Project includes improvements to an existing beach access path that would not significantly increase the use of the beach but would enhance access. Since there is no change or intensification of land use associated with the Project, no additional trips are anticipated to be generated. During construction there would be transfer of equipment and materials to the site that could result in a short-term localized disruption. However, there will be pedestrian and bicycle detours around the construction area. This would not create a conflict since the temporary trail would be constructed to maintain continuity along the existing trail. Post construction, the area would be similar to existing conditions, except for an improved beach access path, staircase, vegetation and lighting. A less than significant impact would occur.

b) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐

Less than Significant Impact. The analysis of vehicle miles traveled (VMT) in CEQA Guidelines section 15064.3 provides that transportation impacts of projects are, in general, best measured by evaluating the project's VMT. VMT reflects both the number and the distance of the trips taken.

The Project would not generate new travel demand as it is simply a rehabilitation of an existing pedestrian access way and would not generate new vehicle trips since the improvements are designed to accommodate existing visitors and would not increase the number of daily visitors. There would be no increase in VMT or rate of VMT per visitor over the baseline condition. Thus, the Project does not meet the criteria for further evaluation. Per the Governor's Office of Planning Research's *Technical Advisory on Evaluating Transportation Impacts in CEQA*[2], projects that generate or attract fewer than 110 new trips per day generally may be assumed to cause a less than significant transportation impact. The Project would generate less than this amount. The Project would cause a less than significant impact.

c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒

No Impact. The Project does not propose any changes to the existing circulation network; the intent of the Project is to improve pedestrian safety and accessibility via rehabilitation and upgrading beach access. Construction equipment would be stored at the Project site and therefore no construction equipment would interfere with any public right of way or create hazards. The Project would not create or increase hazards due to a geometric design feature and would not alter the geometrics of any public roadway. The Project would not introduce incompatible uses. No impact would occur.

[2] https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

d) Result in inadequate emergency access? ☐ ☐ ☒ ☐

Less than Significant Impact. Construction activities would require the delivery of construction equipment and materials to the Project site and the removal of construction waste from the site. Cement trucks will utilize three parking spaces along Esplanade for approximately 10 days, from 7 AM to 3:30 PM. Construction equipment and materials would be staged onsite and lane closures on public right of way are not anticipated. This would temporarily introduce slow-moving trucks; however, such trips would be both brief and infrequent. Once equipment and materials are delivered to the site, they would remain staged onsite during the duration of the Project. Considering the potential for brief delays, plans to maintain emergency access would be required per the Fire Code.

Once the Project is implemented, the site would continue to be accessed via Avenue C, Veterans Park, Avenue I, or Paseo De La Playa. There are no proposed alterations to circulation in and around the Project site. A less than significant impact would occur.

18. TRIBAL CULTURAL RESOURCES

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code §21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code § 5020.1(k), or	☐	☐	☐	☒

No Impact. A tribal cultural resource (TCR) is, by definition, eligible for listing on the CRHR. The records search conducted and described in Section 5, "Cultural Resources," did not identify any resources listed or eligible for listing on the CRHR and, as such, no TCRs, as defined in Public Resources Code § 5020.1(k), would be impacted by Project activities within the Project site.

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code § 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code § 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

No Impact. The City sent "request for consultation" letters to **eight** Native American tribes: Cahuilla Band of Indians, Gabrieleno Band of Mission Indians – Kizh Nation, Gabrieleno Tongva San Gabriel Band of Mission Indians, Gagbrielino Tongva Indians of California Tribal Council, Gabrielino Tongva Nation, and Gabrielino-Tongva Tribe) on **September 5**, 2025**,** initiating Assembly Bill (AB) 52 consultation. Pursuant to AB 52 the Native American tribes have 30 days to request a consultation to discuss any potential significant resources that may exist on the subject property. Staff did not receive any responses to the "request for consultation" letters sent to the tribes. Therefore no impacts are expected concerning Tribal Cultural Resources with this project.

19. UTILITIES AND SERVICE SYSTEMS

	Potentially Significant Impact	*Less Than Significant Impact 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, storm water drainage, electric power, natural gas, or telecommunication facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐

Less Than Significant Impact. Implementation of the Project would not require the relocation or construction of new or expanded, water, wastewater treatment or storm water drainage, beyond local connections and upgrades at the Project site to serve the irrigation improvements. It does not necessitate the need for new or expanded, natural gas, or telecommunications facilities. Thus, post construction demand would be similar to existing conditions.

As detailed in the Project Description above, the Project would replace existing vegetation with drought tolerant landscaping, which would reduce the demand upon water for irrigation.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☐	☒

No Impact. The demand for water is managed through the implementation of policies and procedures as outlined in programmatic documents such as UWMPs. UWMPs determine water usage based on land uses designated in General Plans and other planning documents. Water service in the City is provided by the California Water Service Company (Cal Water), which supplies domestic water to multiple jurisdictions in the state via several water service districts. Redondo Beach falls within the Rancho Dominguez/ Hermosa-Redondo District. Water demand has been accounted for in the UWMP (Cal Water 2020).

The Project would not alter the site's land uses. Rather, the Project consists of rehabilitation of amenities and infrastructure including the replacement of older and obsolete facilities. As discussed above, new infrastructure and fixtures would be Title 24 compliant; which provides an opportunity to improve water conservation as older less efficient fixtures are replaced. Landscape improvements include the installation of drought tolerant landscaping, thereby reducing the demand upon irrigation. Further, the Project would not increase park/beach visitation.

Given that no new land uses are being introduced, the number of visitors would not increase, and the Project includes the installation of water conservation design features and drought tolerant landscaping the water demand post Project would be similar to the existing condition. No impact would occur.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's	☐	☐	☐	☒

projected demand in addition to the provider's existing commitments?

No Impact. The Project does not introduce any new land uses and is intended to serve existing users. Therefore, the generation of wastewater would be similar to existing. No impact would occur.

d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐

Less Than Significant Impact. During construction, there would be the generation of waste from the demolition of the existing structures and other related waste from materials and workers. LACoMC Sections 4.408 and 5.408 identify that in accordance with the California Green Building Standards Code, 65 percent of construction and demolition debris is to be diverted. The Project would require a Waste Management Plan (WMP) to be submitted for approval by the City's Public Works Department prior to the issuance of a demolition permit and/or grading permits. The City requires this as part of its Construction And Demolition Recycling Program (City 2024f). As required, the plan shall outline the methods that would be employed to achieve a diversion rate of 65 percent or greater. Since the Project is not intended to increase trail or beach usage, no operational solid waste increases are anticipated. Less than significant impact would occur.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

No Impact. The Project would comply as required with the City's solid waste reduction programs, which are designed to comply with federal, state, and local statutes and regulations related to solid waste. These statutes and regulations include the California Integrated Solid Waste Management Act, the California Beverage Container Recycling and Litter Reduction Act, and the City's solid waste disposal policies and practices. The Integrated Solid Waste Management Act requires that jurisdictions maintain a 50 percent or better diversion rate for solid waste, including construction and demolition waste. No impact would occur.

20. WILDFIRE

	Potentially Significant Impact	*Less Than Significant Impact 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?	☐	☐	☒	☐

Less than Significant Impact. According to the County of Los Angeles public GIS-Net database, and CAL FIRE's Fire Hazard Severity Zone (FHSZ) Viewer, the Project site is not located in a high fire hazard area (County 2024a, CAL FIRE 2024). Please see response to 9. f) above.

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?	☐	☐	☐	☒

No Impact. According to the County public GIS-Net database, and CAL FIRE's FHSZ Viewer, the Project site is not located in a very high fire hazard area (County 2024a, CAL FIRE 2024). Moreover, the Project would not introduce any new land uses to the Project site and only includes rehabilitation and replacement of existing infrastructure. It would not expose occupants to wildfire pollutants. No impacts would occur.

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?	☐	☐	☐	☒

No Impact. According to the County public GIS-Net database, and CAL FIRE's FHSZ Viewer, the Project site is not located in a very high fire hazard area (County 2024a, CAL FIRE 2024). The Project involves no change of land use and does not include installation or maintenance of infrastructure that would exacerbate fire risk or result in temporary or ongoing impacts to the environment. Utility infrastructure would be improved, and improvements are required to comply with the Fire Code, which stipulates the standards for fire hydrants, water pressure, etc. No impact would occur.

d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☐	☒

No Impact. According to the County public GIS-Net database, and CAL FIRE's FHSZ Viewer, the Project site is not located in a very high fire hazard area (County 2024a, CAL FIRE 2024). Further, the site does not currently and will not in the future include landscape features that exacerbate fire risks or make the site or adjacent areas more susceptible to wildfire. The Project would include drainage changes, but these would not increase the site's susceptibility to wildfire-related erosion, landslides, and runoff that put people or structures at risk. The Project would occur within an existing urban area, would be constructed following municipal fire

code standards, and not only contains extremely limited quantities of flammable material but is located adjacent to the Pacific Ocean. Therefore, the Project would have no impacts with respect to exposing people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of wildfire, specifically from post-fire runoff, post-fire slope instability, or drainage changes. No impact would occur.

e) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

No Impact. According to the County public GIS-Net database, and CAL FIRE's FHSZ Viewer, the Project site is not located in a high fire hazard area (County 2024a, CAL FIRE 2024). It would provide improvements to existing pedestrian infrastructure and landscaping. The Project does not propose the construction of habitable structures. Therefore, it would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires. No impact would occur.

21. MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	*Less Than Significant Impact with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
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?	☐	☒	☐	☐

Less Than Significant Impact with Mitigation Incorporated. The Project site is currently developed as a recreational open space within an urban area and contains limited habitat for listed, protected, sensitive habitat or special status species, which would be avoided with incorporation of proposed mitigation measures BIO 1-3. The Project would not affect any known archaeological, tribal cultural, or paleontological resources. With required compliance with the County's policies and regulatory codes for discovery of archaeological resources, as detailed in Mitigation Measures CR-1 and CR-2, the Project would not eliminate important examples of the major periods of California history or prehistory. A less than significant impact with mitigation incorporated would occur.

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)?	☐	☐	☒	☐

Less Than Significant Impact. State CEQA Guidelines Section 15130 requires a discussion of the cumulative impacts of a project when the project's incremental effect is "cumulatively considerable," meaning that the project's incremental effects are considerable when viewed in connection with the effects of past, current, and probable future projects. According to the City of Redondo Beach Community Development Department (Redondo Beach 2024c), and the Los Angeles County Department of Beaches and Harbors there were no recent past, current, or probably future projects identified within one-half mile of the Project site. Although none were identified, potential cumulative projects that could be constructed in the vicinity of the Project would be required to comply with existing applicable federal, state, and local regulations, thus potentially minimizing impacts to a degree.

As discussed in response to 2. B), the Project would not create additional long-term emissions of criterial pollutants and precursors, since the Project would not add vehicle trips, increase park patronage, or change/ intensify land uses. Therefore, the Project's operational activities would not result in a cumulatively considerable increase of criterial pollutants that would violate any air quality standard or contribute substantially to an existing or projected air quality violation. Similarly, the Project would have a less than significant impact in relation to GHG, which is inherently discussed in terms of cumulative impacts.

The Project would have no cumulatively considerable impacts.

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

Less Than Significant Impact with Mitigation Incorporated. The Project would not consist of any uses or activities that would negatively affect any persons in the vicinity. All resource topics have been analyzed in accordance with CEQA and found to pose no impact, less than significant impact, or less-than-significant impact with mitigation incorporated. A less than significant impact with mitigation incorporated would occur.

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Appendix A
Design Plans

PREPARED FOR:

COUNTY OF LOS ANGELES
DEPARTMENT OF BEACHES AND HARBORS
13837 FIJI WAY
MARINA DEL REY, CA 92292

PREPARED BY:

TETRA TECH, INC.
ENGINEERS, PLANNERS, & ARCHITECTS
17885 VON KARMAN AVE #500,
IRVINE, CA 92614
(949) 809-5000

PROJECT DIRECTORY 1

VICINITY MAP 5

DWG REF.	SHT #	TITLE
T-1	1	TITLE SHEET
G-1	2	GENERAL NOTES (1 OF 2)
G-2	3	GENERAL NOTES (2 OF 2)
G-3	4	PERMIT PLACEHOLDER
D-1	5	DEMOLITION PLAN
V-1	6	SURVEY CONTROL PLAN
C-1	7	SITE PLAN
C-2	8	ADA PATH OF TRAVEL PLAN
C-3	9	TEMPORARY BIKE AND PEDESTRIAN ROUTING PLAN
C-4	10	GRADING PLAN
C-5	11	PLATE PILE LAYOUT
C-6	12	ACCESS RAMP CMU RETAINING WALL PLAN
C-7	13	STAIRCASE CIP RETAINING WALL PLAN
C-8	14	GUARDRAIL AND HANDRAIL PLAN
C-9	15	SITE PLAN ENLARGEMENTS (1 OF 2)
C-10	16	SITE PLAN ENLARGEMENTS (2 OF 2)
C-11	17	DETAILS
C-12	18	DETAILS 2
C-13	19	DETAILS 3
C-14	20	ACCESS PATH RETAINING WALL PROFILES
C-15	21	STAIRCASE RETAINING WALL PROFILES
C-16	22	EROSION AND SEDIMENT CONTROL PLAN
L-1	23	PLANTING SPECIFICATIONS (1 OF 2)
L-2	24	PLANTING SPECIFICATIONS (2 OF 2)
L-3	25	LANDSCAPE PLAN
L-4	26	PLANT LEGEND & DETAILS
I-1	27	IRRIGATION SPECIFICATIONS
I-2	28	IRRIGATION PLAN
I-3	29	IRRIGATION DETAILS (1 OF 2)
I-4	30	IRRIGATION DETAILS (2 OF 2)
E-1	31	ELECTRICAL NOTES
E-2	32	ELECTRICAL SITE PLAN
E-3	33	LIGHTING PHOTOMETRIC SITE PLAN
E-4	34	ELECTRICAL DETAILS
E-5	35	PANEL SCHEDULE
E-6	36	TITLE 24
E-7	37	TITLE 24

SHEET INDEX 2

APPLICABLE CODES 6

2022 EDITION OF THE CALIFORNIA BUILDING CODE

2022 EDITION OF THE CALIFORNIA FIRE CODE

2022 EDITION OF THE CALIFORNIA ELECTRICAL CODE

2022 EDITION OF THE CALIFORNIA MECHANICAL CODE

2022 EDITION OF THE CALIFORNIA PLUMBING CODE+

2025 HIGHWAY DESIGN MANUAL CHAPTER 1000 - BICYCLE TRANSPORTATION DESIGNS

SCOPE OF WORK

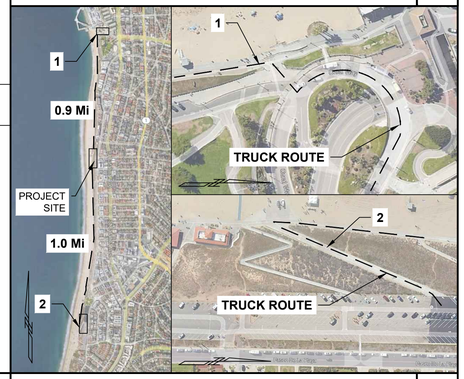
THE WORK TO BE PERFORMED INCLUDES REMOVAL OF THE EXISTING ACCESS PATH AND RETAINING WALL, CLEARING AND GRUBBING, PLACEMENT OF PLATE PILES, EXCAVATION FOR RETAINING WALL FOUNDATIONS, GRADING, INSTALLATION OF RETAINING WALL FOUNDATIONS, CMU WALLS, DRAINAGE SWALES AND MISC. DRAINAGE IMPROVEMENTS, 6' WIDE CONCRETE ACCESS PATH, GUARDRAILS, STAIRCASES, HANDRAILS, PEDESTRIAN LIGHTING, IRRIGATION, DRINKING FOUNTAIN, AND LANDSCAPING.

PROJECT DESCRIPTION 3

SECTION — SECTION NO. A, SHT. TAKEN FROM S1

DETAIL — DETAIL NO. 15, SHT. TAKEN FROM S1

REFERENCE LEGEND 4



CONTRACTOR DELIVERY ROUTES 7

SITE MAP/STAGING AREA

SCALE: N.T.S. 8

DEMOLITION NOTES

1. REMOVE EX. CMU BLOCK WALL AND FOUNDATION
2. REMOVE EX. PCC ACCESS PATH
3. REMOVE EX. PCC CURB
5. REMOVE EX. CHAINLINK FENCE
6. REMOVE EX. IRRIGATION
7. CLEAR AND GRUB EX. BLUFF
8. PROTECT-IN-PLACE
9. RELOCATE EX. TRASH CANS
10. CONSTRUCT TEMPORARY CONTRACTOR STAGING AREA
11. COORDINATE REMOVAL AND RELOCATION OF EX. BENCHES AND TRASH BIN W/ THE CITY OF REDONDO BEACH

CONSTRUCTION NOTES

1. INSTALL 6' WIDE CONC. ADA ACCESS PATH, CMU WALL, AND SWALE PER C-11, DTL. 1
2. INSTALL 6' WIDE CONC. STAIR PER C-12, DTL. 1
3. INSTALL PATH LIGHTING PER ELECTRICAL SHEETS.
4. INSTALL BIKE RACK PER C-11, DTL. 5
5. INSTALL IRR. CONTROLLER, SEE IRRIGATION PLANS
6. INSTALL PLATE PILES PER C-11, DTL. 6
7. INSTALL 6" PVC PIPE PER PLAN AND C-12, DTL. 5
8. INSTALL 1' PCC SWALE PER PLAN AND C-11, DTL. 4
9. INSTALL PEDESTRIAN CROSSING STRIPING PER C-1, DTL. 3
10. INSTALL CMU WALL PER PLAN AND C-14
11. INSTALL CIP STAIRCASE WALL PER PLAN AND C-15
12. INSTALL GUARDRAIL PER PLAN AND C-11
13. INSTALL HANDRAIL PER PLAN AND C-11
14. INSTALL STAINLESS STEEL HAWS MODEL 3612F FILTERED BOTTLE FILLER & DUAL FOUNTAIN WITH HAWS 3670 STAINLESS STEEL DOG BOWL
15. INSTALL LANDSCAPING PER LANDSCAPE PLANS
16. INSTALL ELECTRICAL PER ELECTRICAL PLANS
17. INSTALL IRRIGATION PER IRRIGATION PLANS

DATA SUMMARY

1 EX RAMP TO BE REMOVED: 4'x270'

2 PAVED AREA BEFORE: 1143 SF
PAVED AREA POST-CONSTRUCTION: 8036 SF

3 NET FILL: 730 CY

4 MAX CUT: 4'
MAX FILL: 5.25'

5 TOTAL RETAINING WALL LENGTH: 886 LF

ABBREVIATIONS

ADA	AMERICAN'S WITH DISABILITIES ACT
ADJ.	ADJACENT (LAYOUT, MEASUREMENT)
ALIGN	ALIGN
AVE	AVENUE
BFP	BACKFLOW PREVENTER
BS	BOTTOM OF STEP/BOTTOM SURFACE
BW	BOTTOM WALL
CB	CATCH BASIN
CIP OR C.I.P	CAST IN PLACE (CONCRETE APPLICATIONS)
CIVIL	CIVIL ENGINEER
CL	CENTERLINE (LAYOUT, MEASUREMENT)
CMU	CONCRETE MASONRY UNIT
CONC.	CONCRETE
DEPT	DEPARTMENT
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DTL	DETAIL
EJ	EXPANSION JOINT
EQ	EQUAL (LAYOUT, MEASUREMENT)
EX	EXISTING
FG OR F.G.	FINISHED GRADE(TOP SOIL GRADIENT)
FS OR F.S.	FINISHED SURFACE (HARD SURFACES)
GB	GRADE BREAK
HP	HIGH POINT (GRADIENT)
IE	INVERT ELEVATION
IRR	IRRIGATION
LA OR L.A.	LANDSCAPE ARCHITECT
LOW OR L.O.W.	LIMIT OF WORK
LP	LOW POINT (GRADIENT)
MAX.	MAXIMUM
MIN.	MINIMUM
(N)	NEW
NTS OR N.T.S.	NOT TO SCALE
OC OR O.C.	ON CENTER (LAYOUT MEASUREMENT)
OD OR O.D.	OUTSIDE DIAMETER (LAYOUT, MEASUREMENT)
PA OR P.A.	PLANTING AREA
PCC	PORTLAND CEMENT CONCRETE
PERF.	PERFORATED
PIP	PROTECT-IN-PLACE
POB OR P.O.B.	POINT OF BEGINNING (LAYOUT, MEASUREMENT)
POC	POINT OF CONNECTION
PL	PROPERTY LINE
R	RADIUS (LAYOUT, MEASUREMENT)
REF	REFERENCE OR REFER TO
REIN.	REINFORCEMENT
S.E.	STRUCTURAL ENGINEER
SHT	SHEET
SPECS	CONTRACT SPECIFICATIONS
S/S	STAINLESS STEEL
SS	SANITARY SEWER
TBD	TO BE DETERMINED
TC	TOP OF CURB (GRADIENT ELEVATION)
TG	TOP OF GRATE (GRADIENT ELEVATION)
T.O.P.	TOP OF PILE
TS	TOP OF SURFACE
TSS	TOP OF STRUCTURAL SLAB
TW	TOP OF WALL
TYP	TYPICAL

COUNTY OF LOS ANGELES DEPARTMENT OF BEACHES AND HARBORS - PLANNING DIVISION

13837 FIJI WAY, MARINA DEL REY, CA 90292

APPROVALS

PROJECT MANAGEMENT BUREAU MGR. — DATE

CITY ENGINEER — DATE

No.	DATE	REVISIONS SHEET	APPROVAL

AS-BUILT: REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER
CP NO. 87888
SPEC NO. 7844

REGISTERED PROFESSIONAL ENGINEER — RAFAEL J. HOLCOMBE — No. C 76148 — Exp. 09-30-25 — CIVIL — STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH AVE. A TO AVE. B ALONG ESPLANADE REDONDO BEACH, CALIFORNIA 90277

TITLE SHEET

GRAPHIC SCALE

PAGE

FIELD BOOK

DRAWING REF. T-1

SHEET 01 OF 37

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GENERAL REQUIREMENTS

1. SITE DEVELOPMENT, INCLUDING LANDSCAPING, SHALL CONFORM TO THE APPROVED PLANS ON FILE IN THE DEPARTMENT OF PLANNING AND BUILDING. AT LEAST ONE SET OF APPROVED PLANS CONTAINING PLANNING, BUILDING, FIRE, AND IF APPLICABLE, REDEVELOPMENT AND STAMPS SHALL BE MAINTAINED AT THE JOB SITE, AT ALL TIMES FOR REFERENCE PURPOSES DURING CONSTRUCTION AND FINAL INSPECTION.

2. ANY GRAFFITI FOUND ON SITE MUST BE REMOVED WITHIN 24 HOURS OF ITS APPEARANCE.

3. ALL STRUCTURES SHALL CONFORM TO THE LA COUNTY BUILDING CODE REQUIREMENTS. NOTWITHSTANDING THIS SUBJECT PERMIT, ALL OTHER REQUIRED PERMITS FROM THE COUNTY OF LOS ANGELES MUST BE SECURED.

4. SEPARATE BUILDING PERMITS ARE REQUIRED FOR SIGNS AND RETAINING WALLS.

5. DEMOLITION, SITE PREPARATION, AND CONSTRUCTION ACTIVITIES ARE LIMITED TO THE FOLLOWING PER REDONDO BEACH, CALIFORNIA MUNICIPAL CODE (EXCEPT FOR THE POURING OF CONCRETE WHICH MAY OCCUR AS NEEDED):
   5.1. WEEKDAYS: 7:00 A.M. TO 6:00 P.M.
   5.2. SATURDAYS: 9:00 A.M. TO 5:00 P.M.
   5.3. SUNDAYS AND HOLIDAYS: NOT ALLOWED.

6. ANY OFF-SITE IMPROVEMENTS FOUND TO BE DAMAGED SHALL BE REPLACED TO THE SATISFACTION OF THE COUNTY ENGINEER.

7. THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD HARMLESS THE COUNTY OF LOS ANGELES, ITS AGENTS, OFFICERS, AND EMPLOYEES FROM ANY CLAIM, ACTION, OR PROCEEDING AGAINST THE COUNTY OF LOS ANGELES OR ITS AGENTS, OFFICERS, OR EMPLOYEES BROUGHT TO ATTACK, SET ASIDE, VOID, OR ANNUL AN APPROVAL OF THE COUNTY OF LOS ANGELES, ITS ADVISORY AGENCIES, COMMISSIONS, OR LEGISLATIVE BODY CONCERNING THIS PROJECT. THE COUNTY OF LOS ANGELES WILL PROMPTLY NOTIFY THE APPLICANT OF ANY SUCH CLAIM, ACTION, OR PROCEEDING AGAINST THE COUNTY OF LOS ANGELES AND WILL COOPERATE FULLY IN THE DEFENSE. IF THE COUNTY OF LOS ANGELES FAILS TO PROMPTLY NOTIFY THE APPLICANT OF ANY SUCH CLAIM, ACTION OR PROCEEDING OR FAILS TO COOPERATE FULLY IN THE DEFENSE, THE APPLICANT SHALL NOT, THEREAFTER, BE RESPONSIBLE TO DEFEND, INDEMNIFY, OR HOLD HARMLESS THE COUNTY OF LOS ANGELES.

8. ALL WORK EMBRACED HEREIN SHALL BE DONE IN ACCORDANCE WITH "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" (GREENBOOK).

GENERAL NOTES FOR CONSTRUCTION

1. ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE FOLLOWING:
   1.1. LA COUNTY, DEPARTMENT OF PUBLIC WORKS STANDARD PLANS 2019 EDITION OR LATER.
   1.2. GREENBOOK STANDARD SPECIFICATIONS AND PLANS FOR PUBLIC WORKS CONSTRUCTION, LATEST EDITIONS.
   1.3. CALIFORNIA BUILDING CODE, 2022.

2. IF A CONFLICT EXISTS AMONG STANDARDS SPECIFICATIONS, THE MORE STRINGENT SHALL APPLY.

3. EXISTING UTILITIES ARE SHOWN ON THE PLANS IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY BOTH HORIZONTAL AND VERTICAL LOCATIONS PRIOR TO COMMENCEMENT OF WORK. UNDERGROUND SERVICE ALERT SHALL BE NOTIFIED THREE (3) WORKING DAYS PRIOR TO EXCAVATION AT 1-800-227-2600.

4. ALL BACKFILL MATERIALS AND COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL NOTES, APPLICABLE PUBLIC WORKS, AND GREENBOOK STANDARDS. ALL DISTURBED PAVEMENT AND GRASS AREAS WILL BE RESTORED TO THEIR PRE-CONSTRUCTION CONDITION OR BETTER. MATCH PROPOSED PAVEMENT GRADES TO EXISTING WHEREVER THEY ADJOIN.

5. ALL LANDSCAPING INSTALLED UNDER THIS CONTRACT SHALL BE MAINTAINED BY THE CONTRACTOR UNTIL FINAL ACCEPTANCE BY THE COUNTY OF LOS ANGELES. ANY DEAD OR DYING PLANT MATERIALS MUST BE REPLACED PRIOR TO ACCEPTANCE BY THE COUNTY OF LOS ANGELES.

6. THIS PROJECT IS LOCATED IN CLOSE PROXIMITY OF RESIDENTIAL BUILDINGS. THE CONTRACTOR SHALL PERFORM OPERATIONS IN A NEAT AND ORDERLY MANNER SO AS TO NOT BE DETRIMENTAL TO ADJACENT PROPERTIES AND OCCUPANTS. THIS SHALL INCLUDE THE MAINTENANCE OF ALL BUILDING EXTERIORS AND LANDSCAPING AROUND THE CONSTRUCTION ZONE, TO MINIMIZE DUST AND DEBRIS.

7. THE CONTRACTOR SHALL SECURE THE SITE DAILY. ANY GRAFFITI THAT DOES OCCUR ON THE CONSTRUCTION SITE SHALL BE REMOVED BY THE CONTRACTOR WITHIN 24 HOURS OF ITS DISCOVERY.

8. THE CONTRACTOR SHALL PROTECT ALL EXISTING IMPROVEMENTS, INCLUDING ADJACENT BUILDINGS AND STRUCTURES FROM DAMAGE AS A RESULT OF CONSTRUCTION ACTIVITIES.

9. ALL REQUIRED UTILITY EASEMENTS SHALL BE PROVIDED TO THE SATISFACTION OF THE CONCERNED DEPARTMENT OR AGENCY.

10. SIGN VERBIAGE TO BE PROVIDED BY LA COUNTY. CONTRACTOR SHALL FURNISH AND INSTALL SIGN.

11. GALVANIZE ALL REINFORCING BARS, TIE BARS, AND WELDED WIRE FABRIC.

PROJECT SPECIFIC BEST MANAGEMENT PLANS (BMP's)

1. INFILTRATION/PERCOLATION AT THE FACE OF THE BLUFF WILL TAKE PLACE.

2. VEGETATED SLOPES: WATER WILL BE FILTERED BY NEW VEGETATION ON THE BLUFF BEFORE REACHING THE V-DITCHES.

3. CONSTRUCTION BMP'S: THE CALIFORNIA STORMWATER BMP HANDBOOK FOR CONSTRUCTION SHALL BE USED FOR GUIDELINES ON BMP'S TO BE IMPLEMENTED DURING CONSTRUCTION.

EXISTING IRRIGATION NOTES

1. THE EXISTING IRRIGATION WITHIN THE PROJECT LIMITS IS DECOMMISSIONED.

2. CONTRACTOR SHALL VERIFY ALL SITE CONDITIONS, PROPERTY LINES, DIMENSIONS, ETC. PRIOR TO COMMENCING WORK. ALL EXISTING IRRIGATION SYSTEMS SHALL BE VERIFIED IN THE FIELD AT START OF CONSTRUCTIONS. ALL EXISTING MAINLINES, RCVS, BACKFLOW DEVICES, CONTROLLERS, METERS, SERVICE LINES, ETC. SHALL BE VERIFIED IN FIELD.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE REMOVAL AND DISPOSAL OF ALL EXISTING IRRIGATION EQUIPMENT AFFECTED BY THE PROPOSED IRRIGATION IMPROVEMENTS. CONTRACTOR SHALL VERIFY ALL EQUIPMENT TO BE REMOVED AND DISPOSED OF IN FIELD PRIOR TO COMMENCING WORK.

4. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR/MODIFICATION OF ALL ADJACENT IRRIGATION SYSTEM EQUIPMENT THAT IS AFFECTED BY PROPOSED IRRIGATION IMPROVEMENTS. CONTRACTOR SHALL REPAIR SAID SYSTEMS TO A LIKE NEW MANNER, PROVIDING COMPLETE 100% HEAD TO HEAD COVERAGE IN ALL AREAS WITH SYSTEM LAYOUT AS APPROVED BY LA COUNTY'S AUTHORIZED REPRESENTATIVE. CONTRACTOR SHALL CONFIRM ALL AREAS REQUIRING MODIFICATION WITH LA COUNTY'S AUTHORIZED REPRESENTATIVE PRIOR TO BIDDING WORK AND PRIOR TO COMMENCING WORK.

5. CONTRACTOR SHALL ADJUST AND CAP OFF EXISTING ADJACENT IRRIGATION SYSTEM AS REQUIRED. SYSTEM SHALL PROVIDE COMPLETE 100% HEAD TO HEAD COVERAGE IN ALL AREAS AS APPROVED BY LA COUNTY'S AUTHORIZED REPRESENTATIVE. ALL LAYOUT SHALL BE CONFIRMED WITH LA COUNTY'S AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WORK.

6. CONTRACTOR SHALL REFER TO CORRESPONDING ON-SITE WATER AND SEWER PLAN FOR UNDERLYING WATERLINES, EASEMENTS, AND OTHER RELATED EQUIPMENT. CONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS IN FIELD WITH AUTHORIZED REPRESENTATIVE AND RELATED UTILITY COMPANIES PRIOR TO COMMENCING WORK.

7. CONTRACTOR SHALL MEET WITH LA COUNTY DEPT. OF BEACHES AND HARBORS AUTHORIZED REPRESENTATIVE PRIOR TO BEGINNING DEMOLITION OR ANY OTHER WORK, AND WALK SITE TO LOCATE EXISTING CONTROLLER AND LINES AND OTHER IRRIGATION TO BE PROTECTED IN PLACE.

8. CONTRACTOR SHALL PROVIDE FOR THE IRRIGATION OF EXISTING PLANT MATERIAL THROUGHOUT THE CONSTRUCTION PROCESS. ANY DAMAGE DUE TO CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY TO PREVENT ANY LAPSE IN IRRIGATION OF THE EXISTING PLANT MATERIAL. ANY PLANT MATERIAL AND/OR IRRIGATION DAMAGED AS PART OF CONSTRUCTION SHALL BE REPAIRED TO A LIKE NEW CONDITION AS PART OF CONTRACT.

9. ANY EXISTING IRRIGATION CONTROL VALVES CONNECTED TO THE EXISTING CONTROLLER SHALL BE RECONNECTED TO THE EXISTING CONTROLLER. CONFIRM PROPER CONTROLLER OPERATION AND INSTALLATION WITH LA COUNTY DEPT. OF BEACHES AND HARBORS AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WORK AND UPON COMPLETION OF WORK.

10. CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE ADJUSTMENT/MODIFICATION OF EXISTING IRRIGATION SYSTEM WITHIN THIS AND OTHER AREAS AFFECTED BY THE PROPOSED IMPROVEMENTS. ALL LAYOUT SHALL BE CONFIRMED WITH LA COUNTY DEPT. OF BEACHES AND HARBORS AUTHORIZED REPRESENTATIVE PRIOR TO COMMENCING WORK.

11. NO DISRUPTION OF THE EXISTING IRRIGATION SYSTEMS WATERING WILL BE ALLOWED DURING CONSTRUCTION. ALL ADJACENT SYSTEMS SHALL MAINTAIN AUTOMATIC PROGRAMMED WATERING SCHEDULES THROUGHOUT CONSTRUCTION.

GENERAL GEOTECHNICAL NOTES

1. BASED ON THE RESULTS OF OUR INVESTIGATION, IT IS OUR OPINION THAT FROM A GEOTECHNICAL VIEWPOINT, IT IS FEASIBLE TO DEVELOP THE SITE AS PROPOSED. THE DENSE SANDS ENCOUNTERED AT RELATIVELY SHALLOW DEPTHS THROUGHOUT THE SITE PRESENT RELATIVELY FAVORABLE FOUNDATION SUPPORT CONDITIONS FOR THE PROPOSED IMPROVEMENTS.

2. THE CONSTRUCTION AREA SHOULD BE CLEARED OF ANY PAVEMENT, FLATWORK, RETAINING WALLS, STRUCTURES, VEGETATION, TRASH AND DEBRIS, PRIOR TO COMMENCEMENT OF THE EARTHWORK. ANY SUBTERRANEAN INSTALLATIONS NOT TO BE PRESERVED, SUCH AS PIPES, UTILITY COLLECTORS, TANKS, OLDER FOUNDATIONS, ETC., SHOULD BE ABANDONED AND REMOVED PER GEOTECHNICAL ENGINEER'S RECOMMENDATIONS AND IN ACCORDANCE WITH APPLICABLE REGULATIONS. ALL UNDOCUMENTED FILLS AND DISTURBED SOILS SHOULD BE REMOVED.

3. NEW RAMP AND ASSOCIATED RETAINING WALLS. FOUNDATION AREAS FOR THE RETAINING WALLS AND THE RAMP PATH SHOULD BE OVEREXCAVATED 1 FOOT BELOW THE FOUNDATION SUBGRADE, OR TO COMPETENT NATIVE SOILS, WHICHEVER IS DEEPER. WHENEVER PRACTICAL, THE EXCAVATION SHOULD EXTEND A HORIZONTAL DISTANCE OF AT LEAST 1 FOOT BEYOND THE OUTSIDE PERIMETER OF THE RAMP FOOTPRINT.

4. DISTURBED SOILS AT STRUCTURAL AND NON-STRUCTURAL AREAS WILL LIKELY OCCUR AFTER DEMOLITION OF EXISTING SITE IMPROVEMENTS, NAMELY THE EXISTING RAMP AND THE ASSOCIATED RETAINING WALL. THESE SOILS SHOULD BE OVEREXCAVATED AND RECOMPACTED TO THE TOTAL DEPTH OF THE DISTURBED MATERIAL. THE SLOPE SHOULD THEN BE REBUILT AS INDICATED IN THE REBUILDING THE SLOPE AFTER REMOVAL OF EXISTING RAMP SECTION OF THIS REPORT.

5. THE EXPOSED OVEREXCAVATION SUBGRADE SHOULD BE PROBED AND ACCEPTED BY THE GEOTECHNICAL ENGINEER. THE SOILS SHOULD BE SCARIFIED, THOROUGHLY WETTED FOR AT LEAST 24 HOURS AND RECOMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION PER ASTM D1557. THIS IS INTENDED TO MITIGATE NEAR SURFACE COLLAPSE POTENTIAL OF THE SUBGRADE SOILS.

6. LOOSE AND/OR UNSTABLE SOILS WITHIN THE CONSTRUCTION FOOTPRINT SHOULD BE OVEREXCAVATED AND RECOMPACTED. HOWEVER, IF SUCH ZONES ARE ENCOUNTERED DURING CONSTRUCTION THAT ARE NOT PRACTICAL TO BE EXCAVATED AND PROCESSED, THE GEOTECHNICAL ENGINEER SHOULD PROVIDE APPROPRIATE MITIGATION RECOMMENDATIONS.

7. ALL FILL PLACEMENT ASSOCIATED WITH THE REPLACEMENT OF OVEREXCAVATED SOILS OR TO ACHIEVE FINISH SUBGRADE SHOULD BE MOISTURE-CONDITIONED TO AT LEAST 120 PERCENT OF OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 93 PERCENT RELATIVE COMPACTION (ASTM D1557). FILL PLACED TO ACHIEVE FINISH GRADE BEHIND RETAINING WALLS OR UTILITY TRENCH BACKFILL SHOULD BE MOISTURE-CONDITIONED AT LEAST WET OF THE OPTIMUM MOISTURE CONTENT AND COMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION (ASTM D1557). THE UPPER 1 FOOT OF SOILS BELOW ANY FLATWORK SHOULD BE COMPACTED TO AT LEAST 95 PERCENT RELATIVE COMPACTION. FILL SHOULD BE PLACED IN HORIZONTAL LIFTS NOT MORE THAN 8 INCHES IN LOOSE, UNCOMPACTED THICKNESS.

8. EXCAVATED ON-SITE SOILS MAY BE RE-USED AS COMPACTED FILL, PROVIDED THEY ARE FREE OF ORGANICS, DELETERIOUS MATERIALS, DEBRIS, AND PARTICLES OVER 3 INCHES IN LARGEST DIMENSION. LOCALLY, PARTICLES UP TO 6 INCHES IN LARGEST DIMENSION MAY BE INCORPORATED IN THE FILL SOILS DURING GRADING BASED ON SPECIFIC APPROVAL AND PLACEMENT RECOMMENDATIONS PROVIDED BY THE GEOTECHNICAL ENGINEER.

9. UNSURCHARGED EXCAVATIONS COULD BE SLOPED BACK AT AN INCLINATION OF 1.5(H):1(V) OR FLATTER. HOWEVER, BECAUSE OF THE NEED TO EXCAVATE INTO THE EXISTING 2(H):1(V) AND STEEPER SLOPES, SLOPED EXCAVATION IS NOT EXPECTED TO BE PRACTICAL AND SHORING OR SLOPE REINFORCEMENT WILL BE NECESSARY AS RECOMMENDED BELOW.

10. STOCKPILED MATERIALS SHOULD BE PLACED NO CLOSER THAN 5 FEET FROM THE EDGE OF THE SLOPED EXCAVATION. NO SPOILS SHOULD BE PLACED ON THE UPSLOPE SIDE OF ANY EXCAVATION. A GREATER SETBACK MAY BE NECESSARY WHEN CONSIDERING SURCHARGE LOADS FROM EQUIPMENT SUCH AS HEAVY VEHICLES, CONCRETE TRUCKS AND CRANES. TETRA TECH SHOULD BE ADVISED OF SUCH HEAVY LOADINGS SO THAT SPECIFIC SETBACK REQUIREMENTS CAN BE ESTABLISHED. ALTERNATIVELY, A SHORING SYSTEM MAY BE DESIGNED TO ALLOW REDUCTION IN THE SETBACK DISTANCE.

11. IN ORDER TO MINIMIZE THE EXTENT OF EXCAVATION FOR THE FOUNDATION SUBGRADE FOR THE RETAINING WALL AND THE RAMP, THE EXISTING SLOPE ABOVE THE PROPOSED EXCAVATION MAY BE STABILIZED BY PUSH PLATE PILE SYSTEM. THIS PROPRIETARY SYSTEM IS DESIGN-BUILD BY THE SPECIALTY CONTRACTOR.

12. CONTRACTOR TO REVIEW "GEOTECHNICAL DESIGN REPORT AVENUE A AND ESPLANADE" REDONDO BEACH, CA DATED MAY 30, 2023. GEOTECHNICAL DESIGN AND CONSTRUCTION RECOMMENDATIONS APPLY.

SPECIAL CONDITIONS

1. CONTRACTOR MUST SUBMIT TO LA COUNTY'S BUILDING DEPARTMENT AND WATER DEPARTMENT SEPARATE APPLICATIONS AND MUST OBTAIN SEPARATE PERMITS FOR SIGNS, FENCES, AND RETAINING WALLS. HEALTH AND WATER DEPARTMENT APPROVALS ARE REQUIRED FOR BACKFLOW PREVENTER AND DRINKING FOUNTAIN.

2. LA COUNTY TO PAY FOR ALL PERMITS. CONTRACTOR TO PULL ALL PERMITS AND OBTAIN APPROVALS FOR INSTALLATION/CONSTRUCTION.

3. SITE SECURITY - TO INCLUDE 6' CHAIN LINK FENCE AROUND ALL WORK AREAS. NO TRESPASSING AND APPLICABLE CODE REFERENCES TO BE POSTED ON ALL FENCE ENCLOSURES.

4. CONTRACTOR SHALL SUPPLY AND IMPLEMENT ALL BMP REQUIREMENTS DURING ENTIRE CONSTRUCTION DURATION.

5. CONTRACTOR SHALL SCHEDULE AND COORDINATE CONSTRUCTION AND DEMOLITION/REMOVAL WITH THE COUNTY AND CITY.

STRUCTURAL OBSERVATION

DURING CONSTRUCTION, INTERMITTENT STRUCTURAL OBSERVATIONS SHALL BE PERFORMED BUY A LICENSED CIVIL/STRUCTURAL ENGINEER AT VARIOUS STAGES DURING CONSTRUCTION, AS FOLLOWS:
1. DURING PLATE PILE DRIVING.

SPECIAL DEPUTY INSPECTIONS

THE FOLLOWING ITEMS WILL REQUIRE "SPECIAL INSPECTION" PRIOR TO FINAL INSTALLATION AND ACCEPTANCE OF WORK:

1. GRADING / COMPACTION
2. PLATE PILE INSTALLATION
3. RETAINING WALL FOOTING EXCAVATION AND COMPACTION
4. CONCRETE
5. REINFORCING STEEL

CONTRACTOR SHALL NOTIFY THE COUNTY PRIOR TO START OF INSTALLATION OF THESE ITEMS TO PERMIT EXECUTION OF THE REQUIRED "SPECIAL INSPECTIONS".

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REDONDO BEACH, CALIFORNIA 90277
GENERAL NOTES (1 OF 2)

GRAPHIC SCALE: 40' 20' 0 20' 40' 1" = 20'

PAGE

FIELD BOOK

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SHEET 02 OF 37

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LAST SAVED BY: ryan.cheyne
PLOT DATE: Jul. 16, 25 SAVED PATH: P:\Watr\T414476.07 Ave A Access Path\06 PLANS\02 Sheet Files

STRUCTURAL OBSERVATIONS

DURING CONSTRUCTION, INTERMITTENT STRUCTURAL OBSERVATIONS SHALL BE PERFORMED BY A LICENSED CIVIL/STRUCTURAL ENGINEER AT VARIOUS STAGES DURING CONSTRUCTION, AS FOLLOWS:

PLATE PILE INSTALLATION
CONSTRUCTION OF RETAINING WALLS.

DESIGN CRITERIA

THE FOLLOWING DESIGN PARAMETERS HAVE BEEN USED IN THE DESIGN OF THE STRUCTURAL, AND WHERE APPLICABLE, NON-STRUCTURAL SYSTEMS REPRESENTED IN THESE DRAWINGS.

A. CODE OF RECORD: 2022 CBC, AND AUTHORITY HAVING JURISDICTION: LA COUNTY BUILDING AND SAFETY
B. BUILDING RISK CATEGORY: II
C. WIND DESIGN PARAMETERS:
   - BASIC WIND SPEED (V) MPH (3 SEC. GUST): 110 MPH
   - EXPOSURE CATEGORY: C
D. SEISMIC DESIGN PARAMETERS:
   - SEISMIC SITE CLASS: D
   - SEISMIC IMPORTANCE FACTOR: 1.0
   - SEISMIC DESIGN CATEGORY: II

REFER TO "GEOTECHNICAL DESIGN REPORT - AVENUE A ADA RAMP", DATED MAY 30, 2023.

ASTM DESIGNATIONS, ICC REPORT REFERENCES, AND ALL STANDARDS AND REFERENCED DOCUMENTS SHALL REFER TO THE LATEST EDITIONS AND/OR AMENDMENTS AS ADOPTED BY THE CODE OF RECORD.

REINFORCING STEEL

1. ALL ARRANGEMENT AND DETAILING OF REINFORCING STEEL, INCLUDING BAR SUPPORTS AND SPACERS, SHALL BE IN ACCORDANCE WITH THE LATEST ACI 318 DETAILING MANUAL.

ACCESSIBILITY

1. AN ACCESSIBLE ROUTE OF TRAVEL COMPLYING WITH SECTION 1114B.1.2 SHALL BE PROVIDED. SHOW ACCESSIBLE ROUTE OF TRAVEL BY USE IF AN ARROW FROM PUBLIC WAY/ACCESSIBLE PARKING STALLS TO ADA WALKWAY.
2. IN EXISTING BUILDINGS AND FACILITIES, THE PATH OF TRAVEL (RAMPS, STAIRS, GATES, DOORS, ETC.), PRIMARY ENTRANCE, SANITARY FACILITIES, DRINKING FOUNTAINS, SIGNS, PUBLIC TELEPHONES, AND PARKING SERVING THE AREA OF ALTERATION, STRUCTURAL REPAIRS OR ADDITIONS, MUST COMPLY WITH CURRENT TITLE 24 DISABLED ACCESSIBILITY REQUIREMENTS OF DIVISION I, FOR NEW BUILDINGS . (CBC 1134B.2)
3. THE CROSS SLOPE OF RAMP SURFACES SHALL BE NO GREATER THAN ONE UNIT VERTICAL IN 50 UNITS HORIZONTAL (2 PERCENT SLOPE). (1133B.5.3.1)
4. TOP LANDINGS SHALL BE NOT LESS THAN 60 INCHES WIDE AND SHALL HAVE A LENGTH OF NOT LESS THAN 60 INCHES IN THE DIRECTION OF RAMP RUN.
5. ALL RAMP LANDINGS SHALL BE LEVEL WITH MAXIMUM SLOPE IN ANY DIRECTION NOT TO EXCEED ONE UNIT VERTICAL IN 50 UNITS HORIZONTAL (2 PERCENT SLOPE). (1133B.5.4.1, 1102B)
6. HANDRAILS SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND THE TOP AND BOTTOM OF THE RAMP, AND SHALL PARALLEL THE FLOOR OR GROUND SURFACE. (1133B.5.5.1, FIG 11B-27(B) & (C)) LOCATE ON PLANS.
7. STAIR TREADS SHALL BE NO LESS THAN 11 INCHES DEEP, MEASURED FROM RISER TO RISER. (CBC 1133B.4.5)
8. STAIR RISER HEIGHTS SHALL BE 7 INCHES MAXIMUM AND 4 INCHES MINIMUM. RISERS SHALL BE SOLID. (CBC 1133B.4.5)
9. EXTERIOR STAIRS SHALL HAVE THE UPPER APPROACH AND ALL TREADS MARKED BY A STRIPE PROVIDING CLEAR VISUAL CONTRAST. SEE FIGURE 11B-35. THE STRIPE SHALL BE A MINIMUM OF 2 INCHES WIDE TO A MAXIMUM OF 4 INCHES WIDE PLACED PARALLEL TO AND NOT MORE THAN 1 INCH FROM THE NOSE OF THE STEP OR UPPER APPROACH AND SHALL EXTEND THE FULL WIDTH OF THE STEP. (CBC 1133B.4.4)
10. ALL TREAD SURFACES SHALL BE SLIP-RESISTANT. WEATHER EXPOSED STAIRS AND THEIR APPROACHES SHALL BE DESIGNED SO THAT WATER WILL NOT ACCUMULATE ON THE WALKING SURFACES. TREADS SHALL HAVE SMOOTH, ROUNDED, OR BEVELED EXPOSED EDGES. (1133B.4.5.1, FIG 11B-35)
11. RISERS SHALL BE SOLID AND SHALL BE VERTICAL OR SLOPED FROM THE UNDERSIDE OF THE LEADING EDGE OF THE TREAD ABOVE AT AN ANGLE NOT MORE THAN 30 DEGREES FROM THE VERTICAL.
12. THE RADIUS OF CURVATURE AT THE LEADING EDGE (NOSING) OF THE TREAD SHALL BE NO GREATER THAN ½ INCH BEVELING OF NOSINGS SHALL NOT EXCEED ½ INCH. NOSINGS SHALL NOT PROJECT MORE THAN 1 ¼ INCHES PAST THE FACE OF THE RISER BELOW. NOSINGS THAT PROJECT BEYOND RISERS SHALL HAVE THE UNDERSIDE OF THE LEADING EDGE BEVELED AT AN ANGLE NOT MORE THAN 30 DEGREES FROM THE VERTICAL. THE TRANSITION FROM THE NOSING TO THE RISER SHALL BE FREE OF ABRUPT EDGES. ALL PROJECTIONS SHALL BE OF UNIFORM SIZE, INCLUDING NOSINGS AT LANDINGS. (1133B.4.5.3, FIG 11B-35(C))
13. STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAILS SHALL BE CONTINUOUS ALONG BOTH SIDES OF THE STAIRWAY. INTERMEDIATE HANDRAILS SHALL BE PROVIDED AS REQUIRED IN SECTION 1012.8. (1133B.4.1.1)
14. THE TOP OF HANDRAIL GRIPPING SURFACE SHELL BE MOUNTED 34 TO 38 INCHES ABOVE THE NOSING OF THE (1133B.4.2.1, FIG 11B-35)
15. HANDRAILS SHALL EXTEND A MINIMUM OF 12 INCHES BEYOND THE TOP NOSING AND 12 INCHES PLUS THE TREAD WIDTH BEYOND THE BOTTOM NOSING AND ENDS SHALL BE RETURNED OR TERMINATE IN NEWEL POSTS OR SAFETY TERMINALS.(1133B.4.2.2, 1133B4.2.3, FIG 11B-35 & 37)
16. THE HANDGRIP 'PORTION OF HANDRAILS SHALL BE NOT LESS THAN 1 ¼ INCHES OR MORE THAN 1 ½ INCHES INCROSS-SECTIONAL NOMINAL DIMENSION OR THE SHAPE SHALL PROVIDE AN EQUIVALENT GRIPPING SURFACE. THE HANDGRIP PORTION OF HANDRAILS SHALL HAVE A SMOOTH SURFACE WITH NO SHARP CORNERS. GRIPPING SURFACES (TOP OR SIDES) SHALL BE UNINTERRUPTED BY NEWEL POSTS, OTHER CONSTRUCTION ELEMENTS, OR OBSTRUCTIONS. ANY WALL OR OTHER SURFACE ADJACENT TO THE HANDRAIL SHALL BE FREE OF SHARP OR ABRASIVE ELEMENTS. EDGES SHALL HAVE A MINIMUM RADIUS OF 1/8 INCH. (1133B.4.2.6, FIG 11B-36)
17. THE ORIENTATION OF AT LEAST ONE HANDRAIL SHALL BE IN THE DIRECTION OF THE RUN OF THE STAIR AND PERPENDICULAR TO THE DIRECTION OF THE STAIR NOSING, AND SHALL NOT REDUCE THE MINIMUM REQUIRED WIDTH OF STAIRS. (1133B.4.2.4)
18. INTERSECTING RAILINGS AND SPACE BETWEEN RAILINGS AND WALLS SHALL NOT EXCEED 4".

REINFORCING CONCRETE

1. ALL REINFORCING STEEL (REBAR) SHALL BE DEFORMED EPOXY COATED REINFORCING BAR AND SHALL CONFORM TO ASTM A775, GRADE 60 (#3 REBAR OR LARGER), ASTM A884, GRADE 65 WELDED WIRE FABRIC SHEETS.
2. DETAIL ALL REINFORCING BARS IN ACCORDANCE WITH ACI 318.
3. PROVIDE 3 INCHES OF CONCRETE COVERAGE U.O.N.
4. ALL EXPOSED CORNERS SHALL HAVE A $\frac{3}{4}$" CHAMFER U.O.N.
5. ALL C.I.P. CONCRETE WALLS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 PSI AT 28 DAYS.
6. ALL ARRANGEMENT AND DETAILING OF REINFORCING STEEL, INCLUDING BAR SUPPORTS AND SPACERS, SHALL BE IN ACCORDANCE WITH THE LATEST ACI 318 DETAILING MANUAL.
7. SEE TECHNICAL SPECIFICATION SECTION 03 33 00 CAST-IN-PLACE CONCRETE FOR REINFORCEMENT REQUIREMENTS.

EXISTING CONSTRUCTION

THE EXISTING CONSTRUCTION INDICATED TO REMAIN SHALL BE PROTECTED FROM DAMAGE AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR SHALL EXERCISE CAUTION DURING PLATE PILE DRIVING TO PREVENT MOVEMENT OF ADJACENT MATERIAL.

SURVEY

LAND SURVEYING MONUMENTS SHOWN ON THE PLAN SET AND/OR FOUND WITHIN THE LIMITS OF DEMOLITION/CONSTRUCTION MUST BE LOCATED, DESCRIBED AND A RECORD FILED WITH THE COUNTY SURVEYOR. A COPY OF DOCUMENTS SUBMITTED WILL BE PROVIDED TO THE CITY OF LONG BEACH, ATTENTION TO THE CITY SURVEYOR. UPON COMPLETION OF CONSTRUCTION, EACH MONUMENT SHOWN AND/OR FOUND MUST BE REPLACED IN KIND OR WITH SUITABLE, TAGGED, DURABLE MONUMENT (CA. BUS. & PROF. CODE SEC. 8771 & 8772).

WHERE POSSIBLE, THE SURVEY MONUMENTS AND BENCHMARKS DESCRIBED HEREIN WILL BE PROTECTED IN PLACE. PRIOR TO REMOVAL, ALL MONUMENTS AND BENCHMARKS WHICH WILL BE DISTURBED, CONSTRUCTED OR MODIFIED, SHALL BE LOCATED AND REFERENCED, BY OR UNDER THE DIRECTION OF A PERSON AUTHORIZED TO PRACTICE LAND SURVEYING IN THE STATE OF CALIFORNIA, WITH A CORNER RECORD (A VERTICAL CORNER RECORD FOR BENCHMARKS) OR RECORD OF SURVEY, TO BE FILED WITH THE COUNTY SURVEYOR. A COPY OF THE RECORD TO BE SUBMITTED TO THE COUNTY SURVEYOR MUST BE PROVIDED TO THE LONG BEACH CITY SURVEYOR, FOR REVIEW AND FILING.

UPON COMPLETION OF THE IMPROVEMENTS, THE MONUMENTS WHICH WERE DESTROYED, DAMAGED, COVERED, MODIFIED OR OTHERWISE OBLITERATED, SHALL BE REPLACED AND A CORNER RECORD OR RECORD OF SURVEY SHALL BE FILED WITH THE COUNTY SURVEYOR AND A COPY PROVIDED TO THE LONG BEACH CITY SURVEYOR FOR REVIEW AND INDEXING.

DEMOLITION

1. TAKE ALL NECESSARY PRECAUTIONS TO CONTAIN THE DEMOLITION WITHIN LIMITS OF THE WORK AND PREVENT DAMAGE TO THE EXISTING STRUCTURES. SUPPLY AND INSTALL FLOATING DEBRIS BOOMS IN PLACE AND OTHER APPROVED CONTAINMENT STRUCTURES PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION WORK. REMOVE MATERIALS THAT FALL INTO THE WATER IN AN ON-GOING BASIS.
2. ANY DAMAGE INCURRED IN THE EXECUTION OF THIS CONTRACT TO ANY PART OF THE PROPERTY, STRUCTURES, OR UTILITIES NOT SPECIFICALLY DESIGNATED FOR DEMOLITION SHALL BE REPAIRED, REPLACED, AND/OR RECONSTRUCTED BY THE CONTRACTOR, AT ITS OWN EXPENSE, TO THE PRE-DISTURBED CONDITIONS OR BETTER.
3. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR FIELD VERIFICATION AND DETERMINATIONS OF STRUCTURAL CAPACITY OF THE EXISTING STRUCTURES FOR THE ANTICIPATED LOADS OF THE CONSTRUCTION EQUIPMENT AND OPERATIONS TO BE USED. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY SIGNIFICANT DISCREPANCIES FROM CONDITIONS SHOWN ON THE DRAWINGS.
4. COMPLETELY REMOVE AND DISPOSE OF ALL DEMOLISHED MATERIAL EXCEPT AS NOTED FOR RE-USE OR TO BE TURNED OVER TO THE CITY. REMOVAL, HANDLING AND DISPOSAL OF ALL DEMOLITION MATERIALS SHALL BE IN ACCORDANCE WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS AND PERMIT REQUIREMENTS.
5. CONTRACTOR SHALL REFER TO PLANS FOR ADDITIONAL INFORMATION AND SCOPE OF DEMOLITION.

GROUT

1. GROUT SHALL BE A PEA GRAVEL CONCRETE MIX WITH A MINIMUM COMPRESSIVE STRENGTH OF 2500 PSI AT 28 DAYS. WHERE GROUT IS PLACED BELOW WATER, IT SHALL USE A TREMIE METHOD AND THE CONCRETE SHALL HAVE AN ANTI-WASHOUT ADMIXTURE

GUARDRAIL

1. COORDINATE PLACEMENT OF GUARDRAIL POST BLOCKOUTS WITH GUARDRAIL FABRICATOR PRIOR TO PLACING CONCRETE.
2. SUBMIT GUARDRAIL CALCULATIONS AND SHOP DRAWINGS APPROVAL BY ENGINEER.
3. CONSTRUCT GUARDRAIL OF S.S.316.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
GENERAL NOTES (2 OF 2)

GRAPHIC SCALE
40' 20' 0 20' 1" = 20'

PAGE

FIELD BOOK

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G-2

SHEET
03 OF 37

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PLACEHOLDER FOR PERMIT REQUIREMENTS

REVISIONS				
No.	DATE	SHEET	APPROVAL	DESCRIPTION
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PERMIT PLACEHOLDER

GRAPHIC SCALE
20' 10' 0 20' 40'
1" = 20'

FIELD BOOK | PAGE

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G-3

SHEET
04 OF 37

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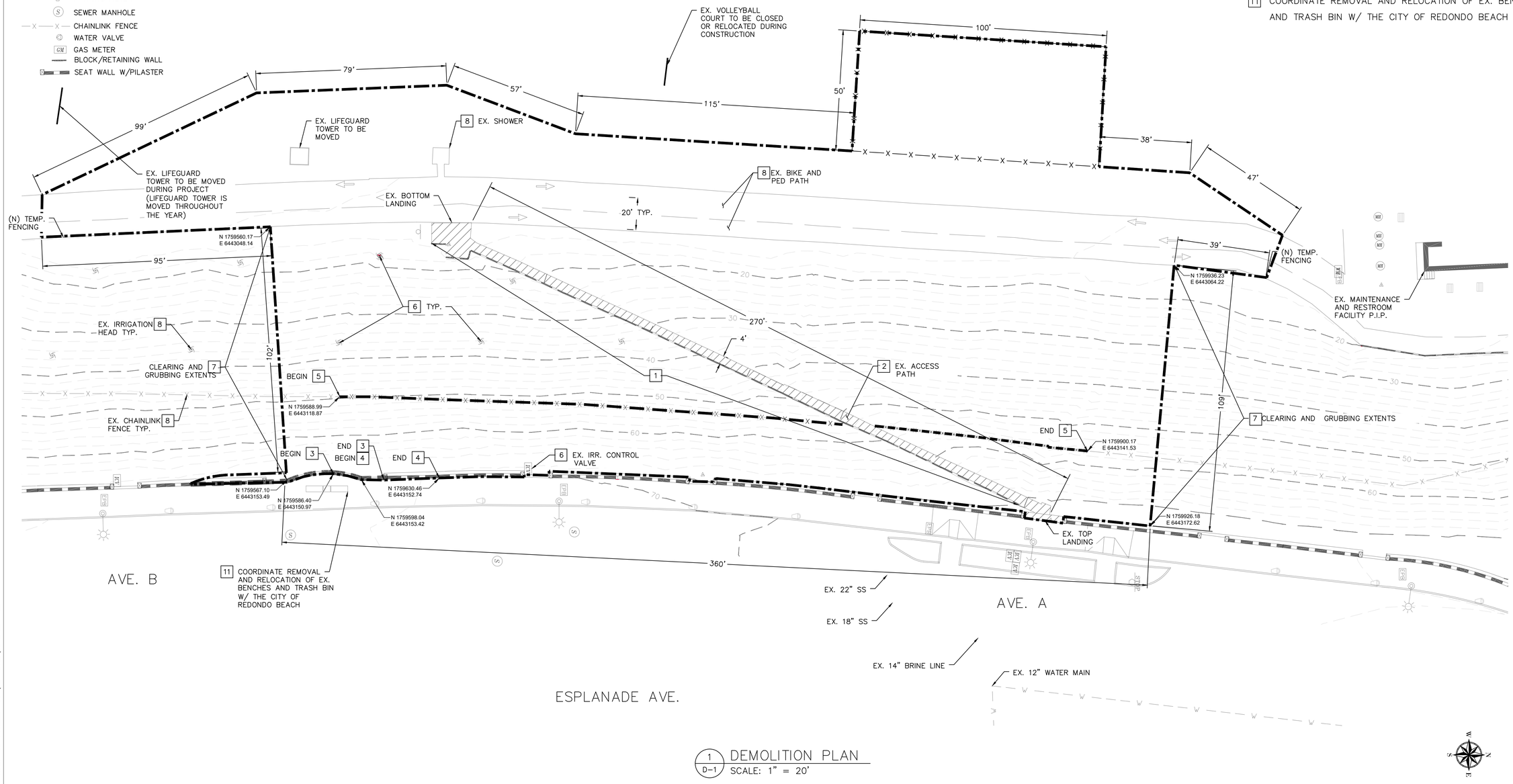
LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX
- WATER METER
- MANHOLE
- GRATE
- SIGN
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE
- CHAINLINK FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- DEMO PCC
- CLEARING AND GRUBBING
- TEMP. BIKE PATH/CONTRACTOR STAGING AREA
- PROJECT LIMITS

DEMOLITION NOTES:

1. REMOVE EX. CMU BLOCK WALL AND FOUNDATION
2. REMOVE EX. PCC ACCESS PATH
3. REMOVE EX. PCC CURB
4. REMOVE EX. MASONRY SEAT WALL AND FOUNDATION
5. REMOVE EX. CHAINLINK FENCE
6. REMOVE EX. IRRIGATION
7. CLEAR AND GRUB EX. BLUFF
8. PROTECT-IN-PLACE
11. COORDINATE REMOVAL AND RELOCATION OF EX. BENCHES AND TRASH BIN W/ THE CITY OF REDONDO BEACH



1 / D-1 DEMOLITION PLAN
SCALE: 1" = 20'

REVISIONS				
No.	DATE	SHEET	APPROVAL	DESCRIPTION
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REDONDO BEACH AVE. A ACCESS PATH
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DEMOLITION PLAN

GRAPHIC SCALE: 0, 10', 20', 40' — 1" = 20'

PAGE

FIELD BOOK

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SHEET 05 OF 37

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LEGEND

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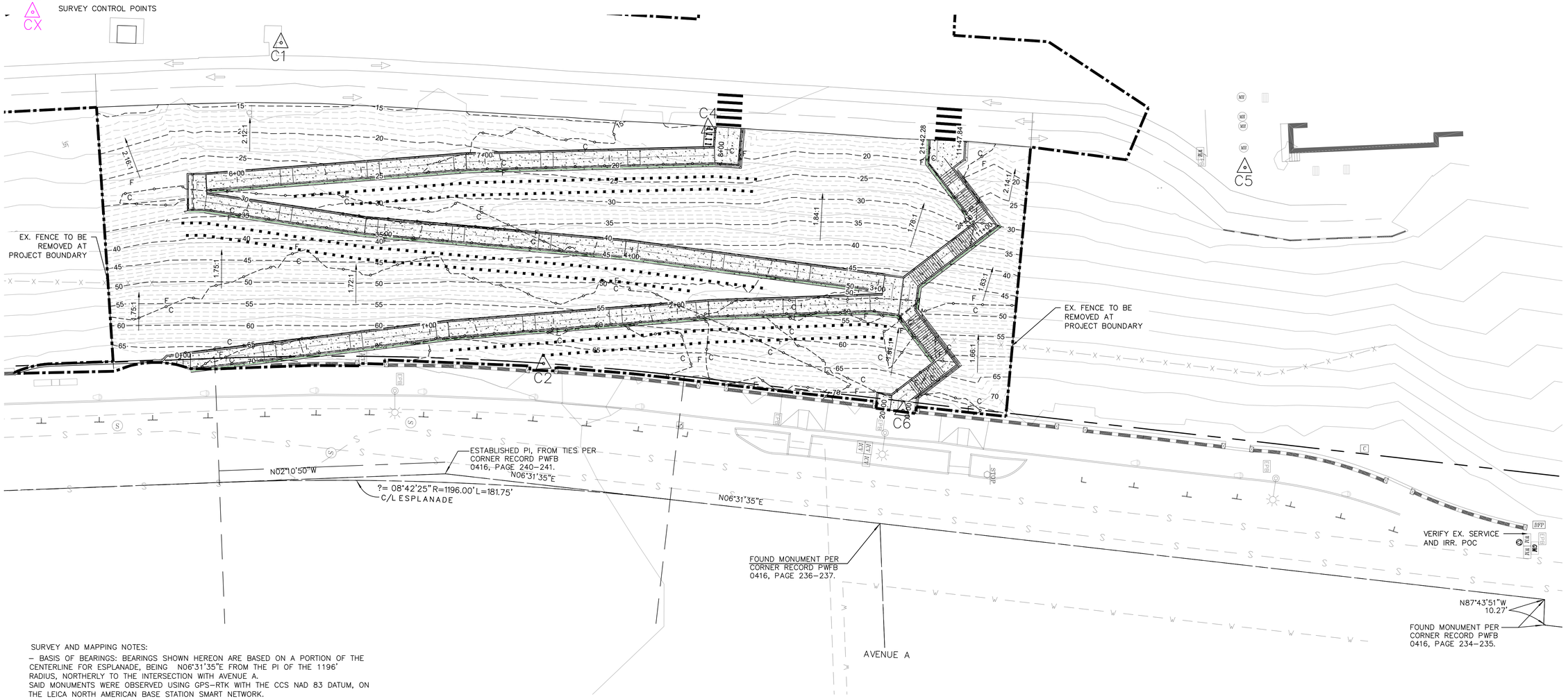
- PARKING METER
- SEWER MANHOLE
- CHAINLINK FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- (N) BOLLARD LIGHTING
- (N) SRT GEOPIER PILES
- STAIRCASE AND WALKWAY CENTERLINE POINTS
- GEOPIER POINTS – SEE SHEET C-6 FOR POINT TABLE
- SURVEY CONTROL POINTS



SURVEY AND MAPPING NOTES:

– BASIS OF BEARINGS: BEARINGS SHOWN HEREON ARE BASED ON A PORTION OF THE CENTERLINE FOR ESPLANADE, BEING N06°31'35"E FROM THE PI OF THE 1196' RADIUS, NORTHERLY TO THE INTERSECTION WITH AVENUE A. SAID MONUMENTS WERE OBSERVED USING GPS–RTK WITH THE CCS NAD 83 DATUM, ON THE LEICA NORTH AMERICAN BASE STATION SMART NETWORK.

– BASIS OF COORDINATES: STATION CAPE–SAN PEDRO, CA. – RTCM ID# 3261 NAD83 EPOCH 2021.750 LATITUDE 33°44'47.64"N, LONGITUDE 118°16'48.20"W; CALIFORNIA ZONE V, N 1730270.410, E 6476524.201.

– BENCH MARK : LOS ANGELES COUNTY BENCH MARK NUMBER QY8369 ELEVATION=71.348 NAVD88 (FT) DATUM, QUAD YEAR 2013 USC & GS BR DISC MON FL 12FT W/O W'LY CF ESPLANADE 47FT W/O C/L & 11FT N/O C/L PROD AVE A MKD (REDONDO 1972) {SIC}

– THIS TOPOGRAPHIC SURVEY WAS DONE WITHOUT BENEFIT OF A CURRENT TITLE REPORT. EASEMENT(S) OF TITLE AND OTHER ENCUMBRANCES MAY EXIST. A CURRENT TITLE SEARCH OF THE SUBJECT PROPERTY WOULD DISCLOSE SUCH INSTRUMENT(S) OF RECORD.

1 / V-1 SURVEY CONTROL PLAN
SCALE: 1" = 20'

CONTROL POINTS:

Point	Northing	Easting	Elevation	Description
C1	1759634.7821	6443022.3864	14.05	EX. LIFEGUARD TOWER TO BE REMOVED
C2	1759740.1503	6443151.3567	69.01	TOP SLOPE ACCROSS PARKING METER #19013
C4	1759806.6501	6443056.4126	15.52	BOTTOM SLOPE @ BIKE RACK
C5	1760022.3860	6443072.4064	17.72	SET+ @ SE CORNER RESTROOM
C6	1759884.7988	6443170.2584	71.348	USC&GS BRASS DISK BENCH MARK @ TOP RAMP. LA COUNTY # QY8369

REVISIONS

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REDONDO BEACH AVE. A ACCESS PATH
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SURVEY CONTROL PLAN

GRAPHIC SCALE: 1" = 20'

PAGE

FIELD BOOK

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SHEET 06 OF 37

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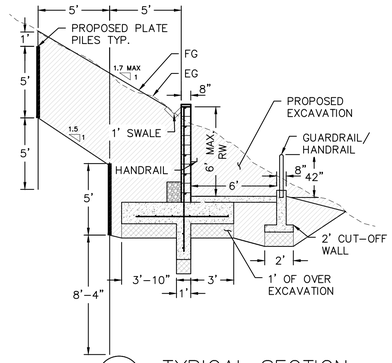
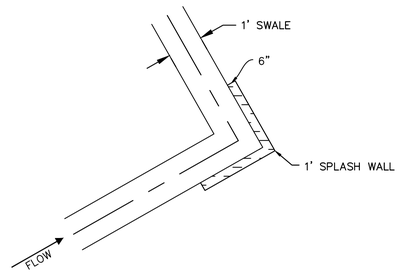
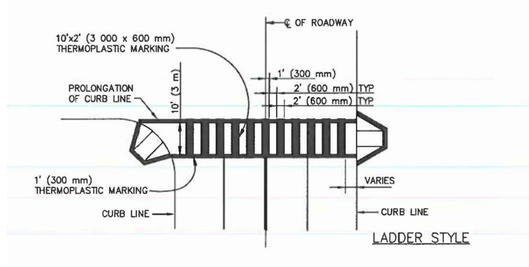


A-A / C-1 TYPICAL SECTION
SCALE: 1" = 5'



2 / C-1 SWALE SECTION
SCALE: 1" = 2'



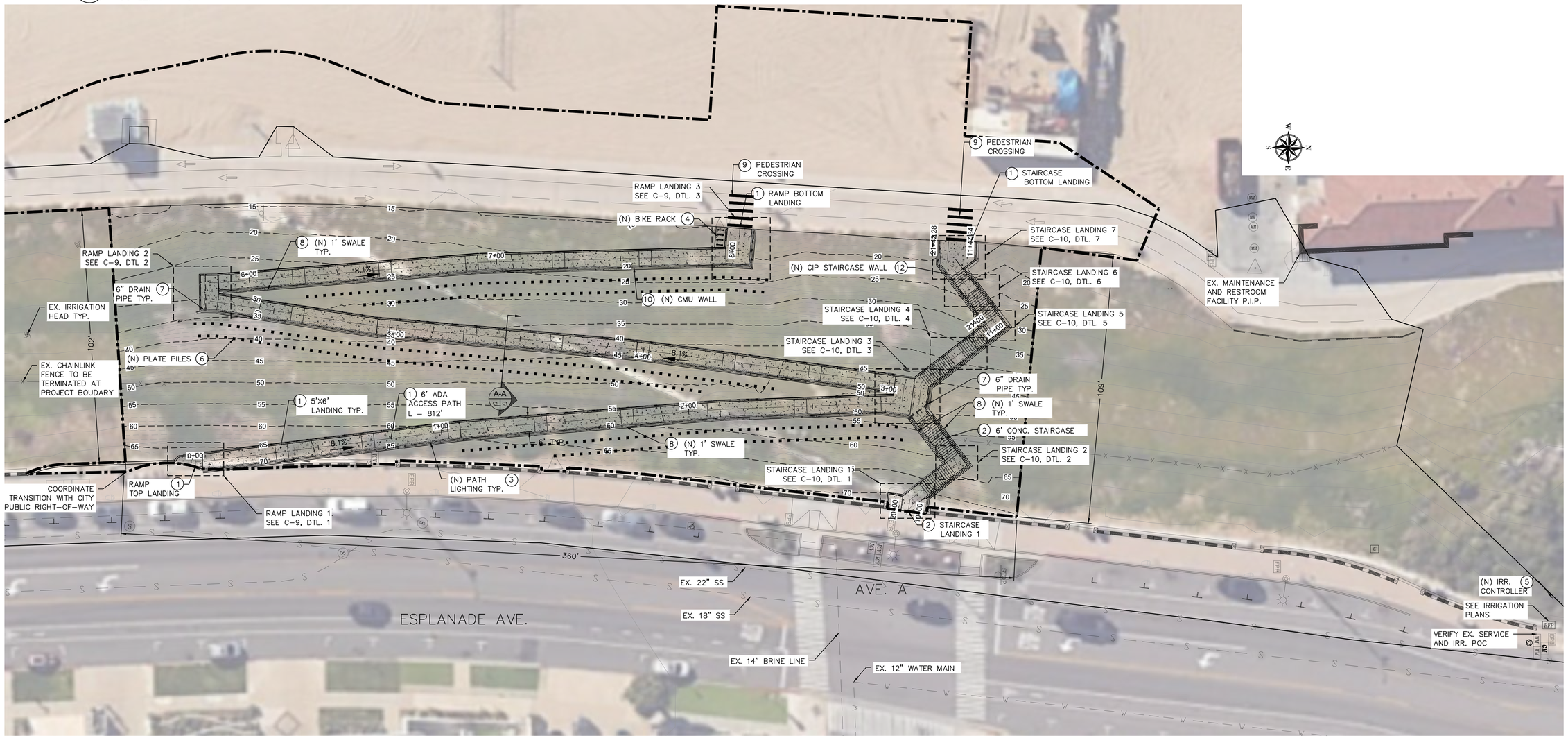
3 / C-1 PEDESTRIAN CROSSING
SCALE: 1" = 2'

LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX
- WATER METER
- MANHOLE
- GRATE
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE
- CHAINLINK FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- (N) PLATE PILES
- (N) CONCRETE

CONSTRUCTION NOTES:

1. INSTALL 6' WIDE CONC. ADA ACCESS PATH, CMU WALL, AND SWALE PER C-11, DTL. 1
2. INSTALL 6' WIDE CONC. STAIR PER C-12, DTL. 1
3. INSTALL PATH LIGHTING PER ELECTRICAL SHEETS.
4. INSTALL BIKE RACK PER C-11, DTL. 5
5. INSTALL IRR. CONTROLLER, SEE IRRIGATION PLANS
6. INSTALL PLATE PILES PER C-11, DTL. 6
7. INSTALL 6" PVC PIPE PER PLAN AND C-12, DTL. 5
8. INSTALL 1' PCC SWALE PER PLAN AND C-11, DTL. 4
9. INSTALL PEDESTRIAN CROSSING STRIPING PER C-1, DTL. 3
10. INSTALL CMU WALL PER PLAN AND C-14
11. INSTALL CIP STAIRCASE WALL PER PLAN AND C-15
12. INSTALL GUARDRAIL PER PLAN AND C-11
13. INSTALL HANDRAIL PER PLAN AND C-11



1 / C-1 CONSTRUCTION PLAN
SCALE: 1" = 20'

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
SITE PLAN

GRAPHIC SCALE 1" = 20'

PAGE

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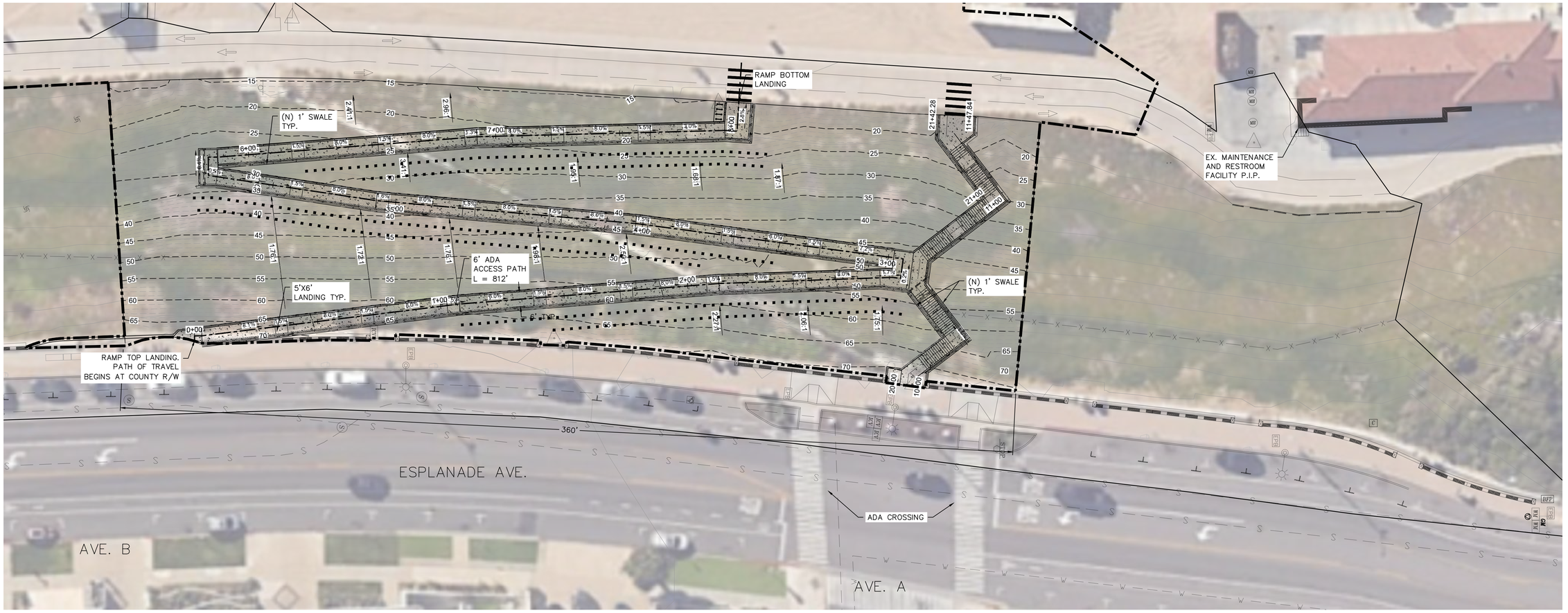
LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX
- WATER METER
- MANHOLE
- GRATE
- SIGN
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE
- CHAINLINK FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- (N) PLATE PILES
- (N) CONCRETE
- ADA PATH OF TRAVEL



1 / C-2 ADA PATH OF TRAVEL PLAN
SCALE: 1" = 20'

NOTE: SEE C-4 AND C-5 FOR LANDING CLEARANCE DIMENSIONS.

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STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
ADA PATH OF TRAVEL PLAN

GRAPHIC SCALE 40' 20' 0 10' 20' 1" = 20'

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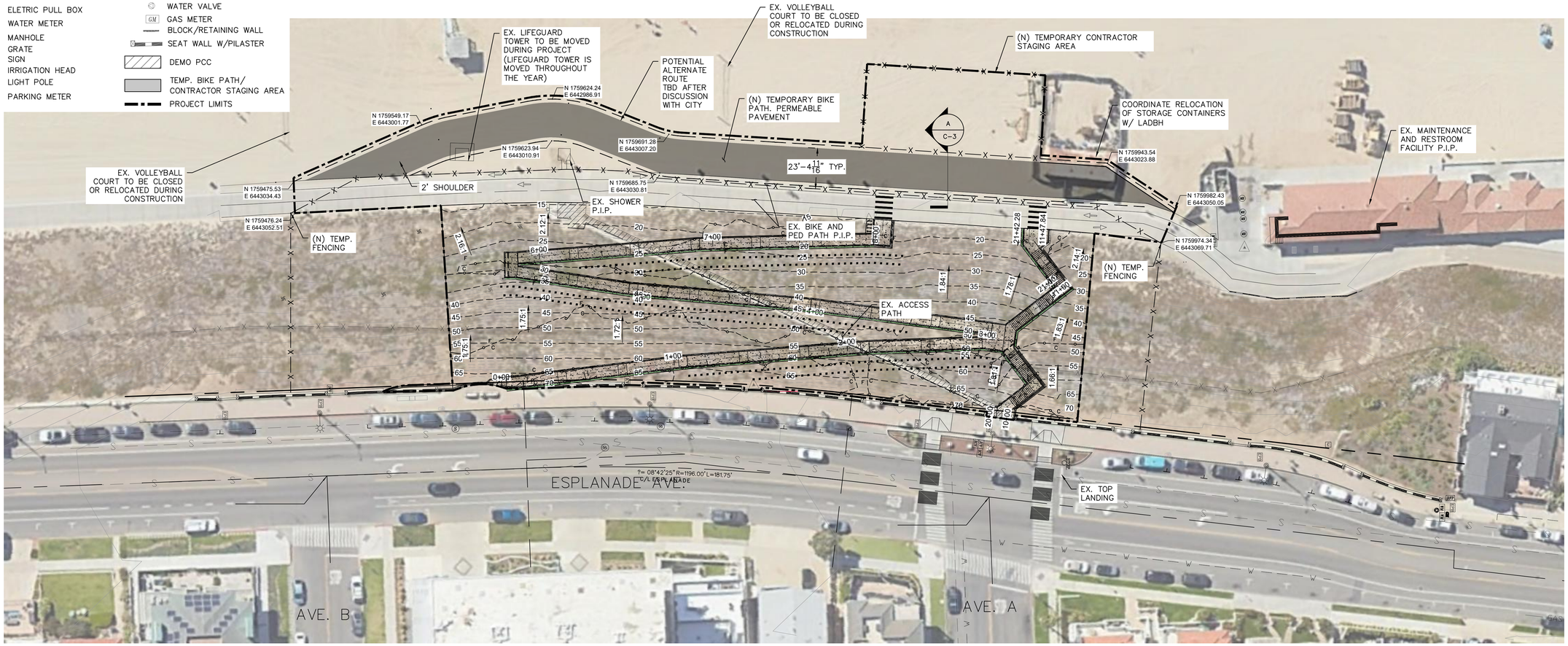
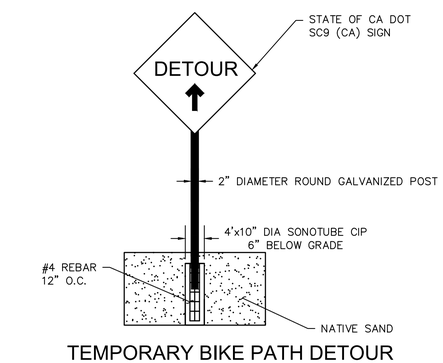
LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX
- WATER METER
- MANHOLE
- GRATE
- SIGN
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE
- TEMPORARY FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- DEMO PCC
- TEMP. BIKE PATH/ CONTRACTOR STAGING AREA
- PROJECT LIMITS





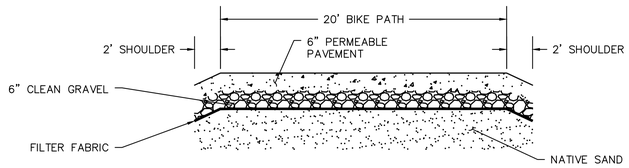
1 / C-3 TEMPORARY BIKE PATH DETOUR SIGNAGE DETAIL

NTS

1 / C-3 TEMPORARY BIKE AND PEDESTRIAN ROUTING PLAN

SCALE: 1" = 20'

NOTES:
1. BEACH SAND IN THE PROJECT AREA MUST BE PROTECTED FROM CONTAMINANTS.
2. PLASTIC SHEETING (POLYETHYLENE) AND DRIP PANS MUST BE PLACED UNDER ALL EQUIPMENT STORED ON THE BEACH.
3. ANY MATERIALS OR CONSTRUCTION SUPPLIES MUST BE STORED ON PALLETS.



A / C-3 SECTION A - TEMPORARY BIKE PATH

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
TEMPORARY BIKE AND PEDESTRIAN ROUTING PLAN

GRAPHIC SCALE 1" = 20'

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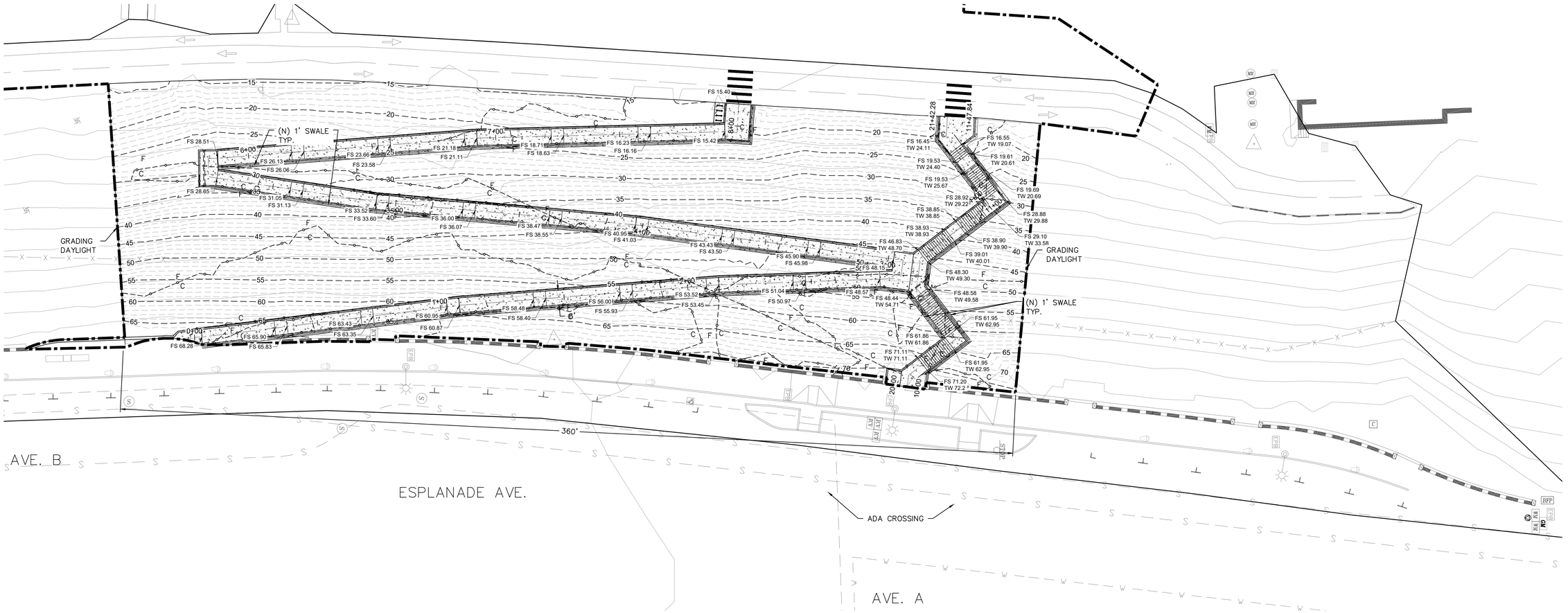
LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX (EPB)
- WATER METER (WM)
- MANHOLE (MH)
- GRATE
- SIGN
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE (S)
- CHAINLINK FENCE
- WATER VALVE
- GAS METER (GM)
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- (N) PLATE PILES
- (N) CONCRETE
- ADA PATH OF TRAVEL



1 / C-4 GRADING PLAN
SCALE: 1" = 20'

NOTES:
1. SEE SHEET V-1 FOR HORIZONTAL AND VERTICAL CONTROL.
2. ACCESS RAMP GRADING PLAN STATIONING: 0+00 TO 8+08.95
3. NORTH STAIRCASE WALL STATIONING: 10+00 TO 11+47.11
4. SOUTH STAIRCASE WALL STATIONING: 20+00 TO 21+42.29

GRADING QUANTITIES	
CUT	584 CY
FILL	1314 CY
NET FILL	730 CY
DISTURBED AREA	37039 SF

REVISIONS

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REGISTERED PROFESSIONAL ENGINEER — RAFAEL J. HOLCOMBE — No. C 76788 — CIVIL — STATE OF CALIFORNIA — Exp. 06-30-25

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
GRADING PLAN

GRAPHIC SCALE: 1" = 20'

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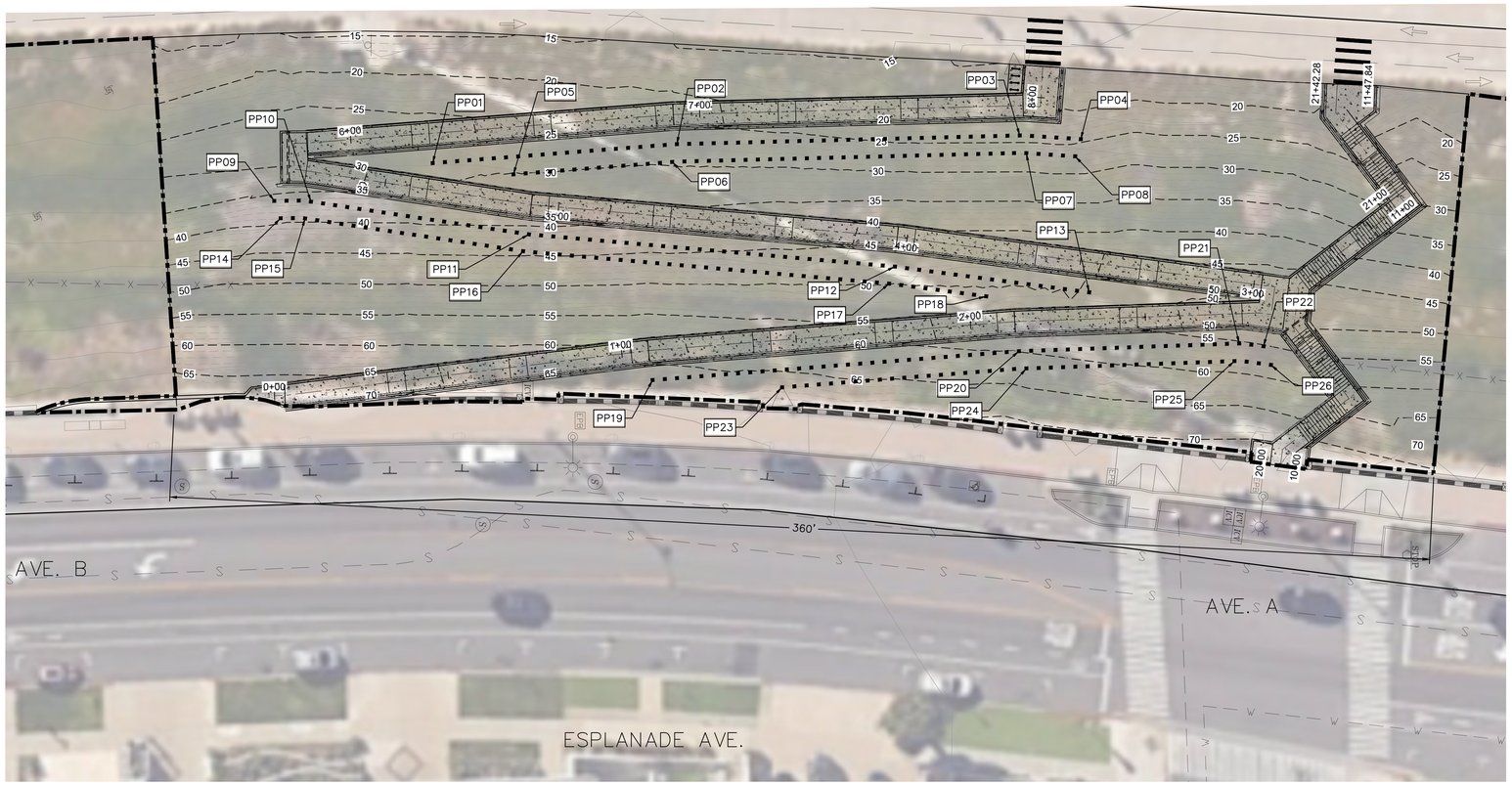


LEGEND

- PLATE PILE

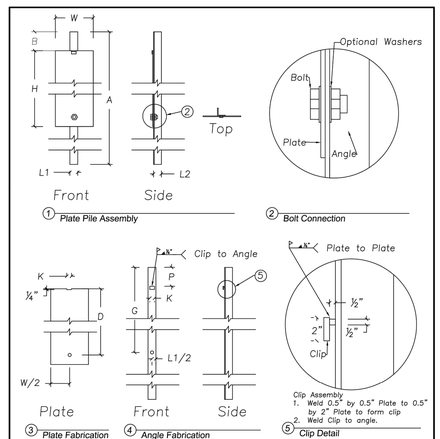
Point Table			
Point #	Northing	Easting	Elevation
PP01	1759641.46	6443078.84	29.42
PP02	1759711.25	6443073.43	26.74
PP03	1759809.22	6443070.93	21.37
PP04	1759826.68	6443072.00	21.81
PP05	1759664.53	6443082.05	28.69
PP06	1759709.90	6443078.52	27.50
PP07	1759811.10	6443075.98	23.70
PP08	1759825.07	6443076.90	24.30
PP09	1759596.18	6443089.65	31.94
PP10	1759606.66	6443089.86	34.94
PP11	1759668.96	6443099.22	39.58
PP12	1759773.55	6443108.43	47.01
PP13	1759829.07	6443115.80	50.53
PP14	1759597.99	6443094.62	35.36
PP15	1759604.98	6443094.67	35.93
PP16	1759667.28	6443104.03	41.24
PP17	1759771.87	6443113.30	47.94
PP18	1759799.63	6443116.94	49.39
PP19	1759704.30	6443140.89	65.75
PP20	1759808.98	6443132.64	58.32
PP21	1759871.94	6443130.41	53.61
PP22	1759878.89	6443131.22	53.50
PP23	1759741.33	6443142.98	64.64
PP24	1759811.12	6443137.56	59.59
PP25	1759870.58	6443135.46	55.30
PP26	1759881.01	6443136.54	54.92

* LOCATION OF PATH ALIGNMENT CHANGES SHOWN

1 C-5 PLATE PILE LAYOUT PLAN

SCALE: 1" = 20'

NOTES:
1. SEE SHEET V-1 FOR HORIZONTAL AND VERTICAL CONTROL.
2. 3.5' SPACING BETWEEN PLATE PILES.
3. PP # # = PLATE PILE CONTROL POINTS
4. PROPOSED PLATE PILES = 321



1 Plate Pile Assembly
2 Bolt Connection
3 Plate Fabrication
4 Angle Fabrication
5 Clip Detail

Note: Refer to Sheet 2.0 for General Fabrication Notes and Dimensions

REVISIONS			SRT™ GEOPIER SRT		
REV	DESCRIPTION	DATE	PROJECT	PROJECT NUMBER N/A	DATE 01/03/13
				REFERENCE SHEET N/A	SCALE Not to Scale
			SRT Tier II Plate Pile Assembly		DRAWING SRT 1.2
			TITLE Type B – Top Clip with Bottom Bolt		

Table 1.1 - Plate Pile Materials - 50 Year Design Life										
Description	Angle Dimensions			Plate Dimensions			Bottom Clip Edge Distance from Top of Angle	Width of Clip	Bolt Diameter	Bolt Length	Number of Bolts
Dimension	L1	L2	T	W	H	T	J	K	L	M	N
6' Plate Pile	2 1/2	2 1/2	5/16	12	24	5/16	27	2	1/2	2 1/2	2
8' Plate Pile - 1	2 1/2	2 1/2	5/16	12	24	5/16	27	2	1/2	2 1/2	2
8' Plate Pile - 2	3	3	5/16	12	36	5/16	39	2 1/2	1/2	2 1/2	2
10' Plate Pile	3	3	5/16	12	36	5/16	39	2 1/2	3/4	3	2
12' Plate Pile	3	3	5/16	12	48	5/16	51	2 1/2	3/4	3	3
14' Plate Pile	3	3	5/16	12	48	5/16	51	2 1/2	3/4	3	3

* All Dimensions are in Inches

Table 1.2 - Plate Pile Materials - 100 year Design Life										
Description	Angle Dimensions			Plate Dimensions			Bottom Clip Edge Distance from Top of Angle	Width of Clip	Bolt Diameter	Bolt Length	Number of Bolts
Dimension	L1	L2	T	W	H	T	J	K	L	M	N
6' Plate Pile	2 1/2	2 1/2	7/16	12	24	7/16	27	2	1/2	2 1/2	2
8' Plate Pile - 1	2 1/2	2 1/2	7/16	12	24	7/16	27	2	1/2	2 1/2	2
8' Plate Pile - 2	3	3	7/16	12	36	7/16	39	2 1/2	1/2	2 1/2	2
10' Plate Pile	3	3	7/16	12	36	7/16	39	2 1/2	3/4	3	2
12' Plate Pile	3	3	7/16	12	48	7/16	51	2 1/2	3/4	3	3
14' Plate Pile	3	3	7/16	12	48	7/16	51	2 1/2	3/4	3	3

* All Dimensions are in Inches

Table 2.0 - Fabrication Dimensions								
Description	Overall Angle Length	Distance from Top of Angle to Top of Plate	Top Bolt Edge Distance from Top of Plate	Bottom Bolt Edge Distance from Top of Plate	Top Bolt Edge Distance from Top of Angle	Bottom Bolt Edge Distance from Top of Angle	Top Clip Edge Distance from Top of Angle	Bottom Clip Edge Distance from Top of Angle
Dimension	A	B	C	D	F	G	P	J
6' Plate Pile	72	6	3	21	9	27	6	30
8' Plate Pile - 1	96	6	3	21	9	27	6	30
8' Plate Pile - 2	96	6	3	33	9	39	6	42
10' Plate Pile	120	6	3	33	9	39	6	42
12' Plate Pile	144	6	3	45	9	51	6	54
14' Plate Pile	168	6	3	45	9	51	6	54

* All Dimensions are in Inches

Fabrication and Assembly Notes

1. *All steel plates and angles shall be ASTM A572, Grade 50 (FY = 50 ksi).*
2. *All welding shall be in accordance with AWS D1.1 specifications.*
3. *All bolts shall be hot dip galvanized.*
4. *Fillet welds shall use SMAW process with E70XX low hydrogen electrodes.*
5. *All bolts shall be either Gr 5, ASTM A 307, or equivalent.*
6. *In hard driving conditions ASTM A325 or ASTM A409 bolts may be required.*
7. *Bolts holes shall be 1/16" larger than the nominal bolt diameter.*
8. *Plate Pile material dimensions are preliminary and should be confirmed in the project review.*
9. *Plate Pile material dimensions are minimal nominal dimensions. Larger sections may be considered depending on material availability.*

REVISIONS			SRT™ GEOPIER SRT		
REV	DESCRIPTION	DATE	PROJECT	PROJECT NUMBER N/A	DATE 01/03/13
				REFERENCE SHEET N/A	SCALE Not to Scale
			SRT Tier II Plate Pile Assembly		DRAWING SRT 2.0
			TITLE Notes and Dimensions		

1 C-5 PLATE PILE

SCALE: N.T.S.

NOTE: SIZE TBD

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

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DRAWN BY: JONATHAN GOBER

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STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
PLATE PILE LAYOUT

GRAPHIC SCALE: 40' 20' 0 10' 20' 1" = 20'

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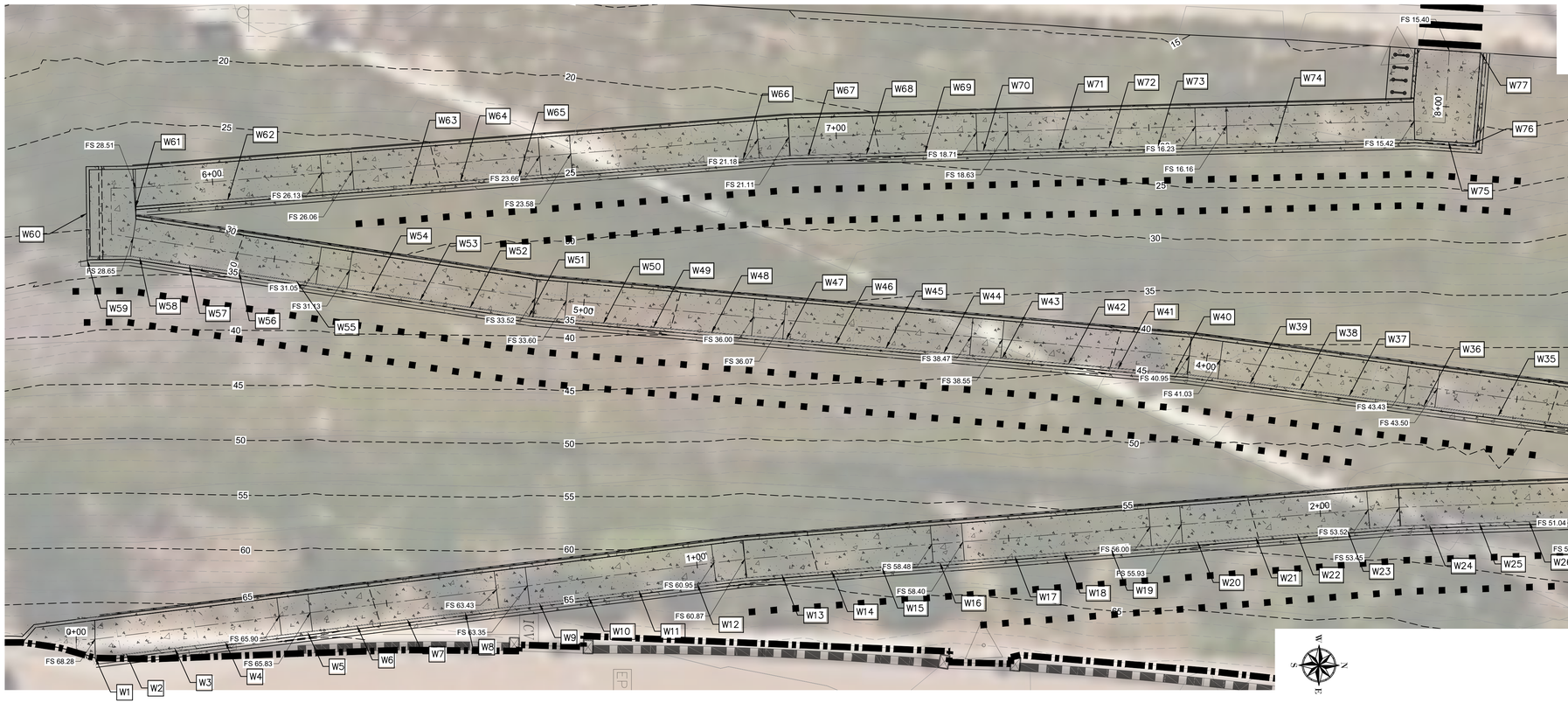
POINT TABLE - WALKWAY						
PT #	Northing	Easting	Station	Finished Surface	Top of Wall	Top of Footing
W1	1759598.04	6443153.4309	STA 0+02.67	73.35	73.53	67.53
W2	1759602.97	6443152.8133	STA 0+07.64	67.95	73.53	66.20
W3	1759610.91	6443151.8348	STA 0+15.64	67.31	72.87	66.20
W4	1759618.85	6443150.8564	STA 0+23.64	66.67	72.20	65.53
W5	1759632.08	6443149.2261	STA 0+36.97	65.88	71.53	64.87
W6	1759640.02	6443148.2476	STA 0+44.97	65.29	70.87	64.20
W7	1759647.96	6443147.2692	STA 0+52.97	64.65	70.20	63.53
W8	1759657.22	6443146.1281	STA 0+62.30	63.90	69.53	62.87
W9	1759669.13	6443144.6604	STA 0+74.30	63.27	68.87	61.34
W10	1759677.07	6443143.6820	STA 0+82.30	62.63	68.20	61.53
W11	1759685.01	6443142.7035	STA 0+90.30	61.99	67.53	60.87
W12	1759694.28	6443141.5612	STA 0+99.64	61.24	66.87	60.20
W13	1759707.85	6443140.1387	STA 1+13.42	60.46	66.20	59.53
W14	1759715.83	6443139.5076	STA 1+21.42	59.82	65.53	58.87
W15	1759723.80	6443138.8764	STA 1+29.42	59.18	64.87	58.20
W16	1759733.10	6443138.1403	STA 1+38.75	58.50	64.20	57.53
W17	1759745.07	6443137.1935	STA 1+50.75	57.80	63.53	56.87
W18	1759753.04	6443136.5624	STA 1+58.75	57.16	62.87	56.20
W19	1759761.02	6443135.9312	STA 1+66.75	56.52	62.20	55.53
W20	1759774.30	6443134.8795	STA 1+80.08	55.78	61.53	54.87

POINT TABLE - WALKWAY						
PT #	Northing	Easting	Station	Finished Surface	Top of Wall	Top of Footing
W21	1759783.62	6443134.1426	STA 1+89.42	55.03	60.87	54.20
W22	1759790.25	6443133.6172	STA 1+96.08	54.50	60.20	53.53
W23	1759798.23	6443132.9860	STA 2+04.08	53.86	59.53	52.87
W24	1759811.41	6443132.1478	STA 2+17.42	53.12	58.87	52.20
W25	1759819.40	6443131.8651	STA 2+25.42	52.48	58.20	51.53
W26	1759827.40	6443131.5823	STA 2+33.42	51.83	57.53	50.87
W27	1759835.39	6443131.2996	STA 2+41.42	51.19	56.87	50.20
W28	1759848.72	6443130.8286	STA 2+54.75	50.45	56.20	49.53
W29	1759856.71	6443130.5459	STA 2+62.75	49.81	55.53	48.87
W30	1759864.04	6443130.2869	STA 2+70.08	49.22	54.87	48.20
W31	1759875.86	6443131.1323	STA 2+81.86	53.00	54.20	47.53
W32	1759882.82	6443131.9954	STA 2+86.02	53.44	53.53	47.53
W33	1759876.59	6443122.4468	STA 2+97.84	50.00	53.00	47.37
W34	1759834.80	6443116.3170	STA 3+40.08	45.37	50.87	44.70
W35	1759822.39	6443114.6746	STA 3+52.59	44.36	50.70	43.37
W36	1759810.50	6443113.0992	STA 3+64.59	43.52	50.04	42.70
W37	1759798.60	6443111.5238	STA 3+76.59	42.77	49.37	42.04
W38	1759790.67	6443110.4735	STA 3+84.59	42.13	48.70	41.37
W39	1759782.74	6443109.4232	STA 3+92.59	41.49	48.04	40.70
W40	1759770.63	6443107.9087	STA 4+04.92	40.83	47.37	40.04

POINT TABLE - WALKWAY						
PT #	Northing	Easting	Station	Finished Surface	Top of Wall	Top of Footing
W41	1759761.66	6443107.1170	STA 4+13.93	40.11	46.70	39.37
W42	1759753.69	6443106.4136	STA 4+21.93	39.47	46.04	38.70
W43	1759743.07	6443105.4764	STA 4+32.59	38.61	45.37	38.04
W44	1759733.77	6443104.6552	STA 4+41.93	38.19	44.70	37.37
W45	1759724.48	6443103.8349	STA 4+51.26	37.44	44.04	36.70
W46	1759716.51	6443103.1316	STA 4+59.26	36.80	43.37	36.04
W47	1759708.54	6443102.4282	STA 4+67.26	36.16	42.70	35.37
W48	1759696.58	6443101.3732	STA 4+79.26	35.53	42.04	34.70
W49	1759687.29	6443100.5529	STA 4+88.59	34.78	41.37	34.04
W50	1759679.32	6443099.8495	STA 4+96.59	34.14	40.70	33.37
W51	1759667.37	6443098.7945	STA 5+08.40	39.52	40.04	32.70
W52	1759657.96	6443097.3396	STA 5+17.93	32.76	39.37	32.04
W53	1759650.07	6443096.1624	STA 5+25.90	36.84	38.70	31.37
W54	1759642.13	6443094.9625	STA 5+33.93	31.48	38.04	30.70
W55	1759630.27	6443093.1797	STA 5+45.93	30.85	37.37	30.04
W56	1759621.04	6443091.7935	STA 5+55.26	30.10	36.70	29.37
W57	1759613.13	6443090.6050	STA 5+63.26	29.46	36.04	28.70
W58	1759605.22	6443089.4165	STA 5+71.26	28.82	35.37	28.04
W59	1759596.75	6443089.7495	STA 5+76.33	28.70	34.70	28.00
W60	1759596.66	6443082.3045	STA 5+79.77	28.19	31.19	27.92

POINT TABLE - WALKWAY						
PT #	Northing	Easting	Station	Finished Surface	Top of Wall	Top of Footing
W61	1759604.52	6443081.2488	STA 5+87.45	28.58	28.59	27.92
W62	1759619.24	6443080.1015	STA 6+02.21	27.39	29.92	26.59
W63	1759648.48	6443077.8210	STA 6+31.54	25.37	29.92	24.59
W64	1759656.45	6443077.1989	STA 6+39.54	24.73	29.26	23.92
W65	1759665.76	6443076.4727	STA 6+48.88	23.99	28.59	23.26
W66	1759701.66	6443073.6736	STA 6+84.88	21.43	27.92	20.59
W67	1759712.13	6443073.0142	STA 6+95.54	20.90	27.26	19.92
W68	1759721.38	6443072.7797	STA 7+04.79	20.84	26.59	19.26
W69	1759730.80	6443072.5387	STA 7+14.21	19.41	25.92	18.59
W70	1759740.13	6443072.3010	STA 7+23.54	18.73	25.26	17.92
W71	1759752.12	6443071.9954	STA 7+35.54	18.03	24.59	17.26
W72	1759760.12	6443071.7916	STA 7+43.54	17.39	23.92	16.59
W73	1759768.12	6443071.5879	STA 7+51.54	16.75	23.26	15.92
W74	1759786.78	6443071.1124	STA 7+70.21	16.07	22.59	15.26
W75	1759814.49	6443070.9205	STA 7+98.13	15.67	21.92	14.59
W76	1759818.36	6443071.1747	STA 7+99.46	15.58	20.59	14.59
W77	1759819.60	6443056.6671	STA 8+08.91	16.00	19.92	14.59



1 C-6 ACCESS RAMP CMU RETAINING WALL PLAN
SCALE: 1" = 10'

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PLOT DATE: Jul. 16, 25 SAVED PATH: P:\Wdr\T41476.07 Ave A Access Path\06 PLANS\02 Sheet Files

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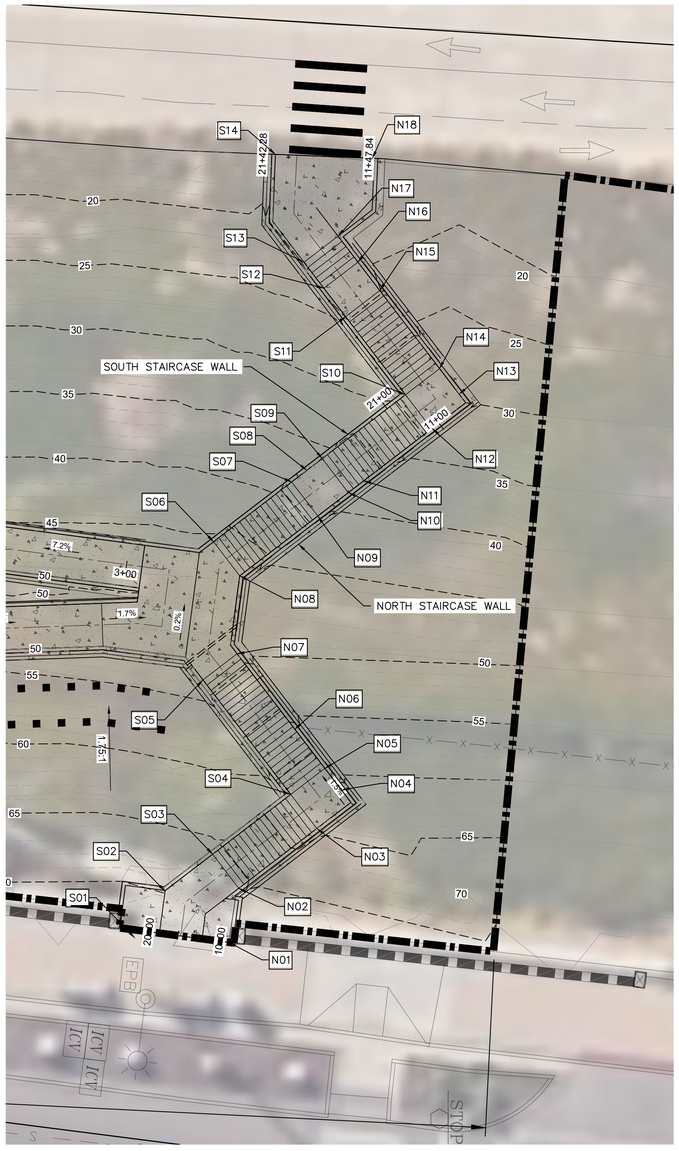
No.	DATE	SHEET	APPROVAL	DESCRIPTION



1 C-7 STAIRCASE CIP RETAINING WALL PLAN
SCALE: 1" = 10'

NOTES:
1. SEE SHEET V-1 FOR HORIZONTAL AND VERTICAL CONTROL.
2. X## = STAIRCASE CONTROL POINTS

North Staircase Wall Point Table

Point #	Stationing	Northing	Easting	Finished Surface	Top of Wall	Top of Footing
N01	10+00	1759890.45	6443166.26	71.30	72.30	69.80
N02	10+07.58	1759891.84	6443158.71	71.20	72.20	69.70
N03	10+21.64	1759902.76	6443150.35	61.95	62.95	60.45
N04	10+30.64	1759906.18	6443144.96	61.95	62.95	55.35
N05	10+34.80	1759903.87	6443141.94	61.95	62.95	55.35
N06	10+41.32	1759899.70	6443136.49	57.28	58.28	55.35
N07	10+55.01	1759891.60	6443125.93	48.52	49.52	47.02
N08	10+65.56	1759891.96	6443115.03	48.34	49.34	46.03
N09	10+78.74	1759902.88	6443106.68	39.00	40.00	37.93
N10	10+84.12	1759907.14	6443103.40	38.94	39.94	36.85
N11	10+86.96	1759909.33	6443101.73	36.61	38.24	31.28
N12	10+98.79	1759918.87	6443094.41	29.10	33.58	26.34
N13	11+07.40	1759922.63	6443089.63	28.98	29.98	26.64
N14	11+12.29	1759919.91	6443086.07	28.92	29.92	26.83
N15	11+26.04	1759911.54	6443075.15	19.69	20.69	18.21
N16	11+31.04	1759908.49	6443071.19	19.62	20.62	17.54
N17	11+33.33	1759905.71	6443067.55	16.54	19.07	15.21
N18	11+47.11	1759910.55	6443056.67	16.13	17.5	15.00

South Staircase Wall Point Table

Point #	Stationing	Northing	Easting	Finished Surface	Top of Wall	Top of Footing
S01	20+00	1759880.76	6443164.98	71.33	71.33	69.83
S02	20+05.77	1759881.55	6443159.03	71.27	71.27	67.36
S03	20+14.73	1759888.19	6443153.96	71.11	71.11	62.83
S04	20+27.86	1759899.10	6443145.58	61.86	61.86	55.81
S05	20+47.74	1759886.84	6443129.58	48.44	54.71	47.01
S06	20+69.42	1759888.32	6443110.27	46.83	48.70	33.76
S07	20+83.16	1759899.23	6443101.91	38.93	38.93	37.44
S08	20+85.33	1759901.32	6443100.31	37.90	38.90	33.76
S09	20+88.55	1759903.50	6443098.64	38.85	38.85	33.76
S10	21+02.62	1759915.14	6443089.72	28.92	29.22	23.35
S11	21+15.77	1759906.77	6443078.81	19.53	25.45	18.04
S12	21+20.77	1759903.75	6443074.84	19.53	24.40	14.57
S13	21+25.35	1759900.95	6443071.20	16.45	24.11	14.57
S14	21+42.34	1759896.97	6443056.13	16.07	16.51	14.57

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER
RAFAEL J. HOLCOMBE
No. 91618
CIVIL
STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
STAIRCASE CIP RETAINING WALL PLAN

GRAPHIC SCALE 1" = 10' (20' 10' 0 5' 10')

PAGE

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SHEET 13 OF 37

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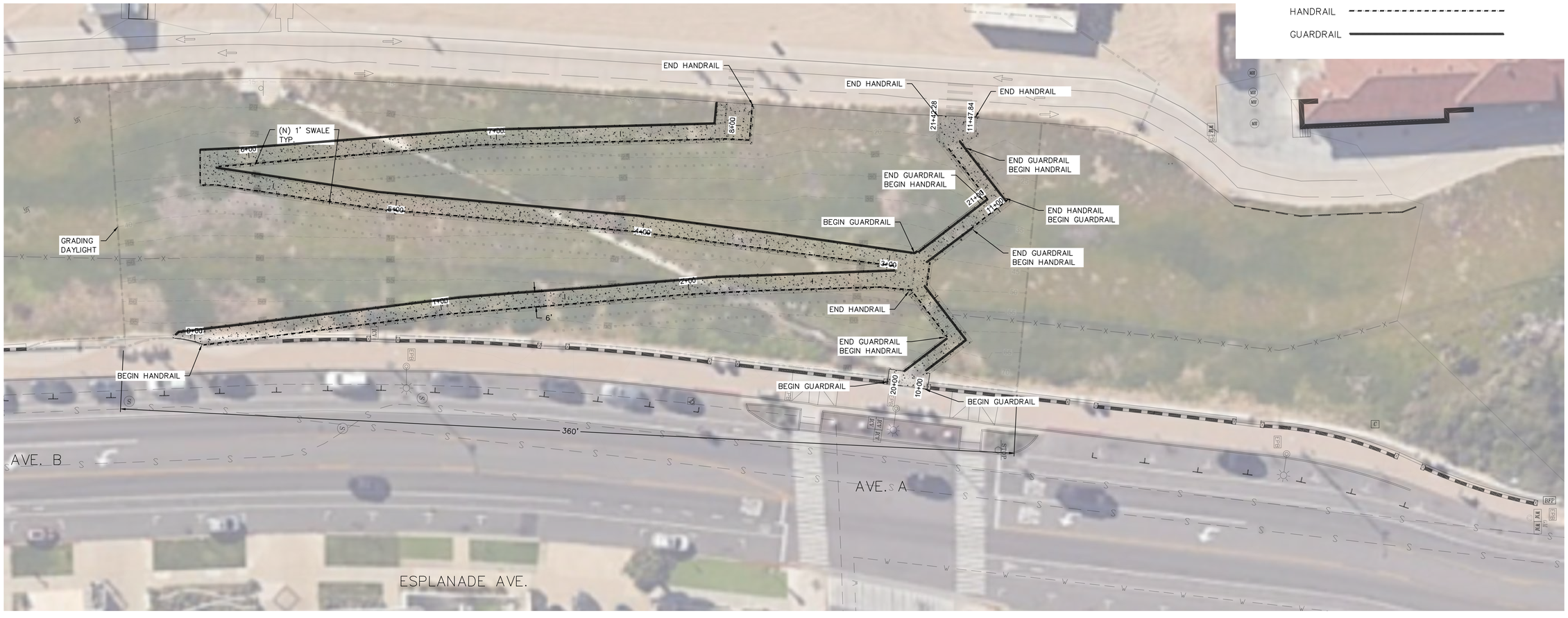

1 / C-8 GUARDRAIL AND HANDRAIL PLAN
SCALE: 1" = 20'

NOTES:
1. SEE SHEET V-1 FOR HORIZONTAL AND VERTICAL CONTROL.
2. SEE SHEET C-13 FOR GUARDRAIL AND HANDRAIL DETAILS.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT:

REF.

DESIGNED BY: RAFAEL HOLCOMBE
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REGISTERED PROFESSIONAL ENGINEER
RAFAEL J. HOLCOMBE
No. 91818
CIVIL
STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
GUARDRAIL AND HANDRAIL PLAN

GRAPHIC SCALE: 0 10' 20' 40' 1" = 20'

PAGE

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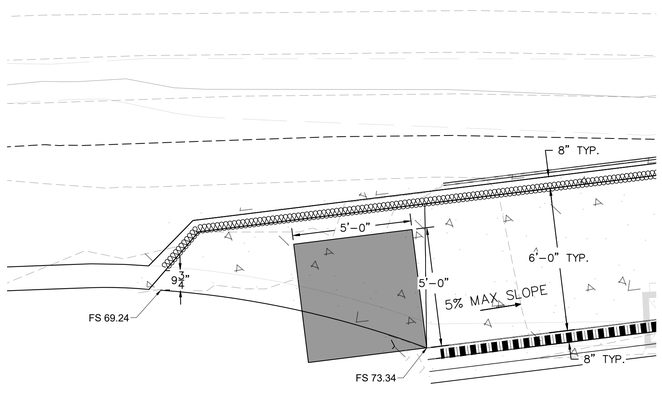
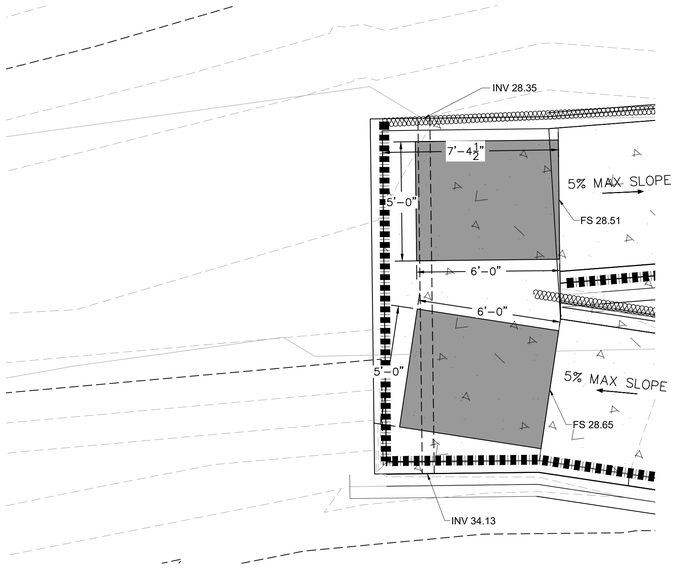
LEGEND

HANDRAIL

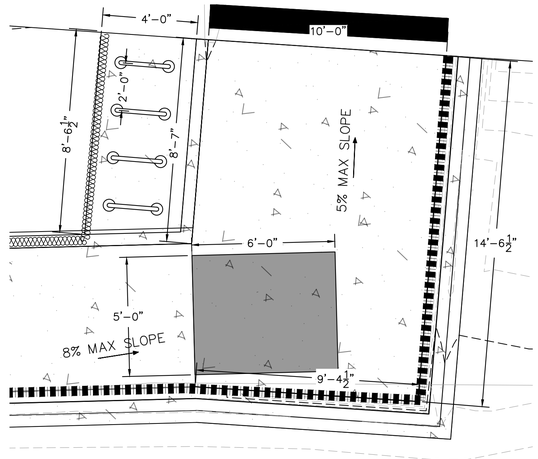
GUARDRAIL



RAMP LANDING 1 (TOP)
SCALE: 1" = 3'



RAMP LANDING 2
SCALE: 1" = 3'

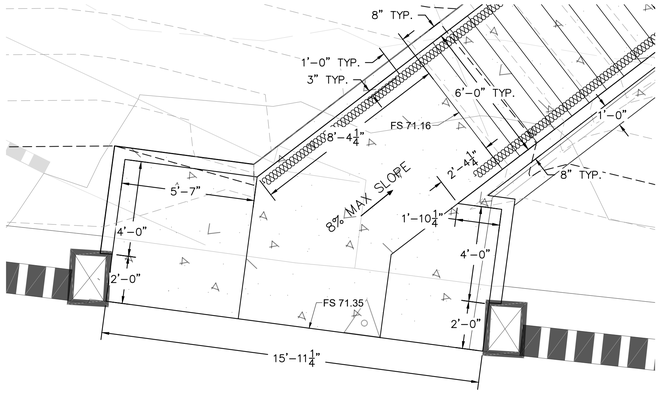


RAMP LANDING 3 (BOTTOM)
SCALE: 1" = 3'

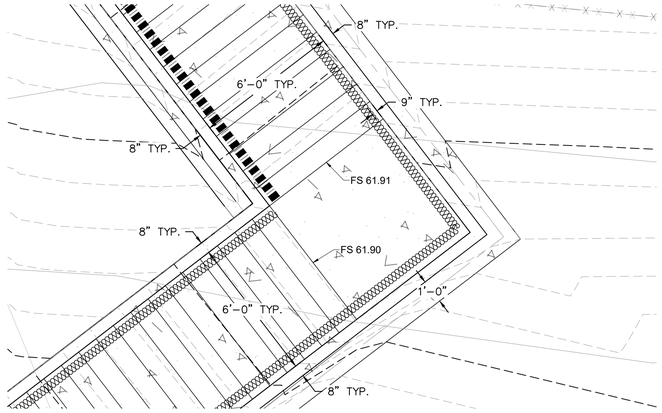
NOTES: SEE SHEET V-1 FOR HORIZONTAL AND VERTICAL CONTROL.

REVISIONS

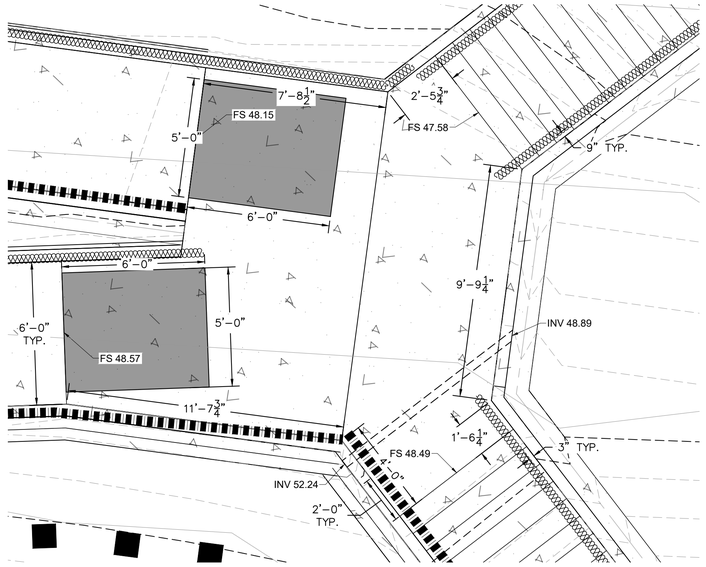
No.	DATE	SHEET	APPROVAL	DESCRIPTION



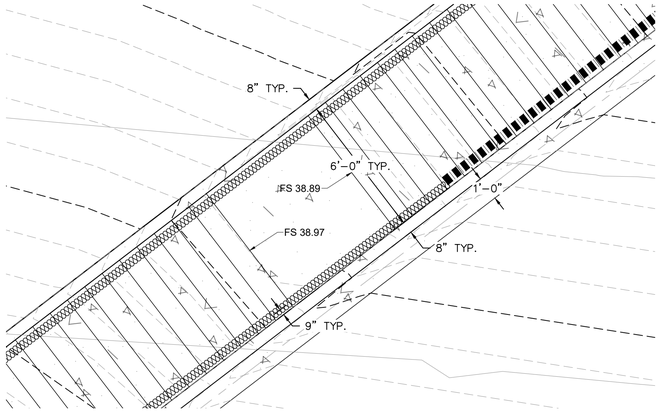
STAIRCASE
LANDING 1 (TOP)
SCALE: 1" = 3'



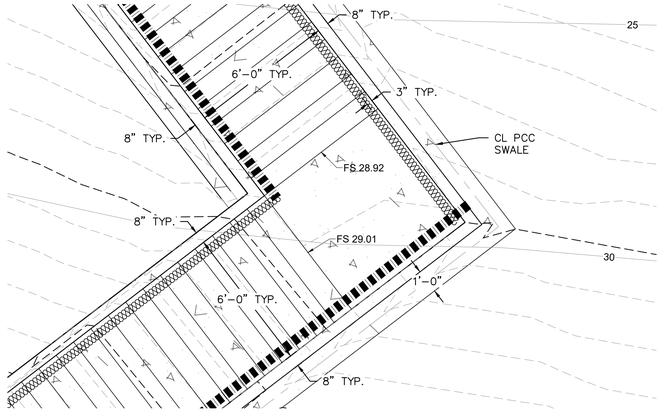
STAIRCASE
LANDING 2
SCALE: 1" = 3'



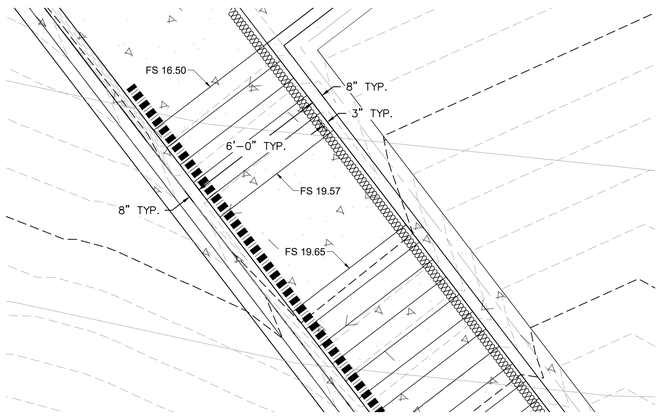
STAIRCASE
LANDING 3
SCALE: 1" = 3'



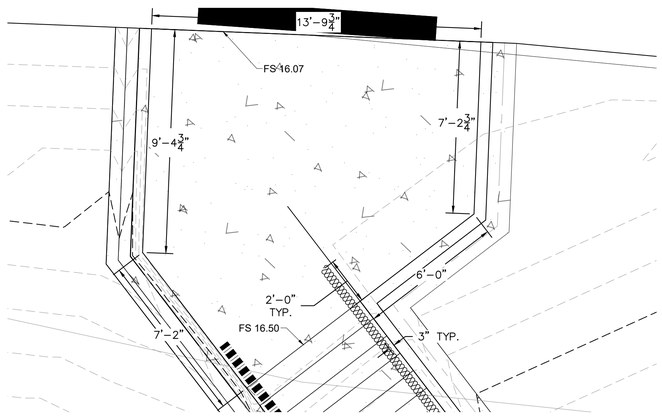
STAIRCASE
LANDING 4
SCALE: 1" = 3'



STAIRCASE
LANDING 5
SCALE: 1" = 3'



STAIRCASE
LANDING 6
SCALE: 1" = 3'



STAIRCASE
LANDING 7 (BOTTOM)
SCALE: 1" = 3'

LEGEND

HANDRAIL

GUARDRAIL

NOTES: SEE SHEET V-1 FOR
HORIZONTAL AND VERTICAL CONTROL.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION
				REF.
				AS-BUILT:

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER
RAFAEL J. HOLCOMBE
No. 16148
CIVIL
STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
SITE PLAN ENLARGEMENTS (STAIRCASE LANDING)

GRAPHIC SCALE: 3" 1.5" 0 3' 6'; 1" = 3'

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SHEET 16 OF 37

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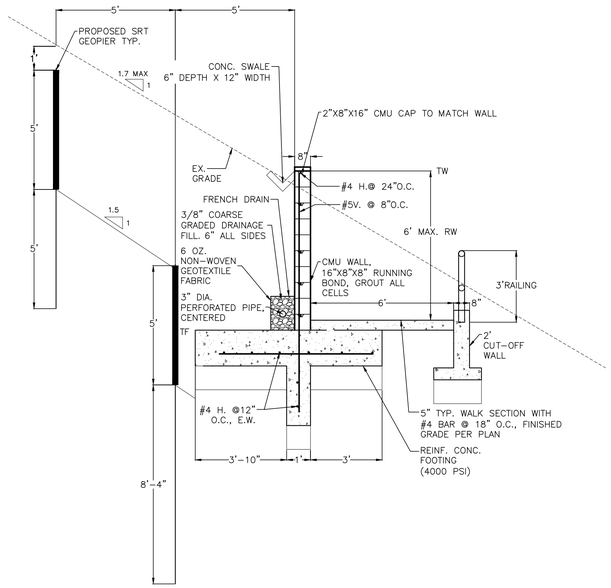
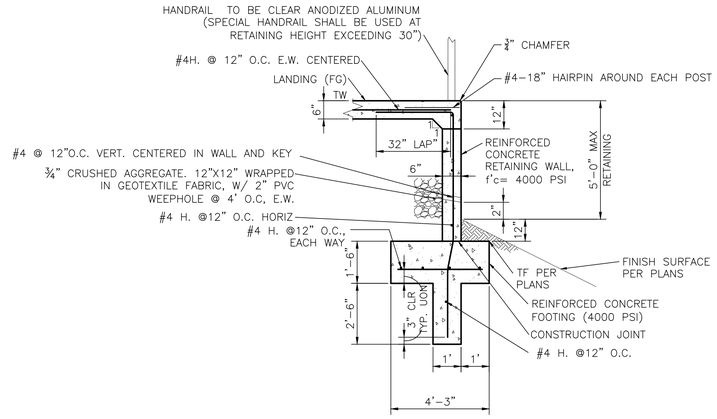
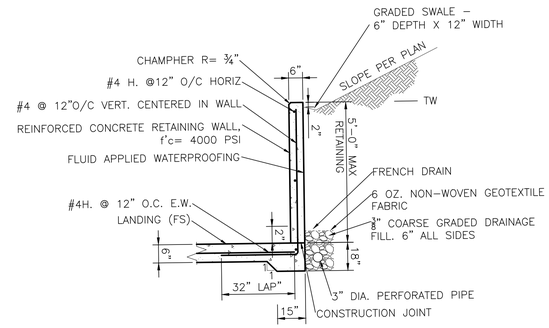


1 / C-1 ACCESS PATH AND RETAINING WALL
SCALE: N.T.S.

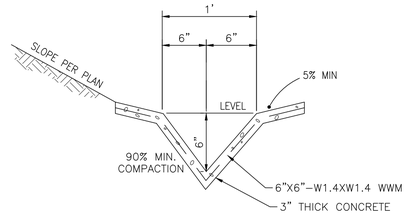
NOTES:
1. CMU SPECS – 8"x16"x8"
2. BOND BEAM SPLIT 1–SIDE
3. COLOR: NATURAL GRAY



2 / C-1 STAIR RETAINING WALL (FINISHED GRADE BELOW LANDING)
SCALE: N.T.S.

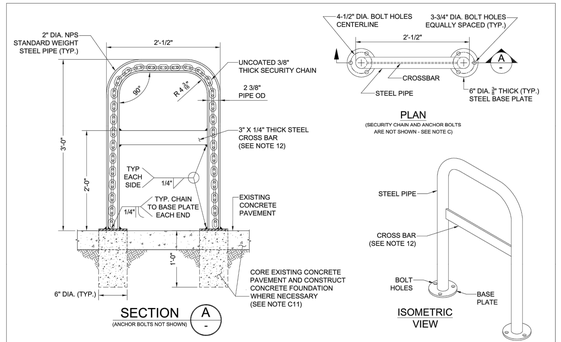


3 / C-1 STAIR RETAINING WALL (FINISHED GRADE ABOVE LANDING)
SCALE: N.T.S.

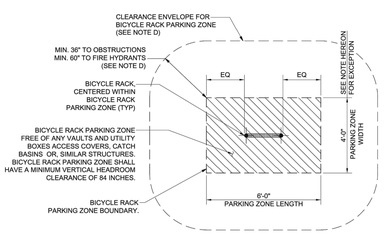


4 / C-1 SWALE/TERRACE DRAIN
SCALE: N.T.S.

NOTES:
1. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 P.S.I. CONCRETE MAY BE PNEUMATICALLY PLACED AND SHALL CONFORM TO SECTION 1905 OF THE CALIFORNIA BUILDING CODE.
2. REINFORCING SHALL BE 6"X6"–W1.4XW1.4 WWM OR APPROVED EQUAL, EPOXY COATED.
3. PRE–WET AND COMPACT SUBGRADE TO 90% COMPACTION PRIOR TO PLACE OF CONCRETE. APPLY CURING COMPOUND PER SPECIFICATION 03301.



BICYCLE RACK



NOTE:
FOR PARALLEL BICYCLE RACKS EITHER STAND-ALONE OR IN A SINGLE-ROW, THE BICYCLE RACKS SHALL BE SETBACK A MINIMUM OF 3'-0" MEASURED FROM THE BACK OF THE STREET CURB TO THE CENTERLINE OF THE BICYCLE RACKS AND THE BICYCLE RACK PARKING ZONE WIDTH SHALL BE 3'-0" (SEE SHEET 2).

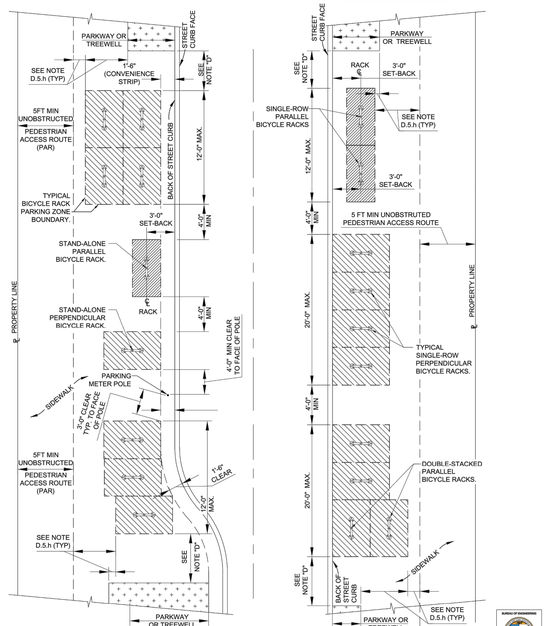
BICYCLE RACK PARKING ZONE AND CLEARANCE ENVELOPE

NOT TO SCALE

BUREAU OF ENGINEERING	DEPARTMENT OF PUBLIC WORKS	CITY OF LOS ANGELES
	BICYCLE RACK	STANDARD PLAN S - 671-1

PREPARED	SUBMITTED	APPROVED	SUPERSEDES	REFERENCES
MATIAS FARFAN, BUREAU OF ENGINEERING	EDWARD ARRINGTON, S.E. ENGINEER OF DESIGN	05/17/2019	S-671-0	S-470
CHECKED: RAFFI MASSABKI, BUREAU OF ENGINEERING; PAULINE CHAN, CITY OF LOS ANGELES DEPARTMENT OF TRANSPORTATION (LADOT)	KENNETH R. REDD, P.E. DEPUTY CITY ENGINEER	GARY LEE MOORE, P.E. CITY ENGINEER	VAULT INDEX NUMBER: B-4783	
			SHEET 1 OF 4 SHEETS	

BICYCLE RACK PARKING ZONE LAYOUTS



NOTE:
BICYCLE RACK PARKING ZONE LAYOUTS SHALL BE ARRANGED TO ENSURE THAT THE REQUIRED CLEAR PATH PER NOTE D.5.d IS PROVIDED.

LEGEND
36"X72" BICYCLE PARKING ZONE
48"X72" BICYCLE PARKING ZONE

B-4783

NOT TO SCALE

STANDARD PLAN NO. S - 671-1 | VAULT INDEX NUMBER edit | SHEET 2 OF 4 SHEETS

5 / C-1 BIKE RACK
SCALE: N.T.S.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION
AS–BUILT:				REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER RAFAEL J. HOLCOMBE No. C-16148 EXP. 06-30-25 CIVIL STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
DETAILS

GRAPHIC SCALE 1" = 20'

FIELD BOOK | PAGE

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SHEET 17 OF 37

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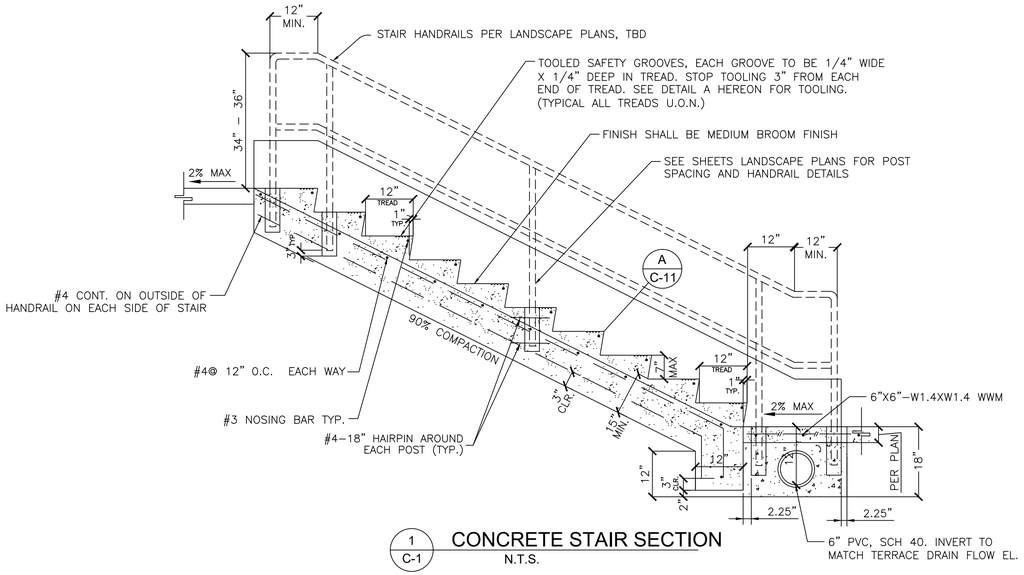
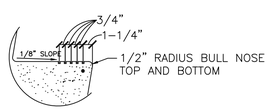


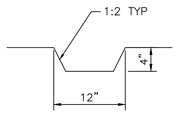
1 C-1 CONCRETE STAIR SECTION
N.T.S.

NOTES FOR CONCRETE STAIRS:
1. STAIR RISERS WILL VARY BETWEEN 6"-7" (MAX) - SEE SITE ELEVATIONS.
2. STAIR RISERS TO BE SAME HEIGHT BETWEEN LANDINGS SHOWN ON SHEETS C-3.1 AND C-3.2.
3. MAXIMUM SLOPE AT LANDINGS = 2.0%
4. COORDINATE LAYOUT OF HANDRAIL POST BLOCKOUTS PRIOR TO PLACEMENT OF CONCRETE.
5. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSIVE STRENGTH AT 28 DAYS OF 2500 P.S.I. CONCRETE MAY BE PNEUMATICALLY PLACED AND SHALL CONFORM TO SECTION 1905 OF THE CALIFORNIA BUILDING CODE AND SPECIFICATION 02751.
6. REINFORCING SHALL BE 6"X6"-W1.4XW1.4 WWM OR APPROVED EQUAL.
7. PRE-WET AND COMPACT SUBGRADE TO 90% COMPACTION PRIOR TO PLACE OF CONCRETE. APPLY CURING COMPOUND PER SPECIFICATION 03301.
8. REBAR AND WWM SHALL BE CENTERED ON CONCRETE SECTION TO PROVIDE MAXIMUM CONCRETE COVERAGE U.O.N.
9. INSTALL BULL NOSING AS PER DETAIL A ON PLAN SHEET C-5 FOR ALL EXPOSED EDGES.
10. CONRCETE SHALL BE MEDIUM-TO-COURSE TEXTURED BROOM FINISHED PER SPECIFICATION 02751.



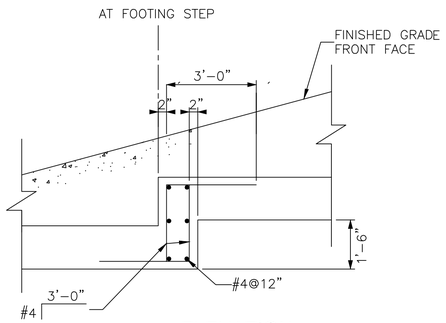
A C-1 TOOLED SAFETY GROOVE DETAIL
N.T.S.

NOTES:
1. PAINT TOOLED SAFETY GROOVE ON STAIRS YELLOW W/ NON-SLIP PAINT.

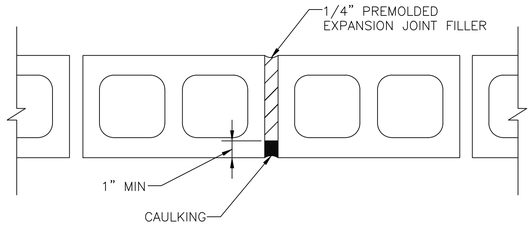


2 C-1 CURB BLOCKOUT DETAIL
N.T.S.

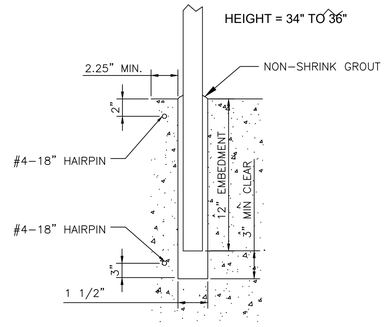
NOTES:
1. HANDRAIL POST SHALL NOT BE PLACED AT CURB BLOCKOUT.



ELEVATION
N.T.S.

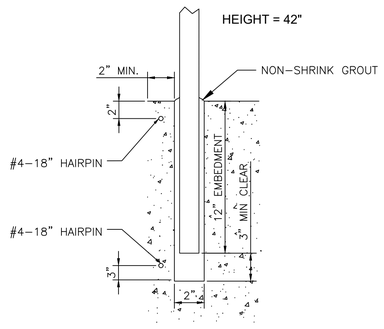


- - SECTION A-A
N.T.S.



B C-1 HANDRAIL POST DETAIL
N.T.S.

NOTES:
1. PRE-SET SLEEVES & SET IN EPOXY.
2. SLOPE EPOXY TO PROVIDE POSITIVE DRAINAGE.
3. DISTANCE FROM DRILL CORE TO EDGE OF CONCRETE = 2.25 INCHES, MINIMUM.



C C-1 GUARDRAIL POST DETAIL
N.T.S.

NOTES:
1. PRE-SET SLEEVES & SET IN EPOXY.
2. SLOPE EPOXY TO PROVIDE POSITIVE DRAINAGE.
3. DISTANCE FROM DRILL CORE TO EDGE OF CONCRETE = 2 INCHES, MINIMUM.

REVISIONS | No. | DATE | SHEET | APPROVAL | DESCRIPTION | REF.
AS-BUILT:

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER RAFAEL J. HOLCOMBE No. 18161 CIVIL STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
DETAILS 2

GRAPHIC SCALE | PAGE | FIELD BOOK

DRAWING REF. C-12
SHEET 18 OF 37
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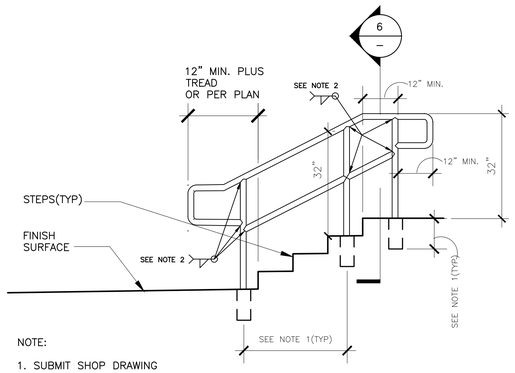
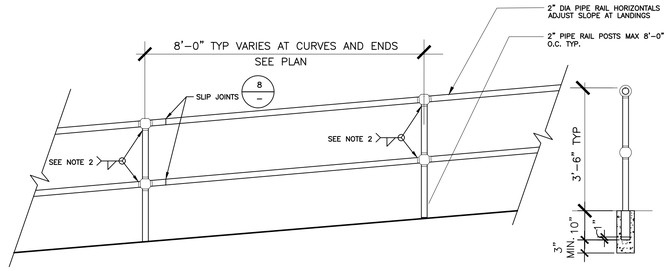


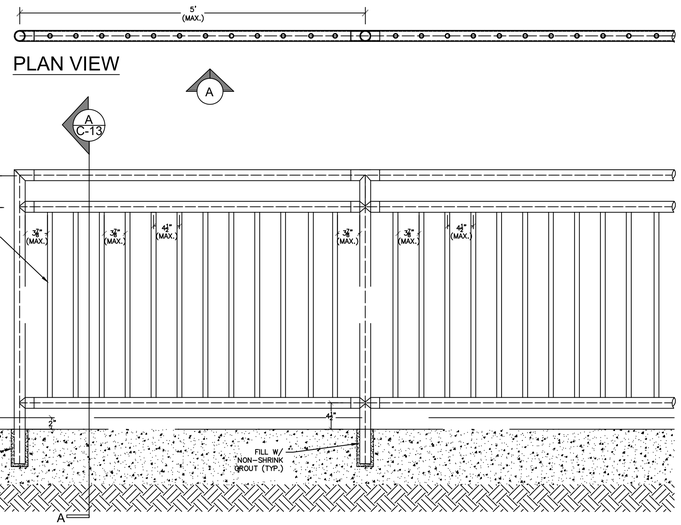
NOTE:

1. SUBMIT SHOP DRAWING

A / C-8 STAIR HANDRAIL (TYP)
SCALE: 1/2" = 1'-0"

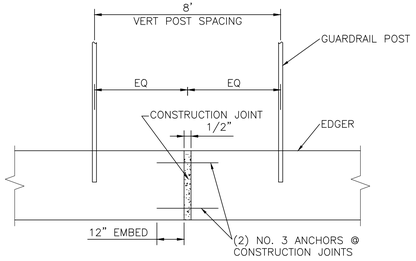


A / C-8 SAFETY RAIL AT WALKWAY
SCALE: 1/2" = 1'-0"



A / C-8 PROMENADE ALUMINUM GUARDRAILING WITH PICKETS
SCALE: 1/2" = 1'-0"

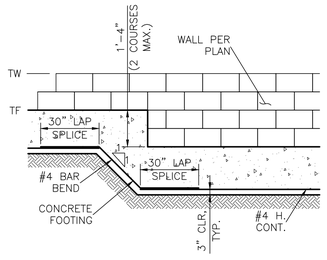
A-A / C-8 HANDRAIL (TYP)
SCALE: 1/2" = 1'-0"



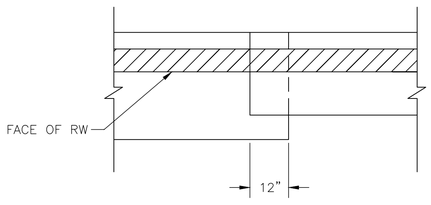
B / C-12 CONSTRUCTION JOINT DETAIL
N.T.S.

NOTES:

1. CONSTRUCTION JOINTS CAN BE USED IN LIEU OF EXPANSION JOINTS AND SHALL NOT EXCEED A WIDTH OF ½".
2. CONSTRUCTION JOINT MATERIAL SHALL CONSIST OF ½" EXPANSION JOINT FILLER CONFORMING TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR PREFORMED SPONGE RUBBER AND CORK EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION, AASHTO DESIGNATION: M153, TYPES I, II, OR III OR THE SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION, AASHTO DESIGNATION: M213, AS PER STATE D.O.T. STANDARD SPECIFICATION LATEST DESIGNATION.

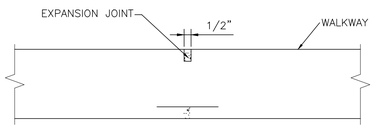


A / C-8 FOOTING TRANSITION DETAIL
N.T.S.



PLAN

D / C-8 STEP FOOTING DETAILS
N.T.S.



C / C-8 EXPANSION JOINT DETAIL
N.T.S.

NOTES:

1. EXPANSION JOINT MATERIAL SHALL CONSIST OF ½" EXPANSION JOINT FILLER CONFORMING TO THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR PREFORMED SPONGE RUBBER AND CORK EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION, AASHTO DESIGNATION: M153, TYPES I, II, OR III OR THE SPECIFICATION FOR PREFORMED EXPANSION JOINT FILLERS FOR CONCRETE PAVING AND STRUCTURAL CONSTRUCTION, AASHTO DESIGNATION: M213, AS PER STATE D.O.T. STANDARD SPECIFICATION LATEST DESIGNATION.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.

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REDONDO BEACH, CALIFORNIA 90277
DETAILS 3

GRAPHIC SCALE
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DRAWING REF. C-13
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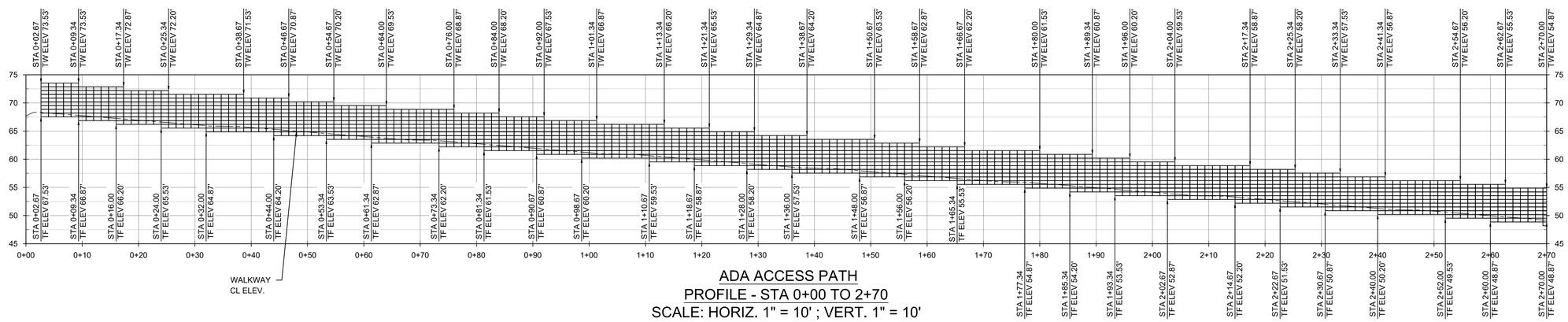
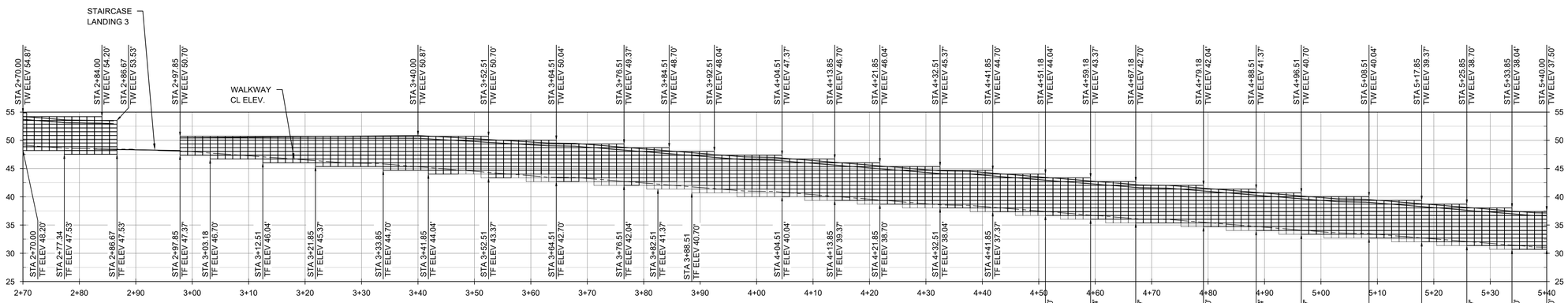
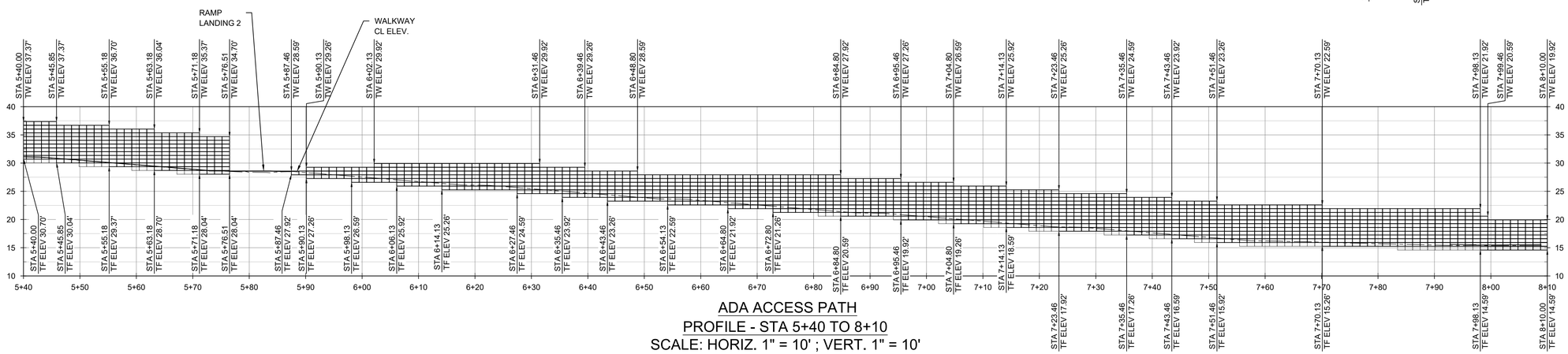


ADA ACCESS PATH
PROFILE - STA 0+00 TO 2+70
SCALE: HORIZ. 1" = 10' ; VERT. 1" = 10'



ADA ACCESS PATH
PROFILE - STA 2+70 TO 5+40
SCALE: HORIZ. 1" = 10' ; VERT. 1" = 10'



ADA ACCESS PATH
PROFILE - STA 5+40 TO 8+10
SCALE: HORIZ. 1" = 10' ; VERT. 1" = 10'

REVISIONS

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
ACCESS PATH RETAINING WALL PROFILES

REF.

GRAPHIC SCALE

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SHEET 20 OF 37

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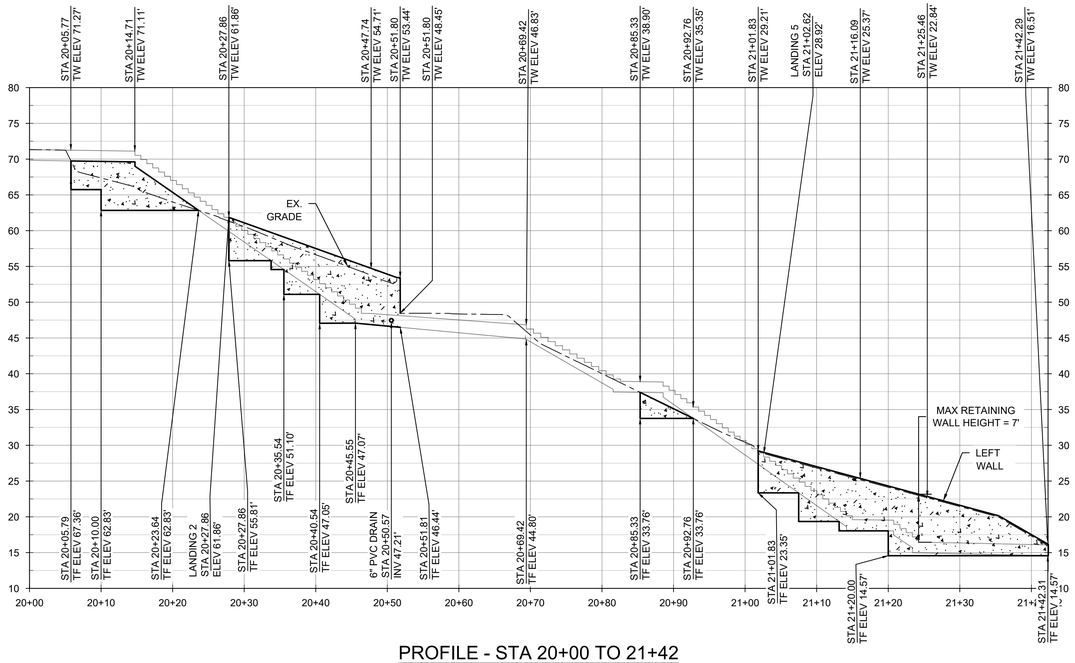
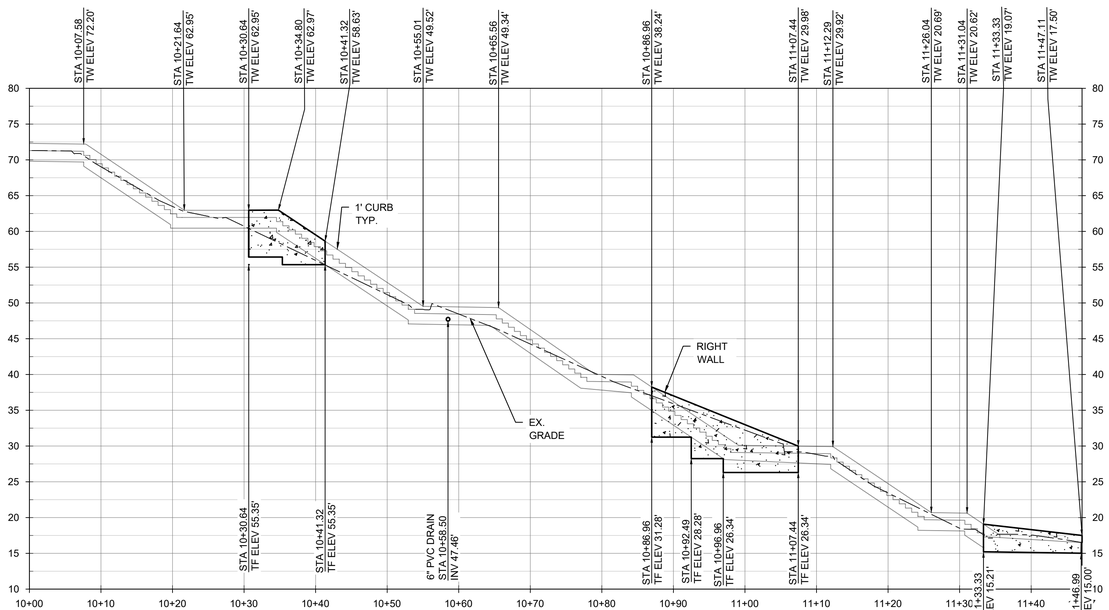


PROFILE - STA 20+00 TO 21+42

STAIRCASE - SOUTH



PROFILE - STA 10+00 TO 11+47

STAIRCASE - NORTH

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STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277

STAIRCASE RETAINING WALL PROFILES

GRAPHIC SCALE: 1" = 20'

PAGE

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LEGEND

- DIRECTION ARROW
- BIKE PATH
- ELETRIC PULL BOX
- WATER METER
- MANHOLE
- GRATE
- SIGN
- IRRIGATION HEAD
- LIGHT POLE
- PARKING METER
- SEWER MANHOLE
- CHAINLINK FENCE
- WATER VALVE
- GAS METER
- BLOCK/RETAINING WALL
- SEAT WALL W/PILASTER
- (N) BOLLARD LIGHTING
- (N) SRT GEOPIER PILES
- PCC

1 / C-15 EROSION AND SEDIMENT CONTROL PLAN
SCALE: 1" = 30'

2 / C-10 CONTRACTOR DELIVERY AREAS
SCALE: N.T.S.

EROSION AND SEDIMENT CONTROL PLAN (ESCP) GENERAL NOTES:

1. In case of emergency, call_____ at_____
   Please fill in name and number
2. Total Disturbed Area 38,829 sf WDID # _____
   i. Risk Level 1 2 3 (circle one as determined by State General Permit for sites greater than 1 acre)
3. A stand-by crew for emergency work shall be available at all times during the rainy season (November 1 to April 15). Necessary materials shall be available on-site and stockpiled at convenient locations to facilitate rapid construction of emergency devices when rain is imminent.
4. Erosion control devices shown on this plan may be removed when approved by the Building Official if the grading operation has progressed to the point where they are no longer required.
5. Graded areas adjacent to fill slopes located at the site perimeter must drain away from the top of slope at the conclusion of each working day. All loose soils and debris that may create a potential hazard to off-site property shall be stabilized or removed from the site on a daily basis.
6. All silt and debris shall be removed from all devices within 24 hours after each rainstorm and be disposed of properly.
7. A guard shall be posted on the site whenever the depth of water in any device exceeds two feet. The device shall be drained or pumped dry within 24 hours after each rainstorm. Pumping and draining of all basins and drainage devices must comply with the appropriate BMP for dewatering operations.
8. The placement of additional devices to reduce erosion damage and contain pollutants within the site is left to the discretion of the Field Engineer. Additional devices as needed shall be installed to retain sediments and other pollutants on site.
9. Storm Water Pollution and Erosion Control devices are to be modified, as needed, as the project progresses, the design and placement of these devices is the responsibility of the field engineer. Plans representing changes must be submitted for approval if requested by the Building Official.
10. Every effort should be made to eliminate the discharge of non-storm water from the project sites at all times.
11. Eroded sediments and other pollutants must be retained on-site and may not be transported from the site via sheet flow, swales, area drains, natural drainage courses, or wind.
12. Stockpiles of earth and other construction-related materials must be protected from being transported from the site by the forces of wind or water.
13. Fuels, oils, solvents, and other toxic materials must be stored in accordance with their listing and are not to contaminate the soils and surface waters. All approved storage containers are to be protected from the weather. Spills must be cleaned up immediately and disposed of in a proper manner. Spills may not be washed into the drainage system.
14. Excess or waste concrete may not be washed into the public way or any other drainage system. Provisions shall be made to retain concrete wastes on-site until they can be disposed of as solid waste.
15. Developers/contractors are responsible to inspect all Erosion Control Devices and BMPs are installed and functioning properly if there is a 50% or greater probability of predicted precipitation, and after actual precipitation. A construction site inspection checklist and inspection log shall be maintained at the project site at all times and available for review by the Building Official (copies of the self-inspection check list and inspection logs are available upon request).
16. Trash and construction-related solid wastes must be deposited into a covered receptacle to prevent contamination of rainwater and dispersal by wind.
17. Sediments and other materials may not be tracked from the site by vehicle traffic. The construction entrance roadways must be stabilized so as to inhibit sediments from being deposited into the public way. Accidental depositions must be swept up immediately and may not be washed down by rain or other means.
18. Any slopes with disturbed soils or denuded of vegetation must be stabilized so as to inhibit erosion by wind and water.
19. As the engineer/QSD of record, I have selected appropriate BMPs to effectively minimize the negative impacts of this project's construction activities on storm water quality. The project owner and contractor are aware that the selected BMPs must be installed, monitored, and maintained to ensure their effectiveness.

   _____ _____
   Civil Engineer/QSD Signature Date
20. The following notes must be on the plan:

    As the project owner or authorized agent of the owner, "I certify that this document and all attachments were prepared under my direction or supervision in accordance with the system designed to ensure that a qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that submitting false and/ or inaccurate information, failing to update the ESCP to reflect current conditions, or failing to properly and/or adequately implement the ESCP may result in revocation of grading and/or other permits or other sanctions provided by law."

    _____ _____
    Owner or Authorized Representative (Permittee) Date
21. Developers/contractors are responsible to inspect all Erosion Control Devices and BMPs are installed and functioning properly as required by the State Construction General Permit. A construction site inspection checklist and inspection log shall be maintained at the project site at all times and available for review by the Building Official.
22. The following BMPs from the "CASQA Construction BMP Online Handbook" must be implemented for all construction activities as applicable. As an alternative, details from "Caltrans Stormwater Quality Handbooks, Construction Site Best Management Practices (BMP) Manual" may be used. Additional measures may be required if deemed appropriate by the Building Official.

EROSION CONTROL
EC1 – SCHEDULING
EC2 – PRESERVATION OF EXISTING VEGETATION
EC3 – HYDRAULIC MULCH
EC4 – HYDROSEEDING
EC5 – SOIL BINDERS
EC6 – STRAW MULCH
EC7 – GEOTEXTILES & MATS
EC8 – WOOD MULCHING
EC9 – EARTH DIKES AND DRAINAGE SWALES
EC10 – VELOCITY DISSIPATION DEVICES
EC11 – SLOPE DRAINS
EC12 – STREAMBANK STABILIZATION
EC13 – RESERVED
EC14 – COMPOST BLANKETS
EC15 – SOIL PREPARATION/ROUGHENING
EC16 – NON-VEGETATED STABILIZATION

TEMPORARY SEDIMENT CONTROL
SE1 – SILT FENCE
SE2 – SEDIMENT BASIN
SE3 – SEDIMENT TRAP
SE4 – CHECK DAM
SE5 – FIBER ROLLS
SE6 – GRAVEL BAG BERM
SE7 – STREET SWEEPING AND VACUUMING
SE8 – SANDBAG BARRIER
SE9 – STRAW BALE BARRIER
SE10 – STORM DRAIN INLET PROTECTION
SE11 – ACTIVE TREATMENT SYSTEMS
SE12 – TEMPORARY SILT DIKE
SE13 – COMPOST SOCKS & BERMS
SE14 – BIOFILTER BAGS

WIND EROSION CONTROL
WE1 – WIND EROSION CONTROL

TEMPORARY TRACKING CONTROL
TC1 – STABILIZED CONSTRUCTION ENTRANCE EXIT
TC2 – STABILIZED CONSTRUCTION ROADWAY
TC3 – ENTRANCE/OUTLET TIRE WASH

NON-STORMWATER MANAGEMENT
NS1 – WATER CONSERVATION PRACTICES
NS2 – DEWATERING OPERATIONS
NS3 – PAVING AND GRINDING OPERATIONS
NS4 – TEMPORARY STREAM CROSSING
NS5 – CLEAR WATER DIVERSION
NS6 – ILLICIT CONNECTION/DISCHARGE
NS7 – POTABLE WATER/IRRIGATION
NS8 – VEHICLE AND EQUIPMENT CLEANING
NS9 – VEHICLE AND EQUIPMENT FUELING
NS10 – VEHICLE AND EQUIPMENT MAINTENANCE
NS11 – PILE DRIVING OPERATIONS
NS12 – CONCRETE CURING
NS13 – CONCRETE FINISHING
NS14 – MATERIAL AND EQUIPMENT USE
NS15 – DEMOLITION ADJACENT TO WATER
NS16 – TEMPORARY BATCH PLANTS

WASTE MANAGEMENT & MATERIAL POLLUTION CONTROL
WM1 – MATERIAL DELIVERY AND STORAGE
WM2 – MATERIAL USE
WM3 – STOCKPILE MANAGEMENT
WM4 – SPILL PREVENTION AND CONTROL
WM5 – SOLID WASTE MANAGEMENT
WM6 – HAZARDOUS WASTE MANAGEMENT
WM7 – CONTAMINATION SOIL MANAGEMENT
WM8 – CONCRETE WASTE MANAGEMENT
WM9 – SANITARY/SEPTIC WASTE MANAGEMENT
WM10 – LIQUID WASTE MANAGEMENT

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.:

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
EROSION AND SEDIMENT CONTROL PLAN

GRAPHIC SCALE: 1" = 20' (40' 20' 0 10' 20')

PAGE

FIELD BOOK

DRAWING REF. C-16

SHEET 22 OF 37

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SECTION 02900
LANDSCAPE PLANTING

PART 1: GENERAL

A. CONTRACTOR SHALL PROVIDE LABOR, MATERIALS, WEEDING, PLANT MATERIALS, SOIL ADDITIVES, SOIL PREPARATION, PLANTING, MULCHING, AND FACILITIES REQUIRED FOR LANDSCAPING WORK AS INDICATED ON DRAWINGS AND SPECIFIED, COMPLETE.

B. DURING PROGRESS OF THE WORK MAINTAIN AT SITE A SUPERINTENDENT AND ASSISTING PERSONNEL WHO ARE ALL SATISFACTORY TO THE OWNER. SUPERINTENDENT SHALL NOT BE CHANGED, EXCEPT WITH CONSENT OF OWNER. SUPERINTENDENT SHALL REPRESENT CONTRACTOR IN CONTRACTO'S ABSENCE, AND ALL DIRECTION GIVEN TO SUPERINTENDENT SHALL BE BINDING AS IF GIVEN TO CONTRACTOR.

C. PROVIDE AT LEAST ONE PERSON APPROVED BY OWNER WHO SHALL BE PRESENT AT ALL TIMES DURING PRUNING (IF NEEDED) OPERATIONS, WHO SHALL BE THOROUGHLY FAMILIAR WITH TYPE OF WORK INVOLVED, AND WHO SHALL DIRECT ALL PRUNING WORK. TREE PRUNER SHALL HAVE PROOF OF ISA- INTERNATIONAL ASSOCIATION OF ARBORCULTURE ARBORIST CERTIFICATION.

D. INSTALLER QUALIFICATIONS: COMPANY SHALL HAVE A MINIMUM OF 5 YEARS OF DOCUMENTED EXPERIENCE IN INSTALLATION OF PLANT MATERIALS IN THE LOCAL VICINITY.

E. TESTS AND INSPECTIONS: PLANTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL OF LANDSCAPE ARCHITECT AT PLACE OF GROWTH AND / OR UPON DELIVERY FOR CONFORMITY TO SPECIFICATION : SUCH APPROVAL SHALL NOT IMPAIR THE RIGHT OF INSPECTION AND REJECTION DURING PROGRESS OF WORK.

F. PLEASE NOTE: THE PLANT MATERIAL IS NOT READILY AVAILABLE FROM NURSERIES. CONTRACTOR NEEDS TO PLAN FOR THE INSTALLATION A MINIMUM 1 YEAR AHEAD OF ACTUAL PLANTING INSTALLATION BY CONTRACT GROWING THE PLANTS FOR LATER DELIVERY.

G. HEALTH AND VIGOR OF PLANT MATERIAL IS THE SOLE RESPONSIBILITY OF CONTRACTOR.

H. PLANT MATERIALS DELIVERED TO CONTRACTOR THAT ARE FOUND TO BE DIFFERENT THAN SPECIFIED AND OR NOT APPROVED BY CHANGE ORDER, DAMAGED, ROOT BOUND, PLANTED IN IMPROPER GROWTH MEDIA, OR IN DISTRESSED CONDITION SHALL BE REJECTED AND REMOVED FROM SITE AND REPLACED BY APPROVED MATERIALS.

PART 2. SOIL CONFORMANCE:

A. CONTRACTOR SHALL ENGAGE SERVICES OF A QUALIFIED AGRICULTURAL SOIL TESTING LABORATORY TO PERFORM SOIL TESTING SERVICES OF ALL TYPICAL AREAS THAT ARE TO BE PLANTED.

B. SOILS TESTING FOR PLANTING AREAS SHALL BE PERFORMED BY WALLACE LABORATORIES, 365 CORAL CIRCLE, EL SEGUNDO, CA 90245, TEL: (310) 615-0116, FAX: (310) 640-6863.

C. AFTER GRADING WORK HAS BEEN COMPLETED AND PRIOR TO PLANTING OPERATIONS, SOIL AREAS WILL BE TESTED BY DESIGNATED LAB TO CONFIRM SOIL PREPARATION RECOMMENDATIONS AS INDICATED IN THE BASE MINIMUM 6 SOIL SAMPLES SHALL BE PROVIDED BY THE CONTRACTOR. CONTRACTOR SHALL MAKE ADJUSTMENTS TO COMPLY WITH FINAL SOILS PREPARATION RECOMMENDATIONS AS DIRECTED BY SOIL TESTING LABORATORY AND THE LANDSCAPE ARCHITECT.

NOTE: IN THE EVENT CONDITIONS ARE SUBSTANTIALLY DIFFERENT THAN DESCRIBED BASE BID, ADJUSTMENT WILL BE MADE BY CHANGE ORDER AS AGREED UPON WITH OWNER.

D. ALL PROPOSED IMPORT SOIL IF REQUIRED, FOR PLANTING AREAS MUST BE APPROVED BY SOIL TESTING LABORATORY, PRIOR TO DELIVERY TO SITE. COST FOR SOILS TESTS FOR APPROVAL SHALL BE PAID BY CONTRACTOR. CONTRACTOR SHALL IDENTIFY SOURCE OF IMPORTED SOIL. CONTRACTOR'S REPRESENTATIVE SHALL COLLECT SAMPLES AT THE SOURCE AND SHALL SUBMIT SAMPLES TO SOIL TESTING LABORATORY.

E. SERVICES OF THE LABORATORY SHALL BE AS FOLLOWS:

(1) TAKE A MINIMUM OF SIX SAMPLES OR ONE SAMPLE PER 5000 SQ.FT. (WHATEVER QUANTITY IS GREATER) OF BASE SOIL AFTER COMPLETON OF ROUGH GRADING IN LANDSCAPE AREAS AS DIRECTED BY LANDSCAPE ARCHITECT

(2) PROVIDE A CHEMICAL ANALYSIS REPORT OF EACH INDIVIDUAL SAMPLE TO COVER THE FOLLOWING:
- (A) PERCENTAGE OF ORGANIC MATTER
- (B) SALINITY
- (C) PH
- (D) LIME CONTENT
- (E) MINERAL NUTRIENTS , INCLUDING CONCENTRATIONS OF NITROGEN, PHOSPHORUS, POTASSIUM, CALCIUM, MAGNESIUM, IRON, MANGANESE, ZINC, COPPER, SULFUR, AND MOLYBDENUM.
- (F) POTENTIAL HAZARDS OF IMPEDIMENTS TO PLANT GROWTH FROM SALINITY, SODIUM CHLORIDE, BORON, IMPAIRED SOIL STRUCTURE, OR DAMAGE.

(3) CONTRACTOR SHALL PROVIDE RECOMMENDATIONS FOR COMPACTION, ORGANIC MATERIALS, FERTILIZERS, AND OTHER MATERIALS FOUND NECESSARY TO AMMEND BASE SOIL FOR OPTIMUM PLANT GROWTH.

(4) PRESCRIBE A BACKFILL MIX, OR MIXES. AS APPROPRIATE TO BE EMPLOYED IN PLANTING OF ALL PLANTS FOR THE PROJECT.

(5) PROVIDE PERIODIC SAMPLING AND LABORATORY TESTING OF PREPARED LANDSCAPE PLANTING AREAS TO ENSURE COMPLIANCE WITH RECOMMENDATIONS. AREAS OF TESTING AND QUANTITY OF TESTS SHALL BE AS DIRECTED BY CITY.

(6) TESTING LABORATORY SHALL FOLLOW THE STANDARDS SET FORTH IN THE USDA AGRICULTURAL SUITABILITY TEST IN ACCORD WITH HANDBOOK-60 AND THE UNIVERSITY OF CALIFORNIA SOIL FERTILITY TEST FOR SOILS ANALYSIS.

2.1 SUBMITTALS

A. SUBMIT MANUFACTURER'S DATA SHEETS ON **ALL** PRODUCTS INCLUDING AMENDMENTS, SOILS PLANT MATERIALS, COBBLES AND MULCHES ETC. INDICATE SPECIFIC PIECE, ITEM, OR PART NUMBER.

B. SUBMIT DOCUMENTATION TO LANDSCAPE ARCHITECT FOR APPROVAL WITHIN 30 DAYS OF GENERAL CONTRACT AWARD AND A MINIMUM 1 (ONE) YEAR PRIOR TO INSTALLATION MATERIALS BY SIZE, SOURCE, AND QUANTITY REQUIRED.

C. PLEASE NOTE THAT DUE TO SHORTAGES, PLANT MATERIALS WILL MOST LIKELY NEED TO BE CONTRACT GROWN TO ENSURE AVAILABILITY. IT IS THE GENERAL CONTRACTOR'S RESPPONSIBILITY TO HIRE THE LANDSCAPE SUBCONTRACTOR AT THE BEGINNING OF THE JOB TO ENSURE THE REQUITRED COMPLETION DATE DELIVERY OF THE PROJECT.

D. ALL SUBSTITUTIONS DUE TO UNAVAILABILITY SHALL BE REQUESTED IN WRITING PRIOR TO CONFIRMATION OF ORDERING . ALL MATERIALS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY LANDSCAPE ARCHITECT AND OWNER.

E. CERTIFICATIONS: AFTER LANDSCAPE IRRIGATION AND PLANTING WORK HAVE BEEN COMPLETED AND APPROVED BY THE LANDSCAPE ARCHITECT, PROVIDE A LETTER TO OWNER STATING THAT WORK HAS BEEN DONE IN ACCORD WITH DRAWINGS AND SPECIFICATIONS, AND IT IS AGREED THAT THE MAINTENANCE PERIOD SHALL COMMENCE ON (DAY , DATE, YEAR).

2.2 PROJECT CONDITIONS

A. PROTECT AND MAINTAIN ALL SURROUNDING EXISTING PLANT MATERIALS. THIS INCLUDES MAINTAINING ALL PROTECTIVE BARRIERS IN PLACE. VEHICLES AND EQUIPMENT SHALL NOT BE PARKED, SERVICED, OR OPERATED WITHIN THE DRIP LINE OF EXISTING STREET TREES OR WITHIN NEWLY PLANTED AREAS. PERSONNEL NOT REQUIRED FOR INSTALLATION WORK SHALL BE BARRED FROM THE PLANTED AREA.

B. SEQUENCING: DO NOT COMMENCE PLANTING UNTIL SITE GRADING, AND WALKWAY CONSTRUCTION IS COMPLETED, SOIL IMPORT AND PREPARATION, IRRIGATION, HAVE BEEN COMPLETED AND APPROVED BY LANDSCAPE ARCHITECT. (PLEASE NOTE SLOPE PLANTERS SHALL NOT BE RIPPED, BUT LARGE PLANTING HOLES ARE REQUIRED, SEE DETAIL ON PLANS.)

2.3 WARRANTY

A. WARRANT ALL PLANT MATERIALS FOR A PERIOD OF 365 DAYS (12 MONTHS) AFTER DATE OF ACCEPTANCE BY LANDSCAPE ARCHITECT.

B. UPON WRITTEN NOTICE FROM LANDSCAPE ARCHITECT AND OR OWNER, PROMPTLY REPLACE ALL DEAD, DYING OR DAMAGED PLANT MATERIALS DURING WARRANTY PERIOD AS DETERMINED BY CONTRACT.

C. REPLACEMENT OF PLANT MATERIALS SHALL BE AT THE SIZE REJECTED BY OWNER, EXCEPT MATERIALS THAT HAVE BEEN REJECTED DUE TO ACTS OF GOD WILL BE REPLACED AT OWNER'S EXPENSE. ACTS OF GOD DO NOT INCLUDE DISEASES, PESTS OR MOISTURE EXTREMES NOTED HEREIN.

PART 3 MATERIALS/PRODUCT HANDLING

A. DELIVERY:

1. DELIVER FERTILIZER TO SITE IN ORIGINAL UNOPENED CONTAINERS BEARING MANUFACTURER'S GUARANTEED CHEMICAL ANALYSIS, NAME, TRADEMARK AND CONFORMANCES TO STATE LAW, DELIVER BULK MATERIALS TO SITE WITH CERTIFICATE THAT INCLUDES MANUFACTURERS, QUANTITY, CHEMICAL ANALYSIS, TRADEMARK, AND CONFORMANCES TO STATE LAW. CONTRACTOR SHALL SECURE WORK STAGING AND STORAGE AREA NEAR THE SITE FROM THE CITY OF REDONDO BEACH..

2. FURNISH RECEIPTS FOR ALL SOIL STABILIZATION PRODUCTS, IMPORTED SOILS, AMENDMENTS, PLANT MATERIALS, ETC TO OWNER.

3. DELIVER ALL PLANTS WITH LEGIBLE IDENTIFICATION LABELS.

4. PROTECT ALL MATERIALS ESPECIALLY PLANT MATERIAL DURING DELIVERY TO PREVENT DAMAGE.

5. NOTIFY LANDSCAPE ARCHITECT 7 DAYS IN ADVANCE OF DELIVERY OF ALL SUPPLIED PLANT MATERIALS AND SUBMIT AN ITEMIZED LIST OF PLANTS INCLUDED IN EACH DELIVERY.

B. STORAGE:

1.PLANT MATERIALS SHALL BE MAINTAINED HEALTHY AND VIGOROUS. THIS INCLUDES, BUT IS NOT LIMITED TO, ACQUIRE ALL NECESSARY CITY PERMITS, MAINTAINING ROOT BALLS WITH ADEQUATE MOISTURE. STORAGE SHALL BE MINIMIZED AS THE SITE IS AN ACTIVE URBAN AREA. CONTRACTOR MUST ARRANGE SECURED STORAGE NEAR THE SITE IF REQUIRED, AND OR ARRANGE FOR DAILY DELIVERIES AND PLANT AND INSTALL ONLY THE MATERIALS THAT CAN BE INSTALLED DAILY.

2. DO NOT STORE PLANTS DIRECTLY ON ASPHALT PAVING. PROVIDE SHADE AND WATER FOR STORED PLANT CONTAINERS IN OUTDOOR STORAGE AREAS.

C. ORGANIC AMENDMENT:

1. HUMUS MATERIAL SHALL HAVE AN ASH CONTENT OF NOT LESS THAN 8% AND NOT MORE THAN 50 %.

2. THE PH OF THE MATERIAL SHALL BE BETWEEN 6 AND 7.5.

3. THE SALT CONTENT SHALL BE LESS THAN 10 MILLIMHO/CM AT 25 DEGREE CELCIUS (ECE LESS THAN 10) IN A SATURATED PASTE EXTRACT. THE MAXIMUM RATE OF APPLICATION SHALL NOT EXCEED 15% BY VOLUME UNLESS THE SALINITY IS LOWER THAN 10 MILLIMHO/CM AT 25 DEGREE CELCIUS.

4. BORON CONTENT OF THE SATURATED EXTRACT SHALL BE LESS THAN 1 PART PER MILLION.

5. SILICON CONTENT (ACID-INSOLUBLE ASH) SHALL BE LESS THAN 20%.

6. CALCIUM CARBONATE SHALL NOT BE PRESENT.

7. TYPES OF ACCEPTABLE PRODUCTS ARE COMPOSTS, MANURES, MUSHROOM COMPOSTS, STRAW, ALFAFA, PEAT MOSSES, ETC., LOW IN SALTS, LOW IN HEAVY METALS, FREE FROM WEED SEEDS, FREE OF PATHOGENS, AND OTHER DELETERIOUS MATERIALS.

8. APPROVED SOIL AMENDMENT SUPPLIERS:

A. EARTH WORKS- COMPOSTED WASHED STEER MANURE, TEL: (310) 322-9702.

B. AGUINAGA FERTILIZER CO.- HYDRO BLEND TEL: (949) 786-9558.

C. CAL-BLEND COMPOSTED GRASS, TEL: (800) 425 -3631.

9. COMPOSED WOOD PRODUCTS ARE CONDITIONALLY ACCEPTABLE (STABLE HUMUS SHALL BE PRESENT). WOOD BASED PRODUCTS ARE NOT ACCEPTABLE WHICH ARE BASED ON REDWOOD OR CEDAR. CONTRACTOR SHALL SUBMIT RECENT SOIL TESTS OF WOOD BASED HUMUS PRODUCTS PRIOR TO DELIVERY TO SITE. ALL HUMUS MATERIALS WILL BE ASSESSED ACCORDING TO THE STANDARDS IN THESE SPECIFICATIONS.

10. SLUDGE BASED MATERIALS ARE NOT ACCEPTABLE.

11. CARBON NITROGEN RATIO SHALL BE LESS THAN 20:1.

12. THE COMPOST SHALL BE AEROBIC WITHOUT MALODOROUS PRESENCE OF DECOMPOSITION PRODUCTS.

D. WATER: FURNISHED BY CITY DISTRIBUTION AND CONNECTIONS BY CONTRACTOR.

E. ON-SITE AND IMPORT SOIL MATERIALS FOR PLANTING AREA SHALL BE AS FOLLOWS:

1. SOIL: FREE OF ROOTS, CLODS, AND STONES LARGER THAN 1 IN. IN THE GREATEST DIMENSION, POCKETS OF COURSE SAND, NOXIOUS WEEDS, STICKS, BRUSH, AND OTHER LITTER. IT SHALL NOT BE INFESTED WITH NEMATODES OR OTHER UNDESIRABLE DISEASE ORGANISMS SUCH AS INSECTS AND PLANT PATHOGENS. SOIL SHALL BE FRIABLE AND HAVE SUFFICIENT STRUCTURE IN ORDER TO GIVE GOOD TILTH AND AERATION TO THE SOIL. TOTAL PORE SPACE CONTENT ON A VOLUME/VOLUME BASIS SHALL BE AT LEAST 15 % WHEN MOISTURE IS PRESENT AT FIELD CAPACITY. SOIL SHALL HAVE A FIELD CAPACITY OF AT LEAST 15% BY WEIGHT.

2. GRADATION LIMITS: SOIL SHALL BE SANDY LOAM, OR LOAM, AND SIMILAR TO THE SITE SOIL. THE SELECTION SHALL BE ACCEPTABLE TO CITY'S SITE GEOTECHNICAL ENGINEER AND AGRONOMIST. THE DEFINITION OF SOIL TEXTURE SHALL BE IN ACCORD WITH USDA CLASSIFICATION SCHEME. OBTAIN CITY'S APPROVAL PRIOR TO GRADING OPERATIONS.

3. PERMEABILITY RATE: HYDRAULIC CONDUCTIVITY RATE SHALL BE LESS THAN 1 IN. PER HOUR NOT MORE THAN 20 IN . PER HOUR WHEN TESTED IN ACCORD WITH USDA HANDBOOK NO. 60, METHOD 34B OR THER CITY APPROVED METHODS.

4. ACIDITY: SOIL PH RANGE MEASURED IN THE SATURATION EXTRACT (USDA HANDBOOK NO. 60, METHOD 21A) SHALL BE 6.0 TO 7.9.

5. SALINITY: SALINITY RANGE MEASURED IN THE SATURATION EXTRACT (USDA HANDBOOK NO. 50, METHOD 3A) SHALL BE 0.5 TO 2.0 DS/M. IF CALCIUM IONS AND SULFATE IONS BOTH EXCEED 10 MILLIEQUIVALENTS PER LITER IN THE SATURATION EXTRACT THE MAXIMUM SALINITY SHALL BE 4.0 DS/M.

6. CHLORIDE: MAXIMUM CONCENTRATION OF SOLUBLE CHLORIDE IN THE SATURATION EXTRACT (USDA HANDBOOK NO. 60, METHOD 3A) SHALL BE 150 MG/1 PARTS PER MILLION).

7. BORON: MAXIMUM CONCENTRATION OF SOLUBLE BORON IN THE SATURATION EXTRACT (USDA HANDBOOK NO. 60, METHOD 3A) SHALL BE 150 MG/1 (PARTS PER MILLION).

8. SODIUM ABSORPTION RATION (SAR): MAXIMUM SAR SHALL BE 6 MEASURED IN ACCORD WITH USDA HANDBOOK NO. 60, METHOD 20B.

9. SOIL ORGANIC MATTER CONTENT: SUFFICIENT SOIL ORGANIC MATTER SHALL BE PRESENT TO IMPART GOOD PHYSICAL SOIL PROPERTIES, BUT NOT BE EXCESSIVE TO CAUSE TOXICITY OR CAUSE EXCESSIVE REDUCTION IN THE VOLUME OF SOIL DUE TO DECOMPOSITION OF ORGANIC MATTER. CALCIUM CARBONATE CONTENT- FREE CALCIUM CARBONATE (LIMESTONE) SHALL NOT BE PRESENT.

10. FERTILITY-RANGE OF ESSENTIAL ELEMENTAL CONCENTRATION IN SOIL SHALL BE AS FOLLOWS:

ELEMENT	LOW [1]	HIGH [1]
PHOSPHORUS	2	40
POTASSIUM	40	220
IRON	2	35
MANGANESE	0.3	6
ZINC	0.6	8
COPPER	0.1	5
BORON	0.2	1
MAGNESIUM	50	150
SODIUM	0	100
SULFUR	25	500
MOLYBDERUM	0.1	30

[1] AMMONIUM BICARBONATE/DTPA EXTRACTABLE, PARTS PER MILLION (MG/KILOGRAM), DRY WEIGHT BASIS.

11. HEAVY METIALS: MAXIMUM PERMISSIBLE ELEMENTAL CONCENTRATION IN SOIL SHALL NOT EXCEED THE FOLLOWING:

METAL	PARTS PER MILLION (MG/KG)
ARSENIC	3
CADMUIUM	2
CHROMIUM	10
COBALT	2
LEAD	30
MERCURY	1
NICKEL	5
SELENIUM	3
SILVER	0.5
VANADIUM	3

12. PLEASE NOTE: TRI-C MYCO TABLETS ARE REQUIRED TO BE INSTALLED FOR ALL PLANTS IN THIS CONTRACT AT THE FOLLOWING RATES: 1GAL PLANTS 2 TABLETS, 5 GAL PLANTS 8 TABLETS,15 GAL PLANTS 22 TABS, 24" BOX 22 TABS ETC. TABS ARE AVAILABLE FROM TRI-C ENTERPRISES TEL:800.927.3311. WWW.NATURAL SOLUTIONS.COM. PLEASE NO SUBSTITUTIONS. . .

F. JUTE MATTING: JUTE MATTING SHALL BE INSTALLED OVER THE ENTIRE SITE PRIOR TO PLANTING.

PART 4: EXECUTION

4.1 EXAMINATION

A. ENSURE THAT FINAL GRADES TO +/-0.10 FT. HAVE BEEN ESTABLISHED PRIOR TO COMMENCING PLANTING OPERATIONS. PROVIDE FOR INCLUSION OF ALL AMENDMENTS, SETTLING, AND OTHER PREPARATORY NEEDS. BE RESPONSIBLE TO SEE THAT FINISH GRADING OF ALL PLANTING AREAS IS AS INDICATED ON CIVIL ENGINEERING PLANS AND AS DIRECTED BY LANDSCAPE ARCHITECT/ OWNER.

B. INSPECT SHRUBS, AND GROUND COVER PLANT MATERIAL FOR INJURY AND INSECT INFESTATION, AND SHRUBS FOR IMPROPER PRUNING. IN THE EVENT OF INJURY, INSECT INFESTATION, AND /OR IMPROPER PRUNING, IT SHALL BE BROUGHT TO OWNER'S ATTENTION FOR DIRECTION AS TO REMEDIAL ACTION TO BE TAKEN.

C. DO NOT BEGIN PLANTING OF ANY PLANTS UNTIL DEFICIENCIES HAVE BEEN CORRECTED OR PLANTS REPLACED, AS THE CASE MAY BE, UNLESS DIRECTED OTHERWISE BY LANDSCAPE ARCHITECT/ OWNER.

4.2 PREPARATION

A WEED CONTROL:

1. BEFORE AND DURING PRELIMINARY AND FINISH GRADING, DIG OUT ALL WEEDS AND GRASSES BY ROOTS AND DISPOSE OF OFF-SITE. PRIOR TO PLANTING, ELIMINATE ANY WEEDS PRESENT IN DELIVERED PLANT STOCK. GRASSES NOT OF PERENNIAL TYPE, EXCEPT FOR TORPEDO GRASS AND NUT GRASS, LESS THAN 2 ½ IN. HIGH AND NOT BEARING SEEDS MAY BE TURNED UNDER. PERENNIAL WEEDS AND GRASSES TO BE REMOVED INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   - A.. NUT GRASS
   - B. ST. AUGUSTINE
   - C. PUNCTURE VINE
   - D. MORNING GLORY
   - E. DOG FENNEL
   - F. TORPEDO GRASS
   - G. COMMON BERMUDA GRASS
   - H. KIKUYU GRASS
2. SITE SHALL BE MAINTAINED WEED-FREE THROUGHOUT PLANTING OPERATIONS AND UNTIL FINAL ACCEPTANCE BY OWNER. PRIOR TO MULCHING, APPLY PREEMERGENT HERBICIDE FOR ALL SHRUB AND GROUNDCOVER AREAS CONSISTING OF RONSTAR, OR APPROVED EQUAL, WITH A DYE MARKER.
3. SUBMIT A WEED CONTROL PROGRAM TO OWNER FOR APPROVAL WITHIN 30 DAYS AFTER AWARD OF CONTRACT AND PRIOR TO STARTING WORK. INCLUDE ALL PRODUCT INFORMATION AND FREQUENCY OF WEED CONTROL OPERATIONS.

B. PREPLANTING SOIL PREPARATION FOR ALL PLANTED AREAS:

1. ALL PLANTED AREAS AREAS ARE SLOPE AREAS! SOIL PREPARATION SHALL BE LIMITED TO THE BACK FILL SOILS AT EACH PLANT PIT AREA. OWNER'S REPRESENTATIVE SHALL OBSERVE INITIAL PLANTING AND WILL REQUEST TEST FOR PERCOLATION OF THE PLANTED AREAS. IF PLANTER BOTTOMS DO NOT PERCOLATE, IF REQUIRED DRAINAGE HOLES SHALL BE INSTALLED AND PAID FOR BY CHANGE ORDER.
2. SOIL FOR PLANTING SHALL BE FREE OF ROCKS OVER ½ IN. IN DIAMETER, AND FREE OF FOREIGN DEBRIS, REFUSE, PLANTS OR ROOTS, CLODS, WEEDS, STICKS, SOLVENTS, PETROLEUM PRODUCTS, CONCRETE, BASE ROCK OR OTHER DELETERIOUS OR UNDESIRABLE AND UNWANTED MATERIALS. SOIL SHALL BE FREE OF SOIL-BORNE DISEASES AND CAPABLE OF SUSTAINING HEALTHY PLANT MATERIAL LIFE. MATERIALS NOT MEETING SUCH REQUIREMENTS SHALL BE REMOVED, INCLUDING ALL TEMPORARY ROAD BASES OR PAVEMENT ALREADY IN PLACE.

C. LANDSCAPE EROSION CONTROL:

1. PROVIDE SAND BAGS, SOD, AND /OR EROSION CONTROL SILT FENCE AT DRAINAGE SWALES UNTIL PLANTING IS ESTABLISHED AND SOIL HAS BEEN STABILIZED. SEE SECTION 02370, EROSION AND SEDIMENTATION CONTROL, FOR ADDITIONAL REQUIREMENTS.
2. REPAIR ALL SCARS CAUSED BY EROSION, AS APPROVED BY OWNER/CIVIL ENGINEER.

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER
RAFAEL J. HOLCOMBE
No.7C-67966
Exp.06-30-25
CIVIL
STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
PLANTING SPECIFICATIONS (1 OF 2)

GRAPHIC SCALE
PAGE
FIELD BOOK

DRAWING REF. L-1

SHEET 23 OF 37

DRAWING NO.

TETRA TECH
www.tetratech.com
17885 VON KARMAN AVE #500,
IRVINE, CA 92614
PHONE: (949) 809-5000

LAST SAVED BY: ryan.cheyne
PLOT DATE: 7/14/25
SAVED PATH: C:\Users\Nancyz\Downloads\01 Baselfies

E. TOP SOIL PLACEMENT:

1. CONTRACTOR SHALL SUBMIT TO THE OWNER A SOIL HANDLING PROGRAM BASED ON THE SOIL LABORATORY TESTS RECOMMENDATIONS, THAT SHALL OUTLINE THE SPECIFIC PROCEDURES OF HANDLING IMPORT SOILS IF REQUIRED.

2. THE INTENT OF THIS PROJECT IS TO USE ON SITE SOILS, SCREENED OF ROCKS AND CENTRALLY MIXED AND AMENDED ACCORDING TO THE SOIL TESTING LAB'S RECOMMENDATIONS

3. THE AMENDED CENTRALLY MIXED SOILS SHALL BE PLACED IN THE DESIGNATED PLANTERS, AND WATERED MAINTAINING THE MAXIMUM 85 % COMPACTION OF THE SOIL IN THE PLANTED AREAS. PLEASE NOTE DELIVERY TRUCKS CAN NOT DRIVE ON SITE TO DELIVER SOIL IN PLACE. CONTRACTOR SHALL MIX BACKFILL OFF SITE AND DELIVER AMENDED SITE SOILS TO EACH PLANTING AREA. INSTALLING CONTRACTOR'S SOIL HANDLING PROCEDURES SHALL INCLUDE BUT NOT BE LIMITED TO THE USE OF VARIOUS EQUIPMENT, DELIVERY SCHEDULING, FLOTATION TIRES, ETC.

4. ANY SOILS THAT ARE OVER COMPACTED AT ANY TIME OF THE PROJECT SHALL BE RESTORED TO UNCOMPACTED STATE AT NO COST TO THE OWNER.

F. SOIL AMENDING:

1. SOIL PREPARATION FOR PLANTINGS: AFTER APPROXIMATE FINISHED GRADES HAVE BEEN ESTABLISHED, SOIL COMPACTION HAS BEEN VERIFIED TO NOT EXCEED 85 % COMPACTION, PITS FOR PLANTS SHALL BE DUG AND CENTRALLY MIXED SOIL IS AMENDED FOR BACKFILLING, THE FOLLOWING ORGANIC, SOIL AMENDMENTS, AND FERTILIZER RATES AND QUANTITIES SHALL BE USED FOR BID BASIS ONLY. FINAL SPECIFIC PLANTING SPECIFICATIONS WILL BE MADE AFTER ROUGH GRADING OPERATIONS ARE COMPLETE AND SOIL SAMPLES HAVE BEEN TESTED BY OWNER.

NOTE: IN THE EVENT CONDITIONS ARE SUBSTANTIALLY DIFFERENT THAN DESCRIBED BASE BID, ADJUSTMENT WILL BE MADE BY CHANGE ORDER AS AGREED UPON WITH OWNER.

2 AMENDMENT APPLICATION RATES PER VOLUME PER CUBIC YARD BASIS.

A.. ORGANIC AMENDMENT: 15 % BY VOLUME / 2 CU. YD (HUMUS MATERIAL)
B. COMMERCIAL FERTILIZERS: SINGLE SUPERPHOSPHATE (0-20-0): 1/2 LB.
C. POTASSIUM SULFATE (0-0-50): 1/3 LB.
D. UREAFORMALDEHYDE (38-0-0): 1/4 LB.
E. GYPSUM: 1/2 LB

4. DO NOT COMMENCE PLANTNG, UNTIL LANDSCAPE IRRIGATION SYSTEM HAS BEEN COMPLETED, FINAL GRADES HAVE BEEN ESTABLISHED, PLANTING AREAS HAVE BEEN PROPERLY GRADED AND JUTE MATTING INSTALLED, AND THE WORK HAS BEEN APPROVED BY OWNER.

5. ALL PLANTINGS SHALL BE PLANTED IN OVERSIZED APPROXIMATELY 3 HOLES PARALLEL TO THE SLOPE HOLES PER THE DETAILS IN THE DRAWINGS.

6. REMOVE EACH PLANT FROM ITS CONTAINER AND PLANT IT IN SUCH A MANNER THAT WHEN SETTLED, IT BE 1-2 IN. HIGHER IN RELATION TO CONSTRUCTED FINISHED GRADE. PLACE EACH PLANT IN CENTER OF PIT AND BACKFILL, UNLESS SPECIFIED OTHERWISE, WITH PREPARED SOIL. FILLING WILL NOT BE PERMITTED AROUND TRUNKS OR STEMS. PROPERLY CUT OFF ALL BROKEN OR FRAYED ROOTS.

G. LAYOUT OF MAJOR PLANTINGS:

1. CONFIRM WITH CITY AND GOVERNING AGENCIES LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS. IF UNDERGROUND CONSTRUCTION OR UTILITY LINES ARE ENCOUNTERED DURING EXCAVATING OF PLANTING AREAS, OTHER LOCATIONS FOR PLANTING MAY BE SELECTED BY THE LANDSCAPE ARCHITECT.

2. LOCATIONS FOR PLANTS AND OUTLINES OF AREAS TO BE PLANTED SHALL BE LOCATED BY FLAG LOCATIONS FOR ALL PLANT MATERIAL SHALL BE AS DIRECTED AND APPROVED BY THE LANDSCAPE ARCHITECT AND OR OWNER. LANDSCAPE ARCHITECT AND OR OWNER WILL HAVE SOLE RESPONSIBILITY TO DETERMINE FINAL PLANT MATERIALS LOCATIONS BASED ON FIELD CONDITIONS AND DESIGN INTENT.

3. INSPECT AND APPROVE ALL LANDSCAPE IRRIGATION WORK AND FINISH GRADING PRIOR TO START OF SHRUB PLANTING AS SPECIFIED. INTERIM WATERING SHALL INCLUDE PROVIDING TEMPORARY DRIP IRRIGATION TO ALL PLANT MATERIALS. REFER TO IRRIGATION DRAWINGS AND SPECIFICATIONS FOR REQUIREMENTS.

4. INSTALL EXCAVATED HOLES IN PER LOCATIONS ON THE DRAWINGS.

A. EXCESS SOIL GENERATED FROM PLANTING PITS AND NOT USED AS BACKFILL, OR WATER BASINS, CAN BE SPREAD OUT AND DISTRIBUTED ON THE SITE IF APPROVED BY CIVIL ENGINEER.

B. CENTER PLANTS IN PIT OR TRENCH. FACE PLANTS WITH FULLEST GROWTH AS DIRECTED BY LANDSCAPE ARCHITECT.

C. SET EACH PLANT PLUMB AND HOLD RIGIDLY IN POSITION UNTIL SOIL HAS BEEN TAMPED FIRMLY AROUND BALL OR ROOTS. PLANT ALL SHRUBS TO EXPOSE ORIGINAL SOIL AT ROOT CROWN.

D. USE THE BACKFILL DESCRIPTION SPECIFIED, PLEASE NOTE: THE SUGGESTED MIX IS INTENDED TO BE USED FOR BID BASIS ONLY. THE SPECIFIC BACKFILL SHALL BE MADE AFTER ROUGH GRADING OPERATIONS HAVE BEEN COMPLETED AND SOIL SAMPLES HAVE BEEN TESTED AND MIXES HAVE BEEN APPROVED BY THE LANDSCAPE ARCHITECT AND THE OWNER.

NOTE: IN THE EVENT CONDITIONS ARE SUBSTANTIALLY DIFFERENT THAN DESCRIBED IN BASE BID, ADJUSTMENT WILL BE MADE BY CHANGE ORDER AS AGREED UPON WITH OWNER.

5. IN A CENTRALIZED AREA, "CENTRAL MIX" ALL BACKFILL SOIL TO ACHIEVE A UNIFORM BLEND OF AMENDMENTS. THE INTENT IS TO ACHIEVE WELL-BLENDED SOIL AND NOT AMEND EACH PLANTING HOLE AT THE PLANT PIT. CLEAN UP UNUSED EXCAVATED SOIL AND DISPOSE AS DIRECTED BY CIVIL ENGINEER.PROTECT MIX FROM WATER UNTIL IT HAS BEEN PLACED AS BACKFILL AROUND PLANTS.

6. WHEN HARDPAN, MUCK, OR UNSUITABLE SOIL IS ENCOUNTERED, BREAK THROUGH TO CLEAN SOIL AND BACKFILL WITH PREPARED BACKFILL AS DIRECTED. LOOSEN COMPACTED SOIL AT SIDES AND BOTTOMS BY SCARIFYING OR OTHER APPROVED METHOD. SET ALL PLANTS TO FINISH GRADE AND FILL PIT WITH PREPARED SOIL, PROGRESSIVELY SETTLING SOIL ABOUT ROOT BALL BY WATER JETTING AND FLOODING TO REMOVE VOIDS.

7. CONTAINER REMOVAL: DO NOT INJURE ROOT BALL.

8. SET PLANT IN CENTER OF PIT IN A VERTICAL POSITION SO THAT CROWN OF BALL BE LEVEL WITH FINISH GRADE AFTER ALLOWING FOR WATERING AND SETTLING. PRIOR TO PLANTING SCARIFY ROOT BALL AS NEEDED OR AS REQUIRED BY THE LANDSCAPE ARCHITECT TO CUT ANY CIRCULAR ROOT SYSTEMS. TWO (2) INCH OF ROOT CROWN SHALL BE ABOVE FINISHED GRADE. SLOPE SOIL TO AVOID WATER COLLECTING AT BASE OF PLANT. PLANTS THAT ARE PLANTED AND DO NOT CONFORM TO THE ABOVE SPECIFICATIONS SHALL BE REPLANTED AT NO COST TO THE OWNER.

9. WATER BASINS

A. AFTER BACKFILLING CONSTRUCT AN EARTHEN BASIN AROUND EACH PLANT. EACH BASIN SHALL BE OF A DEPTH OF SUFFICIENT TO HOLD AT LEAST 3 IN. OF WATER. IF EROSION OCCURS, RECONSTRUCT WATER BASIN UNTIL FINAL ACCEPTANCE.

B. SHRUBS SHALL BE PLANTED SO AS TO EXPOSE ORIGINAL SOIL AT ROOT CROWN.

10. WATER THOROUGHLY IMMEDIATELY FOLLOWING PLANTING. BACKFILL ALL VOIDS WHICH DEVELOP WITH ADDITIONAL PREPARED PLANTING SOIL TO BRING TO FINISH GRADE. INSTALL REQUIRED SOIL MULCH AND OR ROCK COBBLES.

11. MONITOR SHRUB ROOT BALLS FOR ADEQUATE MOISTURE CONTENT. DEEP WATER TO MAINTAIN MOISTURE SUPPLY.

A. USE WATER WANDS, TEMPORARY MICRO SPRAYS, OR FLOODING OF ROOT BALLS AS NEEDED TO MAINTAIN WATER MOISTURE. DO NOT CAUSE THE SOIL TO BECOME CRUSTED. DO NOT CREATE LARGE HOLES IN THE SOIL FROM "WATER JETTING". AFTER THE TREE IS BACKFILLED AND AIR POCKETS HAVE BEEN REMOVED, KEEP THE ROOT BALL MOIST BUT NOT WATER LOGGED NOR TOO DRY TO PROMOTE HEALTHY ROOT AND CANOPY GROWTH. PLANT MATERIAL THAT DIES DUE TO IMPROPER WATER SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.

B. ALL PLANTS WHICH SETTLE DEEPER THAN SURROUNDING GRADE SHALL BE RAISED TO CORRECT LEVEL. THE PLANT PIT SHALL CAREFULLY EXCAVATED, AND PLANT ROOTBALL SHALL BE RAISED WITH ADDITIONAL BACKFILL MIX. AT THIS STAGE, WATER SHALL BE ADDED TO TOP OF PARTLY FILLED HOLE TO THOROUGHLY SATURATE ROOT BALL AND ADJACENT SOIL. PLANTS SHALL BE PLANTED SUCH THAT SOIL AT ROOT CROWN SHALL BE FLUSH WITH FINISHED GRADE. CONTRACTOR SHALL REPLANT MATERIALS NOT MEETING FINAL GRADES AT NO COST TO OWNER.

C. PRUNING SHALL BE LIMITED TO THE MINIMUM NECESSARY TO REMOVE INJURED TWIGS AND BRANCHES AND TO SHAPE PLANTS FOR DESIGN INTENT AS DIRECTED BY THE LANDSCAPE ARCHITECT TO INCLUDE, BUT NOT BE LIMITED TO, LIFTING OF BRANCH STRUCTURE, THINNING OF CANOPY, AND ELIMINATION OF CROSS-BRANCHING. PRUNING MAY NOT BE DONE PRIOR TO DELIVERY OF PLANTS AND ONLY AS DIRECTED BY AN EXPERIENCED AND CITY APPROVED ARBORIST. PRUNING PAINT SHALL NOT BE USED.

D. STAKING: STAKING OF ALL TREES SHALL BE COMPLETED IMMEDIATELY AFTER PLANTING. ALL STAKES SHALL BE INSTALLED PLUMB AND AS INDICATED ON DRAWINGS.

12. FINAL GRADES:

A. FINISH GRADING SHALL ENSURE PROPER DRAINAGE OF SITE AS DETERMINED BY CIVIL ENGINEERING GRADING PLANS (C-SERIES DRAWINGS).

B. AREAS SHALL BE GRADED SUCH THAT FINAL GRADES WILL BE 2 IN. BELOW ADJACENT PAVED AREAS, SIDEWALKS, VALE BOXES, HEADERS, CLEAN-OUTS, DRAINS, MANHOLES, AND SIMILAR CONDITIONS, UNLESS OTHERWISE INDICATED IN DRAWINGS.

C. SURFACE DRAINAGE SHALL BE AWAY FROM BUILDING FOUNDATIONS AT ¼ IN. PER FT. TO ENSURE IN WATER RUNOFF.

E. SOIL SETTLEMENT, TRENCHES AND CENTRALLY MIXED BACKFILL SOIL INSTALLATION THAT EXHIBIT SETTLEMENT SHALL BE RECEIVE ADDED BACKFILL, TO CONFORM TO SPECIFIED REQUIREMENTS.

F. ELIMINATE ALL EROSION SCARS AFTER EACH EROSION EVENT AND PRIOR TO COMMENCING MAINTENANCE PERIOD, UNLESS DIRECTED OTHERWISE BY OWNER.

G. JUTE MATTING SHALL BE INSTALLED AND MAINTAINED..

H. CLEAN-UP

A PICK UP ALL TRASH RESULTING FROM THIS WORK NO LESS FREQUENTLY THAN ONCE EACH WORK DAY OF EACH WEEK. OR AS DIRECTED BY OWNER. ALL TRASH SHALL BE REMOVED COMPLETELY FROM SITE. AFTER PLANTING OPERATIONS HAVE BEEN COMPLETED, REMOVE TRASH, EXCESS SOIL, EMPTY PLANT CONTAINERS, AND RUBBISH FROM PROPERTY. SCARS, RUTS, AND OTHER MARKS IN GROUND CAUSED BY THIS WORK SHALL BE REPAIRED AND GROUND LEFT NEAT AND ORDERLY THROUGHOUT.

B. LEAVE SITE AREA BROOM-CLEAN AND WASH DOWN ALL PAVED AREAS WITHIN CONTRACT AREA, LEAVING PREMISES IN A CLEAN CONDITION. ALL WALKS SHALL BE LEFT IN A CLEAN AND SAFE CONDITION.

C. COMPLETED WORK SHALL BE MAINTAINED AND PROTECTED FROM DAMAGE INCLUDING PROVIDING AND MAINTAINING OF TEMPORARY BARRIERS.

I. OBSERVATION SCHEDULE

A. NOTIFY OWNER/ LANDSCAPE ARCHITECT IN ADVANCE FOR THE FOLLOWING SITE VISITS, ACCORDING TO THE TIME INDICATED:

B. PRE-JOB CONFERENCE: 7 DAYS

C. FINAL GRADE REVIEW: 48 HOURS

D. PLANT MATERIAL REVIEW: 48 HOURS

E. PLANT LAYOUT REVIEW: 48 HOURS

F. SOIL PREPARATION AND PLANTING OPERATIONS. ONE TREE WITH EACH TYPE OF SPECIFIED STAKING AND GUYING SHALL BE APPROVED PRIOR TO PLANTING OF ALL OTHER TREES: 48 HOURS.

G. PREMAINTENANCE: 7 DAYS

H. FINAL WALK-THROUGH: 7 DAYS

J. PROTECTION:

A. CONTINUOUSLY PROTECT ALL PLANTED AREAS, PLANT MATERIALS, AND SUPPORTS UNTIL FINAL ACCEPTANCE OF WORK.

B. PROTECT WORK COMPLETED BY OTHER TRADES FROM DAMAGE.

K. FINAL ACCEPTANCE OF INSTALLATION

A. MAINTAIN ALL PLANTED AREAS FREE OF DEBRIS AND INSECTS. CULTIVATE, WEED AND WATER ALL AREAS UNTIL FINAL ACCEPTANCE OF WORK ZONE IS APPROVED BY OWNER. ALL PUNCH LIST ITEMS SHALL BE COMPLETED AND ALL IRRIGATION OPERATIONAL PRIOR TO OWNER'S ACCEPTANCE OF PROJECT

B. PRIOR TO FINAL APPROVAL OF WORK, DO THE FOLLOWING:

1. REPLANT AREAS WHERE NECESSARY TO OBTAIN FULL AND EVEN COVERAGE.

2. REMOVE ALL DEBRIS RESULTING FROM WORK OF THIS SECTION.

3. REGRADE, LIGHTLY COMPACT, AND REPLANT AROUND SPRINKLER HEADS WHERE NECESSARY TO MAINTAIN PROPER VERTICAL POSITIONING IN RELATION TO ESTABLISHED GRADE.

4. FILL ALL DEPRESSIONS AND ERODED CHANNELS WITH SUFFICIENT SOIL MIX TO ADJUST GRADE TO ENSURE PROPER DRAINAGE, COMPACT LIGHTLY,
AND REPLANT FILLED AREAS IN ACCORD WITH DRAWING REQUIREMENTS.

... C. ACCEPTABILITY OF WORK FOR START OF MAINTENANCE AND COMPLETION OF THE WORK FOR SUBSTANTIAL COMPLETION ISSUED BY OWNER SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO.

1. PUNCH LIST ITEMS COMPLETED AND APPROVED BY LANDSCAPE ARCHITECT.

2. FINAL GRADES APPROVED IN ACCORD WITH DRAWINGS AND SPECIFICATIONS.

3. SITE WEED-FREE IN ACCORD WITH APPROVED WEED CONTROL PLAN.

4. SHRUBS, AND MULCHES INSTALLED IN ACCORD WITH DRAWINGS AND SPECIFICATIONS.

5. ALL MATERIALS FERTILIZED AND SOIL AMENDMENTS COMPLETE AND IN PLACE.

6. LANDSCAPE IRRIGATION SYSTEM COMPLETE AND IN PLACE.

7. AS-BUILT DRAWINGS COMPLETE.

L. MAINTENANCE

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTENANCE WITHIN THE AREA OF WORK THROUGHOUT THE PERIOD OF CONSTRUCTION AND THE PLANT ESTABLISHMENT PERIOD. THE MAINTENANCE SHALL INCLUDE CONTINUOUS OPERATIONS OF PICKING UP TRASH AND EMPTYING TRASH CANS DAILY, WATERING, THE REMOVAL OF ALL WEEDS, ROLLING, REPAIRING EROSION, TRIMMING, FERTILIZATION, SPRAYING CONTROL OF PESTS, INSECTS, AND RODENTS, PLANT REPLACEMENT (IRRESPECTIVE OF CAUSE) OR ANY OTHER OPERATIONS NECESSARY TO ASSURE NORMAL PLANT GROWTH AND THE COLLECTION AND REMOVAL OF ALL TRASH DAILY. PLEASE NOTE: ALL PLANT REMOVALS AND REPLACEMENTS SHALL BE APPROVED BY THE OWNER PRIOR TO WORK. ANY MALFUNCTIONS OF THE IRRIGATION SYSTEM SHALL BE REPAIRED WITHIN 7 DAYS.

B. THE PLANT ESTABLISHMENT PERIOD SHALL BE FOR A PERIOD OF 365 DAYS OR 12 MONTHS, UNLESS EXTENDED AS DESCRIBED IN THIS SECTION. THE PLANT ESTABLISHMENT PERIOD SHALL BE STARTED WHEN ALL PLANTING AND RELATED WORK HAS BEEN COMPLETED, IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE BEGINNING OF THE PLANT ESTABLISHMENT PERIOD SHALL BE DETERMINED BY AN ON-SITE REVIEW BY THE LANDSCAPE ARCHITECT AND THE OWNER. ALL PLANT MATERIALS SHALL BE HEALTHY AND VIGOROUS AT THE COMPLETION OF THE MAINTENANCE PERIOD.

C. THE ENTIRE AREA OF WORK SHALL BE KEPT FREE OF WEEDS, TRASH OR OTHERDEBRIS DURING THE MAINTENANCE PERIOD. THE CONTRACTOR SHALL MAINTAIN THE AREA OF WORK AT MAXIMUM 7-DAY INTERVALS.

D, THE CONTRACTOR SHALL IMMEDIATELY REPLACE ANY AND ALL PLANT MATERIALS WHICH, FOR ANY REASON, DIES OR IS DAMAGED WHILE UNDER THE CONTRACTOR'S CARE. REPLACEMENT SHALL BE MADE WITH PLANTS AS INDICATED OR SPECIFIED FOR THE ORIGINAL PLANTING.

E. THE DESIGNATED PLANT ESTABLISHMENT PERIOD IS PART OF THE TOTAL CONTRACT TIME. THE PLANT ESTABLISHMENT PERIOD WILL BE EXTENDED AT 14-DAY INTERVALS IF, AT THE END OF THE PLANT ESTABLISHMENT PERIOD, THE PLANTING, IRRIGATION AND OTHER IMPROVEMENTS DO NOT REFLECT THE INTENT OF THE PLANS AND NOTICE TO CONTRACTORS.

F. ELIMINATE ALL GOPHERS, SQUIRRELS, AND MOLES WITHIN THE LIMITS OF WORK BY TRAPPING DURING THE PLANT ESTABLISHMENT PERIOD,

G. DO NOT REMOVE ANY TAGS OR LABELS FROM ANY PLANTS.

H. PRUNING: ALL PLANTS SHALL BE ALLOWED TO GROW IN NATURAL FORM: SELECTIVE PRUNING SHALL BE LIMITED TO DEADWOOD, WATERSPROUTS, CONFLICTING BRANCHES, AND ELONGATED BRANCHES. CLIPPING OR SHEARING INTO FORMS IS NOT ALLOWED.

2.10 PAYMENT

A EARTHWORK: PAYMENT FOR LANDSCAPE PLANTING SHALL BE MADE AT THE LUMP SUM PRICE BID, UPON COMPLETION OF THE WORK. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL LABOR, MATERIAL AND EQUIPMENT TO INSTALL THE LANDSCAPE PLANTINGS PER THE DRAWINGS AND SPECIFICATIONS AND TO THE SATISFACTION OF THE OWNER.

B. LANDSCAPE: PAYMENT FOR LANDSCAPE AND RELATED SOIL AMENDING, PLANTING, INSTALLING MULCHES, ETC., SHALL BE MADE AT THE LUMP SUM PRICE BID UPON COMPLETION OF THE WORK.

C. PARTIAL PAYMENTS: PARTIAL PAYMENTS ON A MONTHLY BASIS MAY BE AUTHORIZED UPON SUBSTANTIATION OF WORK PROGRESS.

D. 365 DAY MAINTENANCE PERIOD PAYMENT FOR WORK SHALL BE MADE AT THE MONTHLY LUMP SUM PRICE OR AT THE DISCRETION OF THE OWNER, AND SHALL INCLUDE ALL WORK RELATED TO MAINTAINING THE LANDSCAPING.

END OF SECTION

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No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.

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DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER
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PLANTING SPECIFICATIONS (2 OF 2)

GRAPHIC SCALE

PAGE

FIELD BOOK

DRAWING REF. L-2

SHEET 24 OF 37

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1 GAL | BACCHARIS PILULARIS
COYOTE BRUSH
(PLANT 8" APART)

52 | SALVIA MELLIFERA
1 GAL | BLACK SAGE

236 | ERIOGONUM PARVIFOLIUM
1 GAL | SEACLIFF BUCKWHEAT

151 | EXTRIPLEX CALIFORNICA
1 GAL | CALIFOIRNIA SALTBUSH

55 | ENCELIA CALIFORNICA
1 GAL | BUSH SUNFLOWER

NOTE:
JUTE MATTING TO
BE INSTALLED PRIOR
TO PLANTING.

AVE. B

92 | ERIOGONUM LATIFOLIUM
1 GAL | SEASIDE BUCKWHEAT

130 | ATRIPLEX LENTIFORMIS
1 GAL | BIG SALTBUSH

420 | DUDLEYA CAESPITOSA
1 GAL | SEA LETTUCE

302 | CAMISSONIA CHIERANTHIFOLIA
1 GAL | BEACH EVENING PRIMROSE

LANDSCAPE CALCULATIONS
TOTAL SITE AREA: 38,803 SF
HARDSCAPE AREA: 8,248 SF
SOFTSCAPE AREA: 30,555 SF

ATRIPLEX LENTIFORMIS
BIG SALTBUSH

CAMISSONIA CHIERANTHIFOLIA
BEACH EVENING PRIMROSE

DUDLEYA CAESPITOSA
SEA LETTUCE

ENCELIA CALIFORNICA
BUSH SUNFLOWER

ERIOGONUM LATIFOLIUM
SEASIDE BUCKWHEAT

ERIOGONUM PARVIFOLIUM
SEACLIFF BUCKWHEAT

EXTRIPLEX CALIFORNICA
CALIFORNIA SALTBUSH

SALVIA MELLIFERA
BLACK SAGE

BACCHARIS PILULARIS
COYOTE BRUSH

1 LANDSCAPE PLAN
SCALE: 1/16"=1'-0"

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

REF.

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LANDSCAPE PLAN

GRAPHIC SCALE

PAGE

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L-3

SHEET
25 OF 37

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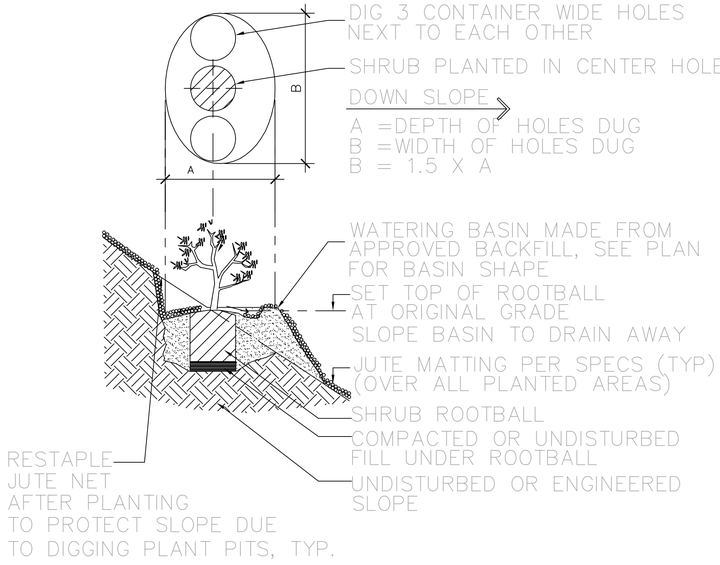
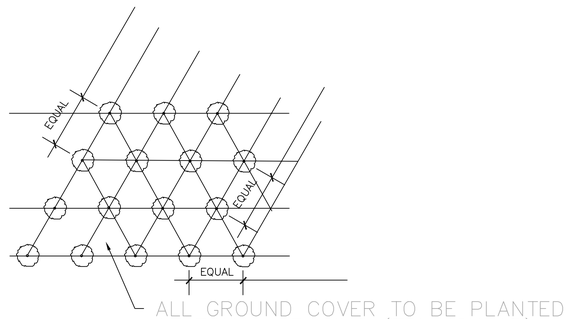
SHRUB/GROUNDCOVER PLANTING LEGEND

SYMBOL	BOTANICAL NAME	COMMON NAME	WUCOL	QTY.	SIZE	SIZE @ INSTALLATION		ULTIMATE SIZE		YEAR TO MATURITY	REMARKS
						HEIGHT	WIDTH	HEIGHT	WIDTH		
✳	ATRIPLEX LENTIFORMIS	BIG SALTBUSH	LOW	130	1 GAL	6–8"	6–8"	5'	5'	3–5 YRS	–
⊙	CAMISSONIA CHIERANTHIFOLIA	BEACH EVENING PRIMROSE	LOW	302	1 GAL	2–4"	6–8"	6–12"	2'	3–5 YRS	
◦	DUDLEYA CAESPITOSA	SEA LETTUCE	LOW	420	1 GAL	2–4"	2–4"	4–8"	4–8"	3–5 YRS	–
⊕	ENCELIA CALIFORNICA	BUSH SUNFLOWER	LOW	55	1 GAL	6–8"	6–8"	3–4'	5'	3–5 YRS	–
Ⓔ	ERIOGONUM LATIFOLIUM	COAST BUCKWHEAT	LOW	92	1 GAL	6–8"	6–8"	1–2'	2–3'	3–5 YRS	–
⊙	ERIOGONUM PARVIFOLIUM	SEACLIFF BUCKWHEAT	LOW	236	1 GAL	6–8"	6–8"	2'	2'	3–5 YRS	–
⊙	EXTRIPLEX CALIFORNICA	CALIFORNIA SALTBUSH	LOW	151	1 GAL	6–8"	6–8"	1–2'	30–36"	3–5 YRS	
Ⓢ	SALVIA MELLIFERA REPENS	CREEPING BLACK SAGE	LOW	52	1 GAL	6–8"	6–8"	1–2'	5–6'	3–5 YRS	–
▨	BACCHARIS PILULARIS	COYOTE BUSH	LOW		1 GAL	6–8"	6–8"	3–4'	4–6'	3–5 YRS	PLANT 3' APART



SHRUB PLANT'G ON SLOPE
NO SCALE



GROUNDCOVER PLANTING
NO SCALE

1 PLANT LEGEND & DETAILS
NOT TO SCALE

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No.	DATE	SHEET	APPROVAL	DESCRIPTION

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PLANT LEGEND & DETAILS

GRAPHIC SCALE
PAGE
FIELD BOOK

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SHEET 26 OF 37
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IRRIGATION SPECIFICATIONS (AS APPLICABLE) :

1. SCOPE OF WORK

1.1. THE WORK CONSISTS OF FURNISHING LABOR, TOOLS, MACHINERY, MATERIALS, AND PROCEDURE REQUIRED TO COMPLETE THE SPRINKLER SYSTEM, INSTALLED READY FOR USE WITHOUT FURTHER COST IN LABOR OR MATERIALS TO THE COUNTY.
1.2. WHEN NOT OTHERWISE SPECIFIED, WORKMANSHIP AND MATERIAL SHALL CONFORM TO THE LOCAL PLUMBING CODE.
1.3. THE CONTRACTOR SHALL APPLY FOR ALL NECESSARY PERMITS AND PAY FOR SAME.
1.4. THE CONTRACTOR SHALL KEEP THE PREMISES CLEAN AND FREE OF EXCESS EQUIPMENT, MATERIALS AND RUBBISH INCIDENTAL TO THIS WORK.
1.5. THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO INDICATE AND SPECIFY A COMPLETE SPRINKLER SYSTEM, INSTALLED AND READY FOR USE WITHOUT FURTHER COST IN LABOR OR MATERIALS TO COUNTY.
1.6. ANY ITEM SHOWN OR WRITTEN ON THE DRAWINGS OR IN THESE SPECIFICATIONS SHALL BE CONSIDERED TO APPEAR ON BOTH.
1.7. IN THE EVENT OF "CONFLICT" BETWEEN THE DRAWINGS AND SPECIFICATIONS, THE LANDSCAPE ARCHITECT SHALL BE CONSULTED.
1.8. PRIOR TO SUBMISSION OF HIS BID, THE CONTRACTOR SHALL EXAMINE THE SITE, THE COMPLETE DRAWINGS OF THE PROJECT AND THE SPECIFICATIONS OF SAME, IN ADDITION TO THE DRAWINGS AND SPECIFICATIONS FOR THE SPRINKLER IRRIGATION PORTION OF THE WORK.

2. REFERENCE SPECIFICATIONS AND STANDARDS

2.1. THE INTENT OF THE DRAWING AND SPECIFICATIONS IS TO GRAPHICALLY INDICATE AND SPECIFY A COMPLETE AND EFFICIENT SPRINKLER IRRIGATION SYSTEM.
2.2. PLOT DIMENSIONS ARE APPROXIMATE. CONTRACTOR SHALL CAREFULLY CHECK AND VERIFY ALL DIMENSIONS AND SHALL REPORT ANY VARIATIONS TO THE LANDSCAPE ARCHITECT.
2.3. DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, ETC. WHICH MAY BE REQUIRED. CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL HIS WORK, AND PLAN HIS WORK ACCORDINGLY. DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. THE WORK SHALL BE INSTALLED IN THE MOST DIRECT AND WORKMANLIKE MANNER, SO THAT CONFLICTS BETWEEN SPRINKLER SYSTEMS, PLANTING AND ARCHITECTURAL FEATURES WILL BE AVOIDED.
2.4. LANDSCAPE ARCHITECT/OWNER'S REPRESENTATIVE SHALL DECIDE ALL QUESTIONS RELATIVE TO THE QUALITY OF WORKMANSHIP AND MATERIALS FURNISHED.
2.5. THE LANDSCAPE ARCHITECT SHALL DECIDE ALL QUESTIONS RELATING TO THE "INTERPRETATION" OF THE DRAWINGS AND SPECIFICATIONS AND THE ACCEPTABLE FULFILLMENT OF THE CONTRACT.

3. SUBSTITUTIONS

3.1. THE CONTRACTOR SHALL FURNISH THE ARTICLES, EQUIPMENT OR MATERIALS SPECIFIED BY NAME IN THE DRAWINGS AND SPECIFICATIONS. NO SUBSTITUTION WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL BY THE LANDSCAPE ARCHITECT.
3.2. EQUIPMENT OR MATERIALS INSTALLED OR FURNISHED WITHOUT THE PRIOR APPROVAL OF THE LANDSCAPE ARCHITECT MAY BE REJECTED AND THE CONTRACTOR REQUIRED TO REMOVE SUCH MATERIALS FROM THE SITE AT THIS OWN EXPENSE.
3.3. APPROVAL OF ANY ITEM, ALTERNATE OR SUBSTITUTE, INDICATES ONLY THAT THE PRODUCT(S) APPARENTLY MEET THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS ON THE BASIS OF THE INFORMATION SUBMITTED.
3.4. MANUFACTURER'S WARRANTIES SHALL NOT RELIEVE THE CONTRACTOR OF HIS LIABILITY UNDER THE GUARANTEE. SUCH WARRANTY SHALL ONLY SUPPLEMENT THE GUARANTEE.
3.5. THE LANDSCAPE ARCHITECT CAN, AT HIS OPTION, REQUIRE A MANUFACTURER'S WARRANTY ON ANY PRODUCT OFFERED FOR USE.

4. IRRIGATION GUARANTEE

4.1. THE ENTIRE SPRINKLER SYSTEM SHALL BE UNCONDITIONALLY GUARANTEED BY THE CONTRACTOR AS TO MATERIAL AND WORKMANSHIP, INCLUDING SETTLING OF BACK-FILLED AREAS BELOW GRADE FOR A PERIOD OF ONE (1) YEAR FOLLOWING THE DATE OF FINAL ACCEPTANCE OF WORK.
4.2. IF, WITHIN ONE (1) YEAR FROM THE DATE OF FILING OF THE NOTICE OF COMPLETION, SETTLEMENT OCCURS AND ADJUSTMENTS IN PIPES, VALVES AND SPRINKLER HEADS, SOD OR PAVING IS NECESSARY TO BRING THE SYSTEM, SOD OR PAVING TO THE PROPER LEVEL OF THE PERMANENT GRADES, THE CONTRACTOR, AS PART OF THE WORK UNDER HIS CONTRACT, SHALL MAKE ALL ADJUSTMENTS WITHOUT COST TO THE COUNTY, INCLUDING THE COMPLETE RESTORATION OF ALL DAMAGED PLANTING, PAVING, OR OTHER IMPROVEMENTS OF ANY KIND.
4.3. SHOULD ANY OPERATIONAL DIFFICULTIES DEVELOP IN CONNECTION WITH THE SPRINKLER SYSTEM WITHIN THE SPECIFIED GUARANTEE PERIOD WHICH, IN THE OPINION OF THE COUNTY, MAY BE DUE TO INFERIOR MATERIAL AND/OR WORKMANSHIP, SAID DIFFICULTIES SHALL BE IMMEDIATELY CORRECTED BY THE CONTRACTOR TO THE SATISFACTION OF THE COUNTY AT NO ADDITIONAL COST TO THE COUNTY, INCLUDING ANY AND ALL OTHER DAMAGE CAUSED BY SUCH DEFECTS.

5. RESPONSIBILITY

5.1. THE CONTRACTOR SHALL LOCATE LINES, VALVES, AND OTHER UNDERGROUND UTILITIES, ETC., PRIOR TO EXCAVATING TRENCHES. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES.

6. RECORD DRAWINGS

6.1. LOCATIONS ON DRAWINGS ARE DIAGRAMMATIC AND APPROXIMATE ONLY, AND SHALL BE CHANGED AND ADJUSTED AS NECESSARY OR AS DIRECTED TO MEET EXISTING CONDITIONS AND TO FOLLOW THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IN OBTAINING COMPLETE WATER COVERAGE. IT IS, THEREFORE, THE CONTRACTOR'S RESPONSIBILITY TO RECORD ANY CHANGES AS TO LOCATION OF EQUIPMENT ON "AS-BUILT" DRAWINGS.
6.2. PROCEDURE FOR "AS-BUILT" PREPARATION SHALL BE:
6.2.1. OBTAIN FROM THE LANDSCAPE ARCHITECT ONE (1) SET OF REPRODUCIBLE DRAWINGS. RECORD ACCURATELY ON THIS SET ALL CHANGES IN THE WORK CONSTITUTING DEPARTURES FROM THE ORIGINAL CONTRACT DRAWINGS.
6.2.2. DIMENSION FROM TWO PERMANENT POINTS OF REFERENCE (BUILDINGS, MONUMENTS, SIDEWALKS, CURBS, PAVEMENT). POST INFORMATION ON "AS-BUILT" DRAWINGS, DAY-TO-DAY, AS THE PROJECT IS INSTALLED. ALL DIMENSIONS NOTED ON DRAWINGS SHALL BE ONE-QUARTER (1/4) INCH IN SIZE.
6.2.3. SHOW DIMENSIONAL LOCATIONS AND DEPTHS OF THE FOLLOWING:

ALL POINT OF CONNECTION / CONTROL EQUIPMENT
ROUTING OF SPRINKLER PRESSURE LINES (DIMENSION MAXIMUM OF ONE-HUNDRED (100) FEET ALONG ROUTING AND ALL DIRECTIONAL CHANGES)
BALL VALVES / GATE VALVES
SPRINKLER CONTROL VALVES (BURIED ONLY)
QUICK COUPLING VALVES
ROUTING OF CONTROL VALVE WIRING
OTHER RELATED EQUIPMENT (AS MAY BE DIRECTED BY THE LANDSCAPE ARCHITECT)

6.2.4. MAINTAIN "AS-BUILT" DRAWINGS ON SITE AT ALL TIMES.
6.2.5. MAKE ALL CHANGES TO REPRODUCIBLE DRAWINGS IN INK (NO BALL-POINT PEN). USE ERADICATING FLUID WHEN REDOING DRAWINGS. MAKE CHANGES IN A MANNER EQUAL TO THE ORIGINAL DRAWING.

7. CONTROLLER CHARTS

7.1. "AS-BUILT" DRAWINGS SHALL BE APPROVED BY LANDSCAPE ARCHITECT OR LANDSCAPE COORDINATOR BEFORE CHARTS ARE PREPARED.
7.2. PROVIDE ONE CONTROLLER CHART OF THE MAXIMUM SIZE CONTROLLER DOOR WILL ALLOW, FOR EACH CONTROLLER SUPPLIED, SHOWING THE AREA COVERED BY AUTOMATIC CONTROLLER.
7.3. THE CHART SHALL BE A REDUCTION OF THE ACTUAL "AS-BUILT" SYSTEM DRAWING. IF THE CONTROLLER SEQUENCE IS NOT LEGIBLE WHEN THE DRAWINGS IS REDUCED, ENLARGE IT TO A SIZE THAT WILL BE READABLE WHEN REDUCED.
7.4. CHART SHALL BE BLACK-LINE PRINT AND A DIFFERENT PASTEL COLOR USED TO SHOW AREA OF COVERAGE FOR EACH STATION.
7.5. WHEN COMPLETED AND APPROVED, HERMETICALLY SEAL THE CHART BETWEEN TWO PIECES OF PLASTIC, EACH PIECE BEING A MINIMUM TWENTY (20) MIL THICKNESS.
7.6. CHARTS SHALL BE COMPLETED AND APPROVED PRIOR TO FINAL INSPECTION OF THE IRRIGATION SYSTEM.

8. OPERATION AND MAINTENANCE MANUALS

8.1. PREPARE AND DELIVER TO THE LANDSCAPE ARCHITECT WITHIN TEN (10) CALENDAR DAYS PRIOR TO COMPLETION OF CONSTRUCTION, ALL REQUIRED AND NECESSARY DESCRIPTIVE MATERIAL IN COMPLETE DETAIL AND SUFFICIENT QUANTITY, PROPERLY PREPARED IN FOUR INDIVIDUALLY BOUND COPIES. DESCRIBE THE MATERIAL INSTALLED IN SUFFICIENT DETAIL TO PERMIT OPERATING PERSONNEL TO UNDERSTAND, OPERATE AND MAINTAIN ALL EQUIPMENT. INCLUDE SPARE PARTS LIST AND RELATED MANUFACTURER INFORMATION FOR EACH EQUIPMENT ITEM INSTALLED. EACH MANUAL SHALL INCLUDE THE FOLLOWING:

INDEX SHEET STATING SUBCONTRACTOR'S ADDRESS AND TELEPHONE NUMBER.
DURATION OF GUARANTEE PERIOD.
LIST OF EQUIPMENT WITH NAMES AND ADDRESSES OF MANUFACTURER'S LOCAL REPRESENTATIVES.
COMPLETE OPERATING AND MAINTENANCE INSTRUCTIONS ON ALL MAJOR EQUIPMENT.

8.2. IN ADDITION TO THE MAINTENANCE MANUALS, PROVIDE THE MAINTENANCE PERSONNEL WITH INSTRUCTIONS FOR MAJOR EQUIPMENT AND SHOW WRITTEN EVIDENCE AT THE END OF THE PROJECT THAT THIS SERVICE HAS BEEN RENDERED.
8.3. LOOSE SPRINKLING EQUIPMENT, OPERATING KEYS AND SPARE PARTS WILL BE FURNISHED BY THE CONTRACTOR IN QUANTITIES AS SHOWN ON PLANS OR IN SPECIFICATIONS.

9. MATERIALS

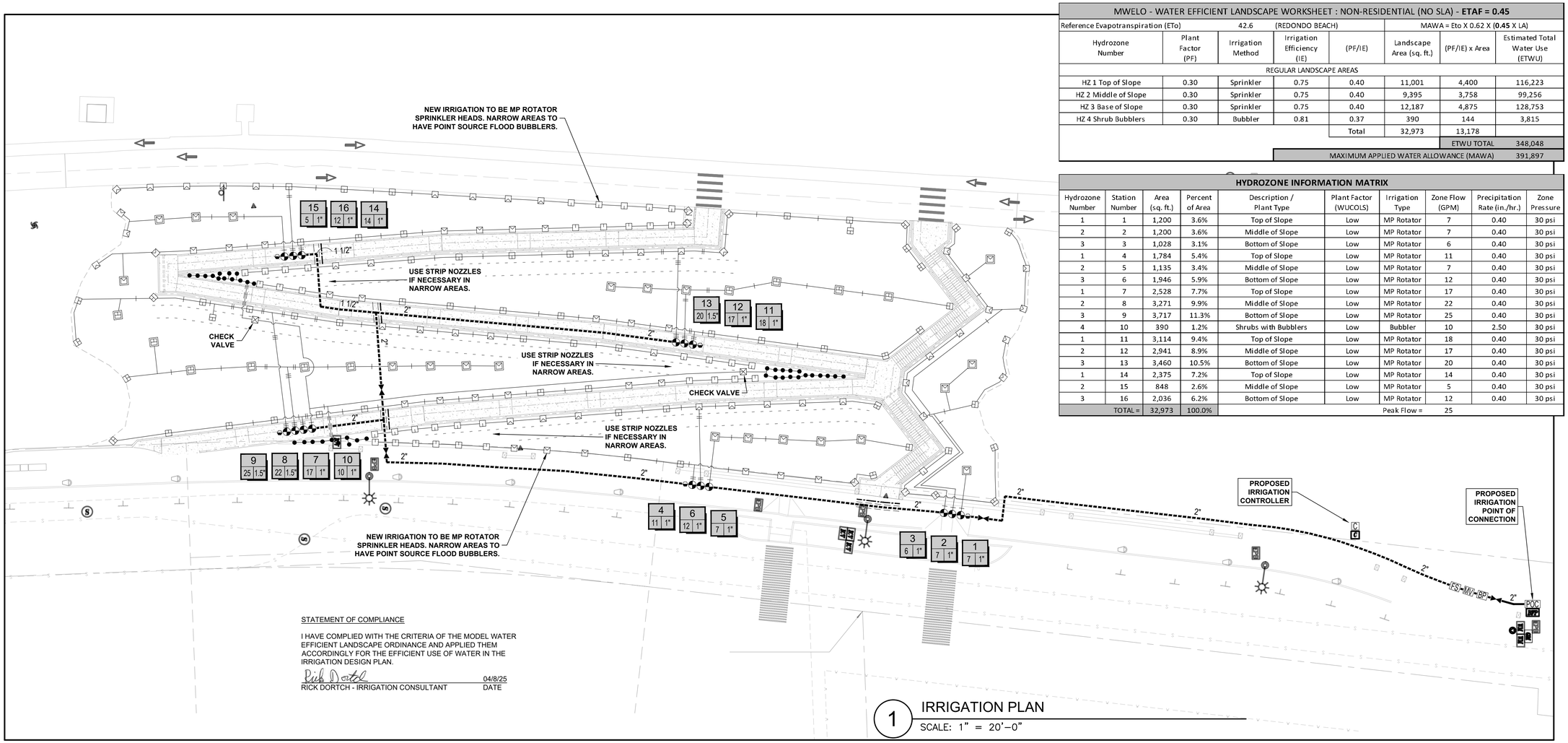
9.1. USE NEW MATERIALS OF THE BEST GRADE OF EACH RESPECTIVE KIND AND OF THE SAME MANUFACTURERS FOR ALL ITEMS OF ONE TYPE.
9.2. STEEL PIPE.
9.2.1. STEEL PIPE AND STEEL FITTINGS WHERE INDICATED ON THE DRAWINGS OR SPECIFIED SHALL BE SCHEDULE 40 GALVANIZED MILD STEEL THREADED PIPE AND BEADED GALVANIZED MALLEABLE IRON THREADED FITTINGS, EXCEPT COUPLINGS WHICH SHALL BE A.P.I. (AMERICAN PIPE INSTITUTE) STEEL COUPLINGS. THREAD ON PIPE AND FITTINGS SHALL BE OF TAPER TYPE.
9.2.2. ALL UNIONS TWO (2) INCHES AND SMALLER SHALL BE GROUND JOINT PATTER. UNIONS LARGER THAN TWO (2) INCHES SHALL BE FLANGED UNIONS. ALL FLANGED UNIONS SHALL BE PLACED WITH ONE-SIXTEENTH (1/16) INCH THICK ASBESTOS FIBER GASKETS. RIGHT AND LEFT COUPLINGS SHALL BE USED INSTEAD OF GROUND JOINT UNIONS IN ALL UNDERGROUND LINES, EXCEPT AT VALVES.
9.2.3. STEEL STREET ELBOWS, BUSHINGS, CLOSE NIPPLES, AND LONG SCREWS SHALL NOT BE USED IN THE WORK.
9.3. PLASTIC PIPE
9.3.1. PLASTIC PIPE SHALL BE EXTRUDED FROM VIRGIN PVC (POLYVINYL CHLORIDE) TYPE 1, GRADE 11 (CLASS 1220) AS MANUFACTURED BY LASCO INDUSTRIES, BALDWIN, PACIFIC WESTERN, JOHNS-MANVILLE OR EQUAL. CLASS SCHEDULE AS INDICATED IN THE LEGEND.
9.3.2. ALL PLASTIC PIPE SHALL BE CONTINUOUSLY AND PERMANENTLY MARKED WITH THE FOLLOWING INFORMATION: MANUFACTURER'S NAME, NOMINAL PIPE SIZE, PVC 1220, S.D.R. (STANDARD DIMENSION RATIOS, OR THE PRESSURE RATING IN POUNDS PER SQUARE INCH) AND THE N.S.F. (NATIONAL SANITATION FOUNDATION).
9.3.3. PLASTIC FITTINGS SHALL BE PVC 11, I.P.S. (INTERNATIONAL PIPE SOCIETY), SCHEDULE 40, N.S.F., SCHEDULE 80, N.S.F., AND SCHEDULE 80 THREADED FITTINGS AS SHOWN IN THE DETAILS AS MANUFACTURED BY SLOANE MANUFACTURING CO. SOLVENT AND PRIMER ARE TO BE PER PIPE MANUFACTURER'S RECOMMENDATIONS.
9.4. PVC PRESSURE RATED PIPE TYPE 1220 (PVC CLASS 160, 200 & 315) AND TYPE 1120 (PVC SCHEDULE 40 & PVC SCHEDULE 80)
9.4.1. TYPE I GRADE II PRESSURE RATED PIPE.
9.4.2. MATERIALS SHALL MEET THE REQUIREMENTS SET FORTH IN ASTM D1784-60T.
9.4.3. OUTSIDE DIAMETER OF PIPE SHALL BE THE SAME SIZE AS IRON PIPE.
9.4.4. PIPE SHALL BE MARKED AT INTERVALS WITH THE FOLLOWING INFORMATION (NOT TO EXCEED 5'): MANUFACTURER'S NAME, NOMINAL SIZE, PVC TYPE AND GRADE (I.E., PVC 1220) SDR RATING CLASS, NSF APPROVAL AND COMMERCIAL STANDARD DESIGNATION.
9.4.5. PVC FITTINGS SHALL BE PVC TYPE II, SCHEDULE 40 NSF, SCHEDULE 80 NSF, OR APPROVED.
9.4.6. SOLVENT SHALL BE #175 GRAY NSF APPROVED AS MANUFACTURED BY INDUSTRIAL POLYCHEMICAL SERVICE, GARDENA CALIFORNIA.
9.4.7. CAUTIONED SHALL BE UTILIZED IN HANDLING TYPE I PIPE DUE TO THE POSSIBILITY OF CRACKING OR OF SPLITTING WHEN DROPPED OR HANDLED CARELESSLY.
9.4.8. WHEN CONNECTION IS PLASTIC TO METAL, MALE ADAPTERS SHALL BE HAND TIGHTENED, PLUS ONE TURN WITH A STRAP WRENCH. JOINT COMPOUND SHALL BE PERMATIX TYPE II.
9.5. SPRINKLER HEADS
9.5.1. SPRINKLER HEADS SHALL BE AS SHOWN ON PLAN.
9.6. VALVES
9.6.1. REMOTE CONTROL VALVES - ELECTRIC REMOTE CONTROL VALVES SHALL BE AS SHOWN ON PLAN.
9.6.2. QUICK COUPLING VALVES - QUICK COUPLING VALVES SHALL BE AS INDICATED ON PLANS AND SHALL HAVE A LOCKING COVER. EACH QUICK COUPLER VALVE SHALL HAVE A MOLDED VINYL COVER, YELLOW IN COLOR (PURPLE WHERE CALLED FOR IN RECYCLED WATER SYSTEMS). ALL QUICK COUPLER VALVES KEYS AND HOSE SWIVELS SHALL BE OF SAME MANUFACTURER AS THE QUICK COUPLER.
9.7. AUTOMATIC CONTROLLERS - AUTOMATIC CONTROLLERS SHALL BE AS SHOWN ON PLANS AND DETAILS.
9.8. CONTROL WIRES FOR RCV'S - ALL WIRING TO BE USED FOR CONNECTING THE AUTOMATIC CONTROLLER TO THE ELECTRICAL SOLENOID ACTUATED BY REMOTE CONTROL VALVE SHALL BE SOLID COPPER, PVC INSULATION, SINGLE CONDUCTOR, UL APPROVED UNDERGROUND FEEDER CABLE. EACH PILOT OR "HOT" WIRE SHALL BE BLACK OR COLOR-CODED WITH THE COMMON WIRE BEING WHITE.
9.9. RUN TWO SPARE CONTROL WIRES TO THE FARTHEST VALVE IN EACH MAINLINE DIRECTION. SHOW ON AS-BUILTS. COLOR CODE DIFFERENT THAN PILOT AND COMMON WIRES.
9.10. WIRING FOR FLOW SENSORS AND MASTER VALVES SHALL BE AS RECOMMENDED BY THE MANUFACTURER AND SHALL BE COLOR CODED DIFFERENTLY THAN COMMON WIRE, CONTROL WIRES, AND SPARE WIRES.
9.11. VALVE BOXES - ALL REMOTE CONTROL VALVES, SHUT-OFF VALVES, FLOW SENSORS, AND QUICK COUPLING VALVES SHALL BE INSTALLED IN SUITABLE VALVE BOXES AS SHOWN IN DETAILS, COMPLETE WITH LOCKING COVERS. ALL SHALL BE N.D.S. OR APPROVED EQUAL AND SHALL BE IDENTIFIED ON THE LID WITH HEAT-BRANDED NUMBERS / LETTERS IN 2" HIGH BLOCK LETTERS AS SHOWN ON THE DETAILS. ALL BOXES SHALL HAVE GREEN COVERS (PURPLE FOR RECYCLED WATER SYSTEMS).
9.12. BACKFLOW PREVENTION UNITS THE BACKFLOW PREVENTION UNITS SHALL BE AS SHOWN ON PLANS AND DETAILS.
9.13. DRIP LINE AND INTEGRAL DRIP LINE COMPONENTS - THE DRIP LINE SHALL BE TECHLINE CV AS MANUFACTURED BY NETAFIM IRRIGATION, INC. DRIPPER FLOW RATE AND SPACING SHALL BE AS INDICATED ON DRAWINGS
9.13.1. TECHLINE CV FITTINGS: ALL TECHLINE CV CONNECTIONS SHALL BE MADE WITH APPROVED TECHLINE CV INSERT FITTINGS.
9.13.2. SOIL STAPLES (TLS6): ALL ON-SURFACE/UNDER MULCH TECHLINE CV INSTALLATIONS SHALL BE HELD IN PLACE WITH TECHLINE SOIL STAPLES SPACED EVENLY EVERY 3' - 5' ON CENTER, AND WITH TWO STAPLES ON EACH CHANGE OF LOCATION.
9.13.3. LINE FLUSHING VALVES: ALL TECHLINE CV SYSTEMS SHALL BE INSTALLED WITH MANUAL FLUSHING VALVE AS INDICATED ON DRAWINGS. TECHLINE CV ZONES DO NOT REQUIRE AN AUTOMATIC LINE FLUSHING VALVES, BUT MUST HAVE A MANUAL FLUSHING PORT(S) IN THE POSITION THAT AN AUTOMATIC FLUSH VALVE WOULD BE POSITIONED.
9.13.4. AIR/VACUUM RELIEF VALVES: EACH INDEPENDENT TECHLINE SUBSURFACE IRRIGATION ZONE SHALL BE INSTALLED WITH AN AIR/VACUUM RELIEF VALVE AT THE ZONE'S HIGHEST POINT(S). TECHLINE CV ZONES DO NOT REQUIRE AN AIR/VACUUM RELIEF VALVE WHEN NO BURIED.
9.13.5. PRESSURE REGULATOR: A PRESSURE REGULATOR SHALL BE INSTALLED AT EACH ZONE VALVE OR ON THE MAIN LINE TO ENSURE OPERATING PRESSURES DO NOT EXCEED SYSTEM REQUIREMENTS. THE PRESSURE REGULATOR SHALL BE AS CALLED FOR ON THE PLANS.
9.13.6. SYSTEM FILTER: A Y-FILTER OR DISC FILTER SHALL BE INSTALLED AT EACH ZONE VALVE AS CALLED FOR ON THE PLANS. A SYSTEM (MAIN LINE) FILTER SHALL ALSO BE INSTALLED TO ENSURE ADDED PROTECTION.
9.14. ANY OTHER EQUIPMENT NOT SPECIFICALLY NOTED HEREIN BUT REQUIRED BY THE PLANS, DETAILS, OR LEGENDS SHALL BE SUPPLIED AND INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS. IF ANY QUESTION ARISES AS TO PROPER PROCEDURE, IT SHALL BE RESOLVED WITH THE LANDSCAPE ARCHITECT BEFORE INSTALLATION.

10. INSTALLATION

10.1. SITE CONDITIONS
10.1.1. ALL SCALED DIMENSIONS ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS ON THE SITE PRIOR TO PROCEEDING WITH WORK UNDER THIS CONTRACT.
10.1.2. EXTREME CARE SHALL BE EXERCISED IN EXCAVATING AND WORKING NEAR EXISTING UTILITIES. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO ANY FACILITIES.
10.1.3. SHOULD UTILITIES NOT LOCATED OR MARKED BE FOUND DURING EXCAVATION, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER AND SHALL DISCONTINUE WITH WORK IN THE AREA, EXCEPT NECESSARY EMERGENCY WORK NECESSARY TO REPAIR OR PREVENT DAMAGE UNTIL INSTRUCTIONS ARE RECEIVED.
10.1.4. FAILURE TO NOTIFY THE OWNER OF DISCOVERY OF SUCH UTILITIES OR DAMAGE THERETO WILL RESULT IN THE CONTRACTOR BEING LIABLE FOR ANY AND ALL DAMAGE CAUSED TO THE UTILITIES AS A RESULT OF HIS ACTIONS.
10.1.5. THE CONTRACTOR SHALL, BEFORE STARTING WORK ON THE SPRINKLER SYSTEM, CAREFULLY CHECK ALL FINISH GRADES TO SATISFY HIMSELF THAT HE MAY PROCEED WITH THE WORK.
10.2. WATER SUPPLY
10.2.1. THE CONTRACTOR SHALL ARRANGE FOR THE PROVISION OF THE WATER SUPPLY AND COORDINATE WITH THE OWNER AS NECESSARY.
10.2.2. THE CONTRACTOR SHALL CONNECT TO THE WATER SOURCE AS INDICATED ON THE DRAWINGS.
10.3. ELECTRICAL
10.3.1. THE OWNER SHALL ARRANGE FOR THE PROVISION OF THE ELECTRICAL SUPPLY. POWER SOURCES SHALL BE AS INDICATED ON THE DRAWINGS. THE CONTRACTOR SHALL CONNECT AT THE POINT SHOWN ON THE DRAWINGS.
10.3.2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ELECTRICAL CONNECTIONS TO THE AUTOMATIC CONTROLLERS. ALL WIRING SHALL BE ROUTED AS SHOWN ON PLANS. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH ALL LOCAL OR COUNTY ORDINANCES.
10.4. EXISTING UTILITIES - THE CONTRACTOR SHALL LOCATE AND MARK ALL EXISTING UTILITIES SUCH AS POWER, TELEPHONE, DOMESTIC WATER AND TILE DRAINS. EXTREME CARE SHALL BE TAKEN BY THE CONTRACTOR WHEN EXCAVATING OR WORKING IN THESE AREAS AND COORDINATION AND COOPERATION WITH OTHER CONTRACTOR IS REQUIRED AS THE WORK PROGRESSES TO THESE AREAS.
10.5. TRENCHES IN GENERAL
10.5.1. TRENCHES SHALL BE DUG STRAIGHT, AND PIPE SHALL HAVE THE CONTINUOUS SUPPORT FOR THE DITCH BOTTOM AND SHALL BE LAID TO AN EVEN GRADE. TRENCHING EXCAVATION SHALL FOLLOW THE LAYOUT INDICATED ON THE DRAWINGS.
10.5.2. ALL PRESSURE SUPPLY LINES SHALL HAVE A MINIMUM DEPTH OF EIGHTEEN (18) INCHES MINIMUM UNLESS OTHERWISE NOTED.
10.5.3. ALL NON-PRESSURE SUPPLY LINES SHALL HAVE A MINIMUM DEPTH OF TWELVE (12) INCHES MINIMUM AS SHOWN IN THE DETAILS.
10.5.4. ALL LINES SHALL HAVE A MINIMUM CLEARANCE OF SIX (6) INCHES FROM EACH OTHER AND FROM LINES OF OTHER TRADES.
10.5.5. NO LINE SHALL BE INSTALLED DIRECTLY OVER ANOTHER LINE.
10.5.6. IF NECESSARY, CALL UNDERGROUND ALERT, OR SIMILAR COMPANY.
10.6. BACKFILLING
10.6.1. BACKFILL FOR TRENCHING SHALL BE COMPACTED TO DRY DENSITY EQUAL TO THE ADJACENT UNDISTURBED SOIL, AND SHALL CONFORM TO THE ADJACENT GRADES WITHOUT DIPS, SUNKEN AREAS, HUMPS OR OTHER IRREGULARITIES. INITIAL BACKFILL ON ALL LINES SHALL BE OF A FINE GRANULAR MATERIAL WITH NO FOREIGN MATTER LARGER THAN ONE-HALF (1/2) INCH IN SIZE.
10.6.2. IF, IN THE OPINION OF THE CONTRACTOR/LANDSCAPE ARCHITECT, THE EXCAVATED MATERIAL IS NOT SATISFACTORY FOR USE AS BACKFILL, THE CONTRACTOR SHALL DISPOSE OF THIS UNSATISFACTORY MATERIAL.
10.6.3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY SETTLING OF TRENCHES FROM HIS WORK.
10.7. PVC PIPE
10.7.1. PVC PIPE SHALL BE INSTALLED IN A MANNER WHICH WILL PROVIDE FOR EXPANSION AND CONTRACTION AS RECOMMENDED BY THE PIPE MANUFACTURER.
10.7.2. ALL PLASTIC TO METAL JOINTS SHALL BE MADE WITH PLASTIC MALE ADAPTERS, UNLESS OTHERWISE SHOWN IN DETAILS.
10.7.3. THE JOINTS SHALL BE ALLOWED TO SET AT LEAST TWENTY-FOUR (24) HOURS BEFORE PRESSURE IS APPLIED TO THE SYSTEM ON PVC PIPE.
10.7.4. AFTER ALL NEW SPRINKLER PIPING AND RISERS ARE IN PLACE AND CONNECTED, AND ALL NECESSARY WORK AS BEEN COMPLETED AND PRIOR TO THE INSTALLATION OF SPRINKLER HEADS, CONTROL VALVES SHALL BE OPENED AND A FULL HEAD OF WATER USED TO FLUSH OUT THE SYSTEM. AFTER THE SYSTEM IS THOROUGHLY FLUSHED, RISERS SHALL BE CAPPED OFF AND THE SYSTEM PRESSURE TESTED.
10.7.5. SPRINKLER LINES SHALL BE TESTED IN PLACE BEFORE BACKFILLING FOR A PERIOD OF NOT LESS THAN TWENTY-FOUR (24) HOURS AND SHALL SHOW NO LEAKAGE OR LOSS OF PRESSURE. DURING THE TEST PERIOD, MINIMUM TEST PRESSURE AT THE HIGHEST POINT OF THE SECTION BEING TESTED, SHALL BE 100 POUNDS PER SQUARE INCH.
10.7.6. AT THE CONCLUSION OF THE PRESSURE TEST, THE HEAD SHALL BE INSTALLED AND TESTED FOR OPERATION IN ACCORDANCE WITH DESIGN REQUIREMENTS UNDER NORMAL OPERATING PRESSURE, CONTRACTOR SHALL VERIFY HEAD PRESSURES WITH PITOT TUBE OR PRESSURE GAUGE ASSEMBLY, AND ADJUST VALVE TO CORRESPOND WITH DESIGN PRESSURE.
10.8. SPRINKLERS
10.8.1. ALL POP-UP SPRINKLERS SHALL BE PROVIDED WITH SWING JOINTS AND SHALL BE ADJUSTED TO THE PROPER HEIGHT. ALL NOZZLES SHALL BE ADJUSTED FOR PROPER THROW RADIUS FOR EFFICIENT COVERAGE.
10.8.2. SPRINKLER HEADS AND RISERS SHALL BE INSTALLED ACCORDING TO DETAILS.
10.9. DRIP LINE INSTALLATION
10.9.1. INSTALL ALL DRIP LINE AS INDICATED ON DRAWINGS. USE ONLY TEFLON TAPE ON ALL THREADED CONNECTIONS.
10.9.2. CLAMP TECHLINE CV FITTINGS WITH OETIKER CLAMPS WHEN OPERATING PRESSURE EXCEEDS SPECIFIC DRIP LINE FITTING REQUIREMENTS.
10.9.3. WHEN INSTALLING TECHLINE CV ON-SURFACE, INSTALL SOIL STAPLES AS LISTED BELOW:

SANDY SOIL - ONE STAPLE EVERY THREE (3') FEET AND TWO (2) STAPLES ON EACH CHANGE OF DIRECTION (TEE, ELBOW, OR CROSS).
LOAM SOIL - ONE STAPLE EVERY FOUR (4') FEET AND TWO (2) STAPLES ON EACH CHANGE OF DIRECTION (TEE, ELBOW, OR CROSS).
CLAY SOIL - ONE STAPLE EVERY FIVE (5') FEET AND TWO (2) STAPLES ON EACH CHANGE OF DIRECTION (TEE, ELBOW, OR CROSS).

10.9.4. CAP OR PLUG ALL OPENINGS AS SOON AS LINES HAVE BEEN INSTALLED TO PREVENT THE INTRUSION OF MATERIALS THAT WOULD OBSTRUCT THE PIPE. LEAVE IN PLACE UNTIL REMOVAL IS NECESSARY FOR COMPLETION OF INSTALLATION.
10.9.5. THOROUGHLY FLUSH ALL WATER LINES BEFORE INSTALLING VALVES AND OTHER HYDRANTS.
10.9.6. TEST IN ACCORDANCE WITH HYDROSTATIC TESTS AS RECOMMENDED BY THE MANUFACTURER.
10.10. VALVES
10.10.1. REMOTE CONTROL VALVES SHALL BE ADJUSTED SO THAT THE MOST REMOTE SPRINKLER HEADS OPERATE AT THE PRESSURE RECOMMENDED BY THE HEAD MANUFACTURER. REMOTE CONTROL VALVES SHALL BE ADJUSTED SO THAT A UNIFORM DISTRIBUTION OF WATER IS APPLIED BY THE SPRINKLER HEADS TO THE PLANTING AREAS FOR EACH INDIVIDUAL VALVE SYSTEM.
10.10.2. QUICK COUPLING VALVES SHALL BE SET IN VALVE BOXES APPROXIMATELY 12" FROM WALKS, CURBS, HEADER BOARDS, OR PAVED AREAS WHERE APPLICABLE. VERTICAL POSITIONING OF QUICK COUPLING VALVES SHALL BE SUCH THAT SLEEVE TOP WILL BE FLUSH WITH THE SETTLED FINISH GRADE AS DETERMINED AFTER THE TURF IS ESTABLISHED AND 2" ABOVE GRADE IN GROUND COVER AREAS.
10.11. VALVE BOXES
10.11.1. VALVE BOXES SHALL BE SET ONE-HALF INCH (1/2") ABOVE THE DESIGNATED FINISH GRADE IN LAWN AREAS AND ONE INCH (1") ABOVE FINISH GRADE IN GROUND COVER AREAS.
10.11.2. VALVE BOXES INSTALLED NEAR WALKS, CURBS, HEADER BOARDS AND PAVING SHALL ABUT THOSE ITEMS. TOP SURFACES SHALL BE FLUSH WITH ITEMS LISTED ABOVE.
10.12. AUTOMATIC CONTROLLER LOCATION AND INSTALLATION
10.12.1. THE AUTOMATIC CONTROLLER SHALL BE INSTALLED AT THE APPROXIMATE LOCATION SHOWN ON THE PLAN. VERIFY EXACT LOCATION WITH THE OWNER.
10.12.2. ALL LOCAL AND OTHER APPLICABLE CODES SHALL TAKE PRECEDENCE IN CONNECTING THE 110 VOLT ELECTRICAL SERVICE TO CONTROLLER. OWNER SHALL PROVIDE POWER TO CONTROLLER. CONTRACTOR SHALL COMPLETE HOOK-UP TO CONTROLLER.
10.12.3. THERE SHALL BE ADEQUATE COVERAGE OF EARTH (18" MINIMUM) OVER THE 24-VOLT CONTROL WIRE. INSTALL WIRE IN TRENCH AND TAPE TO MAIN LINES ON SIDE OF PIPE AT 10' INTERVALS.
10.13. CONTROL WIRE
10.13.1. ALL ELECTRICAL EQUIPMENT AND WIRING SHALL COMPLY WITH LOCAL AND STATE CODES AND BE INSTALLED BY THOSE SKILLED AND LICENSED IN THE TRADE.
10.13.2. CONNECTING AND SPLICING OF WIRE AT THE VALVES OR IN THE FIELD SHALL BE MADE USING A DRI-SPLICE CONNECTOR OR EQUAL.
10.14. PRESSURE TEST
10.14.1. ALL PRESSURE LINES SHALL BE TESTED UNDER PRESSURE WITH WATER AND AIR OF ONE-HUNDRED FIFTY (150) POUNDS PER SQUARE INCH, AND ALL NON-PRESSURE LINES SHALL BE TESTED UNDER THE EXISTING STATIC PRESSURE, AND BOTH BE PROVEN WATERTIGHT.
10.14.2. PRESSURE SHALL BE SUSTAINED IN THE LINES FOR A 24 HOUR PERIOD. IF LEAKS DEVELOP, THE JOINTS SHALL BE REPLACED AND THE TEST REPEATED UNTIL THE ENTIRE SYSTEM IS PROVEN WATERTIGHT.
10.14.3. TEST SHALL BE OBSERVED AND APPROVED BY THE OWNER PRIOR TO BACKFILL.
10.14.4. UPON COMPLETION OF EACH PHASE OF THE WORK, THE CONTRACTOR SHALL CHECK AND ADJUST EACH SPRINKLER HEAD TO MEETING THE SITE REQUIREMENTS.
10.15. COVERAGE TEST - UPON COMPLETION OF ALL SYSTEMS, THE CONTRACTOR, IN THE PRESENCE OF THE ARCHITECT, SHALL PERFORM A COVERAGE TEST TO DETERMINE IF THE COVERAGE OF WATER AFFORDED ALL AREAS IS COMPL



1 IRRIGATION PLAN
SCALE: 1" = 20'-0"

STATEMENT OF COMPLIANCE

I HAVE COMPLIED WITH THE CRITERIA OF THE MODEL WATER EFFICIENT LANDSCAPE ORDINANCE AND APPLIED THEM ACCORDINGLY FOR THE EFFICIENT USE OF WATER IN THE IRRIGATION DESIGN PLAN.

Rick Dortch 04/8/25
RICK DORTCH - IRRIGATION CONSULTANT DATE

MWELO - WATER EFFICIENT LANDSCAPE WORKSHEET : NON-RESIDENTIAL (NO SLA) - ETAF = 0.45

Reference Evapotranspiration (ETo) 42.6 (REDONDO BEACH) MAWA = Eto X 0.62 X (**0.45** X LA)

Hydrozone Number	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	(PF/IE)	Landscape Area (sq. ft.)	(PF/IE) x Area	Estimated Total Water Use (ETWU)
REGULAR LANDSCAPE AREAS							
HZ 1 Top of Slope	0.30	Sprinkler	0.75	0.40	11,001	4,400	116,223
HZ 2 Middle of Slope	0.30	Sprinkler	0.75	0.40	9,395	3,758	99,256
HZ 3 Base of Slope	0.30	Sprinkler	0.75	0.40	12,187	4,875	128,753
HZ 4 Shrub Bubblers	0.30	Bubbler	0.81	0.37	390	144	3,815
				Total	32,973	13,178	
						ETWU TOTAL	348,048
						MAXIMUM APPLIED WATER ALLOWANCE (MAWA)	391,897

HYDROZONE INFORMATION MATRIX

Hydrozone Number	Station Number	Area (sq. ft.)	Percent of Area	Description / Plant Type	Plant Factor (WUCOLS)	Irrigation Type	Zone Flow (GPM)	Precipitation Rate (in./hr.)	Zone Pressure
1	1	1,200	3.6%	Top of Slope	Low	MP Rotator	7	0.40	30 psi
2	2	1,200	3.6%	Middle of Slope	Low	MP Rotator	7	0.40	30 psi
3	3	1,028	3.1%	Bottom of Slope	Low	MP Rotator	6	0.40	30 psi
1	4	1,784	5.4%	Top of Slope	Low	MP Rotator	11	0.40	30 psi
2	5	1,135	3.4%	Middle of Slope	Low	MP Rotator	7	0.40	30 psi
3	6	1,946	5.9%	Bottom of Slope	Low	MP Rotator	12	0.40	30 psi
1	7	2,528	7.7%	Top of Slope	Low	MP Rotator	17	0.40	30 psi
2	8	3,271	9.9%	Middle of Slope	Low	MP Rotator	22	0.40	30 psi
3	9	3,717	11.3%	Bottom of Slope	Low	MP Rotator	25	0.40	30 psi
4	10	390	1.2%	Shrubs with Bubblers	Low	Bubbler	10	2.50	30 psi
1	11	3,114	9.4%	Top of Slope	Low	MP Rotator	18	0.40	30 psi
2	12	2,941	8.9%	Middle of Slope	Low	MP Rotator	17	0.40	30 psi
3	13	3,460	10.5%	Bottom of Slope	Low	MP Rotator	20	0.40	30 psi
1	14	2,375	7.2%	Top of Slope	Low	MP Rotator	14	0.40	30 psi
2	15	848	2.6%	Middle of Slope	Low	MP Rotator	5	0.40	30 psi
3	16	2,036	6.2%	Bottom of Slope	Low	MP Rotator	12	0.40	30 psi
TOTAL =		32,973	100.0%			Peak Flow =	25		

POINT OF CONNECTION
MAKE IRRIGATION POINT OF CONNECTION INTO WATER LINE DIRECTLY DOWN STREAM OF EXISTING IRRIGATION WATER METER. VERIFY EXACT LOCATION IN THE FIELD AND ADJUST AS NECESSARY. INSTALL SHUT-OFF VALVE AT POC FOR IRRIGATION SYSTEM ISOLATION. INSTALL BACKFLOW PREVENTER DOWN STREAM OF SHUT-OFF VALVE PER ALL LOCAL CODES. INSTALL IN ENCLOSURE AS CALLED FOR IN THE IRRIGATION LEGEND. FINAL BACKFLOW PREVENTER LOCATION TO BE APPROVED IN THE FIELD BY THE OWNER OR AUTHORIZED REPRESENTATIVE. PIPING BETWEEN THE WATER METER AND THE BACKFLOW PREVENTER ASSEMBLY TO BE SCH 80 PVC. INSTALL MASTER VALVE DOWN STREAM OF BACKFLOW DEVICE AND WIRE TO CONTROLLER PER MANUFACTURER'S DIRECTIONS. INSTALL FLOW SENSOR DOWN STREAM OF MASTER VALVE AND WIRE TO CONTROLLER PER MANUFACTURER'S DIRECTIONS. MAXIMUM DEMAND IS 25 GPM. STATIC PRESSURE AT METER IS 6 PSI (INFORMATION FROM CIVIL ENGINEER BY EMAIL ON APRIL 2, 2025). CONTRACTOR SHALL VERIFY STATIC PRESSURE AT METER PRIOR TO START OF WORK AND NOTIFY THE LANDSCAPE ARCHITECT IN WRITING IMMEDIATELY IF A DISCREPANCY IS FOUND. DO NOT PROCEED WITH ANY IRRIGATION INSTALLATION WORK UNTIL ANY AND ALL WATER SUPPLY AND PRESSURE ISSUES HAVE BEEN RESOLVED.

CONTROLLER
INSTALL IRRIGATION CONTROLLER AS SHOWN ON THE PLANS. FINAL CONTROLLER LOCATION TO BE APPROVED IN THE FIELD BY THE OWNER OR AUTHORIZED REPRESENTATIVE. THE IRRIGATION CONTRACTOR SHALL COORDINATE 120V AC POWER TO THE FINAL CONTROLLER LOCATION WITH GENERAL CONTRACTOR AND/OR ELECTRICAL CONTRACTOR AS NECESSARY. THE OWNER SHALL PAY ALL ASSOCIATED COSTS. THE IRRIGATION CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS PER LOCAL CODES. MOUNT, GROUND, AND WIRE ALL THE CONTROL EQUIPMENT PER THE MANUFACTURER'S DIRECTIONS, THESE PLANS, AND PER ALL LOCAL CODES. CONTRACTOR TO PROVIDE TO OWNER A COMPLETE HAND-HELD MAINTENANCE REMOTE CONTROL KIT FOR THE CONTROLLER AS PROVIDED BY THE CONTROLLER MANUFACTURER.

WEATHER SENSOR (ET SENSOR / RAIN SHUT-OFF DEVICE)
INSTALL THE WEATHER SENSOR IN THE APPROXIMATE LOCATION SHOWN ON THE PLANS. LOCATE AND MOUNT PER MANUFACTURERS' DIRECTIONS. FINAL WEATHER SENSOR LOCATION TO BE DETERMINED IN THE FIELD AND PRE-APPROVED BY THE OWNER AND/OR ARCHITECT PRIOR TO MOUNTING. ENSURE THE SENSOR IS LOCATED WITHIN WIRELESS RANGE OF THE IRRIGATION CONTROLLER. TEST THE SIGNAL STRENGTH OF THE WIRELESS COMMUNICATION PRIOR TO MOUNTING. IT IS SUGGESTED TO NOT USE THE AUTOMATIC ET ADJUSTING FUNCTIONS OF THE CONTROL SYSTEM UNTIL THE PLANT MATERIAL IS FULLY ESTABLISHED.

SLEEVING
MAINLINE AND VALVES MAY BE SHOWN OUTSIDE OF PLANTED AREAS FOR CLARITY ONLY. INSTALL ALL IRRIGATION EQUIPMENT IN ADJACENT PLANTED AREAS EXCEPT WHERE SLEEVING IS SHOWN ON THE PLANS. ALL PIPES AND WIRES THAT MUST RUN UNDER HARDSCAPE TO BE SLEEVED IN PVC SLEEVES ACCORDING TO THE LEGEND AND SLEEVING CHART, OR AS NOTED ON THE PLANS.

CHECK VALVES
INSTALL IN-LINE CHECK VALVES FOR THE SHRUB BUBBLER SYSTEMS SO THAT THE BUBBLERS LINES DO NOT DRAIN EVERY TIME THE VALVE CYCLES. INSTALL THE BUBBLERS IN A 10" ROUND VALVE BOX. SEE LOCATION ON THE PLANS. ADD MORE CHECK VALVES TO THE BUBBLER SYSTEM AND / OR THE ROTATOR SYSTEMS AS NEEDED (NOT SHOWN) TO MINIMIZE LOW PIPE DRAINAGE.

SPRINKLER LEGEND - POINT SOURCE BUBBLER

SYMBOL	MANUFACTURER / MODEL NUMBER	NOZZLE	RAD	PSI	FLOW - GPM Q	T	H	TT	TQ	F	DETAIL
FLOOD BUBBLER ON FLEXIBLE PVC RISER											
●	RAIN BIRD 1401 SERIES BUBBLER	1 PER PLANT	N/A	20	2 GPH						L / M
NOTE: INSTALL ONE BUBBLER FOR EACH SHRUB IN THE NARROW AREAS ONLY.											

SPRINKLER LEGEND - ROTATOR NOZZLES

SYMBOL	MANUFACTURER / MODEL NUMBER	NOZZLE	RAD	PSI	FLOW - GPM Q	T	H	210°	TQ	F	DETAIL
SHRUB HI-POP HEADS WITH HUNTER MP ROTATOR NOZZLE, CHECK VALVE, AND PRESSURE REGULATION											
	HUNTER PROS-12-PRS30-CV SERIES	MPCORNER	8'-12'	30	0.17						N
	HUNTER PROS-12-PRS30-CV SERIES	MP1000-90-210 MP1000-210-270	8'-12'	30	0.16	0.21	0.32	0.37	0.48		
	HUNTER PROS-12-PRS30-CV SERIES	MP1000-360	8'-12'	30						0.65	
	HUNTER PROS-12-PRS30-CV SERIES	MP2000-90-210 MP2000-210-270	13'-17'	30	0.33	0.42	0.63	0.74	0.95		
	HUNTER PROS-12-PRS30-CV SERIES	MP2000-360	13'-17'	30						1.27	
	HUNTER PROS-12-PRS30-CV SERIES	MP3000-90-210 MP3000-210-270	18'-27'	30	0.74	1.05	1.58	1.84	2.37		
	HUNTER PROS-12-PRS30-CV SERIES	MP3000-360	18'-27'	30						3.15	

EQUIPMENT LEGEND

SYMBOL	MANUFACTURER / MODEL NUMBER	SIZE	DETAIL
M	EXISTING SITE WATER METER - VERIFY LOCATION IN THE FIELD AND ADJUST AS NECESSARY	2"	N/A
BP	FEBCO LF825YA REDUCED PRESSURE BACKFLOW PREVENTER + WYE STRAINER + REGULATOR	1 1/2"	A
MV	SUPERIOR 3200-100 SERIES NORMALLY CLOSED BRASS MASTER CONTROL VALVE	1 1/2"	B
FS	FLOWMEC QS-200-15 ULTRASONIC FLOW SENSOR IN SCH 80 PVC TEE	1 1/2"	C
	NIBCO T-580-70 TWO-PIECE BRONZE BALL VALVE - FULL PORT	LINE SIZE	D
	HUNTER HQ33D-LRC SERIES QUICK COUPLING VALVE WITH LOCKING YELLOW VINYL COVER	3/4"	E
	HUNTER ICV-101G SERIES ELECTRIC CONTROL VALVE WITH FLOW CONTROL	PLAN SIZE	F
	SCH 80 PVC MAINLINE BETWEEN WATER METER AND BACKFLOW PREVENTER	2"	G
	SCH 40 PVC IRRIGATION PRESSURE MAINLINE (1 1/2" AND SMALLER) - 18" MINIMUM COVER CLASS 315 PVC IRRIGATION PRESSURE MAINLINE (2" AND LARGER) - 24" MINIMUM COVER	PLAN SIZE	G
	SCH 40 PVC NON-PRESSURE LATERAL LINE - 12" MINIMUM COVER	PLAN SIZE	G
	SCH 40 PVC PIPE SLEEVING - EXTEND 6" BEYOND EDGE OF HARDSCAPE - 18" MINIMUM COVER	PLAN SIZE	H
	SCH 40 PVC WIRE SLEEVING - EXTEND 6" BEYOND EDGE OF HARDSCAPE - 18" MINIMUM COVER	PLAN SIZE	H
C	HUNTER 'ACC2' A2C-1200-P+(2)A2M-600+A2-WIFI AUTOMATIC WEATHER-BASED ET CONTROLLER WITH MODULAR STATION CAPABILITY - MOUNT SOLAR SYNC ON CABINET IN WR-GUARD	24 STATION	I
ET	HUNTER 'SOLAR SYNC' WSS-SEN WIRELESS RAIN SENSOR / ET SENSOR OWNER	N/A	J
NOT SHOWN	UF DIRECT BURIAL CONTROL WIRE WITH WATERPROOF CONNECTIONS	14 GA UF	K

LATERAL PIPE SIZING

	3/4" PIPE
	1" PIPE
	1 1/4" PIPE
	1 1/2" PIPE
	2" PIPE
	2 1/2" PIPE
	3" PIPE
	4" PIPE

LATERALS TO BE SCH 40 PVC.
NO 1/2" PIPING ALLOWED.

SCH 40 PVC SLEEVING CHART

1 1/4" SLEEVE	1-8 WIRES	1/2" PIPE
1 1/2" SLEEVE	9-16 WIRES	3/4" PIPE
2" SLEEVE	17-26 WIRES	1" PIPE
2 1/2" SLEEVE	27-38 WIRES	1 1/4" PIPE
3" SLEEVE	39-54 WIRES	1 1/2" PIPE
4" SLEEVE	55-100 WIRES	2" PIPE
6" SLEEVE	100+ WIRES	3" PIPE

PIPE SLEEVES TO BE A MIN. 2x LINE SIZE.
WIRE SLEEVES TO BE A MIN. OF 2x WIRE BUNDLE SIZE.

811 Know what's below. Call before you dig.

REVISIONS: No. | DATE | SHEET | APPROVAL | DESCRIPTION
AS-BUILT:
REF.:

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REGISTERED PROFESSIONAL ENGINEER RAFAEL J. HOLCOMBE 04-08-25 CIVIL STATE OF CALIFORNIA

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
IRRIGATION PLAN

GRAPHIC SCALE
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SHEET 28 OF 37
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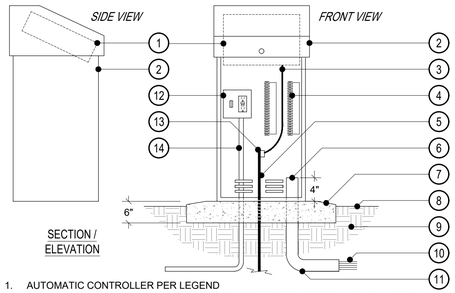
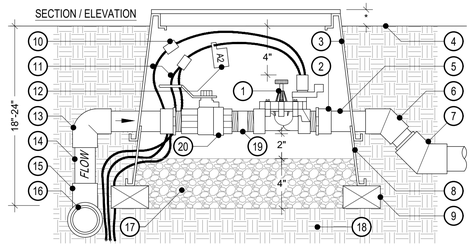
LAST SAVED BY: rickd
PLOT DATE: May. 20, 25 SAVED PATH: E:\Production\Steven Ormeny\2025\5026 Redondo Beach\2 CDs\20250520

AUTOMATIC CONTROLLER | I



1. AUTOMATIC CONTROLLER PER LEGEND
2. STAINLESS STEEL V.I.T. CONTROLLER ENCLOSURE PER LEGEND AND/OR NOTES
3. #6 AWG BARE COPPER WIRE TO GROUND ROD (PAIGE #160635)
4. TERMINAL STRIPS (PART OF V.I.T. CSA OPTION)
5. 5/8"x10' SOLID COPPER GROUNDING ROD (PAIGE #182007)
6. 3" SCH 40 PVC CONDUIT FOR CONTROL WIRES - EXTEND ABOVE PAD
7. POURED IN PLACE CONCRETE PAD - SLOPE EDGES 1% FOR DRAINAGE
8. FINISH GRADE - 2" BELOW TOP OF CONCRETE PAD
9. NATIVE SOIL
10. DIRECT BURIAL CONTROL WIRES TO VALVES
11. USE LONG PVC SWEEP ELLS FOR WIRES
12. 120V AC OUTLET AND SWITCH (PART OF V.I.T. CSA OPTION)
13. CADWELD #GR116TG "ONE-SHOT" WELDING KIT (PAIGE #1820037P)
14. PVC CONDUIT WITH 120V AC POWER WIRES TO ELECTRICAL SOURCE

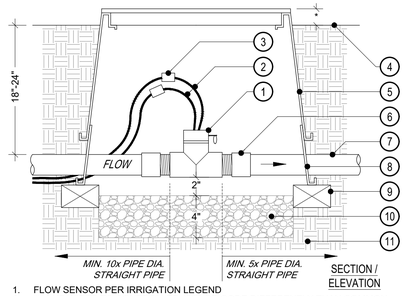
ELECTRIC CONTROL VALVE | F



1. REMOTE CONTROL VALVE PER IRRIGATION LEGEND
2. SCH 40 PVC MALE ADAPTER (2 REQUIRED) VALVE SIZE
3. RECTANGULAR PLASTIC VALVE BOX WITH LOCKING LID (NDS PRO-SPEC SERIES) HEAT BRAND STATION NUMBER ON LID IN 2" HIGH BLOCK LETTERS
4. FINISH GRADE
5. PVC LATERAL LINE PER IRRIGATION LEGEND (VALVE SIZE)
6. SCH 40 PVC 45 DEGREE ELL
7. SCH 40 PVC 45 DEGREE ELL (BUSH UP TO LATERAL LINE PLAN SIZE)
8. RECTANGULAR PLASTIC VALVE BOX EXTENSION AS REQUIRED
9. COMMON BRICK SUPPORTS (4 REQUIRED)
10. WATER PROOF WIRE CONNECTORS (2 REQUIRED)
11. #14 UF WIRES TO CONTROLLER (COLOR CODED)
12. I.D. TAG WITH STATION NUMBER PRINTED ON IT (CHRISTY'S #ID-STD-Y1)
13. SCH 40 PVC ELL (VALVE SIZE)
14. MAINLINE PIPING PER IRRIGATION LEGEND (VALVE SIZE)
15. SCH 40 PVC TEE (OUTLET TO BE VALVE SIZE)
16. MAINLINE PIPING PER IRRIGATION LEGEND (PLAN SIZE)
17. FILL BASE OF BOX WITH PEA GRAVEL
18. NATIVE SOIL
19. SCH 80 PVC THREADED NIPPLE (3")
20. BALL VALVE PER IRRIGATION LEGEND (SAME SIZE AS RCV)

* 1/2" IN TURF AREAS, 2" IN SHRUB AREAS

FLOW SENSOR | C

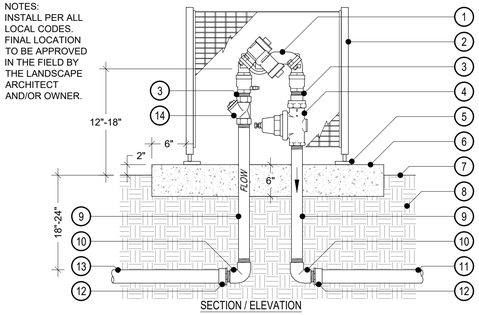


1. FLOW SENSOR PER IRRIGATION LEGEND
2. #14 UF WIRES TO CONTROLLER (COLOR CODE DIFFERENTLY THAN COMMON WIRE, CONTROL WIRES, AND MASTER VALVE WIRES)
3. WATERPROOF WIRE CONNECTORS (2 REQUIRED)
4. FINISH GRADE
5. RECTANGULAR PLASTIC VALVE BOX WITH LOCKING LID (NDS PRO-SPEC SERIES) HEAT BRAND "FS" ON LID IN 2" HIGH BLOCK LETTERS
6. SCH 40 MALE ADAPTERS (SENSOR SIZE, 2 REQUIRED) NOT REQUIRED FOR PVC SENSORS - REFER TO EQUIPMENT LEGEND
7. MAINLINE PIPING PER IRRIGATION LEGEND (SENSOR SIZE)
8. RECTANGULAR PLASTIC VALVE BOX EXTENSION AS REQUIRED
9. COMMON BRICK SUPPORTS (4 REQUIRED)
10. FILL BASE OF BOX WITH PEA GRAVEL
11. NATIVE SOIL

* 1/2" IN TURF AREAS, 2" IN SHRUB AREAS

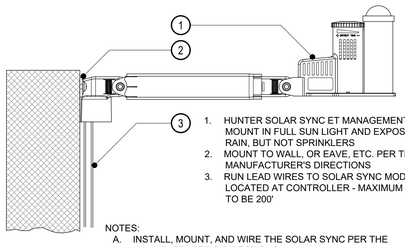
BACKFLOW PREVENTER / LOCKING ENCLOSURE | A

NOTES:
INSTALL PER ALL LOCAL CODES. FINAL LOCATION TO BE APPROVED IN THE FIELD BY THE LANDSCAPE ARCHITECT AND/OR OWNER.



1. REDUCED PRESSURE BACKFLOW PREVENTER PER IRRIGATION LEGEND
2. LOCKING STAINLESS STEEL V.I.T. BACKFLOW PREVENTER ENCLOSURE (#SBBC-30SS)
3. BRASS CLOSE NIPPLE (R/P SIZE)
4. WILKINS 500XL SERIES PRESSURE REGULATOR (R/P SIZE) IF REQUIRED
5. MOUNT ENCLOSURE TO CONCRETE PAD PER MANUFACTURER
6. 6" THICK CONCRETE PAD
7. FINISH GRADE
8. NATIVE SOIL
9. BRASS NIPPLE (R/P SIZE) LENGTH AS REQUIRED
10. BRASS ELL (R/P SIZE)
11. MAINLINE PIPING PER IRRIGATION LEGEND (TO SYSTEM)
12. SCH 40 PVC MALE ADAPTER (BUSH UP TO MAINLINE PLAN SIZE WHERE R/P DEVICE IS SMALLER THAN MAINLINE SIZE)
13. MAINLINE PIPING PER IRRIGATION LEGEND (FROM P.O.C.)
14. WILKINS YBP-80 STRAINER (R/P SIZE)

RAIN SENSOR / ET SENSOR - WIRELESS | J

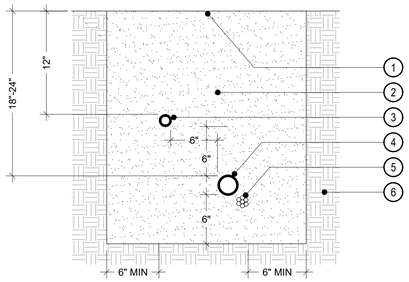


1. HUNTER SOLAR SYNC ET MANAGEMENT SYSTEM - MOUNT IN FULL SUN LIGHT AND EXPOSURE TO RAIN, BUT NOT SPRINKLERS
2. MOUNT TO WALL, OR EAVE, ETC. PER THE MANUFACTURER'S DIRECTIONS
3. RUN LEAD WIRES TO SOLAR SYNC MODULE LOCATED AT CONTROLLER - MAXIMUM WIRE RUN TO BE 200'

NOTES:
A. INSTALL, MOUNT, AND WIRE THE SOLAR SYNC PER THE MANUFACTURER'S DIRECTIONS.
B. FINAL SOLAR SYNC LOCATION TO BE DETERMINED IN THE FIELD AND APPROVED BY THE OWNER.
C. FINAL SOLAR SYNC LOCATION SHALL BE IN A LOW VISIBILITY AREA WITH MAXIMUM VANDAL RESISTANCE.
D. FOR MOST ACCURATE TEMPERATURE SENSING, LOCATE THE SOLAR SYNC SO THAT IT IS EXPOSED TO SUN AS MUCH AS POSSIBLE.
E. THE SOLAR SYNC HAS AN INTEGRATED BRACKET FOR MOUNTING. USE ANY COMBINATION OF ADAPTERS / FITTINGS AS MAY BE REQUIRED TO MOUNT IN THE SPECIFIC LOCATION FOR THIS SITE.
F. ALL WIRING FROM THE STATION TO THE CONTROLLER SHALL BE IN CONDUIT.

ADAPT AS NECESSARY TO MOUNT IN VANDAL RESISTANT ENCLOSURE ON SIDE OF THE CONTROLLER CABINET.

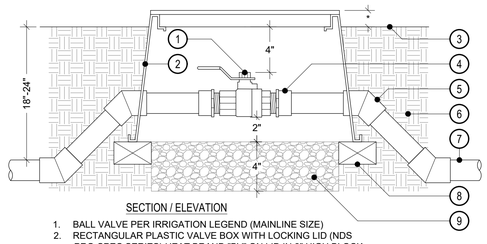
TRENCHING | G



1. FINISH GRADE
2. CLEAN BACKFILL WITH ALL ROCKS 1" OR LARGER REMOVED - 90% COMPACTION REQUIRED - SEE SPECS
3. NON-PRESSURE LATERAL LINE PER LEGEND (SNAKE IN TRENCH)
4. PRESSURE MAINLINE PER LEGEND (SNAKE IN TRENCH)
5. CONTROL WIRES - INSTALL BELOW PRESSURE MAINLINE
6. UNDISTURBED NATIVE SOIL

NOTES:
BUNDLE AND TAPE WIRES AT 10' O.C. PIGTAIL AND LOOP WIRES AT ALL CHANGES IN DIRECTION. SPLICING OF WIRE RUNS IS NOT PERMITTED WITHOUT PRIOR APPROVAL FROM OWNER AND LANDSCAPE ARCHITECT. RUN CONTROL WIRES IN SAME TRENCH AS MAINLINE WHERE POSSIBLE. INSTALL 12"x12"x12" CONCRETE THRUST BLOCKS AT ALL CHANGES IN DIRECTION OF PRESSURE MAINLINE (45'S, 90'S, TEES, ETC.) AND AT ALL TERMINAL POINTS.

BALL VALVE | D

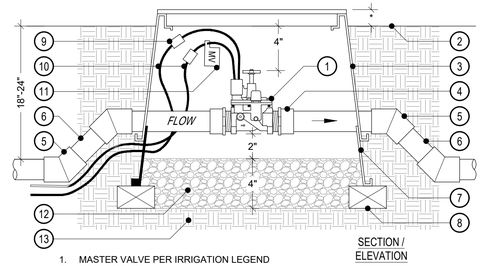


1. BALL VALVE PER IRRIGATION LEGEND (MAINLINE SIZE)
2. RECTANGULAR PLASTIC VALVE BOX WITH LOCKING LID (NDS PRO-SPEC SERIES) HEAT BRAND "BV" ON LID IN 2" HIGH BLOCK LETTERS
3. FINISH GRADE
4. SCH 40 PVC MALE ADAPTER (2 REQUIRED)
5. SCH 40 PVC 45 DEGREE ELL (4 REQUIRED)
6. NATIVE SOIL
7. MAINLINE PIPING PER IRRIGATION LEGEND
8. COMMON BRICK SUPPORTS (4 REQUIRED)
9. FILL BASE OF BOX WITH PEA GRAVEL

* 1/2" IN TURF AREAS, 2" IN SHRUB AREAS

NOTES:
OFF-SET VALVE BOX AROUND BALL VALVE TO ALLOW SPACE FOR FULL MOVEMENT OF THE BALL VALVE HANDLE.

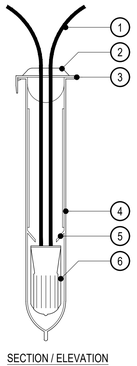
MASTER VALVE | B



1. MASTER VALVE PER IRRIGATION LEGEND
2. FINISH GRADE
3. RECTANGULAR PLASTIC VALVE BOX WITH LOCKING LID (NDS PRO-SPEC SERIES) HEAT BRAND "MV" ON LID IN 2" HIGH BLOCK LETTERS
4. SCH 40 PVC MALE ADAPTER (2 REQUIRED) USE REDUCING ADAPTERS WHERE MAINLINE IS LARGER THAN VALVE
5. SCH 40 PVC 45 DEGREE ELL (4 REQUIRED)
6. MAINLINE PIPING PER IRRIGATION LEGEND (PLAN SIZE)
7. RECTANGULAR PLASTIC VALVE BOX EXTENSION AS REQUIRED
8. COMMON BRICK SUPPORTS (4 REQUIRED)
9. WATERPROOF WIRE CONNECTORS (2 REQUIRED)
10. #14 UF WIRES TO CONTROLLER (COLOR CODE DIFFERENTLY THAN COMMON WIRE, CONTROL WIRES, AND FLOW SENSOR WIRES)
11. I.D. TAG WITH "MV" PRINTED ON IT (CHRISTY'S #ID-STD-Y1)
12. FILL BASE OF BOX WITH PEA GRAVEL
13. NATIVE SOIL

* 1/2" IN TURF AREAS, 2" IN SHRUB AREAS

WATERPROOF WIRE CONNECTOR | K



1. LOW VOLTAGE WIRES - 3 MAXIMUM
2. WIRES PASS THROUGH GROOVES IN TUBE LID TO ALLOW LID TO CLOSE
3. CLOSE TUBE LID AFTER WIRE IS INSERTED INTO TUBE
4. POLY TUBE PRE-FILLED WITH WATERPROOF GEL
5. LOCK TABS PREVENT WIRE REMOVAL ONCE CONNECTOR IS INSERTED
6. SCOTCHLOK ELECTRICAL SPRING CONNECTOR - WIRES SHALL BE PRE-STRIPPED OF 1/2" OF THE INSULATION PRIOR TO INSERTION INTO THE CONNECTOR - TWIST CONNECTOR ONTO WIRES TO SEAT FIRMLY

INSERT SCOTCHLOK CONNECTOR AND WIRES INTO TUBE UNTIL THE CONNECTOR PASSES THE LOCK TABS.

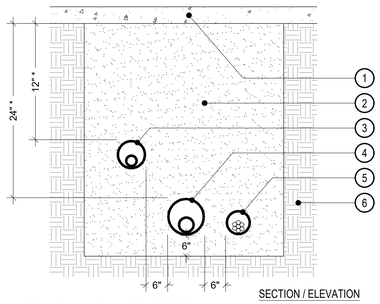
NOTES:
WIRE CONNECTOR SHALL BE A 3M DBY DIRECT BURY SPLICE KIT.

KIT SHALL INCLUDE A SCOTCHLOK SPRING CONNECTOR, A POLYPROPYLENE TUBE AND A WATERPROOF SEALING GEL. TUBE SHALL BE SUPPLIED PRE-FILLED WITH GEL.

DIRECT BURY SPLICE KIT SHALL BE USED TO ELECTRICALLY CONNECT 2-3 #14 OR 2 #12 PRE-STRIPPED COPPER WIRES. LARGER OR GREATER QUANTITIES OF WIRES SHALL REQUIRE A LARGER APPROVED WIRE CONNECTOR.

SECTION / ELEVATION

SLEEVING | H

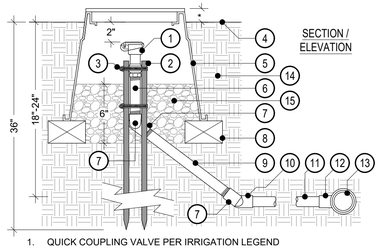


1. HARDSCAPING AND AGGREGATE (TYPICAL)
2. CLEAN SAND BACKFILL - COMPACT TO MATCH DENSITY OF NATIVE SOIL
3. LATERAL LINE IN SCH 40 PVC SLEEVE
4. PRESSURE MAINLINE IN SCH 40 PVC SLEEVE
5. CONTROL WIRES IN SCH 40 PVC SLEEVE
6. UNDISTURBED NATIVE SOIL

NOTES:
SIZE ALL SLEEVES PER THE IRRIGATION PLANS. EXTEND SLEEVES 6" MINIMUM BEYOND EDGE OF HARDSCAPE (AT EACH END) INTO THE PLANTING AREAS.

* SLEEVING UNDER ALL VEHICULAR ACCESS WAYS TO HAVE 36" MINIMUM COVER FROM TOP OF SLEEVE TO BOTTOM OF AGGREGATE BASE.

QUICK COUPLING VALVE | E



1. QUICK COUPLING VALVE PER IRRIGATION LEGEND
2. #4x36" REBAR SUPPORT STAKE (2 REQUIRED)
3. STAINLESS STEEL CLAMP (2 REQUIRED)
4. FINISH GRADE
5. 10" ROUND PLASTIC VALVE BOX WITH LOCKING LID (NDS PRO-SPEC SERIES) HEAT BRAND "QC" ON LID IN 2" HIGH BLOCK LETTERS
6. 3/4"x6" SCH 80 PVC NIPPLE
7. 3/4" SCH 40 PVC STREET ELL (3 REQUIRED)
8. COMMON BRICK SUPPORTS (3 REQUIRED)
9. 3/4"x12" SCH 80 PVC NIPPLE
10. 3/4" SCH 40 PVC ELL (SxT)
11. 3/4" SCH 40 PVC MAINLINE (12" MINIMUM LENGTH)
12. SCH 40 PVC MAINLINE FITTING (TEE OR ELL) WITH 3/4" SLIP OUTLET
13. MAINLINE PIPING PER IRRIGATION LEGEND (PLAN SIZE)
14. NATIVE SOIL
15. FILL BASE OF BOX WITH PEA GRAVEL

* 1/2" IN TURF AREAS, 2" IN SHRUB AREAS

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IRVINE, CA 92614
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REVISIONS: No. | DATE | SHEET | APPROVAL | DESCRIPTION

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

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IRRIGATION DETAILS

GRAPHIC SCALE

PAGE

FIELD BOOK

DRAWING REF. I-3

SHEET 29 OF 37

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IRRIGATION NOTES (AS APPLICABLE) :

1. GENERAL - ALL WORK SHALL BE IN ACCORDANCE WITH APPLICABLE CODES AND THESE PLANS. THE CONTRACTOR SHALL APPLY FOR ALL PERMITS AND PAY SAME.
   1.A. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS SHOWN ON THE PLANS AT THE SITE PRIOR TO COMMENCEMENT OF ANY WORK UNDER THIS CONTRACT.
   1.B. THE CONTRACTOR SHALL CARRY ALL WORKERS COMPENSATION, PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE, AS REQUIRED BY THE OWNER AND/OR GOVERNING AGENCY.

2. SCOPE OF WORK - UNLESS OTHERWISE SPECIFIED, THE CONSTRUCTION OF IRRIGATION SYSTEMS SHALL INCLUDE THE FURNISHING, INSTALLING AND TESTING OF ALL POINTS OF CONNECTION, BACKFLOW DEVICES, AND MAINLINE; AND THE FURNISHING AND INSTALLING OF CONTROLLERS, ELECTRIC CONTROL VALVES, OTHER SPECIFIED VALVES, LATERAL LINES, RISERS AND FITTINGS, SPRINKLER HEADS, AND DRIP LINES; AND EXCAVATION AND BACKFILL AND ALL OTHER WORK IN ACCORDANCE WITH THESE PLANS, DETAILS, AND NOTES. THE CONTRACTOR SHALL FURNISH ALL LABOR, MATERIAL, EQUIPMENT PROPERTY, TRANSPORTATION, AND PERFORM ALL OPERATIONS REQUIRED FOR A COMPLETE AND OPERABLE IRRIGATION SYSTEM AS INDICATED ON, OR REASONABLY IMPLIED BY THE DRAWINGS, DETAILS, AND NOTES. INCLUDED AS A PART OF THE IRRIGATION WORK, BUT NOT LIMITED BY IT, ARE THE FOLLOWING:
   2.A. INSTALL COMPLETE OPERABLE INDEPENDENT IRRIGATION SYSTEMS PER THE PLANS, DETAILS, LEGENDS, AND NOTES.
   2.B. ALL IRRIGATION WORK SHALL BE GUARANTEED BY THE CONTRACTOR AS TO MATERIAL AND WORKMANSHIP, INCLUDING SETTLING OF BACKFILLED TRENCHES BELOW GRADE FOR A PERIOD OF ONE YEAR FOLLOWING THE DATE OF FINAL ACCEPTANCE OF THE WORK.

3. CHECK AND VERIFY ALL SITE CONDITIONS AND UTILITY LOCATIONS PRIOR TO ANY SITE WORK. IF IT IS FOUND THAT THE SITE VARIES FROM THE DRAWINGS, NOTIFY THE LANDSCAPE ARCHITECT. THE LANDSCAPE ARCHITECT SHALL DECIDE ALL QUESTIONS RELATING TO THE INTERPRETATION OF THE DRAWINGS AND THE ACCEPTABLE FULFILLMENT OF THE CONTRACT.

4. COORDINATE ALL IRRIGATION WORK WITH PLANTING AND GRADING OPERATIONS TO AVOID ANY CONFLICT WITH PLANTING PITS, DRAINAGE SWALES, ETC.

5. PIPING SHOWN ON THE PLANS IS ESSENTIALLY DIAGRAMMATIC. CONTRACTOR SHALL ROUTE PIPING TO AVOID CONFLICT WITH STATIONARY ELEMENTS AND IN SUCH A MANNER AS TO CONFORM WITH THE VARIOUS DETAILS AND DESIGN INTENT OF THESE PLANS. WHERE TREES, LIGHT STANDARDS, OR OTHER PHYSICAL OBSTRUCTIONS EXIST, THE PIPING AND SPRINKLER HEAD LOCATIONS SHALL BE ADJUSTED AND / OR RELOCATED AS NECESSARY TO OBTAIN FULL COVERAGE WITH MINIMAL OVER SPRAY.

6. THE CONTRACTOR SHALL AT ALL TIMES PROTECT HIS WORK FROM DAMAGE AND THEFT AND REPLACE ALL DAMAGED OR STOLEN PARTS AT HIS EXPENSE UNTIL THE WORK IS ACCEPTED IN WRITING BY THE OWNER AND/OR GOVERNING AGENCY.

7. EXTREME CARE SHALL BE EXERCISED IN EXCAVATING AND WORKING NEAR EXISTING UTILITIES. CONTRACTOR SHALL VERIFY THE LOCATION AND CONDITION OF ALL UTILITIES AND BE RESPONSIBLE FOR ANY DAMAGE. CONTRACTOR SHALL CONTACT UNDERGROUND SERVICE ALERT A MINIMUM OF TWO WORKING DAYS PRIOR TO DIGGING.

8. THE CONTRACTOR SHALL KEEP THE PREMISES CLEAN AND FREE OF EXCESS EQUIPMENT, MATERIALS, AND RUBBISH INCIDENTAL TO HIS WORK.

9. THE IRRIGATION DESIGN IS BASED ON THE METER AND/OR POINT OF CONNECTION SIZE AND WATER PRESSURE INDICATED ON THE WATER SOURCE / POINT OF CONNECTION NOTE ON THE PLANS. CONTRACTOR SHALL VERIFY THE PRESSURE PRIOR TO CONSTRUCTION. SHOULD A DISCREPANCY EXIST, NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO BEGINNING CONSTRUCTION. DO NOT PROCEED WITH ANY IRRIGATION INSTALLATION WORK UNTIL ANY AND ALL WATER SUPPLY AND PRESSURE ISSUES HAVE BEEN RESOLVED.

10. CONTRACTOR SHALL MAKE POINT(S) OF CONNECTION (POC) AS NOTED ON THE PLANS. ALL FEES AND LOCAL REQUIREMENTS SHALL BE THE RESPONSIBILITY OF THE LANDSCAPE CONTRACTOR.

11. IRRIGATION CONTRACTOR SHALL COORDINATE 120V AC POWER TO FINAL CONTROLLER LOCATION WITH GENERAL CONTRACTOR AND/OR ELECTRICAL CONTRACTOR AS NECESSARY. IRRIGATION CONTRACTOR SHALL PAY ALL ASSOCIATED FEES FOR ELECTRICAL SERVICE. IRRIGATION CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL FINAL CONTROLLER CONNECTIONS PER LOCAL CODES.

12. CONTRACTOR SHALL PROVIDE ALL EQUIPMENT REQUIRED TO PERFORM A MAINLINE PRESSURE TEST. THE HYDROSTATIC TEST SHALL HOLD A MINIMUM OF 150 PSI FOR 3 HOURS OR MORE. CONTRACTOR SHALL CONTACT THE OWNER'S REPRESENTATIVE A MINIMUM OF 48 HOURS IN ADVANCE OF THE TEST FOR CERTIFICATION.

13. CONTRACTOR SHALL THOROUGHLY FLUSH THE ENTIRE MAINLINE PRIOR TO INSTALLING REMOTE CONTROL VALVES. ALL LATERAL LINES SHALL BE COMPLETELY FLUSHED PRIOR TO INSTALLING HEADS AND NOZZLES. FOR DRIP SYSTEMS, ALL PIPING / TUBING DOWNSTREAM OF THE CONTROL VALVE SHALL BE THOROUGHLY FLUSHED PRIOR TO 'CLOSING' SYSTEM (FOR GRID SYSTEMS), OR BEFORE INSTALLING FLUSH VALVES.

14. ALL WIRES SHALL BE SOLID COPPER, PLASTIC INSULATED, U.F. DIRECT BURIAL WIRE. ALL COMMON WIRE SHALL BE AWG #12 WHITE; ALL CONTROL WIRES SHALL BE AWG #14 RED OR BLACK. CONTROLLERS SHALL HAVE SEPARATE COLOR CODED COMMON WIRES AND CONTROL WIRES WHEN TWO OR MORE CONTROLLERS ARE ON THE PROJECT.

15. ALL CONTROL WIRES AND IRRIGATION PIPING THAT RUNS UNDER HARDSCAPE / PAVING SHALL BE ENCASED IN PVC SLEEVES PER THE LEGEND. SLEEVES SHALL BE SIZED ACCORDING TO THE SLEEVING CHART ON THE PLANS. SLEEVES SHALL BE STRAIGHT RUNS OF PVC PIPE WITH NO FITTINGS INSTALLED UNDER HARDSCAPED AREAS. IF WIDTH OF HARDSCAPE EXCEEDS A FULL LENGTH OF PIPE, USE BELLED END CONNECTION OR COUPLER WITHIN SLEEVE, ENSURING SLEEVE IS LARGE ENOUGH FOR THE ADDED DIAMETER OF THE CONNECTION.

16. THE FINAL LOCATION FOR CONTROL VALVES AND QUICK COUPLERS SHALL BE APPROVED IN THE FIELD BY THE LANDSCAPE ARCHITECT OR THE OWNER'S AUTHORIZED REPRESENTATIVE. ALL VALVES AND QUICK COUPLERS SHALL BE LOCATED IN SHRUB AREAS WHEREVER POSSIBLE.

17. THE CONTRACTOR SHALL HEAT BRAND VALVE NUMBERS OR OTHER MARKINGS AS CALLED FOR IN THE IRRIGATION DETAILS ON INSIDE AND OUTSIDE OF ALL VALVE BOX LIDS.

18. ALL BRASS OR GALVANIZED CONNECTIONS SHALL BE COATED WITH TEFLON TAPE OR APPROPRIATE PIPE JOINT COMPOUND. ALL PVC TO PVC THREADED CONNECTIONS SHALL BE COATED WITH TEFLON TAPE. NO PIPE DOPE IS ALLOWED AT VALVE OR SPRINKLER HEAD CONNECTIONS. ANY PVC TO METAL CONNECTIONS SHALL BE MADE WITH A MALE THREADED PVC FITTING AND A FEMALE THREADED METAL FITTING.

19. ALL PVC SOLVENT-WELD CONNECTIONS SHALL BE MADE WITH SOLVENT-WELD MATERIALS AS RECOMMENDED BY THE PIPE MANUFACTURER. SOLVENT-WELD PRIMER SHALL BE APPLIED AT ALL CONNECTIONS.

20. LOW HEAD DRAINAGE WILL NOT BE ALLOWED. CONTRACTOR TO DETERMINE IN THE FIELD WHICH HEADS DRAIN AFTER THE VALVE IS SHUT OFF. CONTRACTOR SHALL PROVIDE AND INSTALL ADDITIONAL IN-LINE CHECK VALVES AS NEEDED AT NO ADDITIONAL COST TO THE OWNER.

21. ALL PRESSURE SUPPLY LINES AND CONTROL WIRES TO HAVE 18"-24" MINIMUM COVER. ALL LATERAL LINES TO HAVE 12" MINIMUM COVER. FOR RECYCLED WATER SYSTEMS, PIPE DEPTH TO BE DETERMINED BY THE LOCAL GOVERNING AGENCY.

22. MAINLINE AND WIRE SLEEVING TO HAVE 24" MINIMUM COVER FROM TOP OF SLEEVE TO BOTTOM OF AGGREGATE BASE. MAINLINE AND WIRE SLEEVING UNDER ALL VEHICULAR ACCESS WAYS TO HAVE 36" MINIMUM COVER FROM TOP OF SLEEVE TO BOTTOM OF AGGREGATE BASE. LATERAL LINE SLEEVING TO HAVE 12" MINIMUM COVER FROM TOP OF SLEEVE TO BOTTOM OF AGGREGATE BASE. LATERAL LINE SLEEVING UNDER ALL VEHICULAR ACCESS WAYS TO HAVE 36" MINIMUM COVER FROM TOP OF SLEEVE TO BOTTOM OF AGGREGATE BASE. CONTRACTOR SHALL INSTALL SLEEVING UNDER ALL HARDSCAPE 36" WIDE OR GREATER. DUE TO GRAPHIC CLARITY, NOT ALL SLEEVES MAY BE SHOWN ON THE PLANS. CONTRACTOR SHALL INSTALL ALL SLEEVING PRIOR TO HARDSCAPE AND PAVING INSTALLATION.

23. THE RADIUS OF EACH HEAD IS TO BE ADJUSTED SO THAT HEAD-TO-HEAD COVERAGE IS MAINTAINED, BUT OVER SPRAY ON BUILDINGS, WALKS, WALLS, AND OTHER HARD SURFACES IS MINIMIZED. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO USING THE BEST NOZZLE RADIUS AND PATTERN, USING PRESSURE COMPENSATING DEVICES FOR NOZZLES, USING ADJUSTABLE NOZZLES, OR USING THE RADIUS ADJUST SCREW ON INDIVIDUAL NOZZLES.

24. FINE TUNE EACH CONTROL VALVE FOR OPTIMUM OPERATION. THIS SHALL BE DONE BY TURNING DOWN THE FLOW CONTROL OF THE VALVE UNTIL SYSTEM PERFORMANCE STARTS TO SUFFER. AT THAT POINT, OPEN UP VALVE FLOW CONTROL ABOUT ONE-HALF TURN OR UNTIL THE VALVE IS JUST OPEN ENOUGH FOR DESIRED OPERATION.

25. CONTRACTOR SHALL INSTALL 2 EXTRA WIRES FROM CONTROLLER(S) TO EACH END OF THE MAINLINE. WIRES SHALL COME UP INTO ALL VALVE BOXES ALONG THE MAINLINE PATH WITH 36" EXPANSION COILS IN EACH BOX. SPARE WIRES SHALL BE COLOR-CODED DIFFERENTLY THAN OTHER CONTROL WIRES FOR EACH CONTROLLER.

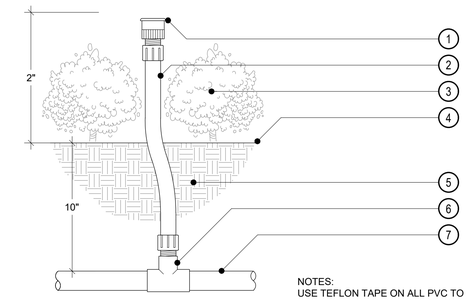
26. UPON COMPLETION OF THE PROJECT, THE CONTRACTOR IS TO TURN OVER TO THE OWNER THE FOLLOWING:
   26.a. A REPRODUCIBLE SET OF "AS-BUILT" DRAWINGS AND CONTROLLER CHART.
   26.b. 2 KEYS FOR EACH CONTROLLER / CONTROLLER ENCLOSURE (AS APPLICABLE).
   26.c. 2 KEYS FOR BACKFLOW PREVENTER ENCLOSURE.
   26.d. 2 QUICK COUPLER KEYS AND MATCHING HOSE SWIVELS.
   26.e. 4 OF EACH SPRINKLER HEAD SPECIFIED (AS APPLICABLE).
   26.f. 100' OF EACH DRIP LINE TUBING SPECIFIED (AS APPLICABLE).
   26.g. 10 OF EACH DRIP EMITTER / FLUSH VALVE / DRIP SYSTEM APPARATUS SPECIFIED (AS APPLICABLE).

27. RECORD DRAWINGS - THE CONTRACTOR SHALL PROVIDE AND KEEP UP TO DATE A COMPLETE RECORD SET OF PRINTS WHICH SHALL BE CORRECTED DAILY AND SHOW EVERY CHANGE FROM THE ORIGINAL DRAWINGS. PRIOR TO FINAL INSPECTION, THE CONTRACTOR SHALL TRANSCRIBE ALL INFORMATION FROM THE RECORD SET TO A BLACK-LINE PRINT PROCURED FROM THE OWNER. ALL WORK SHALL BE NEAT AND LEGIBLE, LOCATING THE FOLLOWING ITEMS FROM PERMANENT POINTS OF REFERENCE: SHUT-OFF VALVES, MAINLINE AND CONTROL WIRE ROUTING, POC, BACKFLOW DEVICE, CONTROL VALVES, CONTROLLER, QUICK COUPLING VALVES, AND OTHER PERTINENT UNDERGROUND ITEMS.

28. "CONTROLLER CHART" - UPON APPROVAL OF THE FINAL RECORD DRAWINGS, PROVIDE ONE CHART FOR EACH CONTROLLER INSTALLED.
   28.A. THE CHART IS TO BE A REDUCED COPY OF THE APPROVED RECORD DRAWING (A BLACK-LINE PRINT REDUCED TO THE MAXIMUM SIZE THE CONTROLLER DOOR WILL ALLOW, COLORED WITH A DIFFERENT COLOR FOR EACH VALVE STATION'S AREA OF COVERAGE).
   28.B. WHEN COMPLETED AND APPROVED, THE CHART SHALL BE LAMINATED BETWEEN TWO (2) PIECES OF 20 MIL. CLEAR PLASTIC AND MOUNTED ON THE INSIDE OF THE CONTROLLER DOOR USING VELCRO TAPE OR EQUAL.

29. BUBBLER IRRIGATION
   29.A. THE BUBBLER SYMBOLS ARE SHOWN FOR CLARITY ONLY, REFER TO THE LEGEND AND NOTES FOR NUMBER OF BUBBLERS PER PLANT / PLANT SIZE. REFER TO THE PLANTING PLAN FOR THE QUANTITY, TYPE, AND SIZE OF THE PLANT MATERIALS. ALL PLANT MATERIALS SHALL RECEIVE THE CORRECT QUANTITY AND SIZE OF BUBBLERS TO MAINTAIN OPTIMUM PLANT HEALTH.
   29.A.1. EACH PLANT IS TO RECEIVE ONE (1) FLOOD BUBBLER.
   29.A.2. USE DIFFERENT FLOW BUBBLERS FOR SHRUBS THAT NEED MORE WATER THAN THE 0.25 GPM FLOW RATES SPECIFIED.
   29.A.3. FOR ALL PLANT MATERIAL INSTALLED ON SLOPES. LOCATE THE BUBBLER ON THE UP-HILL SIDE OF THE SLOPE AT THE EDGE OF THE ROOTBALL.
   29.B. VELOCITY OF WATER IN ALL AREAS OF SYSTEM INCLUDING POLYETHYLENE PIPE SHALL NOT EXCEED 4 FEET PER SECOND. VERIFY CHARACTERISTICS WITH MANUFACTURER.
   29.C. CONTRACTOR SHALL FLUSH ENTIRE ZONE PRIOR TO INSTALLATION OF ANY BUBBLERS. CONTRACTOR SHALL FURTHER FLUSH ALL ZONES AND INSPECT FOR CLOGGED OR BROKEN OR MISSING BUBBLERS AT LEAST EVERY TWO WEEKS AS PART OF REGULAR MAINTENANCE DURING MAINTENANCE PERIOD.
   29.D. CONTRACTOR SHALL NOT REPAIR OR ATTEMPT TO CLEAN ANY BUBBLER ORIFICE; RATHER CONTRACTOR SHALL REPLACE ENTIRE BUBBLER.

PRESSURE LOSS CALCULATIONS				
VALVE : #9 - 25 GPM				
WORST CASE HYDRAULIC CONDITION : HIGHEST FLOW				
		STATIC PRESSURE AT POC :		60
EQUIPMENT	SIZE	LENGTH	LOSS	Remaining PSI
Service Line	2"	50'	0.4	59.6
Water Meter	2"	-	1.0	58.6
Sch 80 PVC Line to R/P	2"	50'	0.3	58.3
Pressure Entering Backflow Preventer Assembly				58.3
Pressure Regulator Setting at R/P Assembly				n/a
Backflow Preventer	1 1/2"	-	12.0	46.3
Master Valve	1 1/2"	-	0.8	45.5
Flow Sensor	1 1/2"	-	1.0	44.5
CL315 PVC Main	2"	600'	3.8	40.7
Elecric Control Valve	1 1/2"	-	1.5	39.2
Lateral Lines	Misc.	Misc	2.0	37.2
Misc. Losses (10%)	n/a	-	2.3	34.9
		SUBTOTAL PRESSURE AVAILABLE :		34.9
Elevation Losses	Feet :	0	0.433	0.0
PRESSURE AVAILABLE AT SPRINKLER HEAD / EMITTER :				34.9
PRESSURE REQUIRED AT SPRINKLER HEAD / EMITTER :				30.0
		RESIDUAL PRESURE :		4.9

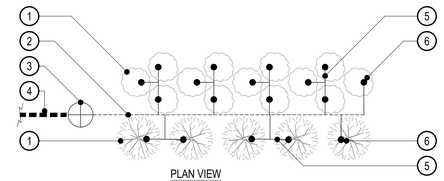


SECTION / ELEVATION

1. BUBBLER HEAD PER LEGEND
2. FLEXIBLE PVC RISER ASSEMBLY WITH FACTORY INSTALLED 1/2" MALE ADAPTERS ON EACH END (12" LENGTH)
3. PLANT MATERIAL PER PLANTING PLAN (TYP)
4. FINISH GRADE
5. NATIVE SOIL / BACKFILL PER SPECIFICATIONS
6. SCH 40 PVC LATERAL LINE FITTING WITH 1/2" FEMALE THREADED OUTLET
7. LATERAL LINE PIPING PER LEGEND

NOTES:
USE TEFLON TAPE ON ALL PVC TO PVC CONNECTIONS; NO PIPE DOPE ALLOWED. SET BUBBLERS AT THE EDGE OF THE ROOTBALL. LOCATE BUBBLERS ON UP-HILL SIDE OF THE PLANT WHEN LOCATED ON SLOPE. DO NOT USE FIXED RISER HEADS IN AREAS SUBJECT TO TRAFFIC, VANDALISM, OR IN ANY SITUATION WHERE A FIXED RISER HEAD COULD BE A SAFETY LIABILITY. LOW HEAD DRAINAGE IS NOT ALLOWED. INSTALL ADDITIONAL IN-LINE CHECK VALVES AS NEEDED AT NO ADDITIONAL COST TO THE OWNER.

WATERPROOF WIRE CONNECTOR | L

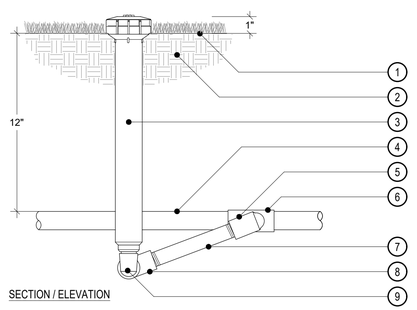


PLAN VIEW

1. TYPICAL SHRUB PER PLANTING PLAN
2. PVC LATERAL LINE "TRUNK LINE" PER IRRIGATION LEGEND (PLAN SIZE)
3. DRIP VALVE ASSEMBLY PER IRRIGATION LEGEND
4. PVC MAINLINE PER IRRIGATION LEGEND (PLAN SIZE)
5. 1/2" SCH 40 PVC LATERAL LINE "SPUR"
6. BUBBLER PER IRRIGATION LEGEND

NOTES:
RUN LATERAL "TRUNK LINE" THROUGH THE APPROXIMATE CENTER OF PLANTS TO BE IRRIGATED. LOCATE "TRUNK LINE" TO AVOID ANY TREES. TEE OFF "TRUNK LINE" AS NECESSARY TO EXTEND PVC "SPURS" TO BUBBLER LOCATIONS. MAXIMUM NUMBER OF PLANTS TO BE IRRIGATED BY ANY SINGLE "SPUR" SHALL NOT EXCEED 4. INSTALL FLUSH VALVE AT THE TERMINAL END OF "TRUNK LINE" IF USING DRIP EMITTERS IN LIEU OF BUBBLERS. WHEN "TRUNK LINE" RUNS IN MULTIPLE DIRECTIONS, INSTALL A FLUSH VALVE AT THE END OF EACH AND EVERY "TRUNK LINE" IF USING DRIP EMITTERS.

BUBBLER SYSTEM - TYPICAL LAYOUT | M



SECTION / ELEVATION

1. FINISH GRADE
2. NATIVE SOIL / BACKFILL PER SPECIFICATIONS
3. 12" HI-POP SPRAY HEAD & NOZZLE PER LEGEND
4. LATERAL LINE PIPING PER LEGEND
5. 1/2" MARLEX STREET ELL
6. SCH 40 PVC LATERAL LINE FITTING WITH 1/2" FEMALE THREADED OUTLET
7. 1/2"x12" MIN. SCH 80 PVC THREADED NIPPLE
8. 1/2" SCH 40 PVC STREET ELL TxT
9. 1/2" MARLEX STREET ELL

NOTES:
USE TEFLON TAPE ON ALL PVC TO PVC CONNECTIONS; NO PIPE DOPE ALLOWED. SET PERIMETER HEADS 4"-6" FROM CURBS AND WALKS AND 6"-12" FROM VERTICAL OBJECTS SUCH AS FENCES AND WALLS, ETC. ONLY USE BOTTOM INLET OF HEAD.

SHRUB HI-POP SPRINKLER HEAD | N

No.	DATE	REVISIONS	SHEET	APPROVAL	DESCRIPTION

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LAST SAVED BY: rickd
PLOT DATE: May. 20, 25 SAVED PATH: E:\Production\Steven Ormeny\2025\5026 Redondo Beach\2 CDs\20250520

ELECTRICAL SYMBOLS - PLANS

SYMBOL	SYMBOL DESCRIPTION
	DUPLEX RECEPTACLE (WP, GFCI AS INDICATED)
J	JUNCTION BOX
S_3	SWITCH (3 = 3-WAY SWITCH, 4 = 4-WAY SWITCH, ETC.)
a	LED LUMINAIRE
a	LED LUMINAIRE W/ EMERGENCY BATTERY PACK
	EMERGENCY LIGHT
	WALL MOUNTED LUMINAIRE
	EXIT LIGHT
	DOWN LIGHT
	POLE MOUNTED LUMINAIRE
A — LUMINAIRE TYPE XXX — LAMP WATTAGE	LUMINAIRE REFERENCE SEE LUMINAIRE SCHEDULE FOR DETAILS
P001	CONDUIT REFERENCE A = ANALOG SIGNAL C = CONTROL D = DATA LINK F = FIBER OPTIC P = POWER T = TELEPHONE
	UNDERGROUND CONDUIT
	EXPOSED CONDUIT
G	GROUNDING CONDUCTOR 30" BELOW GRADE
A-3	HOMERUN TO PANEL "A", CIRCUIT 3
	CONDUIT STUBBED AND CAPPED
	CONDUIT BENDS TOWARD OBSERVER
	CONDUIT BENDS AWAY FROM OBSERVER
J	FLEXIBLE CONDUIT CONNECTION (FROM COUPLING/STUB-UP OR JBOX)
	PANELBOARD
	DISCONNECT SWITCH
	COMBINATION STARTER & DISCONNECT SWITCH
	HANDHOLE OR PULL BOX
	SMOKE DETECTOR
F	FIRE ALARM MANUAL PULL STATION
F	FIRE ALARM STROBE
	TELEPHONE OUTLET
	DATA OUTLET
	CONDUIT SEAL
F F F	CONDUIT & WIRE FOR FIRE ALARM SYSTEM
KP	ELECTRONIC KEYPAD
FACP	FIRE ALARM CONTROL PANEL
	LOCAL CONTROL SWITCH
T	THERMOSTAT
IS	INTRUSION SWITCH
40	MOTOR (NUMBER INDICATES HORSEPOWER)
	GROUND WELL

ELECTRICAL SYMBOLS - SCHEMATIC DIAGRAMS

NORMALLY OPEN	NORMALLY CLOSED	SYMBOL DESCRIPTION
		CONTACT
		TIMED CONTACT, CONTACT ACTION REVERSES ON ENERGIZATION (ON DELAY)
		TIMED CONTACT, CONTACT ACTION REVERSES ON DE-ENERGIZATION (OFF DELAY)
		LEVEL SWITCH
		PRESSURE SWITCH
		TEMPERATURE SWITCH
		LIMIT SWITCH
		FLOW SWITCH
		PUSH BUTTON SINGLE CIRCUIT MOMENTARY CONTACT
HAND OFF AUTO XOO OXO OOX		SELECTOR SWITCH HOA: HAND-OFF-AUTO (HOA SHOWN IN HAND MODE) HO: HAND-OFF HOR: HAND-OFF-REMOTE R-O: REMOTE-OFF SEE SYMBOL NOTE 2 BELOW.
O/L		MOTOR OVERLOAD DEVICE CONTACTS
R		PILOT LIGHT A= AMBER, G= GREEN, R= RED, W= WHITE
CR1		CONTROL RELAY
TD1		TIME DELAY RELAY
M		MOTOR OR STARTER COIL
		SOLENOID OPERATED VALVE
ETM		ELAPSED TIME METER
		FUSE
		CONTROL POWER TRANSFORMER
		GROUND
		MOTOR SPACE HEATER

SYMBOL NOTES

1. THIS DRAWING CONTAINS INDUSTRY STANDARD SYMBOLS. NOT ALL SYMBOLS SHOWN ARE USED ON THIS PROJECT.
2. FOR HOA SWITCHES, "XOO" INDICATES THAT THE TOP CONTACT IS CLOSED WHEN THE SWITCH IS SET TO HAND MODE, AND ALL OTHER SWITCH CONTACTS ARE OPEN; "OXO" INDICATES THAT THE MIDDLE CONTACT IS CLOSED WHEN THE SWITCH IS SET TO OFF MODE, AND ALL OTHER SWITCH CONTACTS ARE OPEN; "OOX" INDICATES THAT THE BOTTOM CONTACT IS CLOSED WHEN SWITCH IS IN AUTO MODE, ALL OTHER SWITCH CONTACTS ARE OPEN.

ANSI/IEEE C37.2 STANDARD DEVICE NUMBERS

THE FOLLOWING IS A LIST OF TYPICAL DEVICE NUMBERS. SEE ANSI/IEEE C37.2 FOR A COMPLETE LIST OF DEVICES.

11	MULTI-FUNCTION DEVICE
27	UNDERVOLTAGE RELAY
32	DIRECTIONAL POWER RELAY OR REVERSE POWER RELAY
37	UNDERCURRENT OR UNDERPOWER RELAY
42	RUNNING CIRCUIT BREAKER
47	PHASE SEQUENCE OR PHASE-BALANCE VOLTAGE RELAY
50	INSTANTANEOUS OVERCURRENT RELAY
51	AC INVERSE TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
55	POWER FACTOR RELAY
57	SHORT-CIRCUITING OR GROUNDING DEVICE
59	OVERVOLTAGE RELAY
67	AC DIRECTIONAL OVERCURRENT RELAY
86	LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY

ELECTRICAL SYMBOLS - SINGLE LINE DIAGRAM

DEVICE	SYMBOL DESCRIPTION
	DRY TYPE TRANSFORMER
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	FUSE
40	MOTOR, 40 HORSEPOWER
	GROUNDING ELECTRODE
	LOW VOLTAGE CIRCUIT BREAKER MCCB UON
52	MEDIUM VOLTAGE CIRCUIT BREAKER, DRAW-OUT TYPE SEE ANSI/IEEE C37.2 STANDARD DEVICE NUMBERS LIST THIS SHEET
VFD	VARIABLE FREQUENCY DRIVE
SSS	SOLID STATE STARTER (SOFT STARTER)
SPD	SURGE PROTECTION DEVICE
PQM	POWER QUALITY MONITOR
SST	SOLID STATE TRIP
MPR	MOTOR PROTECTION RELAY
	NON-FUSED DISCONNECT SWITCH
	FUSED DISCONNECT SWITCH
	VALVE MOTOR AND ACTUATOR
	MOTOR OVERLOAD HEATER
	MAGNETIC MOTOR STARTER FVNR = FULL VOLTAGE NON-REVERSING
47	PROTECTION RELAY SEE ANSI/IEEE C37.2 STANDARD DEVICE NUMBERS LIST
M	METER, ELECTRIC UTILITY

ELECTRICAL ABBREVIATIONS

A	AMPERES, ANALOG SIGNAL
AC	ALTERNATING CURRENT
AF	AMPERES FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPERES INTERRUPTING CAPACITY
AT	AMPERES TRIP
AWG	AMERICAN WIRE GAUGE
BC	BARE COPPER
BFG	BELOW FINISHED GRADE
C	CONDUIT
CB	CIRCUIT BREAKER
CCT	CORRELATED COLOR TEMPERATURE
CO	CONDUIT ONLY
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CRI	COLOR RENDERING INDEX
CT	CURRENT TRANSFORMER
CU	COPPER
DC	DIRECT CURRENT
DSB	DISTRIBUTION SWITCHBOARD
EF	EXHAUST FAN
ELEV	ELEVATION
ETM	ELAPSED TIME METER
EWH	ELECTRIC WATER HEATER
EXST	EXISTING
FIT	FLOW INDICATING TRANSMITTER
FLEX	FLEXIBLE
FLUOR	FLUORESCENT
FPP	FIBER OPTIC PATCH PANEL
FPR	FEEDER PROTECTION RELAY
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING STARTER
G, GND	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HMI	HUMAN MACHINE INTERFACE
HOA	HAND / OFF / AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HS	HAND SWITCH
JB, JBOX	JUNCTION BOX
KAIC	KILOAMPERES INTERRUPTING CAPACITY
KVA	KILOVOLT-AMPERE
KW	KILOWATT
KWH	KILOWATT-HOUR
LED	LIGHT EMITTING DIODE
LCP	LOCAL CONTROL PANEL
LIT	LEVEL INDICATING TRANSMITTER
LOS	LOCKOUT STOP SWITCH
LSLL	LEVEL SWITCH LOW-LOW
LV	LOW VOLTAGE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCP	MOTOR CIRCUIT PROTECTOR
MH	MANHOLE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MPR	MOTOR PROTECTION RELAY
MXR	MIXER
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
P	POLE
PB	PUSHBUTTON, PULLBOX
PCS	PVC COATED STEEL
PFR	PHASE FAILURE RELAY
PH	PHASE
PIT	PRESSURE INDICATING TRANSMITTER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PQM	POWER QUALITY MONITOR
PSH	PRESSURE SWITCH HIGH
PT	POTENTIAL TRANSFORMER
REC, RECEPT	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
SCCR	SHORT CIRCUIT CURRENT RATING
SPD	SURGE PROTECTION DEVICE
SSS	SOLID STATE STARTER (SOFT STARTER)
SWBD	SWITCHBOARD
TEMP	TEMPERATURE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT(S)
VA	VOLT-AMPERE
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER

GENERAL ELECTRICAL NOTES

1. REFER TO ELECTRICAL SPECIFICATIONS FOR FURTHER DETAIL AS TO SCOPE, MATERIALS, AND EXECUTION OF ELECTRICAL WORK.
2. WIRING NOT EXPLICITLY SHOWN ON DRAWINGS SHALL BE ACCORDING TO THE REQUIREMENTS OF NATIONAL ELECTRICAL CODE (NEC) FOR THE SPECIFIC APPLICATION AND CONDITIONS.
3. ALL CONDUCTORS SHALL BE COPPER (MINIMUM SIZE #10 AWG UNLESS SPECIFICALLY NOTED OTHERWISE).
4. CONTRACTOR SHALL SUBMIT SEISMIC ANCHORAGE CALCULATIONS IN CONFORMANCE WITH CODE REQUIREMENTS AND PROVIDE SEISMIC ANCHORAGE MEANS FOR EQUIPMENT IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE.
5. THE ELECTRICAL CONTRACTOR SHALL CONFORM WITH ALL LOCAL CODES AND ORDINANCES, THE STATE OF CALIFORNIA ELECTRICAL SAFETY ORDERS,THE NATIONAL ELECTRICAL CODE AND ANY ADDITIONAL JURISDICTIONS RELATING TO THE WORK.
6. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL CONDUIT, WIRE, SERVICES, SWITCHBOARDS, AND VFD'S REQUIRED FOR A COMPLETE AND OPERATIONAL ELECTRICAL SYSTEM.
7. IN THE EVENT OF A CONFLICT OR INCONSISTENCY BETWEEN ITEMS INDICATED ON THE PLANS AND/OR SPECIFICATIONS, OR WITH CODE REQUIREMENTS, THE NOTE, SPECIFICATION OR CODE WHICH PRESCRIBES AND ESTABLISHES THE MORE COMPLETE JOB OR HIGHER STANDARD SHALL PREVAIL.
8. ALL ELECTRICAL EQUIPMENT EXPOSED TO THE CLIMATE SHALL BE WEATHERPROOF.
9. ALL ELECTRICAL EQUIPMENT IN THIS PROJECT SHALL BE U.L. LISTED.
10. ALL UNDERGROUND CONDUITS NOT SPECIFIED IN THE PLANS SHALL BE INSTALLED AT 30" BELOW FINISHED GRADE MINIMUM.
11. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING UNDERGROUND FACILITIES AND PROTECTING THESE FACILITIES FROM DAMAGE.
12. THE ELECTRICAL CONTRACTOR SHALL ROUTE CONDUITS AS REQUIRED BY FIELD CONDITIONS.
13. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING UNDERGROUND FACILITIES.
14. CONTRACTOR SHALL PROVIDE ALL NEEDED CHANNELS, ANGLES, AND ANY OTHER MATERIALS REQUIRED TO SUPPORT LUMINAIRES, CONDUIT, AND ELECTRICAL EQUIPMENT IN THE LOCATIONS SHOWN ON THE DRAWINGS.
15. CONTRACTOR SHALL NOT CUT ANY STRUCTURAL MEMBERS OR USE ANY ATTACHMENTS THAT WOULD IMPAIR THEIR STRENGTH.
16. CONTRACTOR SHALL DESIGN SUPPORTS IN BETWEEN THE STRUCTURAL SUPPORT MEMBERS AND SUBMIT THE DESIGN AS A SHOP DRAWING SUBMITTAL.
17. INSTRUMENTATION IS SHOWN IN THE GENERAL VICINITY OF THE INTENDED LOCATION AND MAY NOT NECESSARILY MATCH LOCATIONS ON THE PLANS. VERIFY ACTUAL LOCATIONS OF INSTRUMENTS AND RUN ASSOCIATED CONDUITS AS REQUIRED.
18. ELECTRICAL EQUIPMENT AND MATERIAL TO BE LISTED, LABELED AND INSTALLED PER THE CALIFORNIA ELECTRICAL CODE, THE INSTALLATION STANDARDS/MANUFACTURER'S RECOMMENDATIONS AND, IF REQUIRED, A RECOGNIZED ELECTRICAL TESTING LABORATORY.
19. ALL EXPOSED CONDUITS TO BE GALVANIZED RIGID STEEL FOR DRY LOCATIONS AND PVC COATED GALVANIZED RIGID STEEL IN WET AND CORROSIVE LOCATIONS UNLESS OTHERWISE STATED ON THE PLANS.

FN: E-1
DATE: 3/23/22

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AS-BUILT: REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
ELECTRICAL SYMBOLS AND ABBREVIATIONS

GRAPHIC SCALE
PAGE
FIELD BOOK

DRAWING REF. E-1
SHEET 31 OF 37
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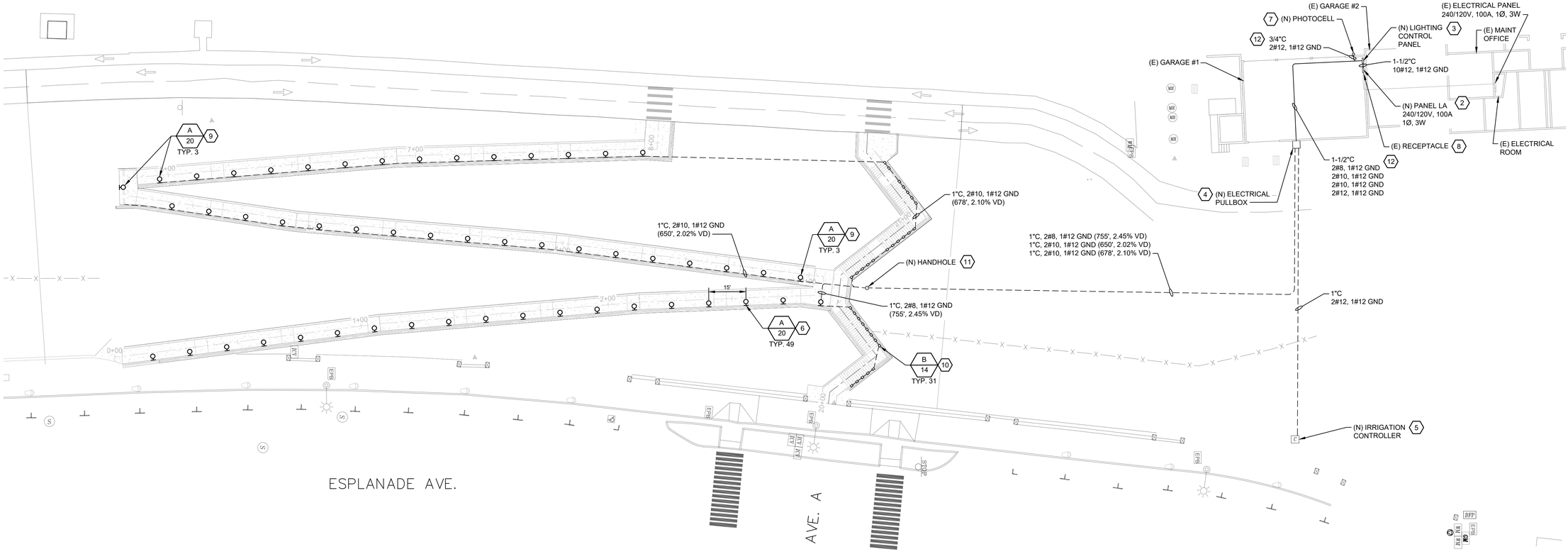
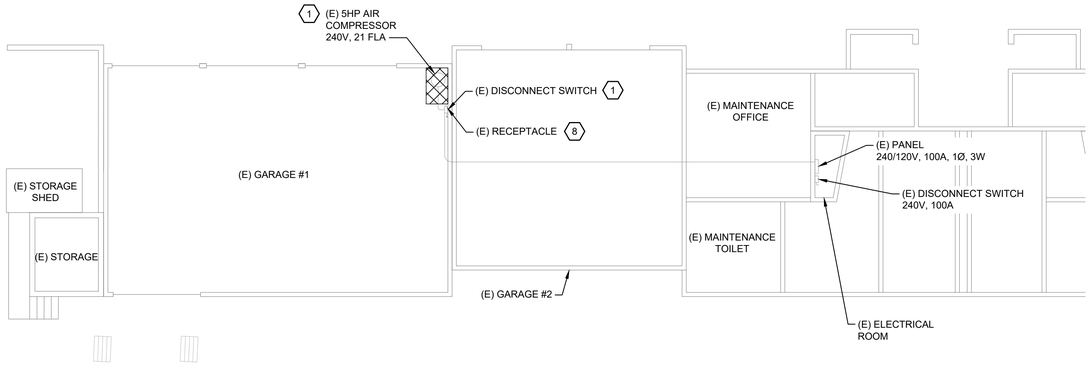


1 E-2 SITE PLAN
SCALE: 1" = 20'



2 E-2 DEMOLITION FLOOR PLAN
SCALE: 1" = 10'

GENERAL NOTES

1. THE SCOPE OF WORK IS TO REMOVE THE EXISTING COMPRESSOR AND COMPRESSOR DISCONNECT. INSTALL A NEW PANELBOARD AND NEW LIGHTING CONTROL PANEL TO PROVIDE POWER TO THE NEW WALL-RECESSED LED FIXTURES AND THE NEW IRRIGATION CONTROLLER.
2. (N) IRRIGATION CONTROLLER SPEC HUNTER 'ACC2' A2C-1200-P+(2)A2M-600+A2-WIFI

CONSTRUCTION NOTES

1. EXISTING AIR COMPRESSOR AND DISCONNECT SWITCH SHALL BE REMOVED AND DISPOSED.
2. NEW PANEL LA SHALL BE INSTALLED AND CONNECTED TO THE EXISTING PANEL. PULL NEW 1#6 NEUTRAL WIRE FROM THE EXISTING PANEL THROUGH EXISTING CONDUIT FOR NEW PANEL LA.
3. NEW LIGHTING CONTROL PANEL SHALL BE INSTALLED AND CONNECTED TO PANEL LA PER DETAIL 3 ON SHEET E-4.
4. INSTALL NEW 12"X12"X6" NEMA 3R STAINLESS STEEL PULLBOX ON THE WALL CLOSE TO THE ROOF. SEE DETAIL 2 ON DRAWING E-4.
5. NEW LOCKABLE WEATHERPROOF 20A GFCI RECEPTACLE SHALL BE INSTALLED FOR THE IRRIGATION CONTROLLER.
6. NEW WALL-RECESSED LED FIXTURE SHALL BE INSTALLED 4' AFF AND CONNECTED TO THE LIGHTING CONTROL PANEL.
7. NEW PHOTOCELL SHALL BE INSTALLED AND CONNECTED TO THE LIGHTING CONTROL PANEL.
8. EXISTING 240V RECEPTACLE SHALL BE PROTECTED IN PLACE AND CONNECTED TO THE NEW PANEL LA.
9. NEW WALL-RECESSED LED FIXTURE SHALL BE INSTALLED 18" AFF AND CONNECTED TO THE LIGHTING CONTROL PANEL.
10. NEW WALL-RECESSED LED FIXTURE SHALL BE INSTALLED 10" ABOVE THE STAIRS AND CONNECTED TO THE LIGHTING CONTROL PANEL.
11. INSTALL NEW 16"X12"X12" CONCRETE HANDHOLE.
12. EXPOSED CONDUITS SHALL BE PVC COATED RIGID STEEL CONDUITS.

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
ELECTRICAL SITE PLAN

GRAPHIC SCALE: 1" = 20' (40' 20' 0 10' 20')

PAGE

FIELD BOOK

DRAWING REF. E-2

SHEET 32 OF 37

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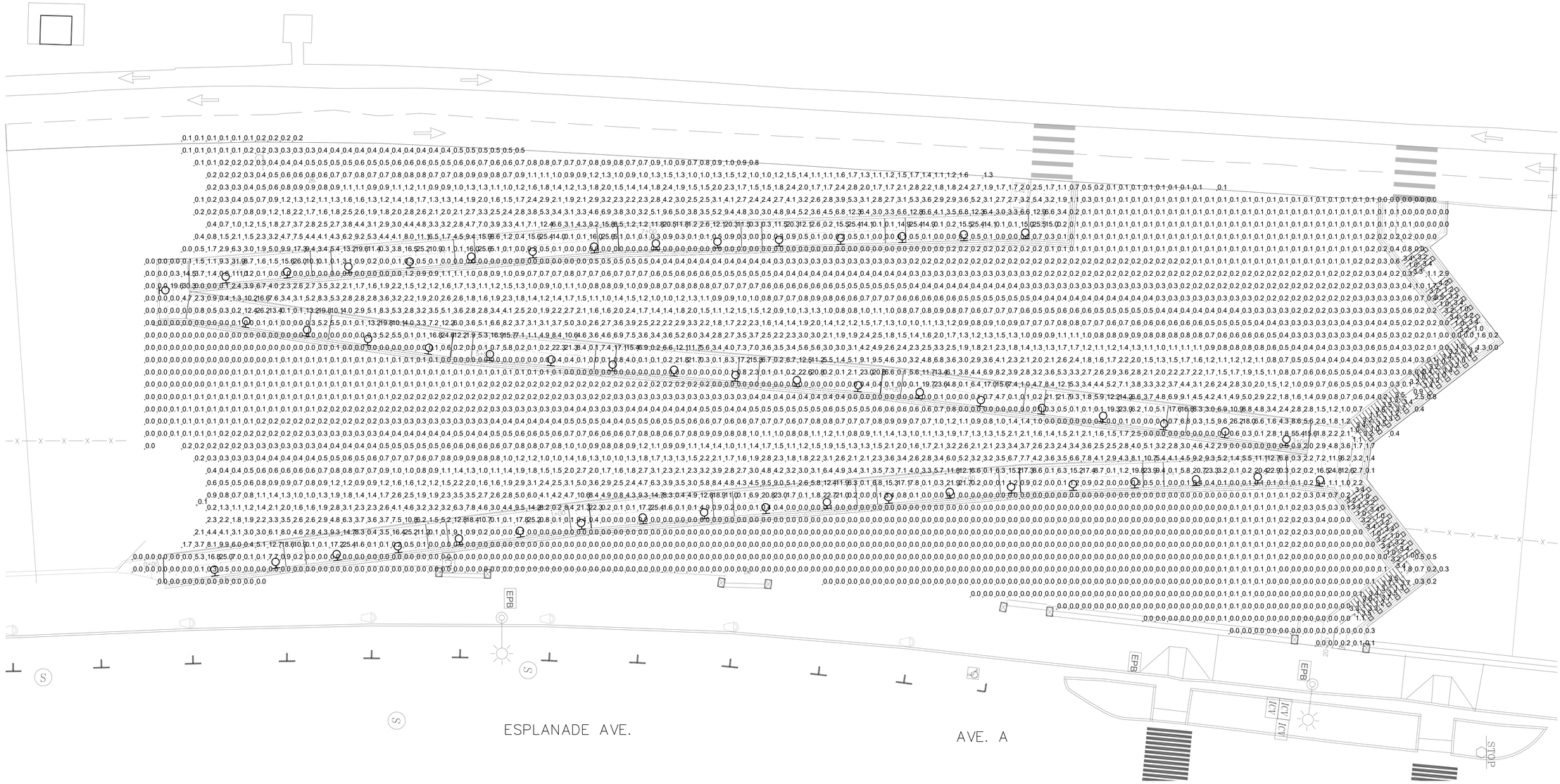

1 E-3 LIGHTING PHOTOMETRIC SITE PLAN

SCALE: 1" = 12'

N

LIGHTING FIXTURE SCHEDULE

FIXTURE I.D.	FIXTURE: INCAND.	FIXTURE: FLUOR.	FIXTURE: H.P.S.	FIXTURE: MET. HAL.	FIXTURE: LED	VOLTS	LAMPS: NO.	LAMPS: WATTS AND TYPE	FIXTURE: RECESS	FIXTURE: SURFACE	FIXTURE: PEND.	FIXTURE: WALL	FIXTURE: POLE	DESCRIPTION AND VARIATIONS	MANUFACTURER AND CATALOG NO.
A 20					●	240	1	20				●		WALL RECESSED MARINE GRADE ALUMINUM HOUSING WITH CLEAR TEMPERED IMPACT RESISTANT GLASS LENS. 4000K COLOR TEMPERATURE. IP65 RATED FOR WET LOCATIONS.	LIGMAN URA-40701-20W-W40-06-120/277-DIM OR APPROVED EQUAL
B 14					●	240	1	14				●		WALL RECESSED MARINE GRADE ALUMINUM HOUSING WITH CLEAR TEMPERED IMPACT RESISTANT ACRYLLIC LENS. 4000K COLOR TEMPERATURE. IP65 RATED FOR WET LOCATIONS.	LIGMAN ULE-40621-13.5W-W40-06-120/277-DIM OR APPROVED EQUAL

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REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277

LIGHTING PHOTOMETRIC SITE PLAN

GRAPHIC SCALE: 1" = 12' (12' 6' 0 12' 24')

PAGE

FIELD BOOK

DRAWING REF. E-3

SHEET 33 OF 37

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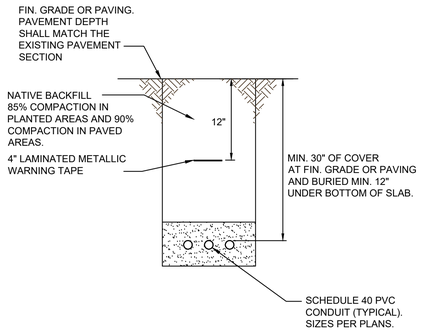
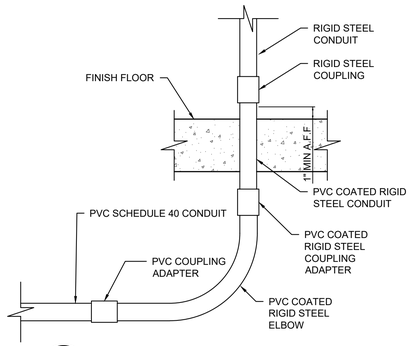


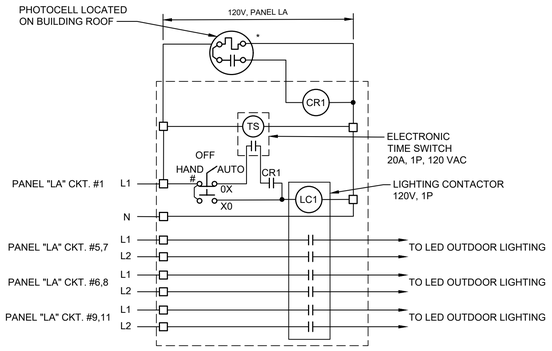
1 E-4 TYPICAL TRENCH DETAIL

SCALE: N.T.S.



2 - CONDUIT STUB-UP DETAIL

SCALE: N.T.S.



3 E-4 EXTERIOR LIGHTING CONTROL PANEL CONTROL SCHEMATIC

SCALE: N.T.S.

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REDONDO BEACH AVE. A ACCESS PATH
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ELECTRICAL DETAILS

GRAPHIC SCALE

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FIELD BOOK

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SHEET 34 OF 37

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Panel:	PNL LA			Phase	1		Location:	GARAGE #1			Main:	50A	
Volts:	240/120V			Wire	3		Enclosure:	NEMA 1			Bus:	100A	
							Mounting:	SURFACE			SCCR:	10,000A	

			Quantity										Quantity					
Description	Volt-Amps		LTG	REC	Misc	Breaker Amp	Pole	Circuit		Circuit	Pole	Breaker Amp	LTG	REC	Misc	Volt-Amps		Description
	A	B										Amp				A	B	
(N) LIGHTING CONTROL PANEL	500				1	20	1	1		2	2	20		1				(E) RECEPTACLE
(N) IRRIGATION CONTROLLER RECEPTACLE		240		1		20	1	3		4								
(N) OUTDOOR LIGHTS CKT 1	347		32			20	2	5		6	2	20	32			327		(N) OUTDOOR LIGHTS CKT 3
		347						7		8							327	
(N) OUTDOOR LIGHTS CKT 2	238		19			20	2	9		10								
		238						11		12								
								13		14								
								15		16								
								17		18								
								19		20								
								21		22								
								23		24								
	1,085	825	VOLT-AMPS SUBTOTAL													327	327	
							A		B									
						LCL:							Panel Volt-Amps =			2,563		
			Total Volt-Amps:				1,412		1,152				FLA =			11		A @240V

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DATE: 3/23/22

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REDONDO BEACH AVE. A ACCESS PATH
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PANEL SCHEDULE

GRAPHIC SCALE
PAGE
FIELD BOOK

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SHEET 35 OF 37

DRAWING NO.

STATE OF CALIFORNIA
Outdoor Lighting
NRCC-LTO-E (Created 01/21) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-E
This document is used to demonstrate compliance with requirements in §110.9, §130.0, §130.2, §140.7, and §141.0(b)2L for outdoor lighting scopes using the prescriptive path.	
Project Name: Redondo Beach Access Path	Report Page: Page 1 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared: 03/21/2025

A. GENERAL INFORMATION

01	Project Location (city)	Redondo Beach	04	Total Illuminated Hardscape Area (ft²)	34,000
02	Climate Zone	6			
03	Outdoor Lighting Zone per Title 24, Part 1 §10-114 or as designated by Authority Having Jurisdiction (AHJ):				
☐ LZ-0: Very Low - Undeveloped Parkland		☐ LZ-2: Moderate - Rural Areas		☐ LZ-4: High - Must be reviewed by CA Energy Commission for Approval	
☐ LZ-1: Low - Developed Parkland		☑ LZ-3: Moderately High - Urban Areas			

B. PROJECT SCOPE

Table Instructions: Include any outdoor lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.7 or §141.0(b)2L for alterations.

My project consists of:

01	02		
☑ New Lighting System	Must Comply with Allowances from §140.7.		
☐ Altered Lighting System	Is your alteration increasing the connected lighting load (Watts)?	○ Yes	◉ No
03	04	05	
% of Existing Luminaires Being Altered[1]	Sum Total of Luminaires Being Added or Altered	Calculation Method	

[1] *FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100*

C. COMPLIANCE RESULTS

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Calculation of Total Allowed Lighting Power (Watts) §140.7 or §141.0(b)2L												Compliance Results	
01		02		03		04		05		06		07	08	09
General Hardscape Allowance §140.7(d)1	+	Per Application §140.7(d)2	+	Sales Frontage §140.7(d)2	+	Ornamental §140.7(d)2	+	Per Specific Area §140.7(d)2	OR	Existing Power §141.0(b)2L	=	**Total Allowed** (Watts)	≥	**Total Actual** (Watts)	**07 Must be ≥ 08**
(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)		(See Table N)				(See Table F)	
2,061.6	+		+		+		+		OR		=	2,061.6	≥	1,458.5	**COMPLIES**
Cutoff Compliance (See Table G for Details)												**Not Applicable**			
Controls Compliance (See Table H for Details)												**COMPLIES with Exceptional Conditions**			

STATE OF CALIFORNIA
Outdoor Lighting
NRCC-LTO-E (Created 01/21) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-E
Project Name: Redondo Beach Access Path	Report Page: Page 2 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared: 03/21/2025

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Table H. Outdoor Lighting Controls Permit Applicant Notes:
Redondo Beach: EXCEPTION 1 to Section 130.2(c)3 - Luminaire rated less than 40 watts
Total Hardscape Area in Table A does not match the areas entered in Table I. Please review for compliance.
Selections made in Table O have been changed by the permit applicant. See Table E. Additional Remarks for permit applicant's explanation.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. OUTDOOR LIGHTING FIXTURE SCHEDULE

Table Instructions: For new or altered lighting systems demonstrating compliance with §140.7 (ie Table I has expanded for input), include all luminaires being installed and any existing luminaires remaining or being moved within the spaces covered by the permit application in the Table below. For altered lighting systems using the Existing Power method per §141.0(b)2L (ie Table N has expanded for input), include only new luminaires being installed and replacement luminaires being installed as part of the project scope (ie, do not include existing luminaires remaining or existing luminaires being moved).

Designed Wattage:

01	02		03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description		Watts per luminaire[1,2]	How Wattage is determined	Total number luminaires[2]	Luminaire Status[3]	Excluded per §140.7(a)	Design Watts	Cutoff Req. ≥ 6,200 initial lumen output §130.2(b)[4]	Field Inspector Pass	Field Inspector Fail
A-20	Recessed Wall Light	☐ Linear	20	Mfr. Spec[1]	52	New	☐	1,040	NA: <6,200 lumens	☐	☐
B-14	Step Light	☐ Linear	13.5	Mfr. Spec[1]	31	New	☐	418.5	NA: <6,200 lumens	☐	☐
						Total Designed Watts:		**1,458.5**			

* NOTES: Selections with a * require a note in the space below explaining how compliance is achieved.
EX: Luminaire is lighting a statue; EXCEPTION 2 to §130.2(b).

STATE OF CALIFORNIA
Outdoor Lighting
NRCC-LTO-E (Created 01/21) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-E
Project Name: Redondo Beach Access Path	Report Page: Page 3 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared: 03/21/2025

[1] *FOOTNOTES: Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per §130.0(c)*
[2] *For linear luminaires, wattage should be indicated as W/lf instead of Watts/luminaire. Total linear feet for the luminaire should be indicated in column 05 instead of number of luminaires.*
[3] *Select "New" for new luminaires in a new outdoor lighting project or for added luminaires in an alteration. Select "Altered" for replacement luminaires in an alteration. Select "Existing to Remain" for existing luminaires within the project scope that are not being altered and are remaining. Select "Existing Reinstalled" for existing luminaires which are being removed and reinstalled as part of the project scope*
[4] *Compliance with mandatory cutoff requirements is required for luminaires with initial lumen output ≥ 6,200 unless exempted by §130.2(b).*

G. CUTOFF REQUIREMENTS (BUG)

This Section Does Not Apply

H. OUTDOOR LIGHTING CONTROLS

Table Instructions: Complete this table demonstrating compliance with controls requirements for all new or altered luminaires installed as part of the permit application. For alteration projects, luminaires which are existing to remain (ie untouched) and luminaires which are removed and reinstalled (wiring only) do not need to be included in this table even if they are within the spaces covered by the permit application.
*When an option having a * is selected, the notes section of this table must be completed. The lighting controls section of the Compliance Summary Table on the first page will show "DOES NOT COMPLY" if the notes are left blank. For each requirement in columns 02 through 04, do not leave the field blank, instead select NA or Exempt* from the dropdown list to indicate not applicable or an exemption.*

Mandatory Controls

01	02	03	04	05	
Area Description	Shut-Off §130.2(c)1	Auto-Schedule §130.2(c)2	Motion Sensor §130.2(c)3	Field Inspector Pass	Field Inspector Fail
Redondo Beach	Photocontrol	Yes	Exempt *	☐	☐

*NOTES: Controls with a * require a note in the space below explaining how compliance is achieved.
EX: Not permitted by health & safety to be turned off; EXCEPTION 1 to §130.2(c).

Redondo Beach	EXCEPTION 1 to Section 130.2(c)3 - Luminaire rated less than 40 watts

I. LIGHTING POWER ALLOWANCE (per §140.7)

Table Continued

STATE OF CALIFORNIA
Outdoor Lighting
NRCC-LTO-E (Created 01/21) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-LTO-E
Project Name: Redondo Beach Access Path	Report Page: Page 4 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared: 03/21/2025

Table Continued

Table Instructions: Please complete this table for areas using the allowance calculations per §140.7. General Hardscape Allowance is per Table 140.7-A while "Use it or lost it" Allowances are per Table 140.7-B. Indicate which allowances are being used to expand sections for user input. Luminaires that qualify for one of the "Use it or lose it" allowances shall not qualify for another "Use it or lose it" allowance.	01 "Use it or lose it" Allowances (select all that apply)				
	☑ General Hardscape Allowance	☐ Per Application	☐ Sales Frontage	☐ Ornamental	☐ Per Specific Area
	Table I (below)	Table J	Table K	Table L	Table M

Calculated General Hardscape Lighting Power Allowance per Table 140.7-A (LZ 2 & 3)

02	03	04	05	06	07	08	09	10
Area Description	Surface Type	Area Wattage Allowance (AWA) Illuminated Area (ft²)	Area Wattage Allowance (AWA) Allowed Density (W/ft²)	Area Wattage Allowance (AWA) Area Allowance (Watts)	Linear Wattage Allowance (LWA) Perimeter Length (lf)	Linear Wattage Allowance (LWA) Allowed Density (W/lf)	Linear Wattage Allowance (LWA) Linear Allowance (Watts)	Total General AWA + LWA (Watts)
Redondo Beach Access Path	Concrete	45,000	0.03	1,350	904	0.4	361.6	1,711.6
								0
						Initial Wattage Allowance for Entire Site (Watts):		**350**
						Total General Hardscape Allowance (Watts):		**2,061.6**

J. LIGHTING ALLOWANCE: PER APPLICATION

This Section Does Not Apply

K. LIGHTING ALLOWANCE: SALES FRONTAGE

This Section Does Not Apply

L. LIGHTING ALLOWANCE: ORNAMENTAL

This Section Does Not Apply

M. LIGHTING ALLOWANCE: PER SPECIFIC AREA

This Section Does Not Apply

N. EXISTING CONDITIONS POWER ALLOWANCE (alterations only)

This Section Does Not Apply

REVISIONS | No. | DATE | SHEET | APPROVAL | DESCRIPTION
AS-BUILT: | REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
TITLE 24 NRCC-LTO-E NEW EXTERIOR LIGHTING

GRAPHIC SCALE | PAGE | FIELD BOOK

FN: E-1
DATE: 3/23/22

TETRA TECH
www.tetratech.com
17885 VON KARMAN AVE #500,
IRVINE, CA 92614
PHONE: (949) 809-5000

DRAWING REF. E-6
SHEET 36 OF 37
DRAWING NO.

LAST SAVED BY: JOHNSONLE
PLOT DATE: Apr. 7, 25 SAVED PATH: O:\Projects\Irvine\01297\200-01297-23009\CAD\SheetFiles

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Redondo Beach Access Path	Report Page:	Page 5 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared:	03/21/2025

O. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCI/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail
○	◉	NRCI-LTO-01-E - Must be submitted for all buildings.	☐	☐
◉	○	NRCI-LTO-02-E - Must be submitted for a lighting control system; or for an Energy Management Control System (EMCS), to be recognized for compliance.	☐	☐

P. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/pttcp/providers.html

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail
◉	○	NRCA-LTO-02-A - Must be submitted for all outdoor lighting controls except for alterations where controls area added to ≤ 20 luminaires.	☐	☐

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Redondo Beach Access Path	Report Page:	Page 6 of 6
Project Address: 809 Esplanade, Redondo Beach, CA 90277	Date Prepared:	03/21/2025

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete

Documentation Author Name:	Johnson Le	Documentation Author Signature:	
Company:	Tetra Tech	Signature Date:	03/21/2025
Address:	17885 Von Karman Ave, Suite 500	CEA/ HERS Certification Identification (if applicable):	
City/State/Zip:	Irvine/CA/92614	Phone:	949-809-5083

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. **The information provided on this Certificate of Compliance is true and correct.**
2. **I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)**
3. **The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.**
4. **The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.**
5. **I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.**

Responsible Designer Name:	Mazen Kassar	Responsible Designer Signature:	
Company :	Tetra Tech	Date Signed:	03/21/2025
Address:	17885 Von Karman Ave, Suite 500	License:	E-15809
City/State/Zip:	Irvine/CA/92614	Phone:	949-809-5137

REVISIONS

No.	DATE	SHEET	APPROVAL	DESCRIPTION

AS-BUILT: REF.

DESIGNED BY: RAFAEL HOLCOMBE
DRAWN BY: JONATHAN GOBER

LAST SAVED BY: JOHNSON.LE
PLOT DATE: Apr. 7, 25 SAVED PATH: O:\Projects\Irvine\01297\200-01297-23009\CAD\SheetFiles

FN: E-1
DATE: 3/23/22

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17885 VON KARMAN AVE #500,
IRVINE, CA 92614
PHONE: (949) 809-5000

REDONDO BEACH AVE. A ACCESS PATH
REDONDO BEACH, CALIFORNIA 90277
TITLE 24 NRCC-LTO-E NEW EXTERIOR LIGHTING

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SHEET 37 OF 37
DRAWING NO.
FIELD BOOK
PAGE
GRAPHIC SCALE

Appendix B
Air Quality and Greenhouse Gas Report

AIR QUALITY & GREENHOUSE GAS REPORT

REDONDO BEACH AVENUE A ACCESS RAMP

COUNTY OF LOS ANGELES

Prepared for: **DEPARTMENT OF BEACHES AND HARBORS**

Prepared by: **MONTROSE ENVIRONMENTAL SOLUTIONS, INC.**

September 2024

County of Los Angeles

Department of Beaches and Harbors

13837 Fiji Way

Marina del Rey, CA 90292

TABLE OF CONTENTS

1 AIR QUALITY AND GREENHOUSE GAS SETTING 1
1.1 Project Location 1
1.2 Applicable Plans, Policies, and Regulations 1
1.2.1 SCAQMD Significance Thresholds 2
2 CONSTRUCTION 3
2.1 CalEEMod Assumptions 3
2.2 Criteria Pollutant Emissions 3
2.3 Health Risk Assessment 4
2.4 Greenhouse Gas Emissions 5
3 OPERATIONS 6
4 CONCLUSIONS 7
4.1 Criteria Pollutant Emissions 7
4.2 Greenhouse Gas Emissions 7

TABLES

TABLE 1 SCAQMD Air Quality Significance Thresholds

TABLE 2 Construction Criteria Pollutant Emissions Compared Against SCAQMD Thresholds

TABLE 3 TAC Emissions from Construction Activities

TABLE 4 Health Risk Assessment

TABLE 5 Construction GHG Emissions Compared Against Thresholds

APPENDICES

Appendix A CalEEMod Detailed Report

Appendix B Health Risk Assessment

1 AIR QUALITY AND GREENHOUSE GAS SETTING

The County of Los Angeles Department of Beaches and Harbors (LABH) is coordinating the replacement of the existing Avenue A beach access ramp in Redondo Beach, California. The project is called the Redondo Beach Avenue A Access Ramp Project (Project). A LABH engineering study performed in 2021 concluded that the existing Avenue A access ramp was not in suitable condition, and the ramp was subsequently closed pursuant to a closure request from the City of Redondo Beach. The Project will demolish the existing 267-ft access ramp and retaining wall to construct an American Disabilities Act-accessible 812-ft concrete access path and two concrete staircases.

1.1 Project Location

The Project is located in Los Angeles County and is included in the South Coast Air Basin (SCAB). The Site lies within the jurisdiction of the South Coast Air Quality Management District (SCAQMD) and is required to comply with applicable SCAQMD rules and regulations. Air pollution for the Project may be generated from the construction activities and operational activities. The project will not create significant increases to the traffic flow; therefore, emission increases from vehicle traffic in the area are not expected. Construction activities and operational activities were modeled using the California Emissions Estimator Model (CalEEMod) Version 2022.1.1.26. The nearest SCAQMD meteorological station is the Hawthorne Airport Station, approximately 7 miles to the northeast.

A sensitive receptor is defined as any residence (including private homes), condominium, apartment, living quarter, school, preschool, daycare center, health facility such as a hospital or retirement and nursing home, long term care hospital, hospice, prison, dormitory or similar live-in housing. The nearest school is Alta Vista Elementary School (at 815 Knob Hill Ave in Redondo Beach), located over 2,000 feet east of the Project Site. The nearest residential receptor is located approximately 95 feet east of the Project site; and the nearest commercial receptor is located approximately 248 feet east of the Project site.

1.2 Applicable Plans, Policies, and Regulations

The Federal Clean Air Act and the California Clean Air Act mandate the control and reduction of specific air pollutants. Under these Acts, the United States Environmental Protection Agency and the California Air Resources Board have established ambient air quality standards for specific “criteria” pollutants, designed to protect public health and welfare. Primary criteria pollutants include carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NOx), particulate matter (PM10), sulfur dioxide (SO2), and lead (Pb). Secondary criteria pollutants include ozone (O3), and fine particulate matter. The Project location is in attainment for ozone, PM10, and PM2.5 according to the National Ambient Air Quality Standards. At the state level, the Project Site is considered nonattainment for ozone and PM10, and unclassified for PM2.5.

Various gases in the Earth’s atmosphere, classified as atmospheric greenhouse gases (GHGs), play a critical role in determining the Earth’s surface temperature. Solar radiation enters the atmosphere from space and a portion of the radiation is absorbed by the Earth’s surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation. Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to

the greenhouse effect are carbon dioxide (CO2), methane (CH4), ozone (O3), water vapor, nitrous oxide (N2O), and chlorofluorocarbons (CFCs). Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for enhancing the greenhouse effect. In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation.

SCAQMD is responsible for assuring that federal and state ambient air quality standards are attained and maintained within the Air District. CEQA Guidelines Section 15064(b) provides guidance for making a determination of whether a project may have a significant effect on the environment, calls for careful judgment on the part of the lead agency, and states that the determination must be based, to the extent possible, on scientific and factual data.

1.2.1 SCAQMD Significance Thresholds

The SCAQMD Air Quality Significance Thresholds for construction and operation are summarized in Table 1 below. If modeled emissions exceed the SCAQMD significance thresholds, mitigation efforts or a more detailed Environmental Impact Report may be required for a Project to obtain CEQA approval.

Table 1. SCAQMD Air Quality Significance Thresholds

Emissions Determination	NOx	VOC	PM10	PM2.5	SOx	CO	GHG
SCAQMD Air Quality Significance Threshold During Construction	100 lbs/day	75 lbs/day	150 lbs/day	55 lbs/day	150 lbs/day	550 lbs/day	10,000 metric tons/year
SCAQMD Air Quality Significance Threshold During Operation	55 lbs/day	55 lbs/day	150 lbs/day	55 lbs/day	150 lbs/day	550 lbs/day	10,000 metric tons/year

2 CONSTRUCTION

Project construction is anticipated to take approximately seven (7) months to complete. Construction activities would consist of demolition, site preparation, grading, path construction, paving, and architectural coating. Project construction would include 703 cubic yards (cy) of imported materials and approximately 1 ton of demolished material. Construction equipment and materials would be staged onsite. Construction equipment will include two (2) cement and mortar mixers, two (2) concrete/industrial saws, two (2) crawler tractors, two (2) dumpers, two (2) excavators, two (2) pavers, four (4) plate compactors, one (1) rough terrain forklift, one (1) loader, one (1) surfacing equipment, one (1) sweeper, one (1) tractor, and one (1) trencher. Construction activities would be limited to five (5) days per week and eight (8) hours per day from 7:00 am to 3:30 pm.

2.1 CalEEMod Assumptions

Emissions from construction activities were calculated using CalEEMod version 2022.1.1.26. CalEEMod calculates both the daily maximum and annual average emissions for criteria pollutants and annual greenhouse gases (GHG). The model calculates emissions caused by demolition, site preparation, grading, building, coating and paving activities from off-road construction equipment; fugitive dust from material movement; on-road mobile equipment associated with workers, vendors, and haulers, and VOC emissions associated with architectural coating. A construction start date of January 1, 2025 was used for modeling purposes.

For this Project, CalEEMod inputs were customized using engineering documents of the project site and an estimated 130-working day construction schedule and equipment list from LABH. CalEEMod default factors were used for other input parameters. CalEEMod inputs are included in Appendix A, with specific construction schedule and equipment information in Section 5.

2.2 Criteria Pollutant Emissions

CalEEMod provides daily emissions rates for selected criteria pollutants based on the construction schedule, equipment and vehicles used, workers, hauling and material movement, and architectural coatings. The maximum daily emissions during the construction phase are summarized in Table 2, below. Modeled maximum daily emissions are below their respective significance thresholds, indicating no significant impacts to air quality. CalEEMod construction emissions are included in Section 2 of Appendix A.

Table 2. Construction Criteria Pollutant Emissions Compared Against SCAQMD Thresholds

Emissions Determination	NOx	VOC	PM10	PM2.5	SOx	CO
SCAQMD Construction Mass Daily Threshold (lbs/day)	100	75	150	55	150	550
CalEEMod Max. Daily Emissions During Construction (lbs/day)	9.24	1.48	56.2	6.07	0.02	9.68
Significant? (Yes/No)	No	No	No	No	No	No

2.3 Health Risk Assessment

Toxic Air Contaminants (TAC) emissions are expected to occur from the off-road equipment during the construction phase of the project. Based on the CalEEMod construction schedule and off-road equipment usage, the daily maximum PM10 exhaust emission is 0.51 lbs/day; and the annual maximum PM10 exhaust emission from off-road equipment is 19.8 lbs/year. It is assumed that the entirety of this PM10 exhaust is diesel particulate matter (diesel PM). Table 3 summarizes the daily and annual maximum of diesel PM.

Table 3. TAC Emissions from Construction Activities

Toxic	Max. Hourly Emissions (lbs/hr)	Max. Daily Emissions (lbs/day)	Max. Annual Emissions (lbs/year)
Diesel Particulate Matter	0.06	0.51	19.6

Pursuant to Rule 1401, a health risk assessment (HRA) was conducted to analyze the impacts of the diesel PM emissions to the surrounding residential and commercial receptors. SCAQMD Rule 1401 Calculator Version 8.1 (updated September 1, 2017) was used to run Tier II Screening Risk Assessment Report. Since Diesel PM is a TAC with chronic and cancer health risks, the Tier II analysis was conducted based on the maximum annual diesel PM emissions of 19.568 lbs or hourly emissions of 0.00941 lbs on a 52-week, 5-day, 8-hour work schedule. The Rule 1401 Calculator is limited in that its minimum project duration is two years; the proposed project has an estimated construction duration of six months. As such, the Maximum Individual Cancer Risk (MICR) from the calculator has been adjusted to reflect the actual project duration. Based on the adjusted MICR, TAC emissions from construction activities are estimated to be below the cancer, chronic, and acute risk thresholds. Table 4 includes the health risk assessment from the construction activities of this Project. Additional information from the HRA is provided in Appendix B.

Table 4. Health Risk Assessment

Health Risk Analysis	Maximum Incremental Cancer Risk	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
SCAQMD TAC Significance Threshold	10.00E-06	1.00	1.00
Proposed Project Health Risk Impacts	6.35E-06	0.0148	Not Applicable
Significant? (Yes/No)	No	No	No

2.4 Greenhouse Gas Emissions

CalEEMod provides daily seasonal maximums and annual maximum carbon dioxide-equivalent (CO_2e) emissions based on the construction schedule, equipment and vehicles used, workers, hauling and material movement, and architectural coatings. The GHG emissions during the construction phase are summarized in Table 5, below. Modeled maximum annual GHG emissions are below the respective significance threshold, indicating no significant impacts.

Table 5. Construction GHG Emissions Compared Against Thresholds

Emissions Determination	GHG Emissions (CO_2e)
SCAQMD Construction Mass Daily Threshold	10,000 MT/yr
CalEEMod Maximum Daily Emissions During Construction	73.4 MT/yr
Significant? (Yes/No)	No

3 OPERATIONS

The Project is expected to be operational in 2026. When complete, the Project will include one ADA-accessible ramp and two sets of staircases that will provide public beach access for pedestrians entering off of Esplanade.

The Project is a beach access ramp for pedestrians; therefore, once the construction phase is completed the Project will generate minimal air quality impacts. The project will not generate additional vehicle trips; and the only potential emissions would be from pesticides and/or fertilizers applied to the landscaped areas or energy consumption for temporary irrigation infrastructure.

These potential emissions were calculated using CalEEMod version 2022.1.1.26 and the inputs were based on CalEEMod default parameters. The air quality impacts from anticipated operation of this Project are well below all air quality significance thresholds. Section 2 of Appendix A includes the estimated operational emissions.

4 CONCLUSIONS

The purpose of this Air Quality and Greenhouse Gas Report was to quantify and assess the potential impacts of the proposed Project on ambient air quality. The analysis performed for the Project shows no significant impacts are expected from criteria pollutant emissions (NOx, VOC, PM10, PM2.5, SOx, CO), toxic air contaminants, or greenhouse gases (CO_2e) when projected construction and operational emissions are compared to the SCAQMD significance thresholds.

4.1 Criteria Pollutant Emissions

Level of Significance before Mitigation: Less than Significant

The daily mass emissions associated with the proposed Project are expected to be below the significance thresholds.

TAC emissions from the proposed Project will not impact public health at levels exceeding the significance thresholds for any residential and/or worker receptors outside the Project area.

Mitigation Measures: NA

Level of Significance after Mitigation: Less than Significant

4.2 Greenhouse Gas Emissions

Level of Significance before Mitigation: Less than Significant

The proposed Project is not expected to generate greenhouse gas emissions exceeding the significance threshold of 10,000 metric tons per year.

Mitigation Measures: NA

Level of Significance after Mitigation: Less than Significant

Appendix A – CalEEMod Detailed Report

Redondo Beach Ave A Access Ramp Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

1.2. Land Use Types

1.3. User-Selected Emission Reduction Measures by Emissions Sector

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

2.2. Construction Emissions by Year, Unmitigated

2.4. Operations Emissions Compared Against Thresholds

2.5. Operations Emissions by Sector, Unmitigated

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

3.3. Site Preparation (2025) - Unmitigated

3.5. Grading (2025) - Unmitigated

3.7. Building Construction (2025) - Unmitigated

3.9. Paving (2025) - Unmitigated

3.11. Architectural Coating (2025) - Unmitigated

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

4.3. Area Emissions by Source

4.3.1. Unmitigated

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

5. Activity Data

5.1. Construction Schedule

5.2. Off-Road Equipment

5.2.1. Unmitigated

5.3. Construction Vehicles

5.3.1. Unmitigated

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

5.5. Architectural Coatings

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

5.6.2. Construction Earthmoving Control Strategies

5.7. Construction Paving

5.8. Construction Electricity Consumption and Emissions Factors

5.9. Operational Mobile Sources

5.9.1. Unmitigated

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

5.10.3. Landscape Equipment

5.11. Operational Energy Consumption

5.11.1. Unmitigated

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

5.13. Operational Waste Generation

5.13.1. Unmitigated

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

5.16.2. Process Boilers

5.17. User Defined

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

5.18.2. Sequestration

5.18.2.1. Unmitigated

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

6.2. Initial Climate Risk Scores

6.3. Adjusted Climate Risk Scores

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

7.2. Healthy Places Index Scores

7.3. Overall Health & Equity Scores

7.4. Health & Equity Measures

7.5. Evaluation Scorecard

7.6. Health & Equity Custom Measures

8. User Changes to Default Data

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Redondo Beach Ave A Access Ramp
Construction Start Date	1/1/2025
Operational Year	2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	3.50
Precipitation (days)	7.40
Location	33.827297, -118.390357
County	Los Angeles-South Coast
City	Redondo Beach
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	4656
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.28

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
City Park	0.87	Acre	0.87	0.00	28,934	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.53	1.48	5.31	7.32	0.02	0.20	54.7	54.9	0.18	5.49	5.67	—	2,065	2,065	0.09	0.04	1.11	2,081
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.38	1.15	9.24	9.68	0.01	0.51	55.7	56.2	0.47	5.60	6.07	—	1,623	1,623	0.07	0.04	0.03	1,636
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.30	0.27	1.41	2.20	< 0.005	0.05	18.4	18.4	0.05	1.85	1.90	—	439	439	0.02	0.01	0.17	443
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.05	0.05	0.26	0.40	< 0.005	0.01	3.36	3.37	0.01	0.34	0.35	—	72.7	72.7	< 0.005	< 0.005	0.03	73.4
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshold	—	75.0	100	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.53	1.48	5.31	7.32	0.02	0.20	54.7	54.9	0.18	5.49	5.67	—	2,065	2,065	0.09	0.04	1.11	2,081
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.38	1.15	9.24	9.68	0.01	0.51	55.7	56.2	0.47	5.60	6.07	—	1,623	1,623	0.07	0.04	0.03	1,636
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.30	0.27	1.41	2.20	< 0.005	0.05	18.4	18.4	0.05	1.85	1.90	—	439	439	0.02	0.01	0.17	443
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.05	0.05	0.26	0.40	< 0.005	0.01	3.36	3.37	0.01	0.34	0.35	—	72.7	72.7	< 0.005	< 0.005	0.03	73.4

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Unmit.	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	< 0.005	< 0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.34	< 0.005	< 0.005	0.00	0.34
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	55.0	55.0	550	150	—	—	150	—	—	55.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	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	0.00
Area	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	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
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	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	0.00
Area	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	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
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	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	0.00
Area	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	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
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.06	2.06	< 0.005	< 0.005	0.00	2.07
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	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	0.00
Area	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	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
Water	—	—	—	—	—	—	—	—	—	—	—	0.00	0.34	0.34	< 0.005	< 0.005	—	0.34
Waste	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.34	< 0.005	< 0.005	0.00	0.34

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.46	0.39	2.80	3.27	< 0.005	0.11	—	0.11	0.10	—	0.10	—	446	446	0.02	< 0.005	—	447
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.17	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.01	135
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.04	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.11	6.11	< 0.005	< 0.005	—	6.13
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.73	0.73	< 0.005	0.07	0.07	—	1.76	1.76	< 0.005	< 0.005	< 0.005	1.85
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.01	1.01	< 0.005	< 0.005	—	1.01
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.13	0.13	< 0.005	0.01	0.01	—	0.29	0.29	< 0.005	< 0.005	< 0.005	0.31

Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	210	210	0.01	0.01	0.02	212
Vendor	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	0.00
Hauling	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	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.92	2.92	< 0.005	< 0.005	< 0.005	2.95
Vendor	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	0.00
Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.48	0.48	< 0.005	< 0.005	< 0.005	0.49
Vendor	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	0.00
Hauling	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	0.00

3.3. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipm	1.13	0.95	8.00	7.83	0.01	0.47	—	0.47	0.43	—	0.43	—	1,146	1,146	0.05	0.01	—	1,150
Dust From Material Movement	—	—	—	—	—	—	1.07	1.07	—	0.12	0.12	—	—	—	—	—	—	—
Onsite truck	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	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.11	0.11	< 0.005	0.01	—	0.01	0.01	—	0.01	—	15.7	15.7	< 0.005	< 0.005	—	15.8
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.60	2.60	< 0.005	< 0.005	—	2.61
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	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	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	210	210	0.01	0.01	0.02	212
Vendor	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	0.00
Hauling	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	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.92	2.92	< 0.005	< 0.005	< 0.005	2.95
Vendor	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	0.00
Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.48	0.48	< 0.005	< 0.005	< 0.005	0.49
Vendor	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	0.00
Hauling	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	0.00

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.29	1.08	9.00	8.67	0.01	0.51	—	0.51	0.47	—	0.47	—	1,284	1,284	0.05	0.01	—	1,289

Dust From Material Movement	—	—	—	—	—	—	1.06	1.06	—	0.11	0.11	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.17	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.01	135
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.25	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	35.2	35.2	< 0.005	< 0.005	—	35.3
Dust From Material Movement	—	—	—	—	—	—	0.03	0.03	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.46	1.46	< 0.005	0.15	0.15	—	3.52	3.52	< 0.005	< 0.005	< 0.005	3.69
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.83	5.83	< 0.005	< 0.005	—	5.85
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.27	0.27	< 0.005	0.03	0.03	—	0.58	0.58	< 0.005	< 0.005	< 0.005	0.61
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	210	210	0.01	0.01	0.02	212

Vendor	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	0.00
Hauling	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	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.83	5.83	< 0.005	< 0.005	0.01	5.91
Vendor	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	0.00
Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.97	0.97	< 0.005	< 0.005	< 0.005	0.98
Vendor	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	0.00
Hauling	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	0.00

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.30	3.39	5.94	0.01	0.11	—	0.11	0.10	—	0.10	—	936	936	0.04	0.01	—	939
Onsite truck	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.30	135
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.30	3.39	5.94	0.01	0.11	—	0.11	0.10	—	0.10	—	936	936	0.04	0.01	—	939

Onsite truck	0.01	< 0.005	0.17	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.01	135
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.56	0.98	< 0.005	0.02	—	0.02	0.02	—	0.02	—	154	154	0.01	< 0.005	—	154
Onsite truck	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	8.77	8.77	< 0.005	0.88	0.88	—	21.1	21.1	< 0.005	< 0.005	0.02	22.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.10	0.18	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	25.5	25.5	< 0.005	< 0.005	—	25.6
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	1.60	1.60	< 0.005	0.16	0.16	—	3.50	3.50	< 0.005	< 0.005	< 0.005	3.67
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.11	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	221	221	0.01	0.01	0.81	225
Vendor	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	0.00
Hauling	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	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.08	0.94	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	210	210	0.01	0.01	0.02	212
Vendor	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	0.00
Hauling	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	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.16	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	35.0	35.0	< 0.005	< 0.005	0.06	35.5
Vendor	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	0.00

Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.79	5.79	< 0.005	< 0.005	0.01	5.87
Vendor	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	0.00
Hauling	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	0.00

3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.65	0.55	5.09	6.14	0.02	0.20	—	0.20	0.18	—	0.18	—	1,716	1,716	0.07	0.01	—	1,721
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.30	135
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.28	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	94.0	94.0	< 0.005	< 0.005	—	94.3
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	2.92	2.92	< 0.005	0.29	0.29	—	7.04	7.04	< 0.005	< 0.005	0.01	7.38
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Roa Equipment	0.01	0.01	0.05	0.06	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	15.6	15.6	< 0.005	< 0.005	—	15.6
Paving	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.53	0.53	< 0.005	0.05	0.05	—	1.17	1.17	< 0.005	< 0.005	< 0.005	1.22
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.11	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	221	221	0.01	0.01	0.81	225
Vendor	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	0.00
Hauling	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	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	11.7	11.7	< 0.005	< 0.005	0.02	11.8
Vendor	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	0.00
Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.93	1.93	< 0.005	< 0.005	< 0.005	1.96
Vendor	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	0.00
Hauling	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	0.00

3.11. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.21	0.17	1.16	1.49	< 0.005	0.04	—	0.04	0.04	—	0.04	—	176	176	0.01	< 0.005	—	177
Architectural Coatings	1.24	1.24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.01	< 0.005	0.16	0.06	< 0.005	< 0.005	54.5	54.5	< 0.005	5.44	5.44	—	128	128	0.01	0.02	0.30	135
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.10	0.12	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	14.5	14.5	< 0.005	< 0.005	—	14.5
Architectural Coatings	0.10	0.10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	4.39	4.39	< 0.005	0.44	0.44	—	10.6	10.6	< 0.005	< 0.005	0.01	11.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.40	2.40	< 0.005	< 0.005	—	2.41
Architectural Coatings	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.80	0.80	< 0.005	0.08	0.08	—	1.75	1.75	< 0.005	< 0.005	< 0.005	1.83
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	1.11	0.00	0.00	0.21	0.21	0.00	0.05	0.05	—	221	221	0.01	0.01	0.81	225
Vendor	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	0.00
Hauling	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	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	17.5	17.5	< 0.005	< 0.005	0.03	17.7
Vendor	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	0.00
Hauling	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.90	2.90	< 0.005	< 0.005	< 0.005	2.93
Vendor	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	0.00
Hauling	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	0.00

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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	0.00
Total	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	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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	0.00
Total	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	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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	0.00
Total	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	0.00

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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
Total	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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
Total	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	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
Total	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

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.00	0.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	2.06	2.06	< 0.005	< 0.005	—	2.07
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.34	0.34	< 0.005	< 0.005	—	0.34
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.34	0.34	< 0.005	< 0.005	—	0.34

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
City Park	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	1/1/2025	1/7/2025	5.00	5.00	—
Site Preparation	Site Preparation	1/8/2025	1/14/2025	5.00	5.00	—
Grading	Grading	1/15/2025	1/28/2025	5.00	10.0	—
Building Construction	Building Construction	1/29/2025	4/22/2025	5.00	60.0	—
Paving	Paving	4/23/2025	5/20/2025	5.00	20.0	—
Architectural Coating	Architectural Coating	5/21/2025	7/1/2025	5.00	30.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Concrete/Industrial Saws	Diesel	Average	2.00	3.20	33.0	0.73
Demolition	Trenchers	Diesel	Average	1.00	8.00	40.0	0.50
Demolition	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46
Site Preparation	Crawler Tractors	Diesel	Average	2.00	8.00	87.0	0.43
Site Preparation	Dumpers/Tenders	Diesel	Average	2.00	8.00	16.0	0.38
Site Preparation	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Site Preparation	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46
Grading	Crawler Tractors	Diesel	Average	2.00	8.00	87.0	0.43
Grading	Dumpers/Tenders	Diesel	Average	2.00	8.00	16.0	0.38
Grading	Excavators	Diesel	Average	2.00	8.00	36.0	0.38
Grading	Plate Compactors	Diesel	Average	4.00	8.00	8.00	0.43
Grading	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46
Building Construction	Rough Terrain Forklifts	Diesel	Average	1.00	8.00	96.0	0.40
Building Construction	Skid Steer Loaders	Diesel	Average	1.00	8.00	71.0	0.37
Building Construction	Tractors/Loaders/Back hoes	Diesel	Average	1.00	8.00	84.0	0.37

Building Construction	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46
Paving	Cement and Mortar Mixers	Diesel	Average	2.00	8.00	10.0	0.56
Paving	Paving Equipment	Diesel	Average	2.00	6.00	89.0	0.36
Paving	Surfacing Equipment	Diesel	Average	1.00	8.00	399	0.30
Paving	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Architectural Coating	Sweepers/Scrubbers	Diesel	Average	1.00	2.00	36.0	0.46

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	16.0	18.5	LDA,LDT1,LDT2
Demolition	Vendor	0.00	10.2	HHDT,MHDT
Demolition	Hauling	0.00	20.0	HHDT
Demolition	Onsite truck	2.00	18.5	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	16.0	18.5	LDA,LDT1,LDT2
Site Preparation	Vendor	0.00	10.2	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	0.00	18.5	HHDT
Grading	—	—	—	—
Grading	Worker	16.0	18.5	LDA,LDT1,LDT2
Grading	Vendor	0.00	10.2	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	2.00	18.5	HHDT
Building Construction	—	—	—	—

Building Construction	Worker	16.0	18.5	LDA,LDT1,LDT2
Building Construction	Vendor	0.00	10.2	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	2.00	18.5	HHDT
Paving	—	—	—	—
Paving	Worker	16.0	18.5	LDA,LDT1,LDT2
Paving	Vendor	0.00	10.2	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	2.00	18.5	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	16.0	18.5	LDA,LDT1,LDT2
Architectural Coating	Vendor	0.00	10.2	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	2.00	18.5	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	0.00	8,000	0.00

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	1.00	—
Site Preparation	352	0.00	5.00	0.00	—
Grading	351	0.00	10.0	0.00	—
Paving	0.00	0.00	0.00	0.00	0.20

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
City Park	0.20	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	349	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
City Park	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	0.00	0.00	—

5.10.3. Landscape Equipment

Equipment Type	Fuel Type	Number Per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
City Park	0.00	349	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
City Park	0.00	405,787

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
City Park	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	5.58	annual days of extreme heat
Extreme Precipitation	4.30	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	0.00	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	0	0	N/A
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	0	0	N/A
Wildfire	1	0	0	N/A
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	0	0	0	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	1	1	1	2
Extreme Precipitation	N/A	N/A	N/A	N/A
Sea Level Rise	1	1	1	2
Wildfire	1	1	1	2
Flooding	N/A	N/A	N/A	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	1	1	1	2

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.

The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	26.7
AQ-PM	71.1
AQ-DPM	56.1
Drinking Water	19.7
Lead Risk Housing	39.5
Pesticides	0.00
Toxic Releases	93.1
Traffic	38.6
Effect Indicators	—
CleanUp Sites	0.00
Groundwater	10.6
Haz Waste Facilities/Generators	20.3
Impaired Water Bodies	72.2
Solid Waste	0.00
Sensitive Population	—
Asthma	9.67
Cardio-vascular	23.8
Low Birth Weights	45.9

Socioeconomic Factor Indicators	—
Education	8.99
Housing	23.4
Linguistic	2.81
Poverty	7.83
Unemployment	11.9

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	93.23752085
Employed	98.02386757
Median HI	77.98023868
Education	—
Bachelor's or higher	87.84806878
High school enrollment	100
Preschool enrollment	95.7141024
Transportation	—
Auto Access	96.70216861
Active commuting	44.34749134
Social	—
2-parent households	94.02027461
Voting	73.47619659
Neighborhood	—
Alcohol availability	4.516874118
Park access	81.35506224
Retail density	59.7330938

Supermarket access	66.55973309
Tree canopy	40.49788272
Housing	—
Homeownership	7.327088413
Housing habitability	47.88913127
Low-inc homeowner severe housing cost burden	21.08302323
Low-inc renter severe housing cost burden	83.3055306
Uncrowded housing	92.9038881
Health Outcomes	—
Insured adults	76.99217246
Arthritis	77.8
Asthma ER Admissions	80.9
High Blood Pressure	83.5
Cancer (excluding skin)	25.9
Asthma	88.8
Coronary Heart Disease	79.3
Chronic Obstructive Pulmonary Disease	88.0
Diagnosed Diabetes	94.1
Life Expectancy at Birth	86.0
Cognitively Disabled	99.4
Physically Disabled	98.1
Heart Attack ER Admissions	58.3
Mental Health Not Good	87.0
Chronic Kidney Disease	90.3
Obesity	78.0
Pedestrian Injuries	19.6
Physical Health Not Good	91.4
Stroke	88.3

Health Risk Behaviors	—
Binge Drinking	5.5
Current Smoker	82.7
No Leisure Time for Physical Activity	97.5
Climate Change Exposures	—
Wildfire Risk	0.0
SLR Inundation Area	90.2
Children	77.6
Elderly	50.9
English Speaking	78.2
Foreign-born	25.4
Outdoor Workers	59.5
Climate Change Adaptive Capacity	—
Impervious Surface Cover	12.1
Traffic Density	55.5
Traffic Access	23.0
Other Indices	—
Hardship	0.4
Other Decision Support	—
2016 Voting	43.1

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	10.0
Healthy Places Index Score for Project Location (b)	93.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	No
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Construction Phases	Construction schedule for 130 working days provided by LABH planner.
Land Use	Project size and landscaped area estimated from project diagrams. Landscaped area is separated by a retaining wall and is not intended for recreational use.
Operations: Vehicle Data	The Project is a beach access ramp for pedestrians; therefore, no vehicle trip generation is expected during operations.
Operations: Solid Waste	The Project is a beach access ramp for pedestrians; therefore, no solid waste generation is expected.
Operations: Refrigerants	The Project is a beach access ramp for pedestrians; therefore, no refrigerant usage is expected.
Construction: Architectural Coatings	The Project is a beach access ramp for pedestrians; therefore, architectural coating is expected to be used only for non-residential exterior area.
Construction: Off-Road Equipment	Construction equipment for 130-day construction schedule provided by LABH planner.
Construction: Trips and VMT	Trips & VMT for 130-day construction schedule provided by LABH planner.
Construction: Paving	Paved area estimated from project diagrams.

Appendix B – Health Risk Assessment

LOS ANGELES DEPARTMENT OF BEACHES AND HARBORS
AVENUE A ACCESS RAMP PROJECT

Health Risk Assessment Site Map

TIER 1/TIER 2 SCREENING RISK ASSESSMENT DATA INPUT

(Procedure Version 8.1 & Package N, September 1, 2017) - Risk Tool V1.105

Application Deemed Complete Date	01/01/25
A/N	
Facility Name	ondo Beach Ave A Access R

1. Stack Data	**Input**	**Units**
Hours/Day	8	hrs/day
Days/Week	5	days/wk
Weeks/Year	52	wks/yr
Control Efficiency	0.000	
Does source have T-BACT?	NO	
Source type (Point or Volume)	V	P or V
Stack Height or Building Height	6	feet
Building Area	8778	ft^2
Distance-Residential	29	meters
Distance-Commercial	75	meters
Meteorological Station	Hawthorne Airport	
Project Duration (Short term options: 2, 5, or 9 years; Else 30 years)	2	years

Source Type	Other
Screening Mode (**NO** = Tier 1 or Tier 2; **YES** = Tier 3)	NO

FOR SOURCE TYPE OTHER THAN BOILER, CREMATORY, ICE, PRESSURE WASHER, OR SPRAY BOOTH, FILL IN THE USER DEFINED TABLE BELOW

Fac Name: Redondo Beach Ave A Access Ramp A/N: 0

TAC Code	Compound	Emission Rate (lbs/hr)	Molecular Weight	R1 - Uncontrolled (lbs/hr)	Efficiency Factor (Fraction range 0-1)	R2- Controlled (lbs/hr)
P1	Particulate Emissions from Diesel-Fueled Engines	9.41E-03	350	9.41E-03	0.00000	0.009407692

EMISSIONS ARE ENTERED ON THE EMISSIONS WORKSHEET OR ON ONE OF EQUIPMENT WORKSHEETS

INPUT PARAMETERS ENTERED ON THE EMISSIONS SHEET ARE USED FOR TIERS 1 AND TIER 2 ANALYSES

TIER 2 SCREENING RISK ASSESSMENT REPORT

(Procedure Version 8.1 & Package N, September 1, 2017) - Risk Tool V1.105

A/N: _____ **Fac:** Redondo Beach Ave A Access Ramp **Application deemed complete date:** 1/1/2025

1. Stack Data

Equipment Type	Other	
Combustion Eff	0.0	
	No T-BACT	
Operation Schedule	8	hrs/day
	5	days/week
	52	weeks/year
Stack Height	6	ft
Building Area	8778	ft²
Distance to Residential	29	m
Distance to Commercial	75	m
Meteorological Station	Hawthorne Airport	

2. Tier 2 Data

Dispersion Factors tables	Volume Source
For Chronic X/Q	Table 7
For Acute X/Q max	Table 7.7

Dilution Factors

Receptor	X/Q (µg/m³)/(tons/yr)	X/Qmax (µg/m³)/(lbs/hr)
Residential	7.58	646.35
Commercial - Worker	2.10	183.90

Intake and Adjustment Factors

	Residential	Worker
Year of Exposure	2	
Combined Exposure Factor (CEF) - Table 4	311.35	4.47
Worker Adjustment Factor (WAF) - Table 5	1	4.20

A/N: _____ Application deemed complete date: 01/01/25

3. Rule 1401 Compound Data

Compound	R1 - Uncontrolled (lbs/hr)	R2 - Controlled (lbs/hr)	CP $(mg/kg\text{-}day)^{-1}$	MP MICR Resident	MP MICR Worker	MP Chronic Resident	MP Chronic Worker	REL Chronic ($\mu g/m^3$)	REL 8-hr Chronic ($\mu g/m^3$)	REL Acute ($\mu g/m^3$)	MWAF
Particulate Emissions from Diesel-Fueled Er	9.41E-03	9.41E-03	1.10E+00	1.00	1.00	1.00	1.00	5.00E+00			1

A/N: _____ Application deemed complete date: 01/01/25

4. Emission Calculations

Compound	R1 (lbs/hr)	R2 (lbs/hr)	R1 (lbs/day)	R2 (lbs/day)	R2 (lbs/yr)	R2 (tons/yr)
Particulate Emissions from Diesel-Fueled Er	9.41E-03	9.41E-03	7.53E-02	7.53E-02	1.96E+01	9.78E-03
Total	**9.41E-03**	**9.41E-03**	**7.53E-02**	**7.53E-02**	**1.96E+01**	**9.78E-03**

TIER 2 RESULTS A/N: _____ Application deemed complete date: 01/01/25

5a. MICR

MICR Resident = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) Resident * CEF Resident * MP Resident * 1e-6 * MWAF

MICR Worker = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) Worker * CEF Worker* MP Worker* WAF Worker* 1e-6 * MWAF

Compound	Residential	Commercial
Particulate Emissions from Diesel-Fueled Er	2.54E-05	4.24E-07
Total	**2.54E-05**	**4.24E-07**
	FAIL	**PASS**

5b. Is Cancer Burden Calculation Needed (MICR >1E-6)?	**YES**
New X/Q at which $MICR_{70yr}$ is one-in-a-million [(µg/m³)/(tons/yr)]:	1.21E-01
New Distance, interpolated from X/Q table using New X/Q (meter):	441.18
Zone Impact Area (km²):	6.11E-01
Zone of Impact Population (7000 person/km²):	4.28E+03
Cancer Burden:	**2.68E-01**
Cancer Burden is less than or equal to 0.5	**PASS**

6. Hazard Index Summary **A/N:** _____ **Application deemed complete date:** 01/01/25

HIA = [Q(lb/hr) * (X/Q)max * MWAF]/ Acute REL
HIC = [Q(ton/yr) * (X/Q) * MP * MWAF] / Chronic REL
HIC 8-hr= [Q(ton/yr) * (X/Q) * WAF * MWAF] / 8-hr Chronic REL

Target Organs	Acute	Chronic	8-hr Chronic	Acute Pass/Fail	Chronic Pass/Fail	8-hr Chronic Pass/Fail
Alimentary system (liver) - AL				Pass	Pass	Pass
Bones and teeth - BN				Pass	Pass	Pass
Cardiovascular system - CV				Pass	Pass	Pass
Developmental - DEV				Pass	Pass	Pass
Endocrine system - END				Pass	Pass	Pass
Eye				Pass	Pass	Pass
Hematopoietic system - HEM				Pass	Pass	Pass
Immune system - IMM				Pass	Pass	Pass
Kidney - KID				Pass	Pass	Pass
Nervous system - NS				Pass	Pass	Pass
Reproductive system - REP				Pass	Pass	Pass
Respiratory system - RESP		1.48E-02		Pass	Pass	Pass
Skin				Pass	Pass	Pass

A/N: _____ Application deemed complete date: 01/01/25

6a. Hazard Index Acute - Resident

HIA = [Q(lb/hr) * (X/Q)max resident * MWAF] / Acute REL

	HIA - Residential									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er										
Total										

6a. Hazard Index Acute - Worker **A/N:** _____ **Application deemed complete date:** 01/01/25

HIA = [Q(lb/hr) * (X/Q)max Worker * MWAF] / Acute REL

	HIA - Commercial									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er										
Total										

A/N: _____ **Application deemed complete date:** 01/01/25

6b. Hazard Index Chronic - Resident

HIC = [Q(ton/yr) * (X/Q) Resident * MP Chronic Resident * MWAF] / Chronic REL

	HIC - Residential												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er												1.48E-02	
Total												1.48E-02	

A/N: _____ Application deemed complete date: 01/01/25

6b. Hazard Index Chronic - Worker

HIC = [Q(ton/yr) * (X/Q) * MP Chronic Worker * MWAF] / Chronic REL

	HIC - Commercial												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er												4.11E-03	
Total												4.11E-03	

6c. 8-hour Hazard Index Chronic - Resident **A/N:** _____ **Application deemed complete date:** 01/01/25

HIC 8-hr = [Q(ton/yr) * (X/Q) Resident * WAF Resident * MWAF] / 8-hr Chronic REL

	HIC - Residential												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er													
Total													

A/N: _____ Application deemed complete date: 01/01/25

6c. 8-hour Hazard Index Chronic - Worker

HIC 8-hr = [Q(ton/yr) * (X/Q) Worker * WAF Worker * MWAF] / 8-hr Chronic REL

	HIC - Commercial												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Particulate Emissions from Diesel-Fueled Er													
Total													

Redondo Beach Avenue A Access Ramp
Health Risk Assessment - Construction Activities

CALEEMOD

Construction Emissions from Off-Road Equipment

Construction Phase	PM10E	Unit
Demolition	0.527	lbs
Site Preparation	2.341	lbs
Grading	5.074	lbs
Building Construction	6.420	lbs
Paving	3.964	lbs
Architectural Coating	1.242	lbs
Construction Total	19.568	lbs
Working Hours per Year	2080	hours
Diesel PM EF	9.41E-03	lbs/hr

SCAQMD Rule 1401 Risk Assessment Calculator - Not Adjusted

Tier 2 Residential MICR	2.54E-05
Tier 2 Commercial MICR	4.24E-07

Actual Health Risk Impacts

Actual Project Duration	6	months
Rule 1401 Calculator Project Duration	24	months
Adjusted Residential MICR	6.35E-06	
Adjusted Commercial MICR	1.06E-07	
SCAQMD MICR Significance Threshold	10.00E-06	

Appendix C
Biological Resources Assessment

BIOLOGICAL RESOURCES ASSESSMENT
REDONDO BEACH AVENUE ACCESS PATH PROJECT
LOS ANGELES COUNTY, CALIFORNIA

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TABLE OF CONTENTS

1.0 Introduction 1
1.1. Project Location and Description 1
2.0 Regulatory Setting 3
2.1 Federal 3
2.1.1. Federal Endangered Species Act (FESA) 3
2.1.2. Migratory Bird Treaty Act (MBTA) 3
2.1.3. Bald and Golden Eagle Protection Act (BGEPA) 3
2.2. State 3
2.2.1. California Environmental Quality Act (CEQA) 3
2.2.2. California Native Plant Protection Act (NPPA) 3
2.2.3. California Endangered Species Act (CESA) 4
2.2.4. California Fish and Game Code 4
2.2.5. Porter-Cologne Water Quality Control Act (Porter-Cologne) 5
2.2.6. California Coastal Act (Coastal Act) 5
2.3. Local 5
2.3.1. City of Redondo Beach – Local Coastal Program 5
3.0 Existing Conditions 7
3.1. Regional Setting 7
3.2. Topography and Soils 7
3.3. Hydrology 7
4.0 Biological Site Assessment 8
4.1. Flora and Fauna Survey 8
4.1.1. Desktop and Literature Review 8
4.1.2. Flora and Fauna Field Methodology 9
4.1.3. Flora and Fauna Results 9
4.1.4. Special-Status Species and Critical Habitat 10
4.2. Waters and Wetlands Resources 12
4.2.1. Waters and Wetlands Desktop and Literature Review 12
4.2.2. Waters and Wetlands Field Methodology 12
4.2.3. Waters and Wetlands Results 12
5.0 Conclusions and Recommendations 14
5.1. Conclusions 14
5.2. Recommendations 14
5.2.1. Suitable El Segundo Blue Butterfly Habitat 15
5.2.2. Trask Shoulderband 15
5.2.3. ESHA Bluff Habitat 16
6.0 References 17

TABLES

Table 1. Special-Status Species Observed During Survey with Potential to Occur 10

FIGURES

Figure 1. Project Location
Figure 2. Project Footprint
Figure 3. CNDDB Occurrences
Figure 4. Critical Habitat
Figure 5. Special Status Species

APPENDICES

Appendix A. Project Plans

Appendix B. Site Photographs
Appendix C. Special-Status Biological Resources With Potential to Occur in the Project Vicinity
Appendix D. Floral and Faunal Compendia

1.0 INTRODUCTION

Environmental Intelligence, LLC (EI) was retained by the County of Los Angeles Department of Beaches and Harbors (DBH) to conduct a biological resources assessment (BRA) in support of the proposed Redondo Beach Avenue Access Path Project (Project) located in Los Angeles County. This BRA summarizes the biological resources known or expected to occur at or near the proposed Project. In 2021, DBH requested the closure of the existing beach access ramp at Avenue A after an engineering study determined that the ramp system was in poor condition and recommended closure for public safety. Since this closure the retaining wall surrounding the existing access ramp has collapsed over a stretch of the ramp and the general condition of the feature has deteriorated further. The purpose of the Project is to remove the existing infrastructure and develop a new accessible ramp to improve public safety associated with the access path to Redondo Beach at Avenue A.

This BRA provides a review of the Project in sufficient detail to determine how the Project may affect sensitive biological resources. Sensitive biological resources include:

- species listed as threatened or endangered under the Federal Endangered Species Act of 1973 (FESA; 16 U.S.C. § 1531 et seq.);
- species listed or candidates for listing as threatened or endangered under the California Endangered Species Act (CESA);
- bald and golden eagles protected under the Bald and Golden Eagle Protection Act (BGEPA; 16 U.S.C. 668-668c);
- species designated as Fully Protected (FP) by the California Department of Fish and Wildlife (CDFW);
- animals designated as Species of Special Concern (SSC) by CDFW;
- animals included in the CDFW "Special Animals" (SA) list;
- plants assigned a California Rare Plant Rank (CRPR) by the California Native Plant Society (CNPS);
- plants listed as rare under the California Native Plant Protection Act (NPPA);
- vegetation types designated as Sensitive Natural Communities by CDFW; and
- features meeting the requirements of jurisdictional waters or wetlands of the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or CDFW.

1.1. Project Location and Description

The Project is located at 811 Esplanade Avenue, in the City of Redondo Beach, Los Angeles County, California on two contiguous parcels, Los Angeles Assessor's Parcel Numbers (APN) 7509-005-900 and 7509-001-900 (Figure 1). The area is found on the *Redondo Beach, California* 7.5' U.S. Geological Survey (USGS) topographic quadrangle. The elevation within the proposed Project site ranges from approximately 4–5 feet above mean sea level (amsl) at the western border to 20–22 feet amsl at the eastern border. Throughout this report, the "Project Site" refers to the proposed Project temporary and permanent footprint area described below. The "Survey Area" refers to the Project Site plus a 500-foot buffer.

The Project includes a series of improvements and modernizations to the existing access ramp and associated infrastructure. The Project includes the destruction of the 4.5-foot-wide by 267-foot-long access

path, the 267-foot-long by approximately 5-foot-tall concrete masonry unit (CMU) wall, and the 267-foot-long pedestrian railing. This infrastructure would be replaced with a 6-foot-wide by 812-foot-long ADA-accessible concrete path and one 6-foot-wide concrete staircase on the north end of the newly constructed access path. Additionally, the Project would include the general grading of the bluff, removal and replacement of existing landscaping and irrigation, removal of an existing chain-linked fence within the project site and installation of a bicycle rack, bollard lighting, bench seating, guardrails and handrails, drainage swales, and miscellaneous drainage improvements.

Installation of a 50-foot-wide by 100-foot-long contractor staging area would be required immediately south of the lifeguard storage containers. The contractor staging area would be paved over for the entirety of the Project but would be returned to its original condition following Project completion. Installation of a 20-foot-wide temporary bike path, extending the length of the Project Site from north to south would be required to redirect pedestrians around the project work area. The temporary bike path will be paved for the entirety of the Project and will be returned to its original condition following project completion. To ensure public safety, two temporary chain-link fences will be installed on the western edge of the Project Site. One chain-link fence will surround the 50-foot-wide by 100-foot-long concreted contractor staging area. The other chain-link fence will sit along the edge of the existing bike path, where project work activities will take place, to prevent pedestrian access. Project plans depicting the planned improvements and activities described are presented in **Appendix A**.

Project construction is anticipated to take 12 months, commencing in Spring of 2026. Substantial grading would occur, and soil import or export is required, as excavated soil would be used for mounding the lawn area. Construction equipment and materials would be staged on-site; therefore, once the equipment is delivered to the site, there will be no further off-site movement of equipment until the Project is complete.

2.0 REGULATORY SETTING

2.1 Federal

The Project Site occurs on and near areas and species that are subject to federal and state regulation. This section provides an overview of the biological resources and related federal regulations considered under this BRA.

2.1.1. FEDERAL ENDANGERED SPECIES ACT (FESA)

FESA establishes a program for the protection and conservation of threatened and endangered plants and animals as well as for the habitats in which these species may be found. FESA requires consultation with the U.S. Fish and Wildlife Service (USFWS) to ensure that a proposed action will not interfere with or inhibit the existence or survival of any listed species.

FESA further prohibits the "take" of any endangered species, lists prohibited actions, and provides guidelines for consultation with agencies regarding species that are designated as "threatened" or "endangered." Under FESA, "take" is defined as "...to harass, harm, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Harm is an act which injures or kills a wildlife species, including significant habitat modification or degradation; whereas harass is defined as an intentional or negligent act or omission which creates the likelihood of injury by annoying the animal to the extent it significantly disrupts normal behavior patterns such as breeding, feeding, or sheltering.

2.1.2. MIGRATORY BIRD TREATY ACT (MBTA)

The Migratory Bird Treaty Act (MBTA) originated in 1918 as a statute designed for the protection of migratory birds. The MBTA prohibits the pursuit, hunt, take, capture, killing, attempt to take, capture, or kill, possession, sell, purchase, or other distribution in any manner, of more than 1,000 migratory bird species unless authorized by regulation. Since 1918, the MBTA has been amended to include treaties between the U.S. and three countries: Mexico, Japan, and Russia, to protect migratory birds.

2.1.3. BALD AND GOLDEN EAGLE PROTECTION ACT (BGEPA)

The BGEPA prohibits the "taking" of bald eagles [or golden eagles] by anyone without a permit issued by the Secretary of the Interior. The Act defines "take" as "pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing [agitating or otherwise bothering a bald or golden eagle in a manner that might result in injury, decreased productivity, or nest abandonment]."

2.2. State

2.2.1. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

The California Environmental Quality Act (CEQA) was signed into law in 1970. CEQA requires any project or action that has the potential to result in physical environmental change, or use, or projects requiring State or local public agency discretionary action (typically through funding, land, or required approvals), to review, consider, disclose, and attempt to avoid, reduce, or mitigate (where necessary) the potential environmental impacts associated with a proposed project.

2.2.2. CALIFORNIA NATIVE PLANT PROTECTION ACT (NPPA)

The NPPA of 1977 requires all State agencies to ensure that programs designed to conserve endangered and rare native plants are implemented. Provisions of the NPPA prohibit the taking of listed plants from the

wild and require notification of the CDFW at least 10 days in advance of any change in land use. The NPPA was expanded within CESA in 1984 to further protect rare and endangered plants within the State.

2.2.3. CALIFORNIA ENDANGERED SPECIES ACT (CESA)

CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected or preserved. CESA prohibits the take (defined as to hunt, pursue, catch, capture, or kill) of any species of wildlife designated by the California Fish and Game Commission as endangered, threatened, or candidate species. The CDFW works with all interested persons, agencies, and organizations to protect and preserve such sensitive resources and their habitats. CDFW may authorize the take of any such species if certain conditions are met.

The classification of FP was the State's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. FP species may not be taken or possessed at any time, and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.

2.2.4. CALIFORNIA FISH AND GAME CODE

The California Fish and Game Code authorizes the CDFW to oversee the direction and implementation of sections related to the protection of the State's natural resources. Relevant sections in regards to the proposed Project shown below.

Sections 1600-1616. Sections 1600-1616 regulates any person, state or local government agency, or public utility that proposes to "substantially divert[s] or obstruct[s] the natural flow or substantially change[s] the bed, channel, or bank of any river, stream, or lake designated by the department, or use[s] any material from the streambeds". This jurisdiction includes ephemeral, intermittent, and perennial streams, dry washes, and lakes characterized by a defined bed and bank and observed relationship to fish or wildlife resources. This jurisdiction extends to adjacent habitats that function as part of the riparian system, regardless of the riparian area's federal status. When riparian vegetation is present, CDFW jurisdiction reaches to the outer limits of the riparian vegetation dripline. Further, CDFW asserts jurisdiction over vernal pools only when California State threatened and/or endangered species (e.g., thread leaved brodiaea [*Brodiaea filifolia*, FAC]) are present.

Sections 1801-1802. Sections 1801-1802 of the California Fish and Game Code encourage the preservation, conservation, and maintenance of the State's wildlife resources. These sections are intended to maintain the existing species populations for biological benefits, educational and recreational uses, in addition to the intrinsic values associated with these resources. The CDFW is tasked as a trustee for wildlife species to ensure that the populations and their habitat are sustained, diverse, and protected.

Section 3503. Section 3503 of the California Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the Code or any associated regulation.

Section 3503.5. Section 3503.5 makes it unlawful to take, possess, or destroy birds of prey. It also prohibits the take, possession, or destruction of nests or eggs of any bird of prey.

Section 3511. Section 3511 describes bird species, primarily raptors that are "fully protected." Fully

protected animals may not be taken incidentally unless pursuant to a CDFW-adopted Natural Communities Conservation Plan.

2.2.5. PORTER-COLOGNE WATER QUALITY CONTROL ACT (PORTER-COLOGNE)

The Porter-Cologne Act provides that the State Water Resources Control Board (SWRCB) and the nine RWQCBs have jurisdiction over all surface water and groundwater in California, including wetlands, headwaters, and riparian areas (California Water Code Division 7). The SWRCB or applicable RWQCB must issue waste discharge requirements for any activity that discharges waste that could affect the quality of waters of the state.

2.2.6. CALIFORNIA COASTAL ACT (COASTAL ACT)

The Coastal Act guides how the land along the coast of California is developed or protected from development. It emphasizes the importance of the public being able to access the coast, and the preservation of sensitive coastal and marine habitat and biodiversity. The Coastal Act requires that local governments develop Local Coastal Programs (LCP) that can carry out policies of the California Coastal Act at the local level. LCPs are land use planning documents that lay out a framework for development and coastal resource protection within a city or county's coastal zone area. They are prepared by the local jurisdiction and submitted to the Coastal Commission for certification. Each LCP includes a Land Use Plan (LUP) which contains policies, and an Implementation Plan (IP) which includes accompanying measures to implement the plan (such as zoning ordinances, zoning district maps, and other implementing actions). LCPs specify the appropriate kinds, location, and intensity of uses of land and water in the coastal zone portion of a local government's jurisdiction. Relevant sections in regards to the proposed Project are shown below.

Section 30107.5 **Environmentally sensitive area (ESA)** means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem, which could be easily disturbed or degraded by human activities and developments.

Section 30240 (a) **Environmentally sensitive habitat areas (ESHA)** shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas. (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas and shall be compatible with the continuance of those habitat and recreation areas *(Amended by Stats. 1991, Ch. 285, Sec. 4.).*

2.3. Local

2.3.1. CITY OF REDONDO BEACH – LOCAL COASTAL PROGRAM

The City of Redondo Beach is in the process of updating its LCP, General Plan, and associated ordinances. The City's Draft Program Environmental Impact Report (State Clearinghouse No. 2023050732) was open for comment until September 16, 2024. The document has not been finalized or approved by the California Coastal Commission. The draft policy sections relevant to this assessment are included, recognizing that language and content may change.

Policy LU (Land Use) - 5.7: "Preserve and Expand Native Habitat and Encourage Use of Native Plants for Landscaping. Continue to support the expansion of native bluff habitat along the Esplanade. Continue to support reestablishment of native habitat in Wilderness Park. Continue to pursue wetlands and native habitat restoration at the power plant site and the adjacent powerline corridor. Ensure connectivity of native habitat, particularly habitat for the endangered El Segundo blue butterfly, with Torrance and Hermosa Beach.

Redefine city plant and tree palettes to prioritize native plants. Apply the strategies and approaches to fund and incentivize expansion of native habitat and plants throughout the City on both public and private property."

Policy OS (Open Space) -1.8: "Provide safe, convenient, and enjoyable routes for residents of all ages, abilities, and income to access the City's open spaces and recreational facilities on foot, bike, and public transit. Provide appropriate bicycle and vehicular parking for all parks, coastal open spaces, and public spaces."

Policy OS (Open Space) - 8.1: "Protect and Expand Critical Habitats. Coordinate with the neighboring cities, Los Angeles County, regional agencies, and environmental and conservation communities/groups to ensure critical habitat areas are preserved, expanded and connected when feasible, and protected from natural and manmade threats, including potential impacts from development on adjacent sites."

Policy OS (Open Space) - 8.2: "Re-Introduce Native Species. Coordinate with conservation groups and non-profit organizations to reestablish habitat areas with native plants and animals in areas of habitat rehabilitation; consider the feasibility of establishing, maintaining, and preserving new habitat areas in other parts of the City."

Policy OS (Open Space) -8.5: "Continue Current Restoration Efforts. Support continuation and expansion of current habitat restoration efforts on the Coastal Bluffs and at Wilderness Park."

Policy S (Safety Element) -7.4. "Nature-based Solutions. Integrate nature-based solutions into sea level rise adaptation strategies, including the construction of living shorelines, which are made of plants, sand, or rock that can grow over time to provide both wildlife habitat and natural resilience, rather than artificial structures."

3.0 EXISTING CONDITIONS

3.1. Regional Setting

The Project Site is located at the western edge of the City of Redondo Beach, immediately west of the Esplanade, at the western terminus of Avenue A (**Appendix B**). The Project Site is located on a coastal bluff overlooking the public beach. The City of Redondo Beach has a diverse array of land uses, including but not limited to hotels, restaurants, office and commercial centers, residential structures, public parks, beaches, and bike paths. Immediately north of the Project Site lie several single-family homes transitioning into multi-unit housing further north. The residential properties north of the Project Site and east of the Esplanade reduce the width of the undeveloped bluff to between 10–50 feet from beach to road, at various points. The Project Site represents a strip of seminatural open space that is contiguous north to the southern side of Redondo Beach pier. East of the Project Site is the Esplanade pedestrian path and Esplanade Road with multiunit housing lining its eastern perimeter. West of the Project Site lies the public beach with the Pacific Ocean beyond. South of the Project Site the beach bluff runs contiguous to the Palos Verdes Peninsula and remains seminatural throughout, with a combination of native soils and non-native ice plant vegetative cover.

3.2. Topography and Soils

The western area of the Project Site is a fine-grained sandy beach, and the bluff and bluff top (coastal terrace) is older stabilized dune and drift sand with the majority fraction of unconsolidated sand (Cooper 1967, and Dibblee et al. 1999). The bluff rises approximately 20 feet from the inland edge of the beach to the coastal terrace at the pedestrian path adjacent to Esplanade, over a run of approximately 90–95 feet. Potential barriers to wildlife and floral dispersion across the bluffs along Redondo Beach include 14 pedestrian access paths (including the existing inoperable Avenue A ramp).

3.3. Hydrology

The Project Site is in California's Mediterranean climate and is distinguished by warm, wet winters under prevailing westerly winds and calm, hot, dry summers. Typically, 75 percent of the yearly precipitation is accumulated during the winter months (December–March). The seasonal 30-year running average precipitation is 13.64 inches. The Project Site has a narrow level strip abutting the pedestrian pathway parallel to the Esplanade, with the remainder of the Project Site sloping towards the beach with no discernable drainage patterns. The paved Esplanade pedestrian path abutting the bluff top features a low wall over the length of the Project Site, excluding the entryway to the existing ramp. This feature appears to prevent any sizable water runoff onto the site from the top of the slope.

4.0 BIOLOGICAL SITE ASSESSMENT

4.1. Flora and Fauna Survey

Flora and faunal taxonomy follow common taxonomy used in current literature, both published and available online. Vegetation communities were classified following those described in the Manual of California Vegetation Online (CNPS 2024). Plant identification and naming follow the Jepson Manual: Vascular Plants of California, 2nd Edition (JM2; Baldwin et al. 2012) and the Jepson eFlora Project (2024). Common plant names are based on entries found online at Calflora (https://www.calflora.org/).

4.1.1. DESKTOP AND LITERATURE REVIEW

A desktop review of existing biological data was conducted prior to the field survey and included an examination of publicly available databases, relevant literature, and previous studies to determine which species/habitats identified as special-status, threatened or endangered by state, federal, and local resources agencies have the potential to occur within the vicinity of a 10-mile radius of the Project Site. Due to the small, fragmented, and isolated quantity of natural and seminatural sites in the vicinity of the Project Site, this extended search provides a better representation of historic and potentially extant species for the Project Site.

The database searched included the following:

- California Natural Diversity Database (CNDDB) RareFind application (CDFW 2024);
- USFWS Species Occurrence Data (USFWS 2024) and IPAC;
- CNPS Online Inventory of Rare and Endangered Plants of California (CNPS 2024b);
- Consortium of California Herbaria (CCH2) Portal;
- Federal Register listing package and critical habitat determination for each federally listed threatened or endangered species potentially occurring within the project vicinity;
- ebird (ebird.org);
- iNaturalist (inaturalist.org); and
- literature review (see Section 6.0).

Special-status species with the potential to occur within the Project site were evaluated based on 1) age of recorded observations, 2) the species' range, 3) habitat requirements of the species versus the major plant community/habitat within the site's vicinity, 4) previous records or observations during field surveys, 5) surveyors' familiarity with the areas resources, and 6) personal correspondence with regional experts.

Each identified species was classified with **Potential to Occur** determinations using the following definitions:

> **Occurs**: the species and/or positive sign was observed on-site during the site visits and field survey.
>
> **Absent**: the species and/or positive sign was not observed on-site during the site survey if it corresponds to the species blooming/activity period.
>
> **Likely to Occur**: all site features indicate this species is very likely present and should be expected. Criteria include Project Site within geographic range; suitable habitat present (e.g., soils, vegetation communities, elevation); and distance to historical record(s) less than 25 years old, is accurately mapped, and is less than 5–8 mile.

Unlikely to Occur: species could occur, but records of the species are not locally known. Criteria include Project Site within geographic range; suitable habitat present (e.g., soils, vegetation communities, elevation); and distance to historical record(s) less than 25 years old and is more than 1 mile; or historical record 26–75 years old indicates it is extant and accurately mapped.

Does Not Occur: species would not occur because the Project Site is outside known or current geographic/elevation range, lacks habitat or suitable conditions, and/or there is reasonable certainty to assume absent based on historical records.

The list of sensitive species with potential to occur determinations and justifications is presented in **Appendix C**. **Figure 3** presents mapped locations of sensitive species provided in the CNDDB records.

4.1.2. FLORA AND FAUNA FIELD METHODOLOGY

Environmental Intelligence (EI) Senior Biologist Jeremiah George, Ph.D., conducted a flora and faunal assessment of the Survey Area on August 14, 2024, and August 29, 2024. The habitat and species assessment included a general pedestrian survey to document existing site conditions, map vegetation/habitat communities, identify botanical and wildlife species, any avian nests present, and identify areas suitable for any special-status species. The Survey Area included a 500-foot buffer around the outside perimeter of the proposed Project footprint, including both permanent and temporary impact areas. An additional pedestrian survey was conducted south of the site for a further 2,000 feet along the bluff to better understand the current distribution of El Segundo blue butterfly's (*Euphilotes battoides allyni*; ESB) sole food plant (seacliff buckwheat [*Eriogonum parvifolium*]). All plants identified during the survey were keyed to species and are included in **Appendix D.**

A more cursory survey of this extended area was made at the same time to document the persistence of any native plant species, wildlife resources, Project Site connectivity, and to examine the northernmost and recently initiated bluff habitat restoration areas adjacent to the western terminus of Avenue G. The habitat and species assessment included a general pedestrian survey to document existing site conditions, map vegetation/habitat communities, identify botanical and wildlife species, including avian nests, and identify areas that could prove suitable for special-status species. All accessible open space areas were surveyed. The developed residential area east of the Esplanade was not surveyed. The Esplanade Bluff Garden at the northeastern corner of APN 7509-001-900 was surveyed for special-status species; however, the numerous California natives of horticultural and non-local origin found in that area were not included in the floral inventory.

4.1.3. FLORA AND FAUNA RESULTS

The current vegetation on the Project Site is dominated by a relatively homogenous cover of ice plant (*Carpobrotus edulis*), an invasive species in California native to South Africa. The vegetation community of the Project Site is best characterized as Ice Plant Mats (*Mesembryanthemum* spp. - *Carpobrotus* spp. Herbaceous Semi-Natural Alliance; CNPS 2024a). Ice plant is a ground-hugging succulent perennial that can form dense mats covering large areas. Broken segments with minimal soil contact can easily root and rapidly establish. Ice plant has been widely planted for soil stabilization and landscaping in California and is prevalent in coastal areas similar to its native range. The species has become problematic in immediate coastal natural areas in California, where it can, over time, overwhelm and extirpate native plant communities.

The site has a history of irrigation, demonstrated by an existing irrigation system observed during the site visit. Open areas were noted to be primarily composed of native soils. The immediate bluff top showed

some superficial fill extending approximately 1 foot from the adjacent pedestrian path. A few native plant species were observed to have persisted, including beach evening-primrose (*Camissoniopsis cheiranthifolia*), which was restricted to the narrow band of aeolian sand deposited at the foot of the bluff; alkali mallow (*Malvella leprosa*) found localized to two individuals at the top of the bluff; and cliff aster (*Malacothrix saxatilis*) present in a number of open areas at the top of the bluff. Plant and wildlife species identified during surveys at each site are included in Appendix D. A total of 23 plant species, including 19 non-native species, were identified within the Survey Area. A total of nine (9) vertebrates were either directly observed or detected through presence or sign during the site survey. These included seven (7) birds, 2 mammals and 1 reptile.

4.1.4. Special-Status Species and Critical Habitat

No special-status plant species were observed in the Survey Area during either of the two site visits. The Survey Area is not located within U.S. Fish and Wildlife Service (USFWS)-designated critical habitat for any species. The nearest terrestrial designated critical habitat unit is for western snowy plover (*Charadrius nivosus nivosus*) and is located 1.7 miles south of the Survey Area (**Figure 4**). The nearest marine designated critical habitat unit is for green sea turtle (*Chelonia mydas*) and is located immediately offshore of Redondo Beach to the west.

A number of special-status species are known from or expected in the area, and the Survey Area was outside of season for some species listed in Appendix C; however, the heavy coverage of Ice Plant Mats appears to have precluded the establishment and persistence of most native species.

Table 1. Special-Status Species Observed During Survey with Potential to Occur

Common Name	Scientific Name	Species Status	Potential to Occur
globose dune beetle	*Coelus globosus*	SSC	Present (putatively)
El Segundo blue butterfly	*Euphilotes battoides allyni*	FE	Occurs nearby
Trask shoulderband	*Helminthoglypta traskii traskii*	SSC	Present

Status Key:
FE = Federally listed as endangered
SSC = CDFW Species of Special Concern

4.1.4.1. Globose dune beetle (*Coelus globosus*)

All species of *Coelus* sp. are restricted to sand dunes or sandy substrates, are fossorial (adapted to digging and spend most of their lives underground) and flightless limiting their dispersal capability (Doyen 1976). All species are likely primarily detritovores feeding on decomposing vegetation buried in the sand. Females lay eggs in the sand, which develop into a fossorial larva which cooccurs with adult beetles. Adult beetles are typically found underground associated with spotty foredune or beach vegetation. Adults produce a very characteristic track when tunneling just below the surface. Globose dune beetle and ciliate dune beetle (*Coelus ciliates*) are known to occur in the greater Santa Monica Bay area. Ciliate dune beetle has a larger distribution than Globose dune beetle. Globose dune beetle appears to be more restricted to foredune and beach areas above the hightide line, and localized populations are known from Sonoma County south to the Ensenada area of Baja California (Doyen 1976). Globose dune beetle and ciliate dune beetle can co-occur and are superficially similar in appearance.

4.1.4.2. El Segundo Blue Butterfly (*Euphilotes Battoides Allyni*)

The El Segundo blue butterfly (*Euphilotes battoides allyni*; ESB) is absent from the Survey Area except

for possible wandering individuals. The closest potentially occupied habitat of ESB, based on the presence of the sole larval foodplant for the species, seacliff buckwheat, is approximately circa 1,400 feet (0.27 mile) south of the site on the contiguous bluff face between the Esplanade and the beach. The presence of seacliff buckwheat at this location is from ongoing habitat restoration activities for the species and the occurrence at this location was recently planted (2024). This area has only recently seen revegetation work and data on definitive occupancy is unknown to us, however if not already occupied, occupancy is just a matter of time if foodplant establishes. Older well-established restoration areas further south on the bluff have been occupied by ESB continuously for almost 20 years. Immediately south of that along the larger bluffs of Torrance Beach is the remnant population discussed in the recovery plan and the source population for colonization of the restoration areas to the north.

4.1.4.3. Trask Shoulderband (*Helminthoglypta traskii traskii*)

The genus *Helminthoglypta* is one of a number of genera of native air breathing land snails in the subfamily *Helminthoglyptinae* with numerous species in California with limited geographic ranges. Trask shoulderband is restricted to coastal Southern California and northwestern Baja California and is inactive most of the year in aestivation and active exclusively during the rainy season. Additionally, they are most active when the humidity is highest in the early evening, night, and early morning hours. Food items include plant detritus, fungi, and lichens. As conditions become drier, activity begins to decrease, and they seek out suitable places to aestivate. Trask shoulderband selects opportunistic locations for aestivation which can vary from native and non-native plants on lower protected outer branches of shrubs and at base of shrubs associated with accumulations of leaf litter and grass, dense clumps of native and non-native grass, ice plant mats, cactus (*Opuntia* spp.), protected crevices in rock formation, mammal burrows, and anthropogenic features and debris such as stockpiled materials (i.e., wood piles and rock or concrete rubble). Mapped locations of the species are presented in **Figure 5**.

4.1.4.4. Federally Listed Species Recovery Units

The proposed Project Site is within the Torrance recovery unit for the ESB (USFWS 1998, USFWS 2019). As discussed elsewhere, habitat restoration for the ESB has been intermittently conducted for over 20 years south of the Project Site and has expanded the size and geographic extent of the population in the Torrance recovery unit.

4.1.4.5. Wildlife Corridors

The ability for wildlife relatively freely among populations and habitat areas is important to long-term genetic variation and population demography. Fragmentation and isolation of natural habitat may cause loss of native species diversity in fragmented habitats. In the short term, wildlife movement may also be important to individual animals' ability to occupy their home ranges, if their ranges extend across a potential movement barrier. These considerations are especially important for rare, threatened, or endangered species, and large mammals with low population densities and individually large ranging.

The California Essential Habitat Connectivity Project was commissioned by the California Department of Transportation (Caltrans) and CDFW to create a statewide assessment of essential habitat connectivity to be used for conservation and infrastructure planning (Caltrans and CDFW 2010). One of its goals was to create the Essential Connectivity Map, which depicts large, relatively natural habitat blocks that support native biodiversity (natural landscape blocks) and areas essential for ecological connectivity between them

(essential connectivity areas). This map does not reflect the needs of a particular species but is based on overall biological connectivity and ecological integrity. A more detailed analysis is required to assess local and regional needs for connectivity and develop linkage designs based on the requirements of individual species (Caltrans and CDFW 2010). The Survey Area is not located within any identified Essential Habitat Connectivity Areas or Natural Landscape Blocks. The Survey Area provides localized movement along the bluff and if the habitat was restored properly would provide greater movement and occupancy opportunities for a number of species included the El Segundo Blue Butterfly.

4.1.4.6. Important Bird Areas

As part of a national and international effort, the National Audubon Society works to identify, monitor, and protect essential habitat for breeding, wintering, and migrating birds (NAS 2024). Audubon California has used the best science to identify and map the Important Bird Areas (IBA) within California. Part of an international effort, these sites were nominated by local experts and selected according to a number of criteria:

- support over 1 percent of the global or 10 percent of the state population of one or more sensitive species;
- support more than nine sensitive bird species;
- 10,000 or more observable shorebirds in one day; and/or
- 5,000 or more observable waterfowl in one day.

The Survey Area is not located within a designated IBA. The Palos Verdes IBA occurs immediately west of the site consisting of 522,699 acres of pelagic open water habitat from the Santa Monica Bay south to Orange County. This IBA was designated primarily for its importance to the Elegant Tern for foraging and supports the nesting colony at the IBA Pier 400 Tern Colony (formerly Terminal Island) in the City of San Pedro, approximately 11 miles south of the Project.

4.2. Waters and Wetlands Resources

4.2.1. Waters and Wetlands Desktop and Literature Review

A desktop review of existing waters and wetlands data was performed prior to the field survey and included examination of publicly available databases, and previous studies to determine the potential for presence of potentially jurisdictional wetlands or other water resources within 10 miles of the Project Site. Sources of background data include the National Hydrography Database and USFWS National Wetlands Inventory.

Potential wetlands and other waters were compared against visible signatures on aerial imagery and noted for further investigation during the field survey.

4.2.2. Waters and Wetlands Field Methodology

While conducting a floral and faunal assessment of the Project Site on August 14, 2024, and August 29, 2024, Senior Biologist Jeremiah George investigated the site for signs of wetlands or other water resources.

4.2.3. Waters and Wetlands Results

No ephemeral, intermittent, or perennial water resources were identified within the Survey Area. The nearest fresh water resources are Malaga Creek in the City of Palos Verdes Estates, 1.6 miles south of the Project, that discharges into the ocean at the base of Malaga cove and a wetland area found 1.3 miles north of the Project at the closed AES Power Plant approximately (California Coastal Commission Staff Report

2015). The nearest salt water resource is the Pacific Ocean, stretch west, adjacent to Redondo Beach.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The proposed Project Site and Survey Area has been heavily impacted by the presence of human activity and ice plant proliferation, both of which have significantly reduced the diversity and volume of sensitive biological resources on-site. However, the persistence of Trask Shoulderband and possibly the Globose Dune Beetle at the site indicate potential for habitat restoration efforts to support the reintroduction and support for native species and habitats.

5.2. Recommendations

The following best management practices are recommended for implementation during project construction to reduce generalized impacts to biological resources from soil erosion, runoff, non-native predators, and trash:

- **Sediment Control**. Require contractor to implement sediment controls to protect the site perimeter and prevent off-site sediment transport, including measures such as silt fencing, fiber rolls, gravel bags, temporary sediment basins, street sweeping, stabilized construction access points and sediment stockpiles, and use of properly fitted covers for sediment transport vehicles until the site has been stabilized.
- **Construction Hours.** Construction activities will be limited to daylight hours. If nighttime construction is necessary, all project lighting (e.g., staging areas, equipment storage sites, roadway, construction footprint) will be selectively placed and directed onto the roadway or construction site and away from sensitive habitats. Light glare shields will be used to reduce the extent of illumination into sensitive habitats. If the work area is located near surface waters, the lighting will be shielded such that it does not shine directly into the water.
- **Prevent Spread of Invasive Species**. The spread or introduction of non-native, invasive plant and animal species by arriving vehicles, equipment, imported gravel, and other materials, will be avoided. When practicable, non-native invasive plants within the Project Site will be removed and properly disposed of in a manner that will not promote their spread. Equipment will be cleaned of any sediment or vegetation at designated wash stations before entering or leaving the Project Site to avoid spreading pathogens or non-native invasive species. Isolated infestations of non-native invasive species identified in the Project Site will be treated with weed management methods at an appropriate time to prevent further formation of seed and destroy viable plant parts and seed. Wash sites must be in confined areas that limit run-off to any surrounding habitat and on a flat grade. Upland areas will use rice straw or invasive species-free local slash/mulch for erosion control, while the remainder of the Project Site will use certified, weed-free erosion control materials. Mulch must be certified weed-free.
- **Equipment Maintenance and Materials Storage.** Vehicle traffic will be confined to existing roads and the proposed access route(s). All machinery must be in good working condition, showing no signs of fuel or oil leaks. Oil, grease, or other fluids will be washed off at designated wash stations, prior to entering the construction site. Inspect and evaluate daily during construction for the potential of fluid leakage. No equipment refueling or fuel storage will take place within 100 feet of a body of water. All fuel and chemical storage, servicing, and refueling will be done in an upland staging area or other suitable location (e.g., barges) with secondary containment to prevent

spills from traveling to surface water or drains. Staging areas will be established for equipment storage and maintenance, construction materials, fuels, lubricants, solvents, and other possible contaminants in coordination with resource agencies. Staging areas will have a stabilized entrance and exit and will be located at least 100 feet from bodies of water unless site-specific circumstances do not provide such a setback, in which case the maximum setback possible will be used. Fluids will be stored in appropriate containers with covers and properly recycled or disposed of off-site. Machinery stored on site will have pans or absorbent mats placed underneath potential leak areas.

- **Material Disposal.** All refuse, debris, unused materials, and supplies that cannot reasonably be secured will be removed daily from the project work area and deposited at an appropriate disposal or storage site. All construction debris will be removed from the work area immediately upon project completion.
- **Trash Removed Daily.** During project activities all trash, especially food-related refuse that may attract potential predators or scavengers, will be properly contained within sealed containers, removed from the work site, and disposed of daily.
- **Project Cleanup after Completion.** Work pads, temporary false work, and other construction items will be removed from the 100-year floodplain by the end of the construction window. Removal of materials must not result in discharge to waterbodies.
- **Revegetate Disturbed Areas**. All temporarily disturbed areas will be de-compacted and seeded/planted with an appropriate assemblage of native plant species suitable for the area, and a revegetation plan will be developed. Plants for revegetation will come primarily from active seeding and planting, or natural recruitment where applicable. Plants imported to the restoration areas will come from local stock. Certified weed-free native mixes and mulch will be used for any restoration planting or seeding. Revegetation activities within and adjacent to waterbodies and other aquatic habitat suitable for Covered Species will commence after construction activities at a site are complete.

The following species-specific mitigation recommendations should be implemented to reduce Project impacts to less-than-significant.

5.2.1. SUITABLE EL SEGUNDO BLUE BUTTERFLY HABITAT

The Project Site is within the range of the El Segundo blue butterfly, and the City of Redondo Beach committed in their proposed changes to the existing LCP to enhance habitat for the species along the coastal bluffs. Post-construction restoration should incorporate plantings of seacliff buckwheat. Post construction restoration should be conducted and only utilize plant species indicated as appropriate for the site, as outlined in the Beach Bluffs Restoration Project Master Plan (Longcore ed. 2005).

5.2.2. TRASK SHOULDERBAND

The presence of habitat similar to areas where Trask shoulderband was found extend for some distance south outside of the Project Site. The species is likely present intermittently throughout the entire Project Site and in adjacent bluff to the south. Any impacts to the population on the Project Site could be mitigated by improving post-construction habitat conditions and allowing natural recolonization. As part of post construction habitat restoration species such as coast prickly pear (*Opuntia littoralis*) and chaparral prickly pear (*Opuntia oricola*) should be prioritized in a planting plan as they are known to be frequently utilized

for shelter by Trask shoulderband and are locally occurring in the area.

5.2.3. ESHA BLUFF HABITAT

Bluff habitat at the site meets the definition of an environmentally sensitive habitat area (ESHA) presented in the LCP. Section 30240 of the Coastal Act specifies that ESHAs "shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas." In order to prevent impacts that would significantly degrade coastal bluff ESHA, restoration of the bluff habitat following Project construction should follow guidelines and restoration plans should be developed in coordination with the City of Redondo Beach and the California Coastal Commission.

DBH presented a conceptual Master Plan for improvements to accessways along the Redondo Beach bluff to both City of Redondo and Coastal Commission staff in November 2024. The Plan included elements of the proposed Project such as ramp removal and natural habitat restoration. The proposed Project is the only large accessibility project included in the Master Plan, and no issues were raised with the Master Plan. The Coastal Commission acknowledged that the square footage of existing habitat will have to decrease in order to pave the minimum amount of ramp necessary for ADA access at Avenue A.

Looking ahead, DBH will provide the City of Redondo Beach and the Coastal Commission with general estimates of natural habitat increases that could be gained from naturalizing other ramps, to offset habitat losses associated with the proposed Project. Per Coastal Commission direction, DBH will also remove deerweed and thread-leaved daisy from the plant palette and replace them with El Segundo blue butterfly host plant species (seacliff buckwheat and *Dudleya* sp.).

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Appendix A:

PROJECT PLANS

(See Plans included in IS/MND)

Appendix B:

SITE PHOTOGRAPHS

Photo 1: View from west side (beach) of proposed Project Site looking northeast.

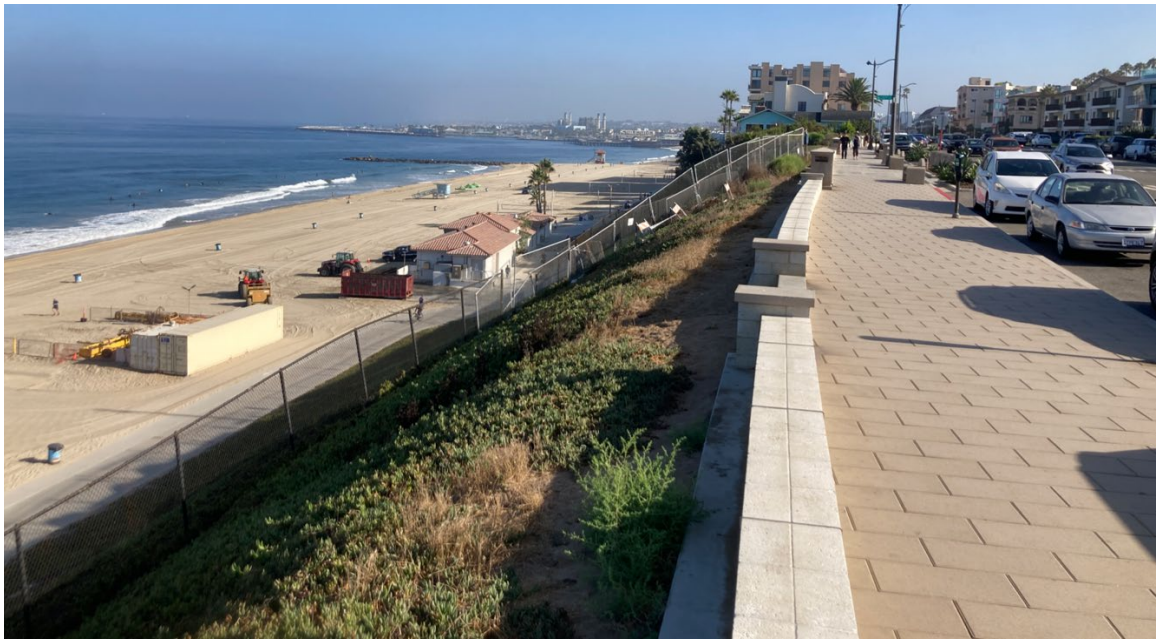

Photo 2: View from east (central) side of proposed Project Site looking northwest.

Photo 3: View from northeast side of proposed Project Site looking south.

Photo 4: View looking south of northern edge of proposed Project Site.

Photo 5: View from north side (mid-slope) looking south of proposed Project Site.

Photo 6: View of partial retaining wall collapse of existing inoperable beach access ramp.

Photo 7: Existing Redondo Beach Ave A Ramp

Photo 8: Beach Educational Placard

Photo 9: One of four deceased individuals of Trask shoulderband (*Helminthoglypta traskii traskii*) observed within Project Site.

Photo 10: Second of four deceased individuals of Trask shoulderband (*Helminthoglypta traskii traskii*) observed within Project Site.

Photo 11: View of base of bluff showing blow sand accumulation. Note: red circle shows location of Photo 12.

Photo 12: View of distinct foraging tracks of *Coelus* species.

Photo 13: Two individuals of *C. globosus* encountered.

APPENDIX C:
SPECIAL-STATUS BIOLOGICAL RESOURCES WITH POTENTIAL TO OCCUR IN THE PROJECT VICINITY

Species Name	Status[1]			Distribution, Habitat, and Occurrence Potential[2]	Activity / Bloom Period
	USFWS	CDFW	CNPS		
PLANTS					
Abronia maritima sticky sand verbena	-	S2	4.2	A perennial herb found on coastal foredunes and beaches. 0–25 meters. **Absent.** Species not recorded in area in the CNDDB or CCH2 recently. A number of individuals are documented in iNaturalist, 860 feet from the Project's southern perimeter. This occurrence was confirmed as present during July's site visit (adjacent to public restroom at the foot of the Avenue C beach access ramp). Species is easily observed throughout the year and was not observed within the survey area.	Feb–Jun (Flowering)
Aphanisma blitoides aphanisma	-	S2	1B.2	An annual herb found on sandy or gravelly soil in coastal bluff scrub, coastal dunes, and coastal scrub. 0–300 meters. **Absent.** Record in CNDDB and CCH2 from bluff and rocky area immediately abutting the coast. Dense cover of ice plant (*Carpobrotus edulis*) over most of the Project Site limits potential occupancy. Species is readily apparent during the summer months and was not observed during July's visit.	Feb–Jun
Atriplex coulteri Coulter's saltbush	-	S2	1B.2	A perennial herb found on alkaline or clay soil in coastal bluff scrub, coastal dunes, coastal scrub, and valley and foothill grassland. 0–460 meters. **Absent.** Recent records exist south of the Project Site in the Malaga cove area (CCH2). Species is readily apparent during the summer months. Species was not observed during July's field visit.	Mar–Oct
A. pacifica south coast saltscale	-	S2	1B.2	An annual herb found in coastal bluff scrub, coastal dunes, coastal scrub, and playas. 0–140 meters. **Absent.** Recorded in CCH2 (2017) 2 miles south of the Project Site in the Malaga cove area of Palos Verdes Estates. Species documented at numerous locations in bluff habitat on the Palos Verdes Peninsula by PVPLC and others (pers comm Neil Uelman, South Coast Chapter of CNPS Conservation Chair). As for all Atriplex species discussed, this species is readily apparent during the summer months and not easily overlooked. Species was not observed during July's field visit.	Mar–Oct

A. serenana var. *davidsonii* Davidson's saltscale	-	S1	1B.2	An annual herb found on alkaline soil in coastal scrub communities, grasslands, and alkali playas. 0 – 200 meters. **Absent.** Species most recently recorded in 2020 (CCH2) 2.5 miles south at toe of coastal bluffs Rancho Palos Verdes. Other populations exist on the Palos Verdes Peninsula but data not publicly available (pers comm Neil Uelman, South Coast Chapter of CNPS Conservation Chair, J. George pers obs.). As for all Atriplex species discussed, this one is also readily apparent during the summer months and not easily overlooked. Species was not observed during July's field visit.	Apr–Oct
Calochortus catalinae Catalina mariposa lily	-	S4	4.2	A perennial bulbiferous herb found in chaparral, cismontane woodland, coastal scrub, and valley and foothill grassland. 15–700 meters. **Absent.** Soils questionable for species occupancy, usually found in clay or other heavy soils. Species occurs at numerous locations on the Palos Verdes Peninsula (CCH2). Closest records are from the Bluff cove area of Palos Verdes Estates 2.7 miles south of Project Site, documented in 2022. July's site visit was late in the season to survey for this species; however, no senescent plants were observed.	Mar–Jun
Camissoniopsis lewisii Lewis' evening-primrose	-	S4	3	An annual herb found in open sandy and clayey grasslands, coastal dunes, and beaches. 0–300 meters. **Absent.** Soils suitable, dense cover of *Carpobrotus edulis* over most of the Project Site limits potential occupancy. Species recorded in CNDDB and CCH2 in region. Closest record is from CCH2, 1.75 miles south of the Project Site at "Malaga cove dune" documented in 2002. None were observed, however this species is usually desiccated and easily missed by July.	March–May
Centromadia parryi ssp. *australis* southern tarplant	-	S2	1B.1	An annual herb found in marshes and swamps, valley and foothill grassland, and vernal pool habitat. 0–480 meters. **Does not occur.** No suitable mesic soils were found on-site. Species recorded in CNDDB and CCH2 in region. Closest records are inland from the Project Site 2.6 mi at the Madrona marsh preserve in the City of Torrance where the species is still extant. Species readily apparent during the summer months, none were observed onsite. Appropriate habitat for this species does not occur on or nearby to the Project Site.	May–Nov
Chaenactis glabriuscula var. *orcuttiana* Orcutt's pincushion	-	S1	1B.1	An annual herb found in coastal dunes and bluffs. 0–100 meters. **Absent.** Very limited habitat available onsite due to dense cover of ice plant (*Carpobrotus edulis*). Species recorded in CNDDB and CCH2 in region. Closest recent record is from a small back-dune habitat fragment 4.5 miles north in the city of Manhattan Beach, documented in 2009.	April–July

Dudleya virens ssp. *insularis* bright green dudleya	-	S3	1B.2	A perennial succulent found on coastal bluffs and cliffs. 0–200 meters. **Absent.** Very limited habitat onsite due to dense cover of *Carpobrotus edulis*. Species is present south of the Project Site 0.9 miles in areas of bluff with remnant native vegetation and that has also been subject to habitat restoration work (personal observation J. N. George). Species is observably throughout the year; none were observed during July's field survey.	April – June
Erysimum suffrutescens suffrutescent wallflower	-	S3	4.2	A perennial herb found in coastal dunes and sandy coastal scrub vegetation. 0–150 meters. **Absent.** Very limited habitat onsite due to dense cover of ice plant (*Carpobrotus edulis*). Species recorded in CNDDB and CCH2 in region. Closest record is 2 miles south at "Malaga cove dune" documented in 2002. Species is observably throughout the year; however, none were observed during July's field survey.	Dec–Aug
Horkelia cuneata var. *puberula* mesa horkelia	-	S1	1B.1	A perennial herb found in old dunes, coastal sandhills, or sandy or gravelly openings in maritime chaparral, or coastal scrub. Sea level – 200 meters. **Absent.** Very limited habitat onsite due to dense cover of *Carpobrotus edulis*. Species recorded in CNDDB and CCH2 in region. Closest record is 2 miles south at "Malaga dune" documented in 2000. Species is observably throughout the year; none were observed during Julys' field survey.	Feb–July
INVERTEBRATES					
Brennania belkini Belkin's dune tabanid fly	-	S1S2	–	Endemic to coastal dunes and other coastal sandy habitats. Documented from Ventura and Los Angeles Counties and northern Baja California. Life history unknown but related species in the genus oviposit in sandy soils in coastal dunes. Where its larval stages are likely predatory or detritivores. **Limited Potential.** This species is poorly known and easily missed out of limited flight season even by specialists. Closest documented occurrences at the LAX Dunes Preserve and Ballona Wetlands Preserve approximately 8 miles north of the Project Site.	April –June
Bombus crotchii Crotch's bumble bee	-	S2 Candidate Endangered	-	Found in grassland and scrubland habitats primarily within the Mediterranean and desert transition habitats within California, requires nesting sites and adequate nectar sources. **Moderate Potential.** Limited habitat onsite for foraging due to the dense cover of *Carpobrotus edulis*. A number of Gopher and California ground squirrel burrows were observed onsite which could provide nesting sites. Documented in April 2024 by a reliable record (photo documentation) in iNaturalist.org. In bluff habitat restoration areas adjacent to Miramar Park 0.8 miles south of the Project Site.	April–Aug (Colony Active Period)

Coelus globosus globose dune beetle	-	S1S2	-	Found in foredunes, sandy hummocks, and less commonly back dunes immediately bordering the coast. Two species of *Coelus* occur in the Santa Monica bay. The more common *Coelus ciliates* is found relatively easily but limited to remaining small patches of beach above hightide line (supralittoral) and foredune, that are not subject to extensive beach grooming. *Coelus globosus* is also encountered in these habitats but is much rarer. Distinct signs of *Coelus* species presence were encountered and the Project Site were superficially sifted to find adults for identification. None were found however deeper excavation would likely encounter adults which dig sometime very deep during the day over the hot and dry summer months. Activity signs were restricted to a narrow 2–5-foot band of blow sand at the toe of the bluff abutting the bike path (See Appendix B Photo 12. **Present.** It remains unknown which *Coelus* species are present. Mixed populations of *C. globosus* and *C. ciliates* are known.	Year Round
Cicindela hirticollis gravida sandy beach tiger beetle	-	S2	-	Found in moist sand near the ocean, for example in swales behind dunes or upper beaches beyond normal high tides. Due to long-term human modification of the area these habitat conditions are absent. Appropriate habitat for this species does not occur on or adjacent to the Project Site. **Does Not Occur.** Does not occur based on absence of appropriate habitat.	June–July (Adult Flight Period)
Euphilotes battoides allyni El Segundo blue butterfly	Endangered	S1	-	Restricted to the greater "El Segundo" sand dunes system which prior to urbanization stretched from Marina del Rey to the Malaga cove area of Palos Verdes Estates. The species also has a narrow extension along the coastal bluff faces of the Palos Verdes Peninsula where Seacliff buckwheat occurs. Sedentary species closely associated with its sole larval host plant and primary adult nectar source seacliff buckwheat (*Eriogonum parvifolium*). **Moderate Potential.** No host plant occurs within the Project Site boundaries or within a 500-foot buffer. Nearest host plant occurs approximately 900 feet south in an area undergoing habitat restoration. However, wandering individuals may pass through the site	June–Sept (Adult Flight Period)
Glaucopsyche lygdamus palosverdesensis Palos Verdes blue butterfly	Endangered	S1	-	Restricted to the Palos Verdes Peninsula and surrounding areas immediately abutting the peninsula. Occurs in open coastal scrub communities, rocky open areas, and grassland sites. The common feature of occupied sites is a disturbance regime or soil conditions which allow persistent open areas which appear essential to maintain adequate size populations of its two larval foodplants, common deerweed (*Acmispon glaber* syn. *Lotus scoparius*), and Santa Barbara milkvetch (*Astragalus trichopodus* var. *lonchus*). **Does Not Occur.** Neither species of foodplant occur onsite or within the survey area. The closest patch of a foodplant species (common deerweed) occur approximately 0.75 mile south along the coastal bluff. The closest documented observation of the species is 1.85 miles south in the Malaga cove area of Palos Verdes Estates.	Feb–April (Adult Flight Period)

Helminthoglypta traskii traskii Trask shoulderband	-	S2	-	Found in numerous habitats including coastal dunes, coastal scrub, chaparral, and at times open habitats (i.e. grasslands) if rocky or other cover is available, as well as rarely in suburban areas. Documented recently at numerous locations nearby by citizen science surveys managed by the Los Angeles County Natural History Museum department of Malacology (https://www.inaturalist.org/projects/slime). **Present.** A number of recently deceased shells of this species were documented on the Project Site. See Appendix B Photos 9–10.	Dec–March (Active During Moist & Cool Conditions)
Rhaphiomidas terminatus terminatus El Segundo flower-loving fly	-	S1	-	Found in the greater El Segundo sand dunes system with a single historic record inland from the sandy flood plain associated with the Los Angeles River (George and Mattoni 2006). A sand obligate (endemic) species based on its life history. Assumed extinct for decades but rediscovered in 2001. The only currently known extant population occurs at the Malaga Dunes in the City of Palos Verdes Estates, 1.75 miles south of the Project Site. **Does Not Occur.** The Project Site currently doesn't support sufficient loose aeolian sand to be considered likely habitat.	June–Sept (Adult Flight Period)
AMPHIBIANS					
Spea hammondii western spadefoot toad	Candidate Threatened	S1	-	Associated with temporary rain pools (i.e. vernal pools), ephemeral ponding sites and nonflowing drainages. Adults are inactive and estivate in underground burrows during the dry season. When rainy season starts they emerge from their burrows to forage and breed in ephemeral pools following seasonal rains in winter and spring. **Does Not Occur.** Appropriate habitat does not occur onsite.	Year Round
REPTILES					
Anniella stebbinsi Southern California legless lizard	-	S3	-	Found in a broad range of habitats found in coastal dunes and a variety of inland habitats characterized by the presence of sandy substates and/or the presence of heavy leaf litter. This species has persisted locally outside of "natural areas" including records from suburban gardens which provide the necessary habitat requirements (inaturalist.org, pers obs. J.N. George). **Moderate Potential.** Appropriate habitat is present. Recent nearby records exist in CNDDB and inaturalist.org 0.4 miles north and 0.8 miles south of the Project Site. Both records are from the coastal bluff and habitat is contiguous with the Project Site.	Year Round
BIRDS					

Campylorhynchus brunneicapillus sandiegensis San Diego cactus wren	-	S2	-	Found in native scrub communities with dominant or large stands of opuntia species and cholla (*Cylindropuntia* sp.). **Does Not Occur.** Locally this species occurs on the Palos Verdes Peninsula. Appropriate habitat for this species does not occur on or adjacent to the Project Site. Nearest CNDDB and eBird records documented from the Bluff Cove area of Palos Verdes Estates approximately 2.6 miles south of the Project Site.	Year Round
Charadrius nivosus nivosus western snowy plover	Threatened	S3	-	Found along sandy open sandy beaches, foredunes, and sand spits adjacent to the ocean. **Moderate Potential.** This species is well documented foraging, roosting, and wintering on the sandy beaches in the greater Santa Monica Bay Area. CNDDB and ebird records list a number of recent observations within 1 mile. The beach in the Project area is narrow, approximately 170 ft at maximum relative to beaches north of the Redondo Beach Harbor in south Hermosa Beach at designated critical habitat (Unit 45D Hermosa State Beach). Potential nesting habitat does not exist on the Project site or nearby based on levels of beach utilization by the general public, routine beach grooming, and the narrowness of the beach in the area.	Year Round (prevalent as wintering birds)
Polioptila californica californica coastal California gnatcatcher	Threatened	S2	-	Found typically in or near coastal scrub, a habitat characterized by relatively low growing and dry-season deciduous plants. Characteristic plants of these communities include California sagebrush, California buckwheat, assorted native salvia species, laurel sumac, and lemonade berry. Locally the species has also been documented nesting in back-dune habitat at LAX dunes preserve. **Does Not Occur.** Appropriate habitat for this species does not occur on or adjacent to the Project Site. Nearest CNDDB and ebird records of non-dispersing individuals are approximately 1.6 miles south of the Project Site in the Bluff cover area of Palos Verdes Estates.	Year Round
Athene cunicularia burrowing owl	-	S2	-	Suitable habitat consists of burrows for roosting and nesting and relatively short vegetation with only sparse shrubs and minimal taller vegetation. In California primarily associated with California ground squirrels' burrows. **Does Not Occur.** No sign of historic or recent occupancy was observed during the survey (whitewash, prey items, pellets, feathers, or nest ornamentation) at any of the burrows observed. Recent records of individual birds moving through or partially wintering in the area are documented in CNDDB and ebird.org but all over 3 miles from the Site. The site is narrow and has heavy pedestrian traffic on the eastern and western periphery.	Year Round

Falco peregrinus peregrine falcon		S3S4		Preferred habitat consists of open landscapes, including urban areas. **Does Not Occur.** Nesting habitat does not occur on the Project Site. Documented in the immediate area, closest recent nesting records from the southside of the Palos Verdes Peninsula in the City of San Pedro.	Year Round

Appendix D:

FLORAL AND FAUNAL COMPENDIA

FLORA

SCIENTIFIC NAME (*introduced/nonnative species)	COMMON NAME
AIZOACEA	
**Carpobrotus edulis*	*Ice Plant
ASTERACEAE – SUNFLOWER FAMILY	
Erigeron canadensis	Canada Horseweed
Malacothrix saxatilis	Cliff Aster
**Sonchus asper*	*Spiny Sowthistle
BRASSICACEAE – MUSTARD FAMILY	
**Raphanus sativus*	*Jointed Charlock
**Cakile maritima*	*Sea Rocket
CARYOPHYLLACEAE – CARNATION FAMILY	
**Silene gallica*	*Common Catchfly
CHENOPODIACEAE – GOOSEFOOT FAMILY	
**Atriplex semibaccata*	*Australian Saltbush
**Chenopodium murale*	*Nettle Leaf Goosefoot
**Salsola australis*	*Russian Thistle
EUPHORBIACEAE – SPURGE FAMILY	
**Euphorbia peplus*	*Petty Spurge
FABACEAE (LEGUMINOSAE) – PEA FAMILY	
Lupinus succulentus	Arroyo Lupine
**Medicago polymorpha*	*California Burclover
**Melilitus indicus*	*Annual Yellow Sweet Clover
GERANIACEAE – GERANIUM FAMILY	
**Erodium botrys*	*Big Heron Bill
**Erodium cicutarium*	*Coastal Heron's Bill
MALVACEA	
**Mollugo verticillata*	*Indian Chickweed
**Malvan nicaeensis*	*Bull Mallow
Malvela leprosa	Alkali Mallow
ONAGRACEAE – EVENING PRIMROSES	
Camissoniopsis cheiranthifolia	Beach Evening-Primrose
POACEAE (GRAMINEAE) – GRASS FAMILY	
**Avena barbata*	*Slim Oat
**Avena fatua*	*Wildoats
**Bromus diandrus*	*Ripgut Brome

INVERTEBRATES

SCIENTIFIC NAME (*introduced/nonnative species)	COMMON NAME
GASTROPODA – SNAILS & SLUGS	
Helminthoglypta traskii	Trask Shoulderband
**Otala lacteal*	*Milk Snail

HEXAPODA	
COLEOPTERA – BEETLES	
TENEBRIONIDAE – DARKLING BEETLES	Dune Beetle
Coelus sp.	
STURNIDAE – STARLINGS AND MYNAS	
**Sturnus vulgaris*	*European Starling

REPTILES	
SCIENTIFIC NAME	**COMMON NAME**
SQUAMATA – LIZARDS AND SNAKES	
Uta stansburiana	Side-Blotched Lizard

BIRDS	
SCIENTIFIC NAME (*introduced/nonnative species)	**COMMON NAME**
ARDEIDAE – HERONS	
Ardea alba	Great Egret
COLUMBIDAE – DOVES AND PIGEONS	
Zenaida macroura	Mourning Dove
TYRANIDAE – TYRANT FLYCATCHERS	
Sayornis nigricans	Black Phoebe
LARIDAE – GULLS AND TERNS	
Larus occidentalis	Western Gull
Thalasseus maximus	Royal Tern
PELECANIDAE – PELICANS	
Pelecanus occidentalis	Brown Pelican
STURNIDAE – STARLINGS AND MYNAS	
**Sturnus vulgaris*	*European Starling

MAMMALS	
SCIENTIFIC NAME	**COMMON NAME**
RODENTIA – RODENTS	
Otospermophilus beecheyi	California Ground Squirrel
Thomomys bottae	Botta's Pocket Gopher

Appendix D
Beach Bluffs Restoration Project Master Plan

Beach Bluffs Restoration Project
Master Plan

April 2005

Beach Bluffs Restoration Project Steering Committee
Ann Dalkey and Travis Longcore, Co-Chairs

Editor's Note

This document includes text prepared by several authors. Julie Stephenson and Dr. Antony Orme completed research and text on geomorphology (Appendix A). Dr. Ronald Davidson researched and reported South Bay history (Appendix B). Sarah Casia and Leann Ortmann completed biological fieldwork, supervised by Dr. Rudi Mattoni. All photographs © Travis Longcore. GreenInfo Network prepared maps under the direction of Aubrey Dugger (http://www.greeninfo.org).

You may download a copy of this plan from:
http://www.urbanwildlands.org/bbrp.html

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Table of Contents

Executive Summary iii
Introduction 5
Goals 6
Study Area 7
Historical Background 9
  Geomorphology of Dunes and Bluffs 10
  Biota of Dunes and Bluffs 10
Current Conditions 12
  Public Infrastructure 13
  Ownership and Other Relevant Plans 13
  Geomorphology 16
  Biological Resources 24
Habitat Restoration Plan 26
  Prioritization of Sites 26
  Top Priority Restoration Sites (19.54 acres) 27
  Second Priority Restoration Sites (16.5 acres) 28
  Third Priority Restoration Sites (2.36 acres) 28
  Restoration Methodology 29
  Plant Propagation 29
  Irrigation 29
  Planting Scheme 30
  Maintenance 32
Infrastructure Improvements 32
  Runoff and Erosion Control 32
  Stormwater Improvement 33
  Traffic Improvements 33
  Design Considerations 33
Education Plan 34
  Interpretive Self-Guided Tour 34
  Volunteer Program 35
  School Program 36
Financial Estimates 36
  Restoration 36
  Education Program 37
References 37
Appendix A: Coastal Dune Morphology and Erosion Assessment 38
  Local Scientific Background 39
  Nature of Dune Bluffs and Dunefields Seaward of Developed Areas 40
  Management Problems and Causes 41
  Management Solutions 43
  Conclusion 44
  References 45

Dune Morphology and Erosion Assessment by Aerial Photograph Polygon Number 45
Appendix B: History of the South Bay Cities 59
The Pre-History of the South Bay Communities 59
European History 60
United States History 60
References 66
Appendix C: Selected Native Plants of the Beach Bluffs 68

Executive Summary

The Beach Bluffs Restoration Project is a resident-initiated effort to restore the natural diversity of the remnant dunes and bluffs along the Santa Monica Bay between Ballona Creek and the Palos Verdes Peninsula. This Master Plan prioritizes the sites that could be restored and describes actions for education and community involvement. The plan includes an assessment of the erosion risk for the bluffs and proposes remediative measures to protect the natural landforms.

Most residents and visitors know the beach bluffs as iceplant (scientific name *Carpobrotus edulis*) covered slopes between the beach and the first road, path, or parking lot. Iceplant was used historically to reduce the amount of drifting sand. While it works for this purpose, it does not work to reduce erosion on steeper slopes, such as those of the beach bluffs. Native plants, with their deep root systems, are actually much more effective at stabilizing the bluffs. Furthermore, iceplant is an invasive species from South Africa, which harms the ecosystem by crowding out native plants. These native plants once supported the endangered El Segundo blue butterfly throughout this area, but the presence of iceplant prohibits this species from returning. If the restoration is implemented as envisioned, beach visitors would observe many more butterflies, birds, and wildflowers on the bluffs.

The Master Plan therefore has the following goals: increase the ecological value of the beach bluffs by restoring the native vegetation, increase recreational value by providing stewardship opportunities for restored bluffs, and provide a public education program about the beach bluffs and their coastal environment.

The study area was surveyed for biological resources and geomorphology. These surveys showed that native plant cover was very low throughout the area, with only disturbance tolerant species remaining. Erosion threats varied throughout the study area, with physical disturbance of cut-through traffic predominating in the southern regions, and run-off from roads contributing most in the northern area.

The native vegetation of the dunes and bluffs prior to human disturbance would have been strand, southern California dune scrub, and southern California bluff scrub. The geographic extent of all of these vegetation types has been drastically reduced by urbanization and all three vegetation types are of high conservation value. In addition, several rare native plants, and the endangered El Segundo blue butterfly, would have been found in the study area.

Part of the educational opportunity of the Beach Bluffs Restoration Project is to share the rich history of the South Bay cities. This history is described in the Master Plan, ranging from Native American villages through the resort and tourist industry to modern residential and recreational centers.

Sites for potential restoration were identified by balancing ecological, educational, and recreational priorities. As a first premise, no sites were identified for restoration that would reduce public access to the beach, or that would impede the operation of the beach in any manner.

Top priority restoration sites included 19.54 acres, of which approximately 4 acres are already being revegetated with native plants. These were spread among Redondo Beach/Torrance, Manhattan Beach, and El Segundo/City of Los Angeles. Second priority sites included 16.5 acres, while third priority sites included 2.36 acres. A planting and maintenance scheme is provided, based on the pilot project now under way in Redondo Beach.

The Master Plan presents an educational program that would include a self-guided interpretive tour composed of high-quality signs along the length of the project area, a public volunteer and stewardship program, and a K–14 education program for school classes visiting the beach.

The estimated cost of the Master Plan for revegetation, maintenance, and the education program is $735,000 plus $57,500 per year. This estimate does not include engineering and construction costs for solving erosion issues in more difficult locations (e.g., along Dockweiler Beach), or any other physical infrastructure outside of plants and irrigation.

Beach Bluffs Restoration Project
Master Plan

Introduction

In summer 2001, a group of local residents, environmental groups, and local, state and federal agencies convened in Redondo Beach to discuss the prospect of restoring native vegetation to the bluffs along the Santa Monica Bay. This group, established by Redondo Beach resident Ann Dalkey and Dr. Travis Longcore of The Urban Wildlands Group, with the strong support of the Los Angeles County Department of Beaches and Harbors and the City of Redondo Beach, agreed upon a vision to remove exotic iceplant (*Carpobrotus edulis*) from the bluffs along the beach, restore native dune and bluff scrub vegetation, and more generally improve the physical infrastructure of the coastline. Since then, the group has operated as a steering committee for an effort to implement this vision.

The group participated in the development of a proposal to secure California state bond funds (Proposition 12) through the Santa Monica Bay Restoration Project and the California Coastal Conservancy. The Los Angeles Conservation Corps' SEA Laboratory served as the applicant for a pilot project, the purpose of which was to show what a native restoration of this habitat would look like, and to develop the infrastructure to implement such a project. The second component of the project was the development of this Master Plan to guide future work, which was also supported in part by a grant from the City of Redondo Beach.

This Master Plan presents a vision for the restoration of dune and bluff scrub along the southern portion of the Santa Monica Bay, from Ballona Creek to the Palos Verdes Peninsula, and between the ocean and the first road or structure. This linear study area ranges along a bike path through the cities of Los Angeles, El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach, and Torrance. The Master Plan identifies the locations that could be restored, the techniques for restoration, educational opportunities, potential associated infrastructure improvements, and approximate unit costs for suggested activities.

The plan begins with a description of the study area. It reviews the geological history of the landforms present, and describes the natural communities that once were found in the study area. The plan also presents a review of the human history of the study area, from Native villages through the modern beach cities so that the social history can be incorporated into educational interpretation of the beach bluffs environment.

The Master Plan describes the conditions currently found within the study area, based on surveys conducted for this project. The description identifies the meager biological resources remaining in the study area, a geomorphological assessment of erosion hazards, physical infrastructure, and other physical parameters. This description is followed by a prioritizing of potential restoration sites based on ease, access, existing conditions, and biological reserve design principles. We then describe restoration techniques, including detailed plant species lists and specifications for plant installation and maintenance.

The next section outlines considerations for improvements to the infrastructure that surrounds the potentially restorable bluff sites, reviewing issues of compatibility between intensive visitor use and maintenance of native vegetation. Options for fencing and other improvements are included.

The outlines of an educational signage program are included to guide the installation of interpretive materials that link the entire study area with signage of a common design. This educational program includes recommendations for interpretation of the biological, geomorphological, and historical aspects of the study area.

Finally, estimates of cost for the various project components are presented, based on experience with the pilot project completed in Redondo Beach.

Goals

The Beach Bluffs Restoration Project Master Plan implements the goals of the steering committee to enhance the natural ecology through restoration, to improve recreational opportunities, to promote aesthetic improvements, and to educate the public about the bluffs, their history, and their ecology.

Specifically for habitat restoration, the objective of the Master Plan is to increase the ecological values of the bluffs and dunes, such that the restored areas 1) contribute to the recovery of the El Segundo blue butterfly, 2) provide habitat for unique and rare plants of the El Segundo dunes, 3) increase biological connectivity between remnant populations of dune species, and 4) support more diverse bird, reptile, and arthropod communities.

The goal of increased recreational opportunities will be achieved through beautification of the bluffs through revegetation with native plants, providing synergistic opportunities for local jurisdictions to improve hardscape infrastructure, providing opportunities for volunteer stewardship, and creating a visual interest along the beach bluffs.

Education of the public will be achieved through an interpretive signage system that reaches from Ballona Creek to the Palos Verdes Peninsula, developing a volunteer

What's so bad about iceplant?

Iceplant was originally planted to reduce blowing sand, and people assumed that it was good at reducing erosion. But it turns out that on steep slopes its shallow roots and heavy leaves actually encourage erosion. The deep roots of native plants are much more effective at reducing erosion on slopes. Iceplant is also an "invasive species," meaning that it replaces native plants by crowding them out. Iceplant has displaced the El Segundo blue butterfly by displacing the plant upon which the butterfly lays its eggs. In South Africa, where iceplant is native, many insects and animals eat the leaves, while nothing eats it in California. Iceplant encourages erosion and crowds out our native plants and animals, so replacing it with a diverse set of native wildflowers is the goal of the Beach Bluffs Restoration Project.

program for local residents to act as stewards of restored vegetation, and providing an outdoor classroom and exercises for students visiting the beach.

Study Area

The study area for this Master Plan is limited to a subsection of the former El Segundo dunes ecosystem. The limits are defined by Ballona Creek to the north and the end of the Los Angeles County beach in Torrance to the south. The plan reviews all areas from the existing bicycle path on the seaward side to the first road, house, or parking lot. This study area omits areas between the bicycle path and the ocean that may support or currently support dune vegetation, as well as other areas inland that support or could support dune vegetation (e.g., Sand Dune Park, Hyperion Treatment Plant, Chevron Refinery, etc.). This geographic limitation allowed for a study area of tractable size that has the potential to provide sites that could be linked together along the immediate coast. This study area also follows an existing paved trail that receives heavy visitor use, making it an ideal site for public education and access to restored coastal resources.

Reconnaissance visits to the study area, combined with aerial photographs, quickly established that potentially restorable sites could be divided into three major sections. From the south, these include the Torrance and Redondo Beach segment, the Manhattan Beach Segment, and the Playa del Rey segment. The urban morphology of some sections, such as that in Hermosa Beach, does not include restorable land between the coastal path and homes or other development.

Figure 1. Regional locator map for Beach Bluffs Restoration Project.

Historical Background

This section describes the geomorphological, biological, and social history of the study area. This background information serves the dual purpose of establishing important physical conditions that limit or enable restoration and documenting the environment for use in an educational program.

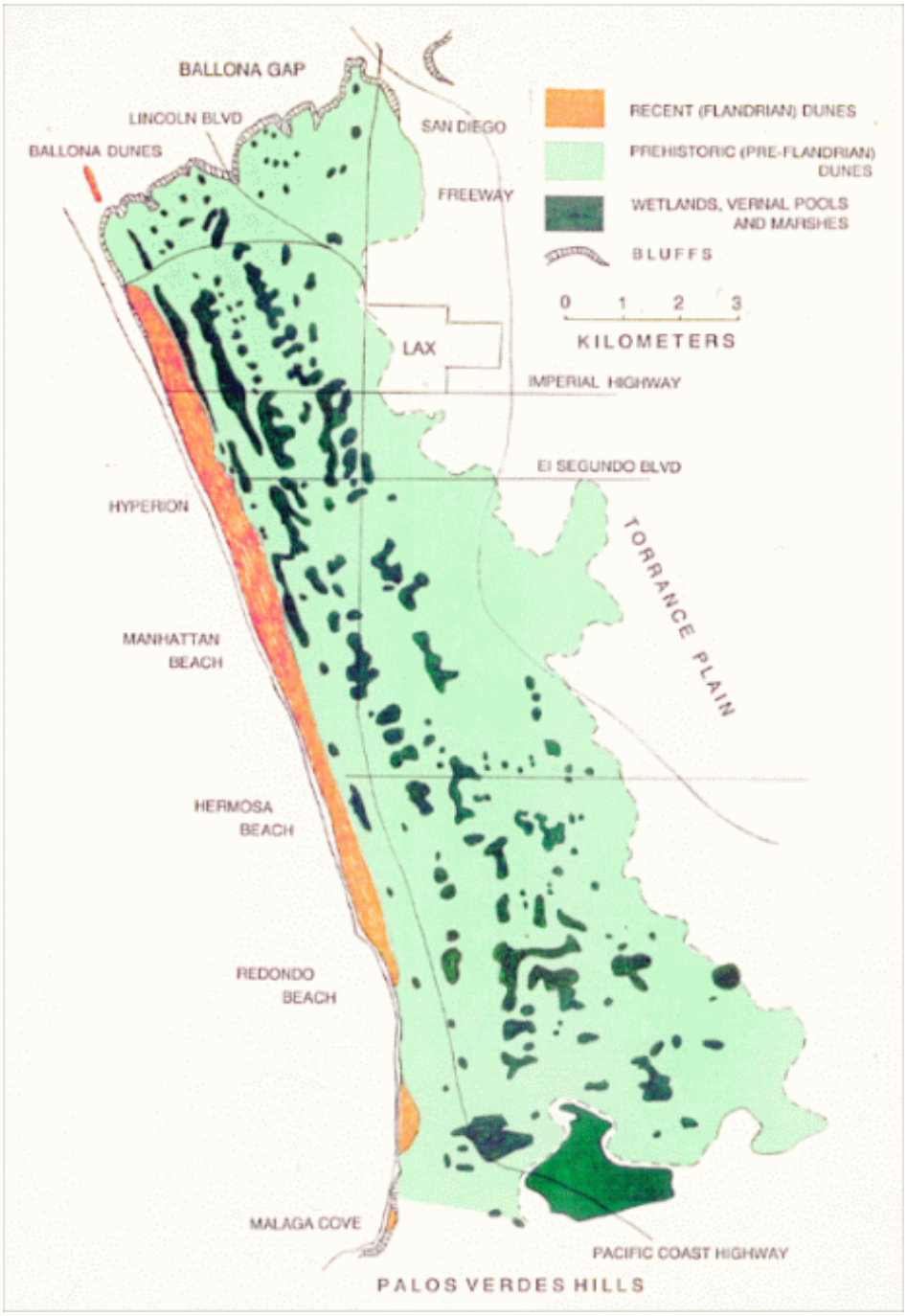

Figure 2. Extent of modern and historic El Segundo dune system (Mattoni 1993a).

Geomorphology of Dunes and Bluffs

The Santa Monica Bay dune field is composed of four separate dune systems extending southward as a series of ridges and troughs from the mouth of Ballona Creek to the Palos Verdes Peninsula (Figure 2). The dune systems rest upon a lowland comprising marine and non-marine terrace materials (Cooper 1967). Santa Monica Bay is characterized by net southward drift of currents along the beach, which provides sediment to beaches, from which sand is blown inland by prevailing northwest winds. The lowland character of the coast south of Ballona Creek has long allowed the development of coastal dunes as far south as the Palos Verdes Peninsula. All dunes in this region have been greatly modified by human activities over the past century but their general form remains decipherable beneath the urban and industrial framework of the coastal communities.

The bluffs that are the subject of this project are made of consolidated sandy soils that were formed from old coastal dune systems. These formations are exposed near the beach, with the active dune system perched on top of them.

Biota of Dunes and Bluffs

The strip of land under consideration in this plan is at the intersection of three vegetation communities: coastal strand, southern California dune scrub, and southern California bluff scrub. These plant communities would have been found historically within the study area.

The *strand* community is dominated by those plant species that can tolerate the harsh conditions of constant mechanical disturbance, salt spray, and occasional inundation (Barbour and Johnson 1988). Such plants have extraordinary abilities to conserve water in a desiccating salty environment and to withstand being partially buried by shifting sand from wind and sometimes wave action. Important among these plants are two species of what might be considered the local ecological equivalent of iceplant. Sand verbenas (both *Abronia umbellatum* and *Abronia maritima*) thrive in the

Figure 3. Beach sand verbena (*Abronia umbellatum*) has delicate purple flowers and succulent leaves that conserve water in the salt spray zone.

strand community, they have strikingly beautiful purple flowers and succulent leaves well adapted to water conservation. They are also notoriously difficult to grow in the nursery environment. Beach burr-bush (*Ambrosia psilostachys*) is also found in the strand environment. It is a hearty plant that can withstand burying and is one of the few native plants, along with beach evening primrose (*Camissonia chieranthifolia*), that is found seaward of the coastal path in the study area. It is important for stabilizing the soil to allow other species to establish. Other plants of the strand include the locally rare *Atriplex pacifica*, beach evening primrose, and saltgrass (*Distichlis spicata*).

Farther from the ocean and away from the immediate salt influence is the foredune vegetation community. While still characterized by active sand transport and open ground, more shrubs are present and the substrate is more stable. Plant species from the strand are also found here, but are joined by deerweed (*Lotus scoparius*, in its prostrate growth form), the coastal ecotype of California poppies (*Eschscholzia californica*; perennial with yellow flowers), silvery blue lupine (*Lupinus chamissonis*), coastal sagebrush (*Artemisia californica*), California sunflower (*Encelia californica*), coast buckwheat (*Eriogonum parvifolium*), goldenbush (*Ericameria ericoides*), and many annual wildflowers. This community would have been found on the sandy portions of the slopes in the project area.

Some portions of the subject sites have more consolidated soils from the underlying consolidated dune systems. This creates different soil conditions that would allow the establishment of a bluff scrub vegetation community. This vegetation would have been dominated more by shrubs, such as black sage (*Salvia mellifera*), California sagebrush, goldenbush, butterbush (*Senecio californicus*), bladderpod (*Isomeris arborea*), and *Rhus integrifolia*. Also included in the consolidated soils would be cacti (*Opuntia littoralis* and *Opuntia prolifera*), and many annual species.

With these vegetation types would be found a number of species that are now

What's so important about native plants?

- Native plants are the habitat for our native wildlife. Some butterflies depend on just one species of native plant. The El Segundo blue butterfly cannot live without coast buckwheat, one of the plants of the coastal dune and bluff.
- Native plants are part of our history and symbolize our state, like the California poppy.
- Native plants have deep root systems that reduce erosion and stabilize the bluff.

considered rare. Among these are the local wallflower population, pacific saltbush, beach spectaclepod (*Cardionema ramosissimum*), the now-extinct coastal dunes milkvetch (*Astragalus tener titi*), and the El Segundo spineflower (*Mucronea californica* var. *suksdorfii*).

Historically, the rich coastal environment, at the intersection of the ocean and land, would have supported a rich and diverse vertebrate fauna. Birds ranged from California condors foraging on carcasses of marine mammals on the beach to the tiny snowy plover nesting in the strand, to burrowing owls nesting in ground squirrel burrows on the dunes. The bird community included many shorebirds and gulls along with the species of open shrub and grasslands, such as roadrunner and many raptors. The mammal fauna ranged from the now-endangered Pacific pocket mouse (*Perognathus longimembrus pacificus*) and Pacifc kangaroo rat (*Dipodomys agilis agilis*) and numerous other small mammals to foraging long-tailed weasel (*Mustela frenata latirostra*), badger (*Taxidea taxus jeffersonii*), bobcat (*Lynx rufus californicus*), mule deer (*Odocoileus hemionus californicus*), and grizzly bear (*Ursus arctos californicus*). Reptiles and amphibians included the now-rare silvery footless lizard (*Anniella pulchra*) and San Deigan horned lizard (*Phrynosoma blainvillii blainvillii*), up to eight snake species, and other toads, salamanders, and frogs.

The insect community of the El Segundo dunes and strand includes a number of endemic species — organisms that have adapted unique characteristics in the isolation of the dune system. These include the federally endangered El Segundo blue butterfly (*Euphilotes bernardino allyni*), and other unique organisms, including a Jeruselam cricket, a cossid moth, and a crab spider that have not be given scientific names.

Because of the biogeographic isolation of the El Segundo dune system — it is isolated from other major dune systems north and south by tens of miles — the flora and fauna contain many locally unique populations. While not all of these variants have been described by science, they constitute a significant expression of native California biodiversity. The development of Los Angeles and the beach cities has drastically reduced the geographic extent of the dune and strand habitats. This human history is recounted in the following section.

Current Conditions

With this rich natural and social environment the opportunity to restore coastal zone resources remains. To evaluate such possibilities, we obtained aerial photographs of the study area from the Los Angeles County Department of Beaches and Harbors and digitized all of the open areas between the coastal path and the first street or home. Each polygon was delineated based on existing paths, stairways and other built infrastructure for beach access. Each polygon represents a contiguous block through which no foot or vehicle traffic should pass (although cut-through foot

Figure 4. California sunflower (*Encelia californica*) is a small shrub found in the bluff scrub habitat.

traffic is an ongoing problem). Surveys of the entire study area were conducted for vegetation and geomorphology and attributes were collected for each polygon. These polygons are, therefore, the unit of analysis to investigate the feasibility of restoration.

Public Infrastructure

The entire study area is adjacent to a bicycle path that runs from the Ballona Channel to Torrance Beach. As documented in field surveys, trashcans are available at nearly every site in Torrance, Redondo Beach, and Manhattan Beach. Lights are also present illuminating both walkways and in some areas the beach along the study area. Many formal access sites to the beach exist, but many other pioneered trails are found, especially through the sites with longer distances between developed paths.

Recreation opportunities in the study area are active (e.g., volleyball, surfing, walking, biking, roller blading) and passive (e.g, looking at the ocean, sitting on the beach). Several sites have unique recreational activites that deserve mention. First, is a site at the northern end of the Esplanade in Redondo Beach where model plane enthusiasts fly their planes (sites 15 and 16). They often go down on to the slope to retrieve planes, which would conflict with the establishment of vegetation in that site. Second is a site at the southern end of Dockweiler Beach where hang gliders use the bluff to take off and to teach hang gliding (near site 71).

Ownership and Other Relevant Plans

All of the property within the study area is owned by local or state government. The largest landowner is the Los Angeles County Department of Beaches and Harbors. Other areas are owned by the State of California and operated by the County and others owned by one of the beach cities. While this land is public, some locations, especially in Manhattan Beach, nearby property owners have planted and maintain gardens between the sidewalk and bike path along the beach.

Figure 5. Bicycle path along Santa Monica Bay from Ballona Creek to the Palos Verdes Peninsula connecting the cities of the South Bay.

Geomorphology

Redondo Beach and a sliver of Torrance are in the southernmost region of interest. The windward dune slopes range between 25 and 40 degrees and are associated with compacted soils forming a bluff-top ledge from 6 to 25 feet wide. The slopes are primarily vegetated by iceplant, covering 40–95% of the polygons. Those areas not vegetated are susceptible to erosion from pedestrian traffic and runoff from adjacent parking lots, roads or walkways. Access from the bluff top to the beach is limited in some areas, which has encouraged short cut trampling. The dune slopes decline gradually into a broad flat beach, largely devoid of vegetation.

Iceplant was planted here, and throughout the study area, to stabilize the dunes and prevent erosion. As the beach cities were developed, drifting sand across roadways was a significant problem — motorists had to bring a shovel to remove the sand drifts from the road. Iceplant was efficient at reducing the amount of free sand, but it makes slopes susceptible to slump erosion. Roots of the iceplant are not deep and it becomes quite heavy when wet. These features make it an undesirable plant for slopes, in addition to its undesirable ecological characteristics.

The area of study in Manhattan Beach lies between Redondo Beach and Playa del Rey and consists of the windward coastal ridge slope as well as portions of the foredune system. The exposed coastal ridge is situated between the eastward-bounding pedestrian strand and the westward-bounding bike path where slopes range from 5 to 25 degrees. The slopes have vegetal covers ranging from 60 to over 95%, which vary in their concentrations of iceplant, trees, shrubs and cacti. Such areas are primarily subject to erosion from concentrated discharges of pipes draining the pedestrian walkway through a one-foot curb. Privately maintained gardens on the top one third of the slope commonly serve to stabilize slopes by dissipating energy from concentrated runoff and preventing trampling. The foredunes lie west of the bike path and are characterized by gentler slopes ranging from 5 to 10 degrees and a more hummocky topography. Vegetation covers approximately 30% of the area and consists of patchy iceplant and low shrubs. The foredunes are susceptible to sheet wash erosion as runoff drains from the adjacent impermeable bike path but this is only of concern where runoff is able to concentrate.

The dune ridge in Playa del Rey is the northernmost region of interest and lies directly west of the Los Angeles International Airport. Although a much broader expanse of the local dune field is exposed, this study is only interested in the publicly owned land west of Vista del Mar Street. Slopes on the coastal ridge range from 25 to 55 degrees. These slopes gradually decrease westward and open into a hummocky foredune system, much like in Manhattan Beach, with slopes ranging from 0 to 10 degrees. Vegetation in the form of iceplant, cacti and shrubs covers 70 to 95% of the ridge slopes and 0 to 35% of the foredunes. The dune slopes are particularly susceptible to runoff overflow from the street and trampling adjacent to areas where

street parking is allowed. The low foredunes fronting much of the Manhattan Beach and Playa del Rey segments result from sand moving in the prevailing winds from the broad beaches whose natural instability is maintained by recreational and beach-grooming activities.

There are various geomorphic concerns associated with the dune slopes that warrant effective management. Of particular importance are raindrop impact, sheet erosion, rill erosion, gully erosion, mass movement, and wind erosion and redeposition. The susceptibility of slopes to the adverse impacts of these processes varies depending upon the prevailing local conditions and is enhanced by channelized runoff, pedestrian trampling and vegetation loss.

Exposed soils on the bluff-top ledges of Redondo Beach and Playa del Rey and the areas of patchy vegetation in Playa del Rey are susceptible to degradation by raindrop impacts. Raindrops may dislodge soils on exposed surfaces where the force of the raindrop impact exceeds the gravitational and cohesive forces maintaining sediment positions. This loosens soils for further erosion and transport and is particularly important where soils are susceptible to mobilization because of a lack of cohesion or vegetation. In the areas of concern, however, raindrop impacts are only of minor importance. These impacts alone are of little consequence but the resulting availability of sediment for more destructive processes warrants consideration.

Sheet erosion occurs naturally on steep slopes with relatively uniform soil resistance and permeability. It may also occur where impermeable surfaces drain unobstructed and unchannelized onto more pervious materials. The sheet wash effectively dislodges sediment by overcoming frictional forces and is capable of transporting it downslope. For the purposes of this study, sheet erosion, like raindrop impact, plays a larger role in setting up conditions more vulnerable to other processes than by degrading slopes by itself. This is of particular concern in Redondo Beach and Playa del Rey where bluff-top ledges consist of soils compacted to the point of limited permeability. Therefore, storm runoff is discharged as sheet flow immediately onto the dune slopes, it may be where it is directed into already established rills and gullies by local vegetation and topography, accentuating erosion processes. Sheet erosion is also of concern in Manhattan Beach and Playa del Rey where bike paths drain directly onto the foredune systems. Erosive impacts are limited to the area immediately adjacent to the concrete paths because of the permeability of the sandy soils and the patchy vegetation.

Dune slopes are susceptible to rill erosion where vegetation is patchy and sparse. Runoff is locally channelized and capable in such mass and velocity to incise shallow rills. Because vegetation coverages for most areas of this study are 70 to 90%, erosion due to rill formation in most places is limited in extent and depth. The only region where this may warrant more consideration is in those areas of Playa del Rey where vegetation is patchy and distinct unvegetated avenues have been cut through the

slopes. In this region, vegetation is a mixture of iceplant and shrubs, the sparse distribution of which facilitates the rilling of bare soils.

Rills may lead to gully formation, which has the greatest adverse effects on the stability of the dune slopes. Gullies form much like rills but require the concentration of greater quantities of discharge and result in deeper, more incised channels. Gullies also serve as major routes for sediment transport during storm flows as the depth and velocity of the channels support sediment in suspension as well as bed load. This is especially important in the area of study because soils are removed from slopes and ultimately delivered to the impervious westward bounding pedestrian and bike paths. This creates maintenance and safety concerns and decreases the utility of the right of way. Gullying is problematic in all three areas of the study. In Torrance and Redondo Beach, deep gullies have formed where pedestrians have taken short cuts down the slopes. These may be exacerbated where runoff from the adjacent bluff-top street overflows during larger storm events onto the dune slopes from collection areas or from breaks in the curb. Gullies in Manhattan Beach are of similar depth but occur at specific intervals associated with the location of pipes draining adjacent bluff-top and mid-bluff walkways. Incision capabilities are enhanced where discharges fall a substantial distance onto dune soils lacking sufficient vegetation to dissipate impact energies. Gullies in Playa del Rey are the most severe, occurring at more frequent intervals and in greater depth than elsewhere. They have been formed by the channelization of overflow runoff from the adjacent street and have been accentuated where storm drains prevent local infiltration. In all areas, pedestrians use gullies as paths and therefore slope and beach-access influence the degree to which erosion has occurred.

The mass movement of slope materials occurs when a large portion of the hillslope is dislodged as a massive unit or as a collection of individual grains and moves downhill in response to gravitational forces. Materials are mobilized initially by bank destabilization, which may occur with saturation or vegetation removal. The material, depending on its consistency and hillslope declivity, moves downhill by sliding, falling or mass flowage. Such processes can substantially deform hillslope profiles and transport large quantities of material very rapidly. In all three sections of the area of study, there are signs of relict mass movements that have been stabilized by vegetation and retaining walls. Mass movement does not appear to be a current problem because problem slopes have been maintained at conservative grades and provided with dense plant coverage. On the occasion that substantial erosion occurs, the Los Angeles County Department of Beaches and Harbors completes repairs to return the area to the original configuration.

Active dunes are, by definition, subject to frequent change as a result of the introduction of fresh sand and/or effective wind velocities (Nordstrom et al., 1990). Under natural conditions, the coastal ridge of the Santa Monica Bay dunes would still be active. Indeed, in the Manhattan Beach and Playa del Rey segments in particular, deflation of broad flat beaches under prevailing wind conditions

continues to provide for active foredune development and sand transport towards the main dune ridge. The latter, however, is not as susceptible to wind erosion because of its vegetation coverage and engineered slopes although sediment from the foredunes may rise onto the coastal ridge. Such processes do not pose any immediate management problems with respect to coastal bluff stability.

Figure 6. Undeveloped bluffs along Santa Monica Bay showing percent native vegetation (Southern Focus Area).

Figure 7. Undeveloped bluffs along Santa Monica Bay showing percent native vegetation (Central Focus Area).

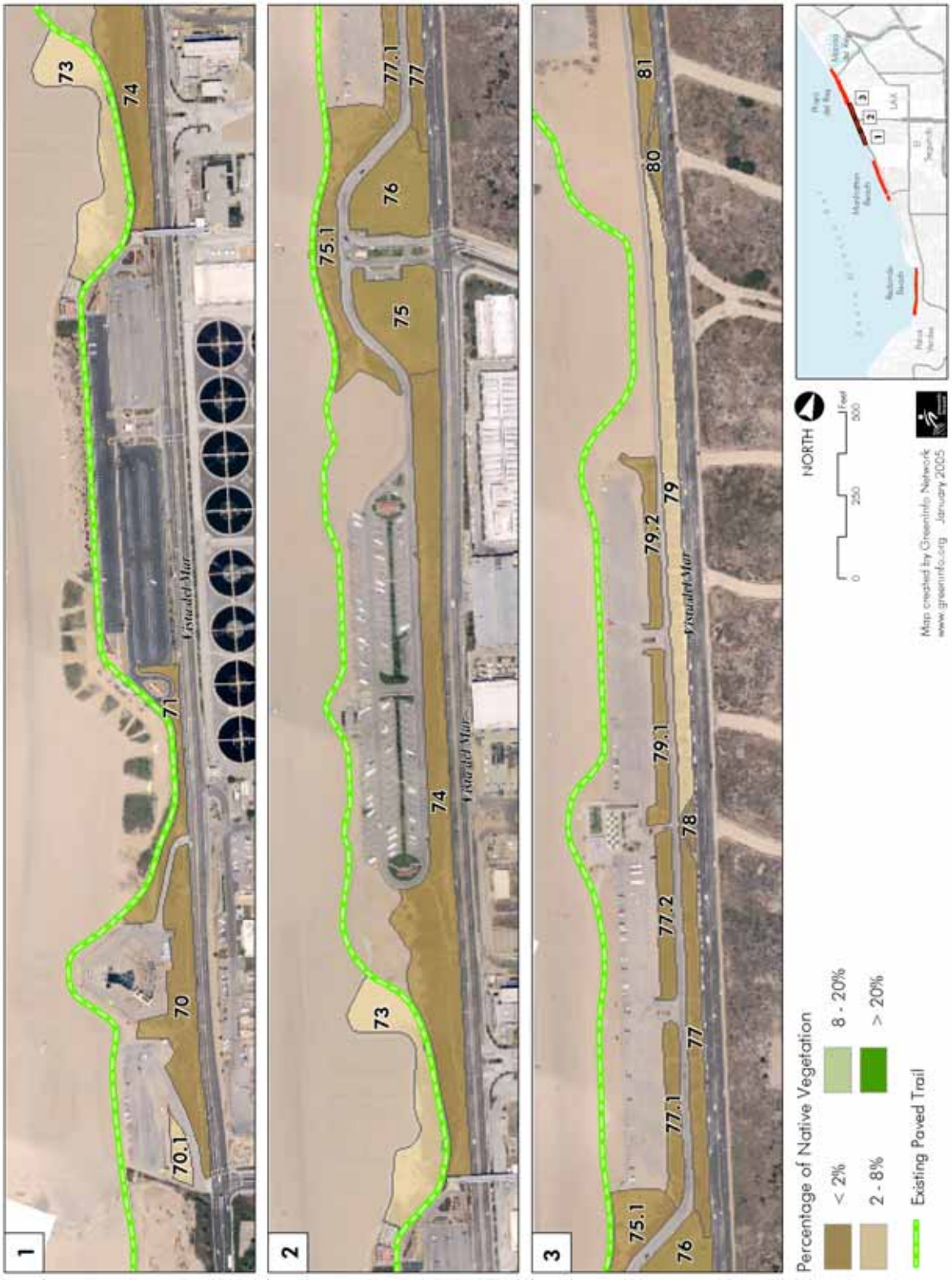

Figure 8. Undeveloped bluffs along Santa Monica Bay showing percent native vegetation (Northern Focus Area, Part 1).

Figure 9. Undeveloped bluffs along Santa Monica Bay showing percent native vegetation (Northern Focus Area, Part 2).

Biological Resources

The Redondo Beach portion of the study area is almost entirely dominated by iceplant (*Carpobrotus edulis*), with the exception of the three sites recently restored in Torrance (0.7 acres), Redondo Beach (3.1 acres), and Manhattan Beach (0.1 acres). 92% of the polygon areas included for this study contained iceplant (Table 1). This invasive species, which overruns and precludes growth by other species, constituted 67% of cover, with the next greatest cover from open sand. No other plant species could be considered dominant; bermudagrass has 2.9% cover, statice at 1.3% and bird of paradise at 1.3%.

Seventeen native plant species were found within in the study area (excluding the three restored sites), all of which were at extremely low density. These species are perennials quite tolerant of human disturbance, such as beach burr-bush, or are opportunistic annual species such as beach evening primrose and telegraph weed, or other disturbance associated species (e.g., Deerweed, *Lotus scoparius*). The presence of these species indicates that some native seedbank may be left in the study area. The persistence of the seedbank was illustrated in the revegetation of the Torrance beach site, where the coastal form of deerweed germinated from seed on a site previously dominated by iceplant. As a whole, the sites surveyed for this project did not contain significant botanical resources, and no rare or endangered species.

The recently restored sites in Torrance, Redondo Beach and Manhattan Beach all now have coast buckwheat (*Eriogonum parvifolium*), foodplant of the El Segundo blue butterfly, and could therefore likely support a population of the butterfly. Several other less common species have also been reestablished at these sites.

Table 1. Plant species found within study area, ranked by percent cover and number of polygons. Excludes recently restored sites at Torrance, Redondo Beach, and Manhattan Beach.

Scientific Name	Common Name	Total Percent Cover	Number of Polygons	Status
Carpobrotus edulis	Iceplant	67.0	81	Exotic
Cynodon dactylon	Bermudagrass	2.9	11	Exotic
Limonium sinuatum	Statice	1.3	2	Exotic
Strelitzia reginae	Bird of paradise	1.3	1	Exotic
Bromus diandrus	Rupgut brome	0.8	17	Exotic
Cakile maritima	Sea rocket	0.8	17	Exotic
Ambrosia chamissonis	Beach burr-bush	0.5	10	Native
Opuntia sp./ *Aloe* sp.		0.5	7	Exotic
Pittosporum sp.	Pittosporum	0.4	4	Exotic

Ricinus communis	Castor bean	0.3	8	Exotic
Ambrosia ancanthicarpa	Burr ragweed	0.2	6	Native
Malva parviflora	Cheeseweed	0.2	1	Exotic
Heterotheca grandiflora	Telegraph weed	0.1	22	Native
Oxalis pes-capri	Oxalis	0.1	18	Exotic
Camissonia cheiranthifolia	Beach evening primrose	0.1	17	Native
Salsola tragus	Russian thistle	0.1	13	Exotic
Sonchus oleraceus	Common sow thistle	0.1	12	Exotic
Atriplex semibaccata	Australian saltbush	0.1	11	Exotic
Brassica tournefortii	Asian mustard	0.1	10	Exotic
Acacia cyclops	Acacia	0.1	8	Exotic
Washingtonia filifera	Mexican fan palm	0.1	6	Exotic
Gazania sp.	African daisy	0.1	5	Exotic
Achillea millefolium	Yarrow	0.1	3	Native
Atriplex nummalaria	Bluegreen saltbush	0.1	2	Exotic
Chenopodium album	Pigweed	0.0	7	Exotic
Lobularia maritima	Sweet alyssum	0.0	7	Exotic
Croton californicus	Croton	0.0	6	Native
Gnaphalium sp.	Cudweed	0.0	6	Native
Lotus scoparius	Deerweed	0.0	6	Native
Cortaderia selloana	Pampas grass	0.0	5	Exotic
Matthiola incana	Stock	0.0	3	Exotic
Isomeris arborea	Bladderpod	0.0	3	Native
Rhus integrifolia	Lemonadeberry	0.0	3	Native
Myoporum laetum	Myoporum	0.0	2	Exotic
Tetragonia tetragonoides	New Zealand spinach	0.0	2	Exotic
Atriplex lentiformis	Brewer's saltbush	0.0	2	Native
Calystegia soldanella	Beach morning glory	0.0	2	Native
Datura wrightii	Jimson weed	0.0	2	Native
Lotus purshianus	Spanish lotus	0.0	2	Native
Lupinus succulentus	Succulent lupine	0.0	2	Native
Centaurea melitensis	Yellow star thistle	0.0	1	Exotic
Erodium sp.	Filaree	0.0	1	Exotic
Pinus sp.	Pine	0.0	1	Exotic
Baccharis pilularis	Coyote bush	0.0	1	Native
Heliotropium curassavicum	Seaside heliotrope	0.0	1	Native

Habitat Restoration Plan

The goals of the habitat restoration component of the Master Plan are to increase the ecological values of the bluffs and dunes, such that the restored areas 1) contribute to the recovery of the El Segundo blue butterfly, 2) provide habitat for unique and rare plants of the El Segundo dunes, 3) increase biological connectivity between remnant populations of dune species, and 4) support more diverse bird, reptile, and arthropod communities.

The habitat restoration also has the practical goal of removing iceplant and replacing it with species that are more efficient at controlling erosion and discouraging the cut-through foot traffic that causes the most erosion damage to the bluffs. Improvements to infrastructure to address this concern are discussed below.

These ecological goals will provide the opportunity to achieve educational goals of increasing awareness of the El Segundo dunes and bluffs as natural features in the landscape, targeting local residents and beach goers. It also has the goal of educating the public about cooperative efforts to recover endangered species.

Prioritization of Sites

All of the sites investigated as part of this study could be restored, given adequate funding and management. A prioritization of restoration sites is needed, however, to identify which sites are most feasible, which would conflict least with other uses, and which would require the least long-term management. While one could envision restoring all sites eventually, the following principles should aid in selection of those sites to be targeted first.

1. Sites with lower edge to area ratios (i.e., compact rather than long and skinny) are preferable because they will be less likely to experience disturbance in the interior.
2. Larger sites are generally preferable to smaller sites for ease of management and restoration.
3. Steeper sites present more challenges than less steep sites.
4. Restoration sites should be spread throughout the length of the study area, both to create a series of ecological stepping-stones and to provide an interesting visitor experience.
5. Within any given subarea, restoration of adjacent parcels is preferable to scattered parcels.
6. Conflicts with other established uses should be avoided.
7. Sites with lower measures of human activity will serve ecological goals better.

8. Sites with higher measures of human activity will serve educational goals better.
9. Restoration actions must be desired by site landowners, and preferably desired by adjacent landowners.

Many restoration projects are limited by the minimum area required to support a target species. For many birds, and larger vertebrates this poses a serious restriction. Even for some butterflies, a significant area, on the order of acres or tens of acres is required. But for the most sensitive species that could be introduced to the project site, the minimum area is quite small. El Segundo blue butterflies are very closely tied to their host plants and are quite sedentary (Mattoni 1992, 1993b). Small populations can persist on extremely small areas, even less than an acre. This is seen with the preserve at the Chevron Refinery, and at Malaga cove, where roughly 125 foodplants support a small El Segundo blue butterfly population. Any area that is restored with appropriate foodplant could potentially aid in the recovery of the El Segundo blue butterfly.

Surveys of the sites reveals that much of the infrastructure necessary to conduct restorations is already in place. Irrigation, which is necessary as a temporary measure to establish plants, is found throughout the study area. The many paths and coastal access sites provide ample and adequate access to the sites. These considerations are therefore not relevant in prioritizing the sites.

Inspection of the results of the surveys, along with calculation of the area and edge to area ratio for each site, quickly identifies those sites that would be best for ecological purposes. The greatest restoration area could be achieved most efficiently in Torrance and southern Redondo Beach as one unit, and along Dockweiler Beach near LAX and El Segundo as a second unit. From a biological perspective it would make sense to restore areas near the existing dunes at LAX because of the possibility of colonization by fauna from that site, perhaps even the El Segundo blue butterfly. At the southern end of the study area in Torrance, Site 1 is only ~1,000 feet from a population of El Segundo blue butterfly. To spread sites out, both for ecological and educational purposes, it would also be important to establish a series of restored sites in the central area of Manhattan Beach.

Top Priority Restoration Sites (19.54 acres)

Torrance/Redondo Beach sites 1–5 (4.05 acres). Part of this area (0.7 acre) has already been restored as part of a Department of Beaches and Harbors infrastructure improvement project. Irrigation is available and this site is closest to the Malaga Cove El Segundo blue butterfly population. Sites between pathways are large, with much interior area that would be largely undisturbed by cut-through foot traffic.

Redondo Beach sites 8–13 (6.38 acres). Part of this area (3.08 acres) is already under restoration as part of the pilot project. It continues along a highly used portion of the coast and the restoration would address some management issues such as cut-through trails.

Manhattan Beach sites 43–56 (2.55 acres). This area gets heavy use and is close to many residences, but there are many paths so cut-through is at a minimum. The choice of this section of Manhattan Beach derives from the slightly wider polygons and the proximity adjacent to the existing restoration at Site 46.

El Segundo/Dockweiler site 73–74 (6.56 acres). Offers opportunity to restore large area, with perhaps less disturbance from foot traffic than other sites

Second Priority Restoration Sites (16.5 acres)

Manhattan Beach sites 31–38 (1.79 acres), and Manhattan Beach sites 60–69 (1.46 acres). These polygons are smaller, with more edge to area than others in Manhattan Beach.

El Segundo/Dockweiler sites 77–86b (13.25 acres). The bluffs along Vista Del Mar at Dockweiler Beach would constitute a significant area for restoration. Advantages of this site are its proximity to the protected dunes at LAX, which would increase the probability of colonization by El Segundo blue butterfly, and the large area. Several challenges keep this from being a top priority. The slope is steep and would require substantial remediative grading to fill in the gullies caused by pedestrian traffic. Ownership patterns are more complex than other sites, with different jurisdictions owning and managing portions of the site. Providing a detailed funding estimate for restoration of these polygons would require additional engineering studies.

Third Priority Restoration Sites (2.36 acres)

Manhattan Beach sites 26–30 (0.34 acres). The smallest of the Manhattan Beach polygons, these sites would be difficult to maintain.

Redondo Beach sites 17–25 (2.92 acres). Compared to other areas in Redondo Beach (e.g, Sites 8–13), these polygons are narrow and steeper in many places. They also are immediately adjacent to apartment buildings, which would require extensive outreach, education, and cooperation to ensure restoration success.

Redondo Beach sites 6–7 (0.22 acres). These are smaller areas located in front of benches at Miramar Park. Restoration plantings would need to be carefully designed to avoid conflicts with views from existing benches.

Restoration Methodology

Over three acres of bluff and dune habitat have been restored in Torrance, Redondo Beach, and Manhattan Beach as part of the pilot project and independently by the Los Angeles County Department of Beaches and Harbors and the City of Manhattan Beach. The restoration approach is to remove perennial exotic vegetation, install container plants and seed from native plants, then allow growth of shrubs to exclude annual exotic species. This approach requires a number of years for the shrubs to mature but it avoids the use of herbicides. Weeding is only required as shrubs and native perennials are established but can then be reduced.

Exotic vegetation within the revegetation areas will be removed by hand. Removed plant material will either be disposed of off site or composted onsite for use as mulch for container plants.

A temporary irrigation system made with 3/4" PVC pipe and Hunter gear-driven sprinkler heads will be used. Irrigation will be used only between 2 A.M. and 6 A.M. to comply with existing Department of Beaches and Harbors policy.

Plant Propagation

All container plants will be propagated from local seed or cuttings, including from the El Segundo dunes. Container plants will be grown from seed in greenhouse conditions such that the plant fills the container size specified. Roots will reach the bottom of the container but not show signs of being root-bound. Seeds will be hand collected and cleaned and refrigerated until application.

A nursery has been established at the Los Angeles Conservation Corps SEA Laboratory in Redondo Beach, jointly operated by The Urban Wildlands Group and the SEA Laboratory. The growing space is sufficient to produce approximately 30,000 plants per year if operated continuously and efficiently, sufficient to revegetate 20 acres. If funding is available to restore habitat at a quicker pace, an alternative or additional nursery site should be located.

Irrigation

Prior to plant installation, the site will be watered for eight hours over two days to saturate the soil to a depth of 18 inches if sufficient rain has not fallen to already do so. After container plant installation, irrigation will be used to supplement natural rainfall as necessary. During the first three months after plant installation, we will irrigate as necessary to keep the soil moist to a depth of 18 inches. Irrigation will be halted three months after plant installation, and no irrigation will be utilized during any following spring or summer months.

During the first two years of establishment, additional water may be beneficial to the vegetation. Irrigation should use the existing overhead spray system to provide a substantial soaking at long intervals. The timing for such additional water should be between October 15 and the first large natural rainstorm. During this period, the system should be set to run for two hours once each week. If other timers are used or the system is run by hand, then four hours once every other week would be preferable.

Planting Scheme

The planting scheme will assume a founder model of succession. This model assumes that those plants that establish early during ecological succession ultimately define the community. Therefore the plantings will emulate the density and proportion of shrub and subshrub species that we intend to comprise the bluff and dune scrub at project completion.

The restoration plantings will predominantly recreate two vegetation types: southern foredune scrub and southern bluff scrub (Table 2). Elements of the strand community will be represented at the base of the bluff as allowed by edaphic conditions.

Table 2. Plant species for beach bluffs revegetation. Zone A: base of bluff in very sandy soils. Zone B: On bluff in more developed soils. Density: 1,500 plants (shrubs and subshrubs) per acre.

Perennials	Name	Planting Zone
Abronia maritima	Sand verbena	A
Abronia umbellatum	Beach sand verbena	A
Ambrosia chamissonis	Beach burr-bush	B
Artemisia californica	California sagebrush	B
Artemisia dracunculus	Mugwort	B
Astragalus trichopodus leucopsis	Southern California milk-vetch	B
Atriplex californica	California saltbush	B
Baccharis salicifolia	Mule fat	B
Calystegia macrostegia	Bindweed	B
Calystegia soldanella	Morning glory	A
Camissonia chieranthifolia	Beach evening primrose	A
Cardionema ramosissima	Sand carpet	B
Corethrogyne filaginifolia	Sand aster	B
Croton californica	California croton	AB
Cucurbita foetidissima	Calabazilla	AB
Cuscuta californica	Dodder	AB
Datura wrightii	Jimson weed	AB
Distichlis spicata	Saltgrass	A
Dudleya lanceolata	Lance-leaf liveforever	B

Encelia californica	California sunflower	B
Ericameria [=Haplopappus] ericoides	Goldenbush	B
Eriogonum parvifolium	Coast buckwheat	AB
Erysimum capitatum [=E. suffrutescens]	Western wallflower	AB
Eschscholtzia californica	California poppy	AB
Galium angustifolium	Bedstraw	AB
Gnaphalium bicolor	Two-tone everlasting	AB
Isomeris arborea	Bladderpod	B
Lotus scoparius	Deerweed	B
Lupinus chamissonis	Silvery blue lupine	AB
Marah macrocarpus	Wild cucumber	B
Mirabilis laevis	Four o'clock	B
Opuntia littoralis	Prickly pear	B
Opuntia prolifera	Cholla	B
Phacelia ramosissima	Branching phacelia	AB
Rhus integrifolia	Lemonadeberry	B
Salvia mellifera	Black sage	B
Senecio flaccidus douglasii	Butterbush	B
Verbena lasiostachys	Verbena	B
Annuals		
Calandrinia maritima	Seaside redmaids	AB
Calyptridium monandrum	Pussypaws	AB
Camissonia micrantha	Minature suncup	AB
Chaenactis glabriuscula	Pincushion flower	AB
Clarkia purpurea	Purple clarkia	B
Crassula connata	Pygmyweed	AB
Cryptantha clevelandii	Cleveland cryptantha	AB
Descurainea pinnata	Tansy mustard	B
Heterotheca grandiflora	Telegraph weed	AB
Lepidium lasiocarpum	Peppergrass	AB
Linaria canadensis	Blue toadflax	AB
Lotus purshianus	Spanish lotus	AB
Lotus strigosus	Strigose bird's-foot-trefoil	AB
Lupinus bicolor	Two-tone lupine	AB
Lupinus succulentus	Succulent lupine	AB
Lupinus truncatus	Truncated lupine	AB
Phacelia cicutaria hispida	Caterpillar phacelia	AB
Plantago erecta	Dwarf plantain	B
Stephanomeria virgata	Wand chicory	AB

Other sensitive species may be added to the planting scheme, as propagules are available. These could include *Dithyrea maritima* (Beach spectaclepod), *Dudleya virens* (Bright green liveforever; at southern end of study area), and *Mucronea californica* var. *suksdorfii* (California spineflower).

Maintenance

Trampling presents a danger to the success of plantings. Fencing to discourage cut-through traffic should remain up one more year to allow for greater shrub establishment.

The largest concern about restoration projects is often "weed control". The reality of restoration in urban areas is that weed sources will always be nearby and complete control of weeds is impossible. It is important therefore to distinguish between weeds that may displace the newly established vegetation (e.g, perennials) and those that are do not (e.g., annuals).

In the dune scrub system, annual weeds are essentially impossible to eradicate. They will decrease in abundance as the native shrubs mature and eliminate the conditions that allow their germination. The common weeds that fit this description are sow thistle (*Sonchus* sp.), ox tongue (*Picris* sp.), pigweed (*Chenopodium* sp.), and three grasses (oats and two brome species). These species do not need to be eradicated as long as shrub cover is gradually eliminating regeneration possibilities.

Several biennial and perennial weed species do threaten the system because of their more competitive characteristics. Such invasive species are identified in *Invasive Plants of California's Wildlands* (Bossard et al. 2000) and other publications by the California Invasive Plant Council. These include, for example, iceplant (*Carpobrotus* sp. and *Mesembryanthamum* sp.) and Bermuda grass. At six-month intervals the site should be searched for invasive species — iceplant should be removed by hand and Bermuda grass killed with a spot application of Round-up.

No clearing of dead vegetation (except for perennial weeds) is recommended or desirable. Trimming of large shrubs is permissible if necessary for aesthetic reasons but is not recommended.

Infrastructure Improvements

The built infrastructure around potential restoration sites could be improved in many locations. This plan does not detail all potential infrastructure improvements because these must be implemented at the initiative of the local jurisdiction. The following types of improvements would be desirable in coordination with restoration efforts.

Runoff and Erosion Control

The geomorphology technical report (Appendix A) details many problems with curbs and other hardscape elements that contribute to erosion of the bluffs. For

example, for Site 5 it is recommended to raise the curb one foot to prevent overflow of stormwater onto the bluff. For Site 15, breaks in the curb should be repaired to divert runoff from slope. In other areas, fencing should be used to reduce cut-through traffic. The intention behind these recommended improvements is to reduce the amount of runoff from adjacent impermeable surfaces that is discharged onto the slopes and to reduce the frequency and intensity of cut-through pedestrian traffic. The third aspect of reducing erosion is to increase infiltration by increasing plant cover and making compacted soils more permeable, both of which would be achieved by the revegetation of the bluffs.

Stormwater Improvement

The beach and bluff environment would be enhanced by improving the quality of stormwater that is discharged into the beach and nearshore area. This may be accomplished through a number of structural best management practices, including low-flow diversion of run-off to water treatments plants, filters, grates, and other engineered solutions. As local jurisdictions contemplate restoration of the beach bluffs, such projects may be paired with infrastructural improvements to improve stormwater quality and reduce dryweather flows.

Traffic Improvements

The enjoyment of the beach bluffs, and its educational value, depends on visitors being able to access sites safely and comfortably. In some locations, conflicts arise between different modes of transportation. For example, along the Esplanade in Redondo Beach there are frequent conflicts between pedestrians, cyclists, joggers, and vehicular traffic and parking areas. An improved multimodal transportation design would improve the experience of the beach bluffs in this and other locations. These improvements may take the form of improved signage, lane striping, or even construction of separate paths where necessary.

Design Considerations

In the design of infrastructure improvements, jurisdictions should be aware of the beach bluffs and considerations to protect the native vegetation of restoration sites. As evident from the discussion above, all stormwater management should divert flows from the bluffs to reduce erosion, and to avoid the input of contaminants in urban runoff. Designs should continue to discourage cut-through traffic down the slopes and pedestrians should be restricted from walking out to the edge of the bluffs by fencing where feasible. Night lighting should not be directed on the bluffs, but rather full cut-off lights on the lowest feasible poles should be used when illumination of paths or streets is desired. Artificial lights disrupt the ecology of

many organisms (see Longcore and Rich 2004 for a full discussion), and detract from the aesthetics of the beach environment.

Education Plan

The restoration of native habitats along the beach bluffs provides an excellent opportunity to educate the public. Because of the heavy recreational use of these beaches by local, national, and international visitors, the efforts here will have more visibility than almost any other restoration project in California. It is therefore imperative for the long-term success of the project that the public appreciates and values the restored environment. The education plan to accomplish this goal has three parts. First is an interpretive program targeted at tourists and infrequent visitors. Second is a volunteer program for local residents to participate in stewardship of the sites. Third is outreach to local schools to incorporate the beach bluff environment into the educational experience, linked to the statewide science standards.

Interpretive Self-Guided Tour

The interpretive self-guided tour will consist of a series of signs installed along the bike and walkways from Ballona Creek to the Palos Verdes peninsula. The signs will be similar in design and appearance to provide a uniform, recognizable set of landscape features that connect these areas. The signs will meet National Park Service quality. Laminate color panels have high resolution and detail and weather well, requiring replacement after more than ten years. Signage will include interpretation of the biophysical environment and the history of the beach bluffs.

The following general areas are suggested for interpretive signs about history. Details of the history of the area are provided in Appendix B.

1. The plaque memorializing the Hollywood Riviera Beach Club in Miramar Park (Torrance)
2. A site about gambling and alcohol smuggling during Prohibition.
3. A site to mark the presence of the Chowigna (Redondo Beach)
4. The Plunge site (Redondo Beach)
5. Shakespeare's Beach at the foot of Longfellow Avenue (Hermosa Beach). To identify the artists' colony now only apparent in the street names.
6. Surfer's Walk of Fame (Hermosa Beach). This site should discuss the history of surfing along the beaches of the south bay.
7. Bruce's Beach (Parque Culiacan in Manhattan Beach). To discuss the name of the city.
8. Standard Oil Site (El Segundo). The City of El Segundo was created by Standard Oil.

The following topics are suggested for interpretive signs about the biophysical environment. Locations to be determined as indicated but paired with restored vegetation.

1. Geological explanation of the Palos Verdes peninsula (southern end).
2. Creation of the El Segundo dune system and its structure.
3. Dunes at Los Angeles International Airport as major site for endangered El Segundo blue butterfly, ten endemic insects, and rare plants.
4. Life forms of plants in the dune and bluff environment (e.g., suffrutescent, drought deciduous, creeping).
5. Birds, reptiles, and mammals of the beach and dunes (e.g, least tern, western snowy plover, legless lizard).
6. Mutualism and competition in dune communities.
7. Habitat loss and conservation of El Segundo dunes species.
8. Ballona Creek as the outlet of the Los Angeles River and the source of sand for the El Segundo dunes (northern end).

All signs will include a common introductory text explaining the route and the revegetation project so that each can stand alone.

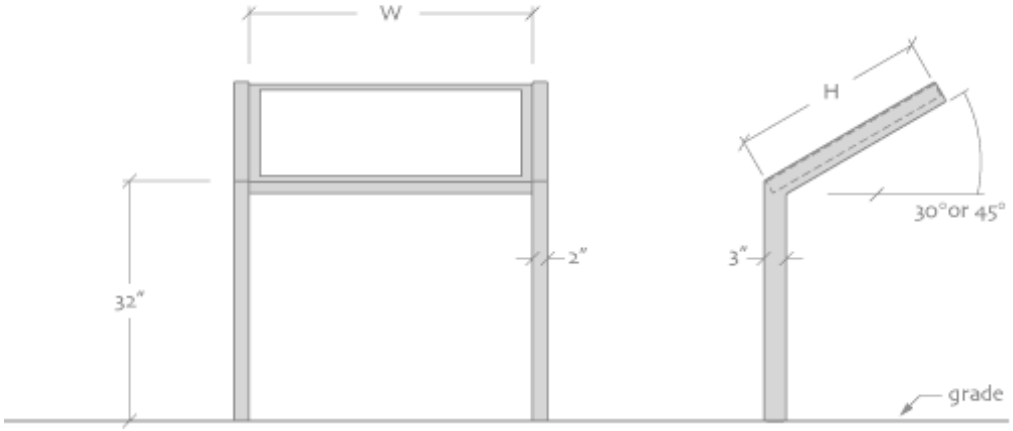

Figure 10. Design of base for interpretive signs.

Volunteer Program

A community-based volunteer program will be established to allow local residents to participate in the stewardship of revegetation sites. This program will be coordinated by the Los Angeles Conservation Corps S.E.A. Laboratory. Volunteer days will be arranged to conduct trash pick-up and light weeding of sites. If interest is sufficient, docents will be trained for revegetation sites to provide educational materials to the public during high use periods.

School Program

Revegetation sites will be used as instructional sites for elementary and middle school visits to the coast. These visits and activities will be coordinated by the Los Angeles Conservation Corps S.E.A. Laboratory to complement the state science education standards. Activities will include investigations into the concept of "habitat," diversity, pollination, mutualism and adaptation.

Financial Estimates

The implementation of this master plan will take place as a series of smaller projects, with this document serving as a guide. Costs of individual projects will vary greatly depending on the degree to which hardscape infrastructure improvements are included. Hardscape development is an order of magnitude more costly than revegetation under most circumstances. The following cost estimates address the revegetation and education portions of the project only.

Restoration

Total revegetation costs per acre, including permits and reporting, will be approximately $20,000 per acre as follows:

Irrigation supplies	$1,300 / acre
Installation of irrigation	$200 / acre
Plant propagation labor and materials	1,500 plants per acre @ $4 / plant = $6,000 / acre
Site preparation (iceplant removal)	$2,500 / acre ($20 / hour total labor cost)
Plant installation	$1,000 / acre
Weeding	$1,000 / acre
Write site-specific revegetation plan, write Coastal Commission application, meet with Coastal Commission, coordinate site access and permission, assess progress, prepare reports	$8,000 / acre

Ongoing maintenance would require removal of invasive weeds once or twice a year, litter clean-up, and periodic replacement plantings in the event of abnormal disturbances. Under normal circumstances plants will set seed and reproduce without human intervention; this will build up a seed bank that should eliminate the need for supplementary plantings, so long as invasive weeds are excluded. This minimal maintenance might be expected to cost $2,000 / year per acre.

Using this cost per acre, restoration of the remaining first priority restoration sites (~16) acres could be accomplished for $320,000. The second priority sites could be completed for another $320,000 while the third priority sites would cost $50,000. The total cost for revegetation of all feasible sites is therefore $690,000. This estimate does not include any fencing or other physical infrastructure beyond the irrigation system and plants.

Education Program

Costs for the interpretive sign program include graphic design and text for 16 signs ($16,000), sign production with high-pressure laminate display and a weatherproof base ($24,000), and sign installation ($5,000) for a total, one-time cost of $45,000.

A public volunteer program could be coordinated by a 1/4-time employee at a cost of approximately $15,000 per year and a budget of $5,000 per year for materials. Any nonprofit hosting this position would require an additional $2,500 per year for liability insurance.

The school program should be integrated into the existing educational programs in the project area (e.g., S.E.A. Laboratory in Redondo Beach, Round House Aquarium in Manhattan Beach). Development and implementation of the educational program could be accomplished by a 1/2-time staff person ($30,000/year) with a budget of $5,000 for materials and expenses.

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Appendix A: Coastal Dune Morphology and Erosion Assessment

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This study of the morphology and erosion characteristics of the coastal dunes flanking Santa Monica Bay was commissioned by Travis Longcore as part of a larger study concerned with the potential revegetation of the dunes seaward of the developed areas of portions of Playa del Rey, Manhattan Beach and Redondo Beach, California. The study was undertaken by Julie Stephenson, a graduate student in geomorphology, under the direction of Antony Orme, Professor of Geography and geomorphologist at UCLA. Field observations were conducted during November and December 2003, the notes from which have been compiled, organized by aerial photographed polygon numbers, in the attached Appendix. This short report summarizes our general findings from such field observations in the context of a broader application.

Local Scientific Background

The Santa Monica Bay dune field is composed of four transverse systems extending southward as a series of ridges and troughs from the mouth of Ballona Creek to the Palos Verdes Peninsula. The dune systems rest upon a lowland comprising marine and non-marine terrace materials. (Cooper 1967) Santa Monica Bay is characterized by net southward littoral drift, which provides sediment to beaches, from which sand is blown inland by prevailing northwest winds. The lowland character of the coast south of Ballona Creek has long accommodated coastal dune development but the Palos Verdes Peninsula has blocked the farther southward transport of sediment. This constructive coastal environment has been enhanced by short intermittent periods of southwest winds, which drive littoral drift northward, further minimizing the escape of sediment around the Peninsula. (Orme and Tchakerian 1986) All dunes in this region have been much modified by human activities over the past century but their general form remains decipherable beneath the urban and industrial framework of the coastal communities.

The dune field covers approximately 96 square kilometers and can be discussed in two parts as designated by form and age. The first part consists of the young, distinct coastal ridge, which is though to have advanced onshore ahead of prograding sea levels during the Flandrian transgression, which culminated around 4,000 years ago. It is well defined as a 300–600 meter wide ridge north of Manhattan Beach but becomes less clearly expressed to the south where it is often confused with the older dunes upon which it has been superimposed. The second part consists of the older dune ridges that extend inland approximately 3–7 km. These dunes were formed prior to the Flandrian transgression and therefore have a more weathered

topography. Various hypotheses have been put forth in explanation of their formation. It was formerly believed that these older dune ridges were once offshore bars at times of higher sea levels and emerged during marine regressions. (Cooper 1967) It is now thought that these ridges are of aeolian origin, reflecting distinctive phases of dune formation associated with relative sea-level changes. (Orme 1988; 1992) Regardless, there are three older ridges similar in relief and extent that extend inland from the more prominent coastal ridge.

Nature of Dune Bluffs and Dunefields Seaward of Developed Areas

Development now covers the majority of the Santa Monica Bay dune field, except in the northernmost portion owned by the Los Angeles International Airport. Thus, for the purposes of this study, we are only concerned with the westernmost slope of the coastal ridge, which remains exposed and, in the absence of human constraints, would likely remain active. The region examined can be discussed in three parts that share general characteristics and are subject to similar disturbances. These are Redondo Beach, Manhattan Beach and Playa del Rey segments.

Redondo Beach is the southernmost region of interest. The windward dune slopes range between 25 and 40 degrees and are associated with compacted soils forming a bluff-top ledge from 6 to 25 feet wide. The slopes are primarily vegetated by iceplant, with coverage from 40 to 95%. Those areas not vegetated are susceptible to erosion from pedestrian traffic and runoff from adjacent parking lots, roads or walkways. Access from the bluff top to the beach is limited in some areas, which has encouraged short cut trampling. The dune slopes decline gradually into a broad flat beach, devoid of vegetation.

The area of study in Manhattan Beach lies between Redondo Beach and Playa del Rey and consists of the windward coastal ridge slope as well as portions of the foredune system. The exposed coastal ridge is situated between the eastward-bounding pedestrian strand and the westward-bounding bike path where slopes range from 5 to 25 degrees. The slopes have vegetal covers ranging from 60 to >95%, which vary in their concentrations of iceplant, trees, shrubs and cacti. Such areas are primarily subject to erosion from concentrated discharges of pipes draining the pedestrian walkway through a one-foot curb. Privately maintained gardens on the top one third of the slope commonly serve to stabilize slopes by dissipating energy from concentrated runoff and preventing trampling. The foredunes lie west of the bike path and are characterized by gentler slopes ranging from 5 to 10 degrees and a more hummocky topography. Vegetation covers approximately 30% of the area and consists of patchy iceplant and low shrubs. The foredunes are susceptible to sheet wash erosion as runoff drains from the adjacent impermeable bike path but this is only of concern where runoff is able to concentrate.

The dune ridge in Playa del Rey is the northernmost region of interest and lies directly west of the Los Angeles International Airport. Although a much broader expanse of the local dune field is exposed, this study is only interested in the publicly owned land west of Vista del Mar Street. Slopes on the coastal ridge range from 25 to 55 degrees. These slopes gradually decrease westward and open into a hummocky foredune system, much like in Manhattan Beach, with slopes ranging from 0 to 10 degrees. Vegetation in the form of iceplant, cacti and shrubs covers 70 to 95% of the ridge slopes and 0 to 35% of the foredunes. The dune slopes are particularly susceptible to runoff overflow from the street and trampling adjacent to areas where street parking is allowed. The low foredunes fronting much of the Manhattan Beach and Playa del Rey segments are active reflections of sand moving in the prevailing winds from the broad beaches to seaward whose natural instability is maintained by recreational and beach-grooming activities.

Management Problems and Causes

As noted below, there are various geomorphic concerns associated with the dune slopes that warrant effective management. For the purposes of this study, the areas of interest are bounded by streets, houses and walkways, which limit the concerns that may arise. Of particular importance given the circumstances are raindrop impact, sheet erosion, rill erosion, gully erosion, mass movement, and wind erosion and redeposition. The susceptibility of slopes to the adverse impacts of the above processes varies depending upon the prevailing local conditions and is enhanced by channelized runoff, pedestrian trampling and vegetation loss.

Raindrops may dislodge soils on exposed surfaces where the force of the raindrop impact exceeds the gravitational and cohesive forces maintaining sediment positions. This loosens soils for further erosion and transport and is particularly important where soils are susceptible to mobilization because of a lack of cohesion or vegetation. In the areas of concern, raindrop impacts are only of minor importance. Exposed soils on the bluff-top ledges of Redondo Beach and Playa del Rey and the areas of patchy vegetation in Playa del Rey are susceptible to degradation by raindrop impacts. These impacts alone are of little consequence but the resulting availability of sediment for more destructive processes warrants consideration.

Sheet erosion occurs naturally on steep slopes with relatively uniform soil resistance and permeability. It may also occur where impermeable surfaces drain unobstructed and unchannelized onto more pervious materials. The sheet wash effectively dislodges sediment by overcoming frictional forces and is capable of transporting it downslope. For the purposes of this study, sheet erosion, like raindrop impact, plays a larger role in setting up conditions more vulnerable to other processes than by degrading slopes by itself. This is of particular concern in Redondo Beach and Playa del Rey where bluff-top ledges consist of soils compacted to the point of limited permeability. Therefore, storm runoff is discharged as sheet flow immediately onto

the dune slopes, it may be where it is directed into already established rills and gullies by local vegetation and topography, accentuating erosion processes. Sheet erosion is also of concern in Manhattan Beach and Playa del Rey where bike paths drain directly onto the foredune systems. Erosive impacts are limited to the area immediately adjacent to the concrete paths because of the permeability of the sandy soils and the patchy vegetation.

Dune slopes are susceptible to rill erosion where vegetation is patchy and sparse. Runoff is locally channelized and capable in such mass and velocity to incise shallow rills. Because vegetal coverage for most areas of this study are 70 to 90%, erosion due to rill formation in most places is limited in extent and depth. The only region where this may warrant more consideration is in those areas of Playa del Rey where vegetation is patchy and distinct unvegetated avenues have been cut through the slopes. In this region, vegetation is a mixture of iceplant and shrubs, the sparse distribution of which facilitates the rilling of bare soils.

Rills are also important in that they may lead to gully formation. Gullying is widespread in the study area and has the greatest adverse impacts on the stability of the dune slopes. Gullies form much like rills but require the concentration of greater quantities of discharge and result in deeper, more incised channels. Gullies also serve as major routes for sediment transport during storm flows as the depth and velocity of the channels support sediment in suspension as well as bed load. This is especially important in the area of study because soils are removed from slopes and ultimately delivered to the impervious westward bounding pedestrian and bike paths. This creates maintenance and safety concerns and decreases the utility of the right of way. Gullying is problematic in all three areas of the study. In Redondo Beach, deep gullies have formed where runoff from the adjacent bluff-top street overflows during larger storm events onto the dune slopes from collection areas or from breaks in the curb. Gullies in Manhattan Beach are of similar depth but occur at specific intervals associated with the location of pipes draining adjacent bluff-top and mid-bluff walkways. Incision capabilities are enhanced where discharges fall a substantial distance onto dune soils lacking sufficient vegetation to dissipate impact energies. Gullies in Playa del Rey are the most severe, occurring at more frequent intervals and in greater depth than elsewhere. They have been formed by the channelization of overflow runoff from the adjacent street and have been accentuated where storm drains prevent local infiltration. In all areas, gullies are used by pedestrians as paths and therefore slope and beach-access influence the degree to which erosion has occurred.

The mass movement of slope materials occurs when a large portion of the hillslope is dislodged as a massive unit or as a collection of individual grains and moves downhill response to gravitational forces. Materials are mobilized initially by bank destabilization, which may occur with saturation or vegetation removal. The material, depending on its consistency and hillslope declivity, moves downhill by sliding, falling or mass flowage. Such processes can substantially deform hillslope

profiles and transport large quantities of material very rapidly. In all three sections of the area of study, there are signs of relict mass movements that have been stabilized by vegetation and retaining walls. Mass movement does not appear to be a current problem because problem slopes have been maintained at conservative grades and provided with dense vegetal coverage.

Active dunes are, by definition, subject to frequent change as a result of the introduction of fresh sand and/or effective wind velocities. (Nordstrom et al. 1990) Under natural conditions, the coastal ridge of the Santa Monica Bay dunes should still be active. Indeed, in the Manhattan Beach and Playa del Rey segments in particular, deflation of broad flat beaches under prevailing wind conditions continues to provide for active foredune development and sand transport towards the main dune ridge. The latter, however, is not as susceptible to wind erosion because of its vegetation coverage and engineered slopes although sediment from the foredunes may rise onto the coastal ridge. Such processes do not pose any immediate management problems with respect to coastal bluff stability.

Management Solutions

The destabilization and deformation of the exposed dune ridge in Redondo Beach, Manhattan Beach and Playa del Rey are primarily the result of erosion caused by storm runoff and pedestrian traffic. There are a number of ways in which drainage, pedestrian access and slope susceptibility may be managed to mitigate the adverse impacts of development on the dunes.

As discussed in the previous section, directed runoff from adjacent streets, parking lots or walkways initiates a multitude of destructive processes, most notably rill and gully formation. While most impervious surfaces in the area of study (except for Manhattan Beach) do not discharge runoff directly onto the dune slopes, overflow events occur during large storm events and poorly maintained infrastructure allows for breaks in the system, as evident in curb failures and downspout problems at Redondo Beach and Playa del Rey. While it is unlikely that such impervious surfaces will be reengineered to fix minor glitches, attention should be given to reducing the capacity of collection areas during storm events and to the repair of the curb breaks to reduce the impact of excess runoff on dune slopes. The area of concern in Manhattan Beach is unique because runoff from the pedestrian strand is directed through pipe culverts at intervals ranging from 20 to 50 feet on to the dune slopes, not all of which are presently functioning. In such cases, it is more important to prepare the dune with hardy vegetation at the outfall to dissipate the erosive energy.

Erosion caused by runoff has been exacerbated by pedestrian trampling of the dunes and their vegetation cover, which has led in many places to rilling and gullying. The dune ridge presents an obstruction to the direct access of the beach and therefore stairways and ramps have been designed to provide safe avenues of travel. Such

access points must be properly placed to provide access to the greatest number of recreational users. Therefore, planning and circulation concerns such as pathway directness, continuity and accessibility are important in encouraging use and preventing the trampling of the dunes. In Redondo Beach and Playa del Rey in particular, access is limited and pedestrians are required to walk some distance to reach a stairway or ramp to descend to the beach. Many people are simply too lazy to walk that distance when sand and surf beckon! Therefore, to discourage short-cutting and the resulting trample erosion of the dunes, providing more frequent access paths should be considered. Less expensive bluff-top fences and/or revegetation of informal access paths with plants that deter pedestrian traffic (e.g. native cactus!) should also be considered.

Finally, dune vegetation and slope should be maintained to reduce vulnerability to the adverse impacts of natural processes. Gullies may be filled and revegetated to stop active erosion of local slopes. Furthermore, bare soils may be revegetated to stabilize slopes and reduce exposure to weathering. Such actions would be most effective in combination with the drainage and access measures discussed above.

Conclusion

The primary purpose of this report is to assess the local physical, chemical and biological forces acting on the exposed coastal ridge of the Santa Monica Bay dune field. From the field observations, it is apparent that hillslope profiles are altered predominantly by natural processes, such as rill and gully erosion caused by stormwater runoff, and enhanced by pedestrian trampling. The occurrence and rates of erosion processes are therefore dependent not only on rainfall intensity and hillslope susceptibility but also on the channelization of runoff and pedestrian access to the beachfront and dune slopes. Vegetation can play a vital role in naturally stabilizing slopes by retaining the cohesiveness of slope materials with extensive root systems and by dissipating rainfall and runoff energies that would otherwise erode exposed soils. Larger prickly shrubs may also be used to physically block pedestrian access to dune slopes and therefore prevent short-cut trample erosion. Revegetation efforts should consider the geomorphic benefits of slope vegetation as well as the prevailing local conditions (summarized in Appendix) in selecting locations and species for renovation. Areas that would be conducive to revegetation trials are the bluff-top ledges that line many of the slopes in Redondo Beach and Playa del Rey as well as the foredunes of Manhattan Beach and Playa del Rey. It is recommended that further revegetation be evaluated on a section-by-section basis in consideration of slopes, soils, adjacent development and its drainage, and the history of pedestrian trampling. Lastly, revegetation success would be greatly enhanced by the implementation of the other drainage and access suggestions contained throughout the body of this report.

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Dune Morphology and Erosion Assessment by Aerial Photograph Polygon Number

TORRANCE/REDONDO BEACH

1 iceplant vegetated bluff; some past slope failure stabilized by ~90% vegetative cover

1-2 (3–5 m wide sandy track from bluff parking lot) no vegetation and heavily trafficked ----> erosion prone
Recommendation: close bluff-top access

2 iceplant coverage of 70%, remaining 30% bare due to heavily trafficked diagonal tracks which increase vulnerability to erosion
Recommendation: restrict bluff-top access by means of a fence or impenetrable vegetation

3 80% iceplant coverage; 1/3 from bluff top – distinctly indurate, hardened sand; has suffered gullying and erosion, downslope sandbagging indicating active erosion north of men's restroom
*recently re-vegetated segment with new zig-zag wheelchair access ramp, slope engineering during construction of ramp eliminated gullies (north of men's restroom)

4 largely refurbished segment with gullies repaired during construction of zig-zag concrete access path
*polygon boundary change – south boundary path is now at a greater angle diagonal to dune orientation, old ramp eliminated

5 40% iceplant coverage, actively eroding gully 4–6 inches in depth at northern boundary adjacent to relict re-vegetated gully, consecutive trampled gullies, receives parking lot runoff overflow during larger storm events (parking lot drains to storm drain via intervallic culverts)
Recommendation: prevent further erosion by raising curb 1 foot to prevent overflow and restricting access (move bluff top fence east 4 feet to the parking lot curb AND/OR plant prickly hedge grove to deter shortcutting instead of iceplant near bluff top parking lot

6 newly trampled swath, unvegetated, eroded
Recommendation: extend bluff top fence to south bounding zig zag path to prevent short cutting

7 recently graded, 40% iceplant coverage, slight gullying but not significant due to small watershed size, cliff top above — grass covered with distributed Japanese black pines

8 bluff divided in half by chain link fence which has been successful in protecting area downslope, upslope area extensively degraded –> 15–18 foot barren ledge and potential gullying because of denuded bluff top, significant gullying near north boundary in places 1 foot deep
Recommendations: restrict access at bluff top by placing barrier fence immediately adjacent to street curb, close holes in chain link fence under which people can climb to short cut
**Bluff top barren ledge ideal location for revegetation with natives with protection of fence*

9 bluff divided in half by chain link fence, significant erosion above and below fence due most likely to impacts of rain on 18–25 foot wide barren bluff top strip ----> actively eroding gullies exacerbated by trampling where holes under fence, gully 50 feet north of Vista del Mar excavated to depths > 2 feet forming alluvial fan mid-slope
Recommendations: construct or plant discouraging barrier at sidewalk curb to prevent people from short cutting through gullies already established by rainfall (critical points = benches), construct additional access ramps or stairs to mitigate need to bypass foredune slopes

10 bluff divided in half by chain link fence, trampling less problematic because polygon lies between more closely placed access ramps, bluff top ledge of compacted soils 6–10 feet wide
Recommendation: extend chain link fence all the way to path to prevent any attempts at short cuts

11 bluff divided in half by chain link fence, bounded by relatively close access ramps ---->minimal gullying, 4–6 foot compacted bluff top ledge, steep slopes

12 bluff divided in half by chain link fence, 3–6 foot compacted bluff top ledge, 30° slope (too steep for trampling), relict gullying largely arrested by iceplant revegetation, actively eroding gully at north bounding path
Recommendation: extend mid-slope fence to path edge to prevent short cutting

13 bluff divided in half by chain link fence, 6–8 foot denuded bluff top ledge enabling minimal gully initiation, actively eroding gully at north bounding path
Recommendation: extend mid-slope fence to path edge to prevent short cutting

14 bluff divided in half by chain link fence, small aerial extent, 80% iceplant coverage, limited watershed, no significant gullying

15 bluff divided in half by chain link fence, 40° slope, barren cemented dune sand exposures at bluff top ----> sheet erosion onto steep slopes, severe gullying in places depths >3 feet, upper slopes largely exposed, vulnerable to street drainage where breaks in sidewalk allow runoff to breach curb and wash downslope
Recommendation: maintain integrity of curb, fix breaks where runoff can breach slope

16 severe gullying at south boundary caused by street runoff allowed to enter dune slope due to cut in sidewalk for pedestrian access trail, mass slump in middle, 95% iceplant coverage
Recommendation: prevent runoff from dune slope by directing it away from path entrance (additional storm drain, diffusion and/or dissipation)

17 runoff from pathway washes over small curb---->gullying (sandbags now protect up and downslope of critical areas of erosion), recent debris flow activity caused by runoff from break in berm protecting slope from pathway runoff, 30–40° slope

18 95% iceplant coverage with patchy cactus, patches of bare soils on upper boundary may enable erosion from rain impacts, hummocky topography throughout polygon atop 40° slope indicative of relict slumping or unstable slopes, lower boundary retained by wall 5–15 feet in height, gullying

primarily focused in three locations resulting from runoff from barren upper bounding ledge and short cut trampling
Recommendation: re-vegetate barren soils with vegetation to discourage trampling

18-19 boundary no longer exists ---> stairwell destroyed and slope retained by 10 foot wall with fence barrier at top, revegetated in tiered iceplant

19 boundaries no longer exist, upper slope bounded by fence, 95% iceplant coverage, no gullying

20 erosion caused by short cut trampling because of restricted access near south boundary (Sapphire Street access blocked off), no runoff gullying
Recommendation: construct access path at Sapphire Street

21 95% iceplant coverage, no visible runoff channelization, trampled pathways vulnerable to further trample erosion and enhanced channelization from concentration of upslope runoff, retaining wall breaks indicate slow creep of slope under weight of soils, barren ledge ~9 feet wide at top near benches
Recommendation: prevent pedestrian access from above by planting discouraging plants on bluff top ledge or constructing a fence

22 severe trample erosion from parking lot to all sides of restroom further enhanced by concentrated, channeled runoff ----> gullies ~2 feet in depth, 25° slope, 90% iceplant coverage, no apparent drainage from parking lot, upper boundary pathway may encourage short cut trampling

23 severe trample erosion from parking lot further enhanced by concentrated, channeled runoff ----> gullies ~1 feet in depth, slope at south boundary ~25° gradually decreases northward, 95% iceplant coverage, upper boundary pathway may encourage short cut trampling

24 stable slopes, 95% grass coverage, bounded upslope by fence

25 stable slopes, 95% grass coverage, bounded upslope by fence

*all subsidiary 1.1, 2.1, 3.1, … beach segments were relatively flat and devoid of vegetation

MANHATTAN BEACH

26 99% vegetation coverage (private irrigated gardens predominate south of 720 The Strand, north of which is characterized by iceplant), level "planter" of ~10 feet width (0° slope), private planters have extensively fertilized, 2 foot retaining wall adjacent to western bounding bike path

*iceplant areas ----> runoff from strand (walking path) drains through 1 foot curb to planters where localized channelization has resulted (gullies no deeper than 6 inches)
Recommendation: plant vegetation to dissipate concentrated flows from drains, reduce height at which runoff falls from drain to reduce initial impact

27 80% vegetation coverage, minimal slope (<5°) retained by 3 foot wall lining bike path to west, minimal gully erosion at drains

28 no vegetation coverage at north end of polygon, minimal slope (<5°), localized channelization at drains, retained by 3 foot wall lining bike path to west

28-29 access boundary no longer exists, retaining wall now blocks soils from splay on bike path, sandy pathway – no vegetation cover

29 minimal, patchy vegetation increases southward with spotty trees and cacti, localized channelization at drains, minimal slope (<5°), retained by 3 foot wall lining bike path to west, slope may be decreasing

30 minimal iceplant coverage at north end where two large storage containers (10 ft x 10 ft) have been placed, truck access through sandy area to parking lot tracks soils from dune into adjacent parking lot, 30% iceplant and grass cover, slight gully erosion at drains from strand where there is a 5 foot drop from strand elevation (drain spout) to underlying dune slope (receiving vegetation) ----> downslope alluvial fans, apparent soil denudation as unfinished concrete is exposed on west side of strand wall

26.1-30.1 (west of bike path)

Patchy, sparse iceplant and low scrub cover; minimal trampling because existing large barren areas provide naturally constructed access paths; hummocky terrain; depth of sands and infiltration capacity appears to prevent extensive gully erosion or channelization of runoff from bike path, vulnerable to sheet wash from bike path especially in locations across from stairways or access ramps which contribute additional localized runoff; gentle slopes

31 95% vegetation cover (iceplant and prickly bushes), un-vegetated path vulnerable to erosion used as access path down to parking lot, local channelization originating at drains has been enhanced by trampling erosion, ~7° slope, gullying fronting 13th street where drain outfalls drop 3 feet and have caused localized channelization (~4 inches deep), 85% iceplant coverage
Recommendation: plant hardy vegetation at foot of drains to dissipate energy from runoff

32 99% vegetation cover (iceplant and brush), one private garden atop bluff on ledge, >5 foot drop from drain outlet to dune soils deters trampling, no apparent gully erosion from strand runoff most likely due to vegetation density, relict re-vegetated gullies evident where drains have been filled in with concrete, slope profile shows slumping (gently sloped foredune ridge backed by steeper upslope scarp face)

33 90% iceplant cover, patchy cactus, minimal gullying due to vegetation density, ~25° slope

34 relict gullies below old concrete-filled drains that have been re-vegetated, 80% vegetation cover (iceplant and cacti), minimal trampling, ~20° gentle slope more stable where cactus lines upper boundary

35 top 1/3 slope leveled and planted with private gardens, bottom 2/3 – 75% iceplant cover, fence lining strand on upper slope preventing trampling, some runoff channelization where drainage outfalls onto slope, upper slopes vegetated by hardy bushes stabilize lower slopes by dissipating runoff and preventing trampling
Recommendation: line strand with bushes that discourage trampling and dissipate energy from drainage outfalls, incorporate soils capable of infiltration as opposed to compacted soils over which runoff can flow

36 upper slope lined by cacti, bushes, and fence, >20° slope, top 1/3 of slope leveled for private gardens, bottom 2/3 – 95% iceplant coverage, minimal gullying from trampling or runoff most likely due to garden maintenance and irrigation

37 fairly stable 20° slope, top 1/3 of slope leveled for private gardens, bottom 2/3 slope – 95% iceplant coverage, erosion potential where gardens lack full vegetation coverage

38 relict gully blocked and re-vegetated with abundant iceplant, west side of downslope bike path sandbagged due to apparent sheet wash from concrete onto sand, several locations of severe gullying (>1–3 feet in depth) from pipes through curb draining strand (sand bags and plastic reinforcement has not prevented erosion due to runoff coupled with trampling) ----> resulting debris fans onto lower bounding bike path, where cacti and bushes lining strand ---> minimal erosion, some private gardens covering top 1/3 slope, otherwise, 90% iceplant coverage

31.1 – 38.1 (west of bike path)
patchy vegetation (iceplant and low scrub), hummocky topography, stable slopes (3°–7°), intermittent paths continuing from stairways or ramps as access

to beach, infiltration capacity of soils minimizes gullying erosion, potential for erosion from sheet wash off of bike path (especially where wash comes from stairway or access ramp as well)
Recommendation: possible site for revegetation with native species.

39 70% slope, patchy vegetation, polygon adjacent to lifeguard headquarters and parking lot ---> vulnerable to parking lot, street and bike path runoff (evidenced by sand bags)

40 patchy iceplant coverage (80%), hummocky topography, stably vegetated tops with less stable and minimally vegetated side-slopes, no significant gullying

41 60% iceplant cover, large barren sandy soil at mid-slope vulnerable to erosion, 20° slope, very small polygon abutting lifeguard headquarters (protected from street, bike path runoff)

42 20° slope, 90% iceplant coverage, small polygon abutting lifeguard headquarters (protected by structure from street, bike path runoff)

43 pipe drain gullying facilitated where receiving soils lack vegetation (>1 foot in depth), ledge at upper slope ~20 feet wide ---> trampled paths have been created where widest and lacking vegetation, hummocky 25° slope
Recommendation: re-vegetate barren ledge to dissipate drainage outfall energy and deter trampling

44 stable slopes, 95% iceplant cover, no significant trampling or drainage erosion most likely due to existence of private gardens on top 1/3 which deter people from short cutting and dissipate energy

45 85% iceplant cover, 12 foot grass or soil ledge upslope between 1 foot curb and 25° slope, gullying due to runoff and trampling erosion
Recommendation: revegetate ledge to dissipate runoff and deter trampling

46 gullying primarily from trampling erosion; northern end ---> potentially unstable sands with 50% iceplant cover, upper slope (30°) stably vegetated, lower slope (<5°) unvegetated with potential to spill out onto bike path; southern end ----> area restored with native vegetation and stabilized by netting (major erosion potential where sparse vegetation – some signs of erosion but not gullying yet), 40% vegetation cover

47 severe erosion from trampling as people step over 1 foot curb at benches and walk through iceplant, barren ledge at top of slope, 85% vegetation cover, stable 20° slope decreasing northward to about 5°, minimal trampling where bushes adjacent to strand restrict access

Recommendation: replant discouraging vegetation adjacent to strand to deter trampling

48 99% iceplant cover, top 1/3 covered by private garden, manmade pathways surrounded by dense vegetation leading down to bike path from private gardens show no erosion, gentle slope with flat ledge at top, no significant gullying or trampling (private gardens deter people from cutting through and strand now graded inslope to drain to storm drains instead of dune soils)

49 top 1/3 planted with private gardens, trampling occurs where there are breaks in the gardens and people can get through bushes to bike path, 80% iceplant coverage with erosion potential concentrated in areas devoid of vegetation
Recommendation: close vegetation gaps adjacent to strand between private gardens to prevent further trampling erosion

50 top 1/3 planted with private gardens, 95% vegetation cover, stable 25° slope, some trampling between gardens
Recommendation: close vegetation gaps adjacent to strand between private gardens to prevent further trampling erosion

51 top 1/3 planted with private gardens, no significant gullying, densely iceplant vegetated 25° slope

52 95% iceplant cover, top 1/3 planted with private gardens, no significant gullying, large area at northern polygon edge devoid of vegetation and vulnerable to erosion during storm events

53 top 1/3 leveled and replanted as private gardens, elsewhere 95% iceplant cover, 35° slope stabilized by dense vegetation, no significant gullying

54 top 1/3 leveled and replanted as private gardens, elsewhere 95% iceplant cover, 35° slope stabilized by dense vegetation, no significant gullying, Northern end -> hummocky topography due to relict slumping that has since been stabilized by vegetation

55 portions of extremely steep slopes >60° that are stabilized by iceplant, gullying potential from runoff where iceplant has been cleared for private garden which has been sparsely replanted and leads out onto steep slope, steep slopes vulnerable to slippage, slumping, etc.

56 85% vegetation cover (iceplant), vulnerable to runoff from adjacent street and parking lot, sidecast cover over vegetation in places vulnerable to erosion during storm events

43.1–56.1 (west of bike path)

30% vegetation coverage, hummocky terrain with intermittent trampled paths, gullying erosion minimal due to infiltration capacity of sands, vulnerable to sheet wash immediately adjacent to bike path especially where stairways and ramps may provide additional runoff. **80–100 yard wide beach is more than sufficient to resupply foredunes*

57 80% iceplant coverage, vulnerable to sheet wash during storm events from bike path and lifeguard parking lot (sand bagged upslope), erosion at foot of slope from trampling or resulting from removal of vegetation serving as stabilization, soils from upslope wash over iceplant
Recommendation: protect slopes from sheet wash from impermeable areas by constructing a berm or curb

58/59 85% iceplant cover, additional distributed rocks and cacti, upslope curb protects slopes from lifeguard parking lot runoff but there is potential for overflow into dunes, fence upslope prevents trampling, northern end devoid of curb protection shows signs of erosion from sheet wash from parking lot
Recommendation: extend curb to meet edge of vegetated area

60 95% vegetation cover (80% iceplant, 15% bushes and palms), 20–25° stable slope, no significant gullying, southern end hummocky formations

61 95% iceplant cover with patchy cactus and trees, enclave gardens, lower bounding retaining wall, 20° slope, fence lining upper slope, no significant gullying, minimal trampling erosion originating in gardens
Recommendation: replace piling ~50 feet from southern border which is no longer present – soil is spilling into parking lot

62 95% iceplant cover with patchy grasses, cacti, bushes and trees, stable 15° slope, fence lining strand prevents people from trampling, no significant gullying, areas cleared of vegetation near southern boundary show signs of erosion

63 sporadic gardens on top ledge portions of slope adjacent to walkway / strand, fence and bushes (3–5 feet in height) lining strand, pilings retain 15° slope, 95% iceplant cover, no significant gullying

64 fence, trees and bushes line strand and prohibit trampling, pilings retain lower slope, 95% iceplant cover, top ledges planted with private gardens, gentle slope ~10°, no significant gullying

65 fence lining strand preventing people from cutting through vegetated areas, 95% vegetation cover (iceplant, cactus and bushes), <10° slope, lower slopes bounded by retaining wall, no significant gullying

66 <10° slope, 95% iceplant cover with sparse trees and bushes, fence lining strand and retaining wall at lower boundary with parking lot, stable slopes, no significant gullying, northern end ----> trampling and runoff erosion
Recommendation: construct fence and curb or plant discouraging vegetation to prevent trampling and runoff erosion at northern end

67 95% vegetation cover (iceplant, patchy trees, grasses, bushes), 15° slope, fence lining strand and lower slopes retained by pilings, stable slopes, no significant gullying, runoff directed away by 4 inch curb

68 95% vegetation cover (iceplant, patchy trees and bushes), 25° slope, fence lining strand and lower slopes retained by pilings, stable slopes, no significant gullying, potential for erosion at northern end where path from trampling is vulnerable to runoff during storm events

68.1 area leveled and revegetated with lawn and boxed planters holding flowers and plants, potential runoff from parking lot over wall into soils directly adjacent

69 80% vegetation cover (iceplant, trees, bushes, flowers in planters), upslope protection from street within hyperion plant by wooden planks which prevent runoff from entering planters, stable slopes

PLAYA DEL REY

70 level area (0° slope), 12 yd ledge leading into well vegetated 20° slope, ledge containing patchy ground cover, chain link fence at ledge separates ledge from slope leading onto plant property, protected from street runoff by 1 foot curb and densely lining vegetation, minimal gullying due to lack of slope, compacted soils most vulnerable to erosion during storm events from rain impact

71 slope decreases northward from 25° to 5°, 85% vegetated with iceplant, protected from street runoff by 1 foot curb, no significant gullying or trample erosion (street is 4 lane highway with speed limits of 50 mph, plant is immediately across street, street does not host parallel parking ----> area subject to minimal foot traffic)

71.1 13 yard barren ledge atop grass and scrub vegetated 25° slope with interspersed trampled pathways from HANGLIDING, 2.5 foot net fence lining ledge in between pathways, area appears to be maintained -----> no significant erosion, soils loose on slope pathways facilitating infiltration as opposed to runoff downwards, stable slopes and abundant vegetation, may be vulnerable

to sheet wash from bike path during storm events; irrigated by sprinklers approximately 15 yards apart.

72 10 foot un-vegetated ledge ----> sheet wash from bike path does not infiltrate and goes directly to 20° slope where it is channelized, eroding interspersed gullies (< 1 foot in depth), gullies quickly decrease in gradient and fan at top of slope (channels are initiating, potential for future erosion during heavy storms), fence and curb line adjacent parking lot ----> access limited to bikers traveling on the bike path

73 foredune system with sparse grass cover, hummocky terrain, minimal sliding where slopes are un-vegetated, minimal gullying where runoff energy from bike path is not dissipated by vegetation

74 stable 30° slope, well vegetated, no significant gullying

74.1 foredune system sparsely vegetated with grasses, iceplant patches, erosion potential where devoid of vegetation, some gullying from runoff from adjacent street (<1 foot in depth), some larger gullies with downslope debris fans

74.2 subject to sheet wash erosion from street (sand bagged)

7 5 gently sloping lawn, stable with patchy tree planters, maintained by lifeguards or campsite managers

75.1 40% patchy iceplant cover, storm drain discharge gully; north of drain --> sparsely vegetated, minimal slopes; south of drain ---> street graded to drain inslope, minimal runoff erosion as curb protects slopes from street runoff, some trampled pathways

7 6 gently sloping lawn, stable with patchy tree planters, maintained by lifeguards or campsite managers

77 unstable slope (sliding, debris fans), fence _ downslope, vegetated but active erosion where sparse, severe gully erosion ----> road and fence undercutting

77.1 1 foot curb adjacent to street / pathway, almost entire grass coverage, few gullies continued from upslope (77)

77.2 70% vegetation coverage (grass and iceplant)

78 runoff gullying (4 feet deep), runoff originating from diagonal concrete pathways which ultimately crosses asphalt street and ends up in 79.1 near stairway where curb cuts (locally eroding / sandbagged)

79 unstable slope (45º), actively eroding steep slopes, Northern end vegetation sparse _ active erosion due to unstable soils
well vegetated at 8 foot retaining wall stretching 50 feet at mid-slope
Southern end : 70% vegetation cover (iceplant, low scrub and bunch grasses), upper slope road exposures (possible where storm drains built into slopes from street), _ further channelized runoff and increases amount creating gullies downslope of exposures, severe road undercutting – giving way in places, evidence of mice and lizard habitation
Recommendation (77–79): prevent short-cut trampling from above by prohibiting access from street side parking areas and walkway.

79.1-79.2 10º slope, 80% vegetation coverage (iceplant), minimal trampling erosion, some gully erosion from upslope 79

80 80% vegetation coverage (iceplant and low scrub), severe gully erosion (greater than 3.5 feet deep) _ soils spilling into pathways at various points, 45º slope – hummocky topography
vegetation unhealthy (healthier vegetation might stabilize slopes)
1 foot curb separating adjacent road – may be some overflow runoff concentrated where road exposed in slopes – gullies have formed, area not lined by roadside parking which limits the amount of trampling due to access

81 45º slope, iceplant coverage, some gullying from runoff (1 foot deep), asphalt outcropping, apparent slides from slope profile and slope, erosion where unvegetated, lower slump scars revegetated, some unhealthy vegetation

82 stable 45º slope, no gullying, 95% iceplant cover

83 stable 45º slope, no gullying, 95% iceplant cover

84 45º slope, dried vegetation with patchy shrubs, iceplant (shrubs are dead, iceplant alive) – 80% cover
gullying where asphalt from road exposed on slopes at top
adjacent roadside parking – some trampling but slope is rather steep
curb at top unable to prevent runoff during storms – gullies at 30 feet intervals (2 feet in depth)
Southern end more stable with minimal gullying
Recommendation: replace upslope curb

85 severe gully erosion from trampling and walkway runoff overflow – soils spilling into walkway (channels every 20 feet), 55º slope, vegetation cover where no gullies, road undercutting and asphalt exposures
Recommendations: restrict access from above and repair curb to prevent run-on from street overflow

85.1 – 85.5 gentle slopes, vegetation mixture of grass, iceplant, palm trees, stable slopes, up slope portions may receive sheet wash from adjacent eastward bounding asphalt street

86 Northern end – private condo development (not pictured) under construction, aerial coverage extends to bottleneck at southern end of polygon
Southern end not claimed by construction area — 85% vegetation coverage (iceplant, grasses, scrubs), stable 30º slope, some gullying due to runoff (may be seeping through curb where road is undercut)
areas where there is no curb separating asphalt walkway from vegetated slope

87 no slope, all sand – no vegetation coverage, not subject to erosion from runoff from impermeable surfaces

88 hummocky dunes, no net slope, patchy grass coverage, some iceplant and low scrub, 35% vegetation cover but distributed evenly, fence surrounding entire area restricting human access, not vulnerable to runoff from impermeable surfaces (permanence of fence?)
Recommendation: curtail all access by pedestrians to allow for the revegetation of barren patches.

89 no slope, all sand, potential to re-vegetate perimeters of sandy pathways through houses, vulnerable to minimal runoff from adjacent houses – no erosion

GENERAL CONSIDERATIONS

1. limited access in Redondo Beach – municipal boundaries
2. extension of median fence all the way to path to prevent possibility of short cuts (Redondo Beach)
3. curb maintenance – fix breaks to prevent runoff breaches
4. upper boundary ledges (Redondo Beach)
5. drains from strand through curb onto dunes (Manhattan Beach south of 27th street – north of which, strand is graded inslope and runoff goes into storm drains
6. sheet wash erosion from bike path on west side dunes (especially at access points)

7. in-slope storm drain exposures – concentrate and increase flows leading to downslope gullying (Playa del Rey)
8. roadside parking leading to trample erosion because of access (Playa del Rey)
9. unhealthy vegetation (Playa del Rey)

Appendix B: History of the South Bay Cities

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The South Bay communities of El Segundo, Manhattan Beach, Hermosa Beach, Redondo Beach and Torrance are separate, incorporated cities with their own identities and historical experiences. In large and small ways, the histories of their coastal landscapes reflect these differences.

The Pre-History of the South Bay Communities

The first inhabitants of the South Bay were lodges of the so-called Gabrielino Tribe (this was the name given by the Spanish) of Native Californians. The Chowigna lodge inhabited the Redondo Beach area and the Engnovangna lodge inhabited Manhattan Beach, for example. Linguistically, the Gabrielinos are classified as having been of Shoshone stock (Johnson 1965). As many as 10,000 Gabrielino Indians lived in the South Bay at the time of first European contact (Shanahan 1982:17). As hunter-gatherers, the Gabrielinos did not practice agriculture. They had abundant food, however. The Indians caught fish near the shore in Redondo, where an underwater canyon channeled fish close to land. They gathered shellfish from tidepools at the base of the Palos Verdes cliffs and hunted game in the hills above. Fowl was abundant at inland marshes (Johnson 1965). The Gabrielino also ate lizards, acorn meal, mesquite pods yucca stalks and other foods (Shanahan 1982, Shanahan and Elliot 1984).

The natives were accomplished weavers of baskets. They also carved pipes from steatite, a white-green talc found on the Channel Islands (Shanahan 1982, Shanahan and Elliot 1984). A settlement of stick huts was located beside a group of five salt ponds in present-day Redondo Beach. The ponds, north of present-day Beryl Street between Pacific Avenue and the ocean, covered fifty acres and were known to the Spanish as Las Salinas (Grenier and Gillingham 1987). The name Chowigna – the lodge that lived at the ponds – reflects the importance of salt. “Chowi” was the native name for the hills of Palos Verdes, while “igna” comes from “egne”, the Indian name for a salty plant that they used to flavor mush (Johnson 1965). There was also a concentration of Indians at what is today the Esplanade north of Sapphire street (Shanahan 1982). The Indians obtained fresh water from a stream near the present-day location of Ainsworth Court. They had a camping site at a small hill at present-day Beryl and Catalina streets. The Chowigna sold and bartered goods with other Indians, especially those in the San Bernardino Mountains. They traded salt, fish, baskets and steatite pipes for pottery or for strings of small shells that were used as currency (Shanahan 1982, Shanahan and Elliot 1984).

European History

The permanent presence of Europeans in the South Bay began with Gaspar de Portola's expedition in 1769, which escorted Father Junipero Serra, the founder of the California missions (Shanahan 1982). Serra removed the natives to the San Gabriel Mission, which was founded in 1771. Two hundred years later, virtually all of the natives would be dead from the ravages attendant upon European settlement: infectious diseases, alcohol, syphilis and tuberculosis (Shanahan 1982).

In the nineteenth century the South Bay was divided between two vast ranchos. The El Sausal-Redondo Rancho included the present-day locations of El Segundo, Manhattan Beach and Hermosa Beach. The Rancho San Pedro (later called the Dominguez Rancho) included the present-day locations of Redondo Beach and Torrance (Shanahan and Elliot 1984).

United States History

1800s. After California became part of the United States and US settlers arrived in significant numbers in the late nineteenth and early twentieth centuries, the South Bay cities were established and developed along their own separate trajectories.

In the mid- to late-nineteenth centuries much of the South Bay had been used for cattle ranching and, after the drought of 1875 that decimated that industry, dry farming. In 1855 businessmen Henry Allanson and William Johnson, who had bought over 200 acres of land from the Dominguez Rancho, founded the first Anglo-American industry in the Redondo Beach area (Johnson 1965). The Pacific Salt Works was located at Las Salinas, the ponds where the Chowigna lodge had lived and sold and traded salt. Wood to heat the salt works boilers was supplied by willows growing on the north slope of the Palos Verdes hills (Grenier and Gillingham 1987). During the land boom two years later, the firm of Vail and Freeman established the townsite of Redondo Beach (which would be incorporated in 1892) (Myers and Stewart 1976). The name of the town, Spanish for "round", was inspired either by the curving shoreline, the curving streets planned around an oval in the center of town, or from the name of the Rancho of which it had been part (the El Sausal Redondo rancho, meaning "The round clump of willows"; Myers and Stewart 1976).

Subsequently, developers Capt. J.C. Ainsworth and Capt. R.R. Thompson sought to stimulate tourist trade in the area. Working out a deal with the Dominguez sisters, heirs to the original rancho, they re-laid the city in blocks and named the north-south streets after Spanish women and the east-west streets after precious stones. Population growth and development would come slowly until the involvement of Henry Huntington in 1905, however (Johnson 1965). Meanwhile, in 1889 the Santa Fe Railroad completed laying track from Los Angeles to Redondo Beach. The following year a deepwater canyon was discovered offshore at Redondo and the rail line

became a conduit between cargo ships at a newly constructed wharf and Los Angeles (Pipkin 1985). In 1890 the railroad constructed a passenger line to Redondo and built a 225-room hotel at the present-day site of Veteran's Park. The hotel had an English motif and luxuries such as a bathroom on every floor, steam heat, landscaped gardens, a ballroom, an 18-hole golf course and tennis courts on the beach. Writes Redondo Beach historian Ken Johnson (1965), "If you want a more vivid picture of what the Hotel Redondo was like, visit the Hotel Coronado in Coronado, California. This hotel, built at the same time, was a sister-operation to the Redondo facility, and still stands as a major tourist attraction in the San Diego area."

The Santa Fe Railroad and local boosters strove to make Redondo – rather than San Pedro or Santa Monica, two locations pushed by Collis Huntington, controller of the rival Southern Pacific Railroad – to be the main port of Los Angeles. Redondo was closer to San Francisco than San Pedro and, unlike Santa Monica, it had a natural deep water harbor. However, Redondo did not have a protective breakwater. For that reason a five-man board of engineers recommended in 1897 that San Pedro become the main port for Los Angeles (Port of Los Angeles 2003). After this decision tourism and recreation once again became the main activities at Redondo (Pipkin 1985).

1900–1910. Manhattan Beach, which would receive its charter in 1912, benefited from the Santa Fe railroad line since it passed through the area. In addition, in 1903 the Pacific Railway Company laid track from Los Angeles to Santa Monica and from there down the coast to Redondo Beach. Passengers could come by Santa Fe or trolley to spend weekends or summers in beach cottages (Manhattan Beach Historical Society 2003). In 1902 two major developers of Manhattan Beach, George Peck and John Merrill, reportedly flipped a coin to decide the name of the area. Peck had been calling his northern section "Shore Acres" (after the local Santa Fe station) and Merrill had named the southern part Manhattan (after his home town). Merrill won, and the town became Manhattan Beach at the behest of the postmaster, who sought to avoid confusion with fourteen other Manhattans in the country (Manhattan Beach Historical Society 2003). Prior to the railroad era, people had traveled to the South Bay beaches from Los Angeles and Inglewood by horse and buggy (Dennis 1987). They had had to tie their horses to trees on the inland sides of the dunes and walk to the shore because it was difficult to get buggy wheels through beach sand (Dennis 1987). The trolley system also benefited Hermosa Beach, which incorporated in 1907 (Gazin 1991).

After San Pedro had been chosen as the site for Los Angeles' main harbor, development of Redondo Beach slowed. Henry Huntington's brother quipped that the very name Redondo made a capitalist "shy like a horse at an automobile" (quoted in Whitcomb 2000, p. 39). Nonetheless, in 1905 Henry Huntington announced his intention to purchase the Redondo Improvement Company, which owned most of Redondo Beach (Friedericks 1989). Huntington had already gained control of the Redondo Railway, which operated two lines from Los Angeles. "The

magic name of Huntington", as the *Los Angeles Times* put it (ibid.), emboldened speculators and others and triggered a two-week real estate frenzy. Agents set up over 100 real estate offices, some in tents, on Front Street. Huntington placed ads in the *Los Angeles Times* promising "Free Excursions Every Twenty Minutes!" to Redondo where the "Dirt is Flying! Spikes Are Being Driven!" (Whitcomb 2000, p. 39). As a result of the boom Huntington sold about three million dollars worth of Redondo Beach property (Whitcomb 2000).

Although some investors lost money when property values fell after the boom, Huntington invested heavily in Redondo Beach and did encourage development. In 1907 he constructed a 3-story pavilion with a ballroom, restaurant and theater at Coral Way and Midway (Friedericks 1989). In 1909 he opened the largest indoor saltwater plunge in the world. It had three heated pools, steam and Turkish baths and over 1000 dressing rooms. The complex could hold 2000 bathers at a time. For thirty years the plunge was a major west coast attraction (Shanahan 1982).

To lure the public to Redondo, Huntington hired George Freeth, now considered the father of modern-day surfing, to exhibit the sport to crowds on the shore. Huntington had learned of Freeth from Jack London, who had written an account of Freeth and his littoral avocation in "A Royal Sport", an essay first published in *A Woman's Home Companion* in 1907 (Whitcomb 2000). London had met Freeth after sailing his *Snark* to Waikiki Beach earlier that year. Entranced by Freeth's ability to "walk on water", London asked for lessons. He wrote in his essay, "Shaking the water from my eyes as I emerged from one wave and peered ahead to see what the next one looked like, I saw him tearing in on the back of it, standing upright on his board, carelessly poised, a young god bronzed with sunburn" (Bandana College 2003). Soon after the essay was published Huntington's agents arrived in Hawaii to offer Freeth a job. From then until his death from influenza a dozen years later, Freeth would demonstrate surfing on a heavy wooden board at Redondo Beach. He also demonstrated diving techniques in the plunge. Freeth not only introduced surfing to southern California, but became the first professional lifeguard and the inventor of a "rescue can", a large bucket on a cable that could be thrown to drowning swimmers.

Redondo Beach grew around Huntington's splashy resorts. The population rose from 855 in 1900 to 2935 in 1910 to 4900 in 1920 (Friedericks 1989). Meanwhile a more highbrow beach community was being planned nearby at the Hermosa Beach - Manhattan Beach border. In 1903, Moses Sherman and Eli P. Clark – the developers who built the Los Angeles Pacific Railway down the coast – attempted to establish a literary colony called Shakespeare's Beach at the site (Roebuck 1987). The bid was unsuccessful, however, so the developers built and sold beach cottages (Roebuck 1987). While the exact borders of the planned literary colony are disputed, the tract was probably demarcated by the Strand, Hermosa Avenue, Twenty-Seventh Street and the northern boundary of Hermosa Beach, according to Hermosa Beach Building Director Bill Grove (Roebuck 1987). Evidence of the abandoned dream can be found

today in the street names of the area, which include Longfellow Avenue and Keats, Shelly and Tennyson Streets.

1910–1920. Large-scale industry came to the South Bay coast in the 1910s, and with them came El Segundo and Torrance. El Segundo was a product of the Standard Oil Company, which built a refinery for oil pumped from the Fullerton and Torrance oil fields in 1911. Standard Oil chose the refinery site because the land was cheap and undeveloped, was located near water for cooling, and included a large dune tract. Storage tanks were located on the dune ridge, so that oil could flow by gravity to tankers offshore. Pocket-depressions in the dunes would contain leaks and minimize the danger of explosions. The sparseness of the dune vegetation meant there would be a reduced fire hazard (Gerlach 1940). The El Segundo Land Improvement Co. acquired the townsite – for housing the refinery's workers – to the north of the refinery. The name El Segundo ("the Second One") refers to the fact that it was the second oil refinery in California (Gerlach 1940). A harbor was constructed for tankers to load the oil, but it was destroyed by an underwater earthquake in 1914. The company then built a pipeline to allow tankers to load up and take the oil to other ports in the US, Asia and Australia (Gerlach 1940).

The creation of the El Segundo refinery spurred the growth of Hermosa Beach and Manhattan Beach as well. Until 1910 these areas had existed as resorts with beach cottages and had several hundred permanent residents. Now they became "black gold suburbs" – residential suburbs for refinery workers (Viehe 1991). In the teens and twenties black gold suburbs were the fastest growing areas in Southern California. For example, in 1910–1920 Hermosa Beach grew at a 243% rate (Viehe 1991). The growth of these suburbs indicated the preference of oil industry workers to live near their jobs but in residential rather than industrial suburbs. Other black gold suburbs included the San Pedro-Long Beach and Vernon-Huntington Park clusters (Viehe 1991).

Torrance was founded in 1912 (and incorporated in 1921). The city's founding father and namesake, Jared S. Torrance, was vice president of Union Oil and its subsidiary Union Tool Companies (Phelps 1995). In 1912 he persuaded Union Tool to purchase land from the Dominguez Estate Company. The land, a windy tract of sand and agricultural fields, was inexpensive at a time when Los Angeles real estate prices were rising sharply (Shanahan and Elliot 1984). It was also removed from the utilitarian, gritty industrial corridor along the Los Angeles River and offered room for residential and industrial development (Phelps 1995). At the time labor unrest had erupted into violence in the region. In 1910 the main building of the assertively open-shop *Los Angeles Times* had been bombed by union activists. Other bombings and examples of labor unrest flared that year in Southern California. In this context Torrance attempted to create an industrial town based on the garden city concept that would please both labor and management (Shanahan and Elliot 1984, Phelps 1995). The firm of John C and Frederick Law Olmsted, Jr. was hired, for $5000 (and subsequent consulting fees), to design the western United State's first "modern

industrial city" with a planned population of 15,000 inhabitants (Shanahan and Elliot 1984). The Olmsted plan borrowed elements from the City Beautiful, City Practical and National Playground movements, in an attempt to combat the ugliness of industrial cities by creating a place that synthesized utility, efficiency and beauty (Phelps 1995). The Pacific Electric station formed the hub of the city, and industrial properties lay near the tracks. Housing was located upwind of the smoky factories. A shopping center and residential park were located to maximize interaction among different social classes. One hundred thousand trees were planted to create a garden-like feel (Phelps 1995).

Not as many workers bought lots as the developers hoped, however. Shortly after the housing sites went to market the economy soured. Moreover, much of the work offered in Torrance was sporadic and did not raise the confidence of house buyers. The town also met fierce resistance from labor leaders who saw the project as an attempt by capitalists to pacify and control non-union workers. As a consequence of these factors, most Union Tool employees chose to live outside the town and commute to work on the Pacific Electric cars. In 1922 the city had only 2500 residents, far fewer than planned. Only after Torrance shed its model industrial city image did the population significantly grow (Phelps 1995).

1920s. In 1920, as a symbol of its growth and hometown pride, Manhattan Beach constructed a 928-foot long cement pier with a rounded front end (Manhattan Beach Historical Society 2003). In 1991, after decades of wear and tear, the city decided to restore it to its 1920s form. Restoration was complete in 1992 and in 1995 the pier – the oldest standing cement pier on the west coast – was declared a state historic landmark.

As Manhattan Beach grew in the 1920s it confronted a longstanding obstacle to its development, shifting mountains of sand. Sand frustrated development by inhibiting the construction of buildings on level land and by constantly blowing across boardwalks, roads and railroad tracks. Railroad companies hired teams of Mexican workers to clear the sand from the tracks, but trains were delayed for hours at a time. To level the landscape for the construction of buildings, a more radical solution was needed. The Kuhn Brothers Construction Company solved the problem when they found a buyer for Manhattan Beach sand in Hawaii. For nearly ten years the sand was taken by Santa Fe railroad cars to San Pedro harbor and shipped to Waikiki Beach, where it was spread over the pebbly shore (Manhattan Beach Historical Society 2003). A letter writer noted in the *Los Angeles Times*: "Many a honeymooner has since returned from Hawaii with a little vial of Waikiki Beach sand – that actually came from the South Bay" (McCafferty 1992). Manhattan Beach sand was also used as ballast in Santa Fe and Southern Pacific railroad cars, in the flooring of Los Angeles Memorial Stadium and elsewhere in the state and in Arizona (Dalton 1976, Moon 1952). Not all of the sand dunes were removed, however. The dune system stretching from El Segundo south through Manhattan Beach was used for the location shooting of desert scenes in early Hollywood films such as "The Sheik"

(Pipkin 1985).

Also during the 1910s and 1920s Manhattan Beach became a site that represented the negative attitudes towards minorities in the South Bay communities. When Manhattan Beach was incorporated in 1912, no places on the southern California coast welcomed minorities. Racially restrictive covenants prevented blacks from moving into white shorefront neighborhoods. Flouting this tradition, Manhattan Beach developer George Peck established a 2-block area fronting the beach between Twenty-Sixth and Twenty-Seventh Streets for minority residents. The first African Americans to buy lots at the site were Charles and Willa Bruce, who were born in Union states during the Civil War (Rasmussen 2002). Peck helped the Bruces and other blacks build a fishing pier (Rasmussen 2002).

As the value of coastal real estate increased, however, white hostility toward the residents of Bruces' Beach (as it had come to be called) increased. Racial intolerance expressed itself in various forms, reportedly including a cross-burning by the Ku Klux Klan (Drake 2003). Long time (white) resident Wilmer Drake recalls that African Americans risked being thrown in jail if they went to public places in the city after dark (Drake 2003).

In 1924 city officials condemned the neighborhood ostensibly to build a park on the site. When the families refused to sell their properties to the city at below market value, the city seized the land under eminent domain. The Bruces and three other families sued the city. The judge insisted that the plaintiffs be allowed to live elsewhere in the city, if not adjacent to the beach. In 1927 Bruces' Beach Resort was razed along with other cottages on the site. The Bruces received $14,500 and left the city. In 1924 a blacks-only section of Santa Monica Beach, called the Inkwell, opened near the foot of Pico Boulevard (Rasmussen 2002).

Manhattan Beach finally built a park on the site of Bruces' Beach in the 1950s. Since the 1970s it has been designated Parque Culiacan, signifying the link to Manhattan Beach's sister city in Sinaloa, Mexico (Rasmussen 2002).

In the mid 1920s Oregon-born entrepreneur Clifford Reid arrived in Southern California with several big plans. One of them was to develop a square mile of land in present-day Torrance into California's equivalent of the French Riviera (Shanahan and Elliot 1984). Reid planned the "Hollywood Riviera", linked by a local parkway to the Culver City and Gower Street studios, to be a coastal playground for the region's movie stars. Initial sales were strong, but few Hollywood people were among buyers. The onset of the Depression slowed sales considerably. In 1931 the Hollywood Riviera Club opened above the beach west of Paseo de la Playa at the foot of Calle Miramar. The boundary separating Torrance and Redondo Beach ran through the club, and because the rules about drinking alcohol differed in the two cities, people had to change their positions within the building to comply with the hours for the legal consumption of alcohol. The club burned down in 1958 and a plaque dedicated

to preserving its memory can be found today by the steps in Miramar Park (Payne 2003).

Smuggling and gambling were among the more seamy aspects of South Bay life into the early 1930s and after. During Prohibition alcohol runners would sail their cargo past the shore. Once, recalls Manhattan Beach resident and historian Wilmer Drake, liquor smugglers in a boat offshore were chased by police. The smugglers dumped their cargo overboard, and cases of Canadian Club whiskey washed ashore. The precedent for smuggling in Manhattan Beach was set long ago: in the early nineteenth century a Manhattan Beach resident known as Col. Duncan would signal from his white beachfront house to smugglers from Mexico, England, and the Spanish Phillipines (Shanahan 1982). They brought cloth and foodstuffs ashore to sell in Los Angeles without having to pay a tariff.

Gambling also took place along — or rather off — the coast. Mob associate Anthony Cornero owned several barges that had been converted into floating casinos. The ships anchored three miles offshore, beyond the pale of police and tax authorities. Congress abolished gambling in coastal waters in 1948.

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Appendix C: Selected Native Plants of the Beach Bluffs

California poppy

Black sage

Coast buckwheat

California sunflower

Mule fat

California verbena

Pincushion flower

Beach evening primrose

Deerweed

Prickly pear

Cholla

Bright green liveforever

Bladderpod

Western wallflower

California saltbush

Succulent lupine

Purple clarkia

Chia

Silvery blue lupine

California sagebrush

Beach-burr

Telegraph weed

Butterbush

Branching phacelia

California four o'clock

Coyote bush

Bedstraw

Milkvetch

Lemonadeberry

Beach sand verbena

Appendix E
Geotechnical Report

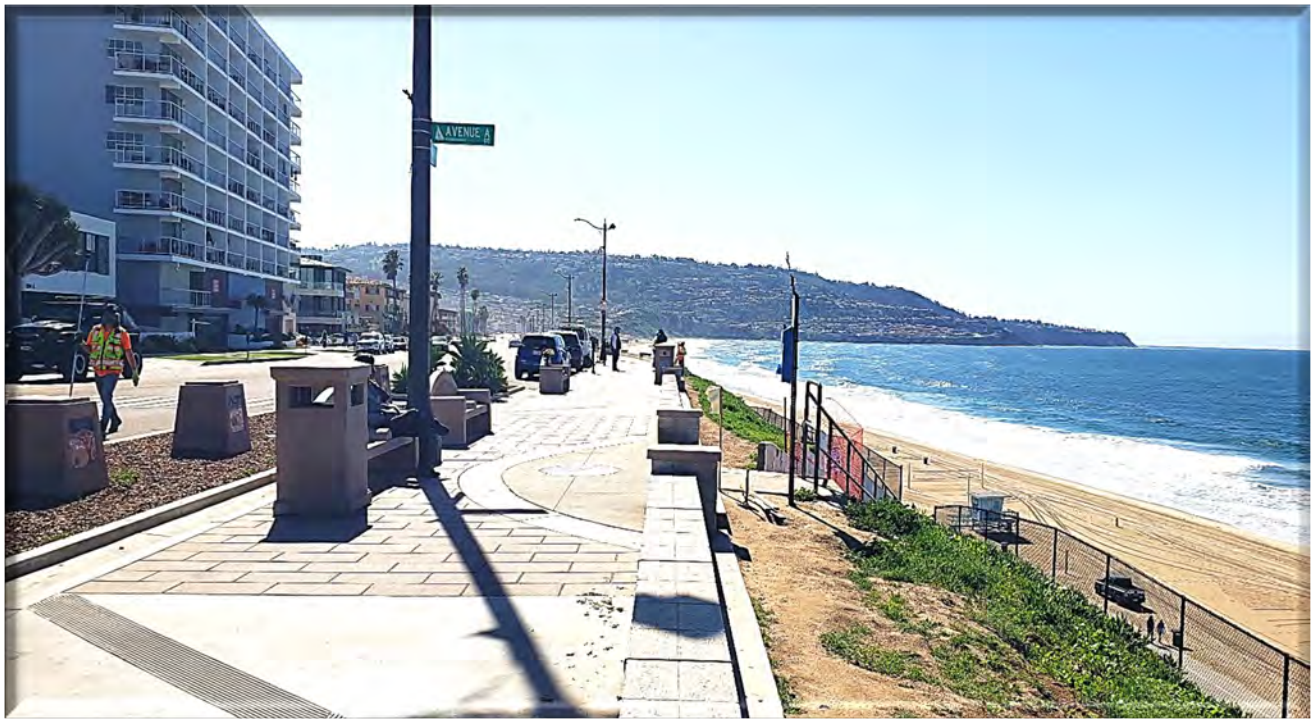
TETRA TECH

Geotechnical Engineering ● Engineering Geology

Geotechnical Design Report

AVENUE A ADA RAMP

Avenue A and Esplanade
Redondo Beach, California



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May 30, 2023
Project No. TET 22-230E

TETRA TECH

Project No. TET 22-230E
May 30, 2023

Mr. Rafael Holcombe
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Subject: **GEOTECHNICAL DESIGN REPORT**
AVENUE A ADA RAMP
Avenue A and Esplanade
Redondo Beach, California

Dear Mr. Holcombe:

Presented herein is Tetra Tech's geotechnical design report for the proposed ADA switchback ramp to provide beach access from the top of the bluff at the intersection between Avenue A and Esplanade in the City of Redondo Beach. This report summarizes the results of our geotechnical investigation to characterize the soils and provides recommendations for the geotechnical design and construction of the proposed ramp a including the temporary excavation stabilization, retaining walls and flatwork. The appendices of the report include boring logs, results of soil laboratory tests, determination of the seismic demand for the retaining wall design, and results of slope stability analyses.

We appreciate the opportunity to provide our professional services on this project. If you have any questions regarding this report or if we can be of further service, please do not hesitate to contact the undersigned.

Respectfully submitted,
Tetra Tech BAS, Inc.

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TABLE OF CONTENTS

Page

1. INTRODUCTION AND BRIEF PROJECT DESCRIPTION 1
2. SCOPE OF WORK 2
3. SUBSURFACE INVESTIGATION 3
4. LABORATORY TESTING 5
5. SUBSURFACE CONDITIONS 6
5.1. REGIONAL GEOLOGY 6
5.2. SITE GEOLOGY 6
5.2.1. Artificial Fill (Af) 6
5.2.2. Native Surficial Sediments (Qos) 6
5.3. GROUNDWATER 7
6. ENGINEERING SEISMOLOGY AND OTHER GEOLOGIC HAZARDS 8
6.1. GENERAL SEISMIC SETTING 8
6.2. HISTORICAL EARTHQUAKES 9
6.3. SURFACE FAULT RUPTURE 10
6.4. SEISMIC HAZARD ZONES 11
6.5. EARTHQUAKE-INDUCED LANDSLIDES 11
6.6. LATERAL SPREADING 11
6.7. SUBSIDENCE 11
6.8. METHANE HAZARD 12
6.9. OIL AND GAS FIELDS 12
6.10. EXPANSIVE/COLLAPSIBLE SOILS 12
6.11. FLOOD HAZARD 12
6.12. TSUNAMI 12
7. SLOPE STABILITY ASSESSMENT 13
7.1. MATERIAL SHEAR STRENGTH 13
7.2. GROUNDWATER 13
7.3. SEISMIC DEMAND 13
7.4 RESULTS OF SLOPE STABILITY AND PERMANENT SEISMIC DEFORMATION ANALYSES 14
7.5 SURFICIAL SLOPE STABILITY 15
8. DESIGN RECOMMENDATIONS 16
8.1. GENERAL 16
8.2. CLEARING AND GRUBBING 16
8.3. SITE PREPARATION 16
8.4. GENERAL FILLS AND BACKFILL 17
8.5. TEMPORARY SLOPES AND EXCAVATIONS 17
8.5.1. Sloped Excavations 17
8.5.2. Excavation Stabilization with Push Plate Piles 18
8.6. REBUILDING OF SLOPE 19

TABLE OF CONTENTS (continued)

Page

8.7. SEISMIC DESIGN PARAMETERS 19
8.8. RETAINING WALL FOUNDATIONS 20
8.8.1. Continuous Footings 20
8.8.2. Foundations Adjacent to Trenches 21
8.8.3. Lateral Earth Pressures 22
8.9. ADA RAMP CONCRETE FLATWORK 24
8.10. SOIL CORROSION 25
9. GENERAL SITE GRADING RECOMMENDATIONS 26
10. DESIGN REVIEW AND CONSTRUCTION MONITORING 27
10.2.1. Construction Observations for Excavations 27
10.2.2. Construction Observations for Slope Stabilization 27
10.2.3. Foundation Construction Observations 27
11. LIMITATIONS 29
12. SELECTED REFERENCES 30

Figures

Figure 1 – Site Location Map
Figure 2 – Boring Location Map
Figure 3 – Geologic Map
Figure 4 – Historic High Groundwater Map
Figure 5 – Regional Faults and Seismicity Map
Figure 6 – Seismic Hazard Zones Map

Appendices

Appendix A – Boring Logs
Appendix B – Laboratory Testing
Appendix C – Seismic Demand
Appendix D – Slope Stability Analyses

1. INTRODUCTION AND BRIEF PROJECT DESCRIPTION

This report presents the results of Tetra Tech's geotechnical engineering investigation for the design and construction of the proposed ADA switchback ramp to provide beach access from the top of the bluff at the intersection between Avenue A and Esplanade in the City of Redondo Beach (see Figure 1 – Site Location Map). This ramp will replace the existing ramp.

The existing access ramp has been closed to pedestrian traffic due to significant deterioration of the existing concrete masonry units (CMU) cantilever retaining wall which has manifested as extensive cracking, block shifting, bulging, and localized leaning. Some cracking of the ramp flatwork was also observed. No weepholes were observed in the face of the existing retaining wall. The cause of distress of the existing wall was not investigated within the scope of work for this report. The existing retaining wall ranges in exposed height (vertical distance measured from the grade in front of the wall, i.e., ramp grade, to the grade at the top of the wall) between about 2.5 to 5 feet. The ramp is about 4 feet wide. The adjacent 2(H):1(V) slopes are covered by sparse drought resistant vegetation. The existing ramp and retaining walls will be demolished, and replaced with the new ADA ramp

The top of slope at the Esplanade level is at about elevation 70 feet, i.e., approximately 55 feet above the toe of the slope at elevation of 15 feet. The proposed ADA ramp is proposed to consist of 2 switchbacks with a total approximate length of 750 feet, a maximum downhill gradient of about 8 percent, and a path width of about 6 feet. The design of the new ramp will involve cutting into the slope and constructing a CMU retaining walls on the upslope side of the ramp about 3 to 6 feet high (exposed height). The wall will support the existing or slightly regraded slopes at gradients ranging from about 1.5 to 2(H):1(V). To minimize the necessary cutting into the slope, the wall foundation is expected to be designed with the heel projecting of no more than 1.5 feet behind the wall. The proposed ramp will also include guardrails, landings, and a staircase connecting the top of the bluff with the beach.

This report summarizes the collected data, presents our findings, conclusions, and provides geotechnical design recommendations for the design and construction of the ramp and associated retaining walls.

2. SCOPE OF WORK

Tetra Tech's scope of services for this project consisted of the following tasks:

- Review readily available background data.
- Perform a reconnaissance site visit to observe ground conditions and mark boring locations.
- Place signage at in the proposed work area on Esplanade to block off street parking.
- Perform GPR survey in the street to provide utility clearance.
- Coordinate prior to drilling with Department of Beaches and Harbors personnel, City of Redondo Beach personnel, and Underground Service Alert for clearance of buried on-site utilities.
- Advance 1 deep exploratory boring to a depth of about 51 feet on Esplanade at the top of the proposed switchback ramp using a truck mounted hollow stem drill rig.
- Advance 4 shallow exploratory borings along the existing slope to a maximum depth of 10.5 feet using a hand auger.
- Process and evaluate the collected data to develop geotechnical recommendations for the design and construction of the proposed ADA ramp including the following items:
    - Evaluation of general subsurface conditions and description of types, distribution, and engineering characteristics of subsurface materials.
    - Evaluation of static and seismic stability for the existing and improved slopes.
    - Determination of seismic design parameters in accordance with the 2022 California Building Code (CBC).
    - Recommendations for design of foundation systems for the retaining walls including allowable bearing capacity, lateral pressures and resistances, and settlement estimates.
    - Recommendations for stabilization of the excavation for the proposed CMU retaining walls.
    - Evaluation of the corrosion potential of the on-site soils to buried concrete.
- Prepare this written report documenting the work performed, physical data acquired, and geotechnical design and construction recommendations.

3. SUBSURFACE INVESTIGATION

The subsurface soil conditions were explored on March 4, 2022 and included advancing a total of 5 exploratory soil borings denoted B-1 through B-5 to a maximum depth of 50.8 feet (see Figure 2 – Boring Location Map). Prior to starting the field exploration program, a field reconnaissance was conducted to observe the surface conditions and to mark the planned exploratory locations in agreement with the Department of Beaches and Harbors staff. Drilling permits were also obtained from the City of Redondo Beach.

GPR services were used for utility clearance, and Underground Service Alert was also notified of the subsurface exploration locations at least 48 hours prior to drilling. In addition, signage was placed to block any cars from parking at the location where B-5 would be drilled. Daily visits to the site were required to obtain photos of the signage and to provide records to the City of Redondo Beach.

Exploratory boring B-5 was drilled using a CME-75 truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. Borings B-1 through B-4 were advanced with a 4-inch diameter hand auger. The approximate latitude and longitude, elevations and depths of the advanced borings are included in Table 1. These locations are also shown on Figure 2.

Table 1
Boring Locations

Exploration Number	General Location	Approximate			
		Latitude	Longitude	Ground Elevation (feet msl)	Depth (feet)
B-1	On the existing slope	33.827649	-118.390172	71	10.5
B-2		33.827421	-118.390252	58	10.5
B-3		33.827229	-118.390421	31	3.5
B-4		33.826995	-118.390550	17	5
B-5	On Esplanade	33.827106	-118.390162	69	50.8

Bulk, driven California-type ring samples and Standard Penetration Test (SPT) samples were collected during the drilling and transported to a laboratory for testing. The SPT sampler consisted of a 2-inch outside diameter, 1.4-inch inside diameter split barrel without liners, while the California-type sampler consisted of a 3-inch O.D., and a 2.4-inch I.D. split barrel. The interior of the California-type sampler was lined with 1-inch-long brass rings.

SPT testing was performed using an SPT sampler driven by an automatic 140-pound hammer with a drop of 30 inches in general accordance with ASTM D1586. The total number of hammer blows required to drive the sampler the final 12 inches is termed the "blowcount." The hammer calibration record indicated an average energy transfer ratio of 83.4 percent. Ring-type samples

were collected by driving the California-type sampler using the same equipment as for the SPTs. Sampling was generally carried out at 2.5- and 5-foot vertical intervals.

The encountered soils were surface-logged by a Geologist in general accordance with the visual-manual procedure for description and identification of soils, ASTM D2488. The Geologist also prepared the recovered samples for subsequent reference and laboratory testing.

At the completion of drilling, boring B-5 along Esplanade was backfilled with a bentonite-cement grout and the asphalt surface was restored with black-dyed concrete. The excavated materials were drummed and disposed of at an approved disposal facility. Borings B-1 through B-4 were backfilled with tamped soil cuttings.

4. LABORATORY TESTING

Laboratory tests were performed on selected samples recovered from the borings to aid in the classification of soils and to evaluate pertinent engineering properties of the foundation soils. The following tests were performed:

- Moisture Content, ASTM D2216;
- Density of Soil Specimens, ASTM D7263;
- Particle Size Analysis, ASTM D6913 and ASTM D7928;
- Percent Passing #200 Sieve, ASTM D1140;
- Expansion Index, ASTM D4829;
- Direct Shear Testing, ASTM D3080;
- Corrosion Testing: Minimum electrical resistivity and pH, CTM 643;
  Sulphate Content, CTM 417;
  Chloride Content, CTM 422.

Results of all laboratory tests are presented in Appendix B. For ease of referral to the soil profile, selected laboratory results have also been included on the boring logs presented in Appendix A.

5. SUBSURFACE CONDITIONS

5.1. Regional Geology

The project site is located in the western portion of the Los Angeles Basin known as the West Coast Basin at the northwest extension of the Peninsular Ranges geomorphic province. The Los Angeles Basin is a relatively low-lying alluvial plain that rises gently from the Pacific Ocean inland to the surrounding Santa Monica and San Gabriel Mountains to the north, Puente Hills to the northeast, the Santa Ana Mountains to the southeast, and the San Joaquin Hills and Palos Verdes Peninsula to the south. The basins alluvial plain is underlain by several thousand feet of recent to mid-Tertiary-age sediments that rest unconformably on metamorphic basement rock. Structurally, the Los Angeles basin is divided into sections by 4 major fault systems; the basin sections are referred to as the northwest, northeast, central, and southwest structural blocks. The project site is situated west of the major Newport-Inglewood Fault Zone in the southwest structural block of the basin.

5.2. Site Geology

As shown on Figure 3 – Geologic Map (Dibblee et al., 1999), the site is underlain by Quaternary age older surficial sediments (Qos) consisting of older stabilized dune and drift sand, described as unconsolidated fine-grained sand. The native material is typically mantled by artificial fill in the site vicinity associated with urban development of the area. Generalized descriptions of subsurface soil conditions encountered at the investigated locations are provided below. Detailed descriptions of subsurface soil conditions encountered at the boring location are presented in the boring logs in Appendix A.

5.2.1. Artificial Fill (Af)

Artificial fill (Af) was encountered in all borings. In boring B-5, located in the street on Esplanade, fill was encountered below the pavement to a depth of about 2 feet (1.5 feet of fill below the 0.5-foot-thick asphalt pavement course). In boring B-2, located behind the existing retaining wall, fill was encountered to a depth of about 8 feet. Fill materials were also encountered in borings B-1, B-3, and B-4 to a depth of about 2 feet, but the upper 1 foot consisted of distinctly disturbed materials. The fill materials consisted of loose brown, damp sand with varying amounts of gravels consisting primarily of siltstone fragments.

5.2.2. Native Surficial Sediments (Qos)

Native older surficial deposits (Qos) were encountered in boring B-5 below the artificial fill to the maximum depth explored of 50.8 feet. The near-surface native deposits consist of loose to medium dense, light yellowish brown, damp to moist silty sand, poorly graded sand, and poorly graded sand with gravel. The native materials are consistent with the geologic map of the area (Dibblee et al., 1999) i.e., unconsolidated dune and drift sand.

5.3. Groundwater

Groundwater was not encountered in any of our borings during this investigation to the maximum explored depth of about 50.8 feet (elevation of about 18 feet). It is very likely that groundwater is present at or near sea level, which may be influenced by the tides, and may be present within 10 feet of the surface at the base of the ramp.

According to the State of California (CDMG, 1998), the historic high groundwater on the beach at the toe of the slope has been mapped at a depth of about 10 feet (Figure 4 – Historic High Groundwater Map), i.e., elevation at the base of the ramp is about 15 feet, therefore the inferred historic high groundwater elevation is 5 feet.

Fluctuations of the groundwater level, localized zones of perched water, and increased soil moisture content should be anticipated during and following the rainy season. Evaluation of such factors is beyond the scope of our services.

6. ENGINEERING SEISMOLOGY AND OTHER GEOLOGIC HAZARDS

6.1. General Seismic Setting

The Southern California region is known to be seismically active. Earthquakes occurring within approximately 60 miles of the project site are considered capable of generating ground shaking of engineering significance to the proposed construction. The site is located in the general proximity of several seismically active faults (see Figure 5 – Regional Faults and Seismicity Map). Table 2 provides a summary of known seismically active faults within approximately 33 miles of the project sites identified by the USGS Quaternary Fault Database and in the 2008 National Seismic Hazard Maps (https://usgs.maps.arcgis.com and https://earthquake.usgs.gov, respectively).

Table 2
Summary of Active Faults
Referenced Site Latitude and Longitude: 33.8273531, - 118.390161

Fault Name	Approximate Fault Distance to Site (miles)	Slip Sense	Maximum Moment Magnitude
Compton	0.11	thrust	7.4
Palos Verdes	0.89	strike slip	7.3
Redondo Canyon	1.18	right-reverse	6.5
Newport Inglewood	8.14	strike slip	7.5
Puente Hills	13.51	thrust	7.0
Santa Monica	14.71	strike slip	7.4
Malibu Coast	15.91	strike slip	7.0
Anacapa-Dume	16.25	thrust	7.2
Hollywood	17.72	strike slip	6.7
Elysian Park (Upper)	18.78	reverse	6.7
Raymond	22.42	strike slip	6.8
Elsinore	22.77	strike slip	7.48
Verdugo	24.4	reverse	6.9
San Joaquin Hills	27.81	thrust	7.1
Sierra Madre	28.82	reverse	7.2
San Jose	32.76	strike slip	6.7

Potential seismic sources of significance to the project include active surface-rupturing faults and faults that are not known to break the ground surface but are considered active. This latter group of faults includes buried or “blind” thrust faults. Current tectonic models for the Los Angeles

basin include buried thrust faults, several of which are considered partly responsible for the north-to-south compression of the basin. Although these faults are not currently zoned by the State of California for surface rupture hazards (Earthquake Fault Zones), many are considered capable of generating seismic shaking of significance to structures.

Of these buried active faults, the closest to the site are the Compton blind-thrust and the Puente Hills Trust Fault (PHTF).

- The Compton blind-thrust fault located about 0.1 miles to the north of the site is active and has generated at least six large-magnitude earthquakes (Mw 7.0-7.4) during the past 14,000 years (Leon et al., 2009). This large, concealed fault runs almost parallel to the Palos Verdes fault underlying the Los Angeles metropolitan area, and thus poses one of the largest sources of seismic risk to the area. Deformed Holocene strata record recent activity on the Compton thrust and are marked by discrete sequences that thicken repeatedly across a series of buried fold scarps. The intervals of growth have been interpreted as occurring after the formation of now-buried paleo-fold scarps that formed during uplift events on the underlying Compton thrust ramp. Minimum uplift in each of the scarp-forming events, which occurred at 0.7-1.75 ka [Event 1], 0.7-3.4 ka or 1.9-3.4 [Event 2], 5.6-7.2 ka [Event 3], 5.4-8.4 ka [Event 4], 10.3-12.5 ka [Event 5], and 10.3-13.7 ka [Event 6], ranged from ~0.6 to ~1.9 m, indicating minimum thrust displacements of ≥1.3 to 4.2 m. Such large displacements are consistent with the occurrence of large-magnitude earthquakes (Mw >7).

- The PHTF located about 13.5 miles northeast of the site is currently defined as 3 separate but juxtaposed, generally east-west trending and north-dipping, fault surfaces that combined extend from Downtown Los Angeles to Brea. From west to east these include the Los Angeles, Santa Fe Springs, and Coyote Hills segments. Based upon recent studies by several researchers including: Shaw et al., (2002), Olsen and Cooke (2005), and Leon et al. (2007), the 3 fault surfaces are interpreted to extend from depths in excess of 9 miles on the north side of the Los Angeles basin to less than 1.2 miles at the southerly limits of the fault surfaces in the central portion of the basin. Fault surface geometries are interpreted from historical petroleum exploration data, geotechnical subsurface exploration data, and limited seismicity (e.g., the 1987 magnitude 5.9 Whittier Narrows earthquake). Leon et al. (2007) estimates that upwards of 60 percent of the total Los Angeles basin compression may be attributed to strain along the PHTF. Although ground rupture has not been officially attributed to the fault, the presence of youthful hills (e.g., Coyote Hills) and shallow folding at depth in the upper portion of the interpreted thrust ramp suggests recent activity. The PHTF is considered capable of generating earthquake magnitudes up to about M_w 7.1.

6.2. Historical Earthquakes

A large amount of seismic activity and associated events with their epicenters have been recorded surrounding the project site. However, relatively few large earthquake epicenters (i.e., ≥ Magnitude M5.5) have been recorded in the immediate area of the project. The most significant historic earthquakes near the project site were the 1994 Northridge M_w6.7 earthquake about 15 miles northwest of the site, the 1971 San Fernando earthquake M_w6.6 about 29 miles north of the site, and the 1933 Long Beach M_w6.4 earthquake about 37 miles southeast of the site

(https://service.scedc.caltech.edu). Notable historic earthquakes in Southern California since 1899 with magnitudes M_w >5.5 and within 100 kilometers of the site are listed in Table 3.

Table 3
Historic Earthquakes in Southern California

Earthquake Name	Year	Fault and Fault Type	Earthquake Magnitude*	Epicenter	
				Latitude	Longitude
Northridge	1994	Northridge Thrust (Blind Thrust)	6.7 M_w	34.21°N	118.54°W
Big Bear	1992	Fault unknown (left-lateral strike slip)	6.3	34.20°N	116.83°W
Landers	1992	Johnson Valley, Landers, Homestead Valley, Emerson Valley and Camp Rock faults (right-lateral strike-slip)	7.3	34.22°N	116.43°W
Sierra Madre	1991	Clamshell-Sawpit Canyon fault (Reverse)	5.8 M_L	34.20°N	118.14°W
Claremont	1990	Sierra Madre fault (reverse)	5.5 M_L	34.14°N	117.70°W
Whittier Narrows	1987	Puente Hills fault (blind thrust fault)	5.9 M_w	34.06°N	118.08°W
San Fernando	1971	San Fernando fault (thrust)	6.5-6.7 M_w	34.42°N	118.37°W
Long Beach	1933	Newport-Inglewood fault (right-lateral strike-slip)	6.4 M_w	33.63°N	118.00°W
Cajon Pass	1899	San Andreas fault (right-lateral strike-slip)	6.4 M_w	34.30°N	117.50°W

*M_w refers to Moment Magnitude scale
M_L refers to Local Magnitude scale

6.3. Surface Fault Rupture

Official Maps of Earthquake Fault Zones were reviewed to evaluate the location of the project sites relative to active fault zones. Earthquake Fault Zones (known as Special Studies Zones prior to 1994) have been established in accordance with the Alquist-Priolo Special Studies Zones Act enacted in 1972. The Act directs the State Geologist to delineate the regulatory zones that encompass surface traces of active faults that have a potential for future surface fault rupture. An active fault is defined by the State as a fault that has had surface displacement within Holocene time (the last 11,700 years). The purpose of the Alquist-Priolo Act is to regulate development near active faults in order to mitigate the hazard of surface fault rupture.

Based on a review of State of California Earthquake Fault Zone maps, Redondo Beach Quadrangle, the site is not located within a designated Earthquake Fault Zone for fault surface rupture hazard. The closest fault zone for surface rupture to the site is the Newport Inglewood

fault located approximately 8.5 miles to the northeast according to the CGS website application https://maps.conservation.ca.gov.

No surface traces of any active faults are known to pass directly through or project towards the site. Based on the presented research, the potential for surface rupture due to faulting occurring beneath the site during the design life of the proposed development is considered low.

6.4. Seismic Hazard Zones

Maps of seismic hazard zones are issued by the California Geological Survey (CGS, formerly California Department of Conservation, Division of Mines and Geology (CDMG)) in accordance with the Seismic Hazards Mapping Act enacted in April 1997. The intent of the Seismic Hazards Mapping Act is to provide for a statewide seismic hazard mapping and technical advisory program to assist cities and counties in developing compliance requirements to protect the public health and safety from the effects of strong ground shaking, liquefaction, landslides, or other ground failure and other seismic hazards caused by earthquakes.

Based on the review of the Redondo Beach Quadrangle Official Map of Seismic Hazard Zones issued March 25, 1999 (see Figure 6 – Seismic Hazard Zones Map), the slope is not located within an area identified by the State of California as subject to the hazard of liquefaction. It is noted, however, that the beach level at the toe of the slope is mapped as an area that is subject to the hazard of liquefaction. Given the nature of the project, liquefaction is not considered a hazard to be considered in the design of the proposed ramp.

6.5. Earthquake-Induced Landslides

This site is not located in an Earthquake-Induced Landslide Hazard Zone designated by the State of California (see Figure 6). No evidence of landsliding was observed on or in the immediate vicinity of any of the sites. Therefore, the occurrence of an earthquake-induced landslide is not considered to be a hazard to the site.

6.6. Lateral Spreading

Lateral spreading is a hazard for sites where liquefaction takes place and there is a gentle sloping ground or free faces. Given the nature of the project, liquefaction is not considered a hazard to be considered in the design of the proposed ramp.

6.7. Subsidence

Land subsidence is caused by extraction of groundwater or other fluids, e.g., oil, from the subsurface soil pores, which causes an increase in the effective stress and results in densification of the soil. Damage caused by subsidence can be visible cracks, fissures, or surface depression.

The site is not mapped within an area of land subsidence in California (https://ca.water.usgs.gov) due to groundwater pumping. Therefore, subsidence is not considered a hazard for the project site.

6.8. Methane Hazard

Methane is a naturally occurring gas associated with the decomposition of organic materials. In high concentrations, methane is considered to be an explosion hazard. The is not located within a methane buffer zone or methane zone according to the City of Los Angeles mapping (https://www.partneresi.com).

6.9. Oil and Gas Fields

The site is not located within an oil or gas field according to the State of California Department of Conservation's Division of Oil, Gas and Geothermal Resources Map (https://maps.conservation.ca.gov).

6.10. Expansive/Collapsible Soils

Collapsible soils are defined soils that undergo rearrangement of particles resulting in decrease in volume upon wetting, additional loading, or both. Typically, these soils are found in arid or semiarid regions and have a loose soil structure, i.e., a large void ratio and a water content far less than saturation. The structure of these low-unit weight unconsolidated sediments consists of coarser particles bonded at their contact points by finer silt and/or clay fraction, or possibly by surface tension at the pore air-water interfaces. Whereas some potential for collapsible behavior may exist for the near surface soils, such potential is expected to be relatively minor and is intended to be largely mitigated during grading by flooding the retaining wall foundation subgrade.

Expansive soils are distinguished by the presence of swelling clay minerals that when unsaturated and exposed to moisture can absorb a significant amount of water causing them to expand and swell. Likewise, when expansive soils lose moisture through desiccation, they begin to shrink. The sandy soils at the site with almost no fines content are not considered to be susceptible to the hazard of swelling or shrinkage.

6.11. Flood Hazard

The project site is not located within an area mapped by the California Department of Water Resources within the 100-year or 200-year projected floodplain (https://gis.bam.water.ca.gov).

6.12. Tsunami

The project is located within an area mapped by the California Department of Conservation as subject to tsunami hazard (https://www.conservation.ca.gov).

7. SLOPE STABILITY ASSESSMENT

Static and seismic stability of the existing and improved slopes was evaluated using the computer program Slope/W (Geo-Slope Office, 2022) with Spencer's limit equilibrium method. The existing slope is about 55 feet high and is inclined at gradients of about 1.5(H):1(V) to 2(H):1(V). Slope stability analyses were performed on a representative / design cross-section. The location of the analyzed cross-section is shown in Figure 2 – Boring Location Map.

Permanent seismically induced deformation of the slopes was calculated using the method developed by Bray and Macedo (2019) that considers the following:

- Earthquake magnitude;
- Yield acceleration of the slope;
- Fundamental period of the failure wedge T_s; and
- Spectral acceleration corresponding to the degraded fundamental period at $1.3*T_s$.

7.1. Material Shear Strength

The shear strength parameters assumed for the materials are summarized in Table 4 below. Strength parameters for the onsite dune and drift sands were determined based on the results of laboratory testing on selected samples.

Table 4
Summary of Material Shear Strength Parameters

Material	Unit Weight (pcf)	Friction Angle (deg)	Cohesion (psf)	Basis of Selection
Dune and Drift Sands	110	37	50	Results of direct shear testing
CMU Concrete wall	145	Not penetrable		–

7.2. Groundwater

Section 5.3 of this report presents the information on the groundwater conditions at the site. For this study, we have adopted a groundwater table at an elevation of 5 feet (i.e., about 10 feet below the toe of the slope).

7.3. Seismic Demand

An estimated earthquake magnitude for the design seismic event is required for permanent seismically induced deformation analyses. From the USGS Seismic Unified Hazard Tool website (https://earthquake.usgs.gov/hazards/interactive/) and using the 2014 Dynamic Conterminous U.S. v4.2.0 edition, the ground motion for a return period of 475 years (10% of probability of exceedance in 50 years) corresponds approximately to a modal earthquake magnitude of M_w 7.3

located at a distance of approximately 3.3 km from the site. The design acceleration response spectrum (ARS) is shown in Illustration No.1 below.

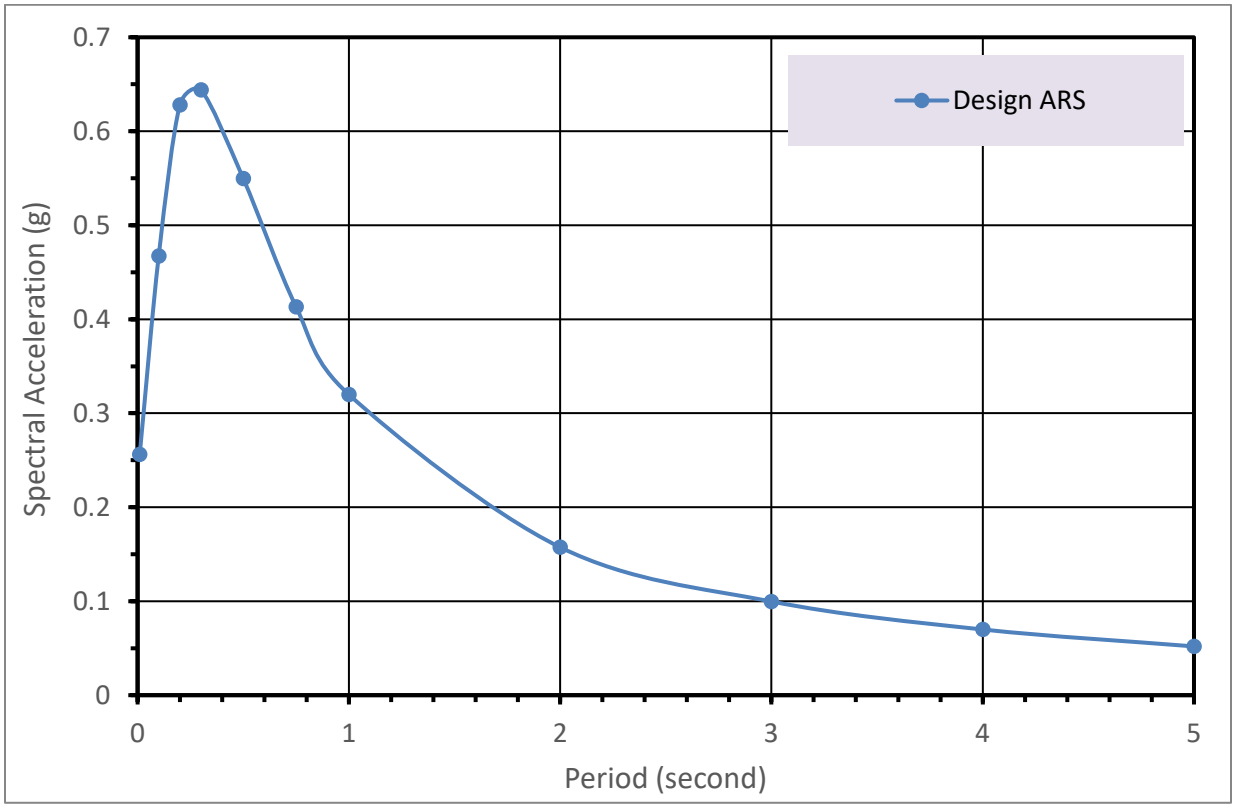

Illustration No.1 Design Acceleration Response Spectra for the design seismic event

7.4 Results of Slope Stability and Permanent Seismic Deformation Analyses

Results of static slope stability and permanent seismically induced deformation analyses are summarized in Table 5 and the details are presented in Appendix D.

Table 5
Stability Analyses of Existing and Improved Slopes

Design	**Existing Slope**	**Improved Slope**
Static Factor of Safety (minimum required FS = 1.5)	1.50	1.51
Yield Acceleration k_y (g)	0.20	0.21
Permanent Seismic Deformation $\delta_{seismic}$ (maximum acceptable deformation = 6 inches)	< 0.5 inches	< 0.5 inches
Page No. in Appendix D	D-1 ~ D-3	D-4 ~ D-6

The analysis of the results provides the following observations and conclusions:

- The calculated Factors of Safety for static condition are equal to or greater than the acceptable Factor of Safety of 1.5, therefore, the existing and improved slopes are considered stable for static condition.

- The calculated permanent seismic slope deformations are less than 0.5 inches. A permanent seismic slope deformation up to 6 inches is considered acceptable in accordance with "Recommended Procedures for Implementation of DMG Special Publication 117 Guidelines for Analyzing and Mitigating Landslide Hazards in California" published by Southern California Earthquake Center (SCEC, 2002). Therefore, the existing and improved slopes at both considered sites are considered stable for seismic condition.

7.5 Surficial Slope Stability

According to the project Civil Engineer the improved slopes vary in gradient from about 1.5(H):1(V) to 2(H):1(V). The slopes above the retaining walls will be stabilized by the Geopier SRT push plate piles. These piles are intended to provide temporary stability during the excavation for the proposed retaining walls as well permanent surficial stability. The SRT piles are designed and installed by the Specialty Contractor.

8. DESIGN RECOMMENDATIONS

8.1. General

Based on the results of the field exploration and engineering analyses, it is Tetra Tech's opinion that the proposed construction of the ADA ramp and associated retaining walls is feasible from a geotechnical standpoint, provided that the recommendations contained in this report are incorporated into the design plans and implemented during construction.

Design considerations specific to this project include:

- Minimizing the excavation volume required to construct the proposed retaining walls by installing temporary slope reinforcement utilizing Geopier SRT push plate pile system.
- Foundation subgrade preparation to mitigate soil collapse potential.

The design recommendations presented below reflect these considerations. The design recommendations are based on Tetra Tech's current understanding of the project. Once the project configuration is finalized and the design is complete, Tetra Tech should review the plans and specifications to evaluate if the geotechnical design recommendations have been incorporated as intended.

8.2. Clearing and Grubbing

The construction area should be cleared of any pavement, flatwork, retaining walls, structures, vegetation, trash and debris, prior to commencement of the earthwork. Any subterranean installations not to be preserved, such as pipes, utility collectors, tanks, older foundations, etc., should be abandoned and removed per Geotechnical Engineer's recommendations and in accordance with applicable regulations. All undocumented fills and disturbed soils should be removed.

8.3. Site Preparation

In order to create uniform bearing conditions for the proposed improvements the following is recommended:

- New ramp and associated retaining walls. Foundation areas for the retaining walls and the ramp path should be overexcavated 1 foot below the foundation subgrade, or to competent native soils, whichever is deeper. Whenever practical, the excavation should extend a horizontal distance of at least 1 foot beyond the outside perimeter of the ramp footprint.

- Disturbed soils at structural and non-structural areas will likely occur after demolition of existing site improvements, namely the existing ramp and the associated retaining wall. These soils should be overexcavated and recompacted to the total depth of the disturbed material. The slope should then be rebuilt as indicated in the Rebuilding the Slope after Removal of Existing Ramp section of this report.

The exposed overexcavation subgrade should be probed and accepted by the Geotechnical Engineer. The soils should be scarified, thoroughly wetted for at least 24 hours and recompacted to at least 90 percent relative compaction per ASTM D1557. This is intended to mitigate near surface collapse potential of the subgrade soils.

Loose and/or unstable soils within the construction footprint should be overexcavated and recompacted. However, if such zones are encountered during construction that are not practical to be excavated and processed, the Geotechnical Engineer should provide appropriate mitigation recommendations.

8.4. General Fills and Backfill

All fill placement associated with the replacement of overexcavated soils or to achieve finish subgrade should be moisture-conditioned to at least 120 percent of optimum moisture content and compacted to at least 93 percent relative compaction (ASTM D1557). Fill placed to achieve finish grade behind retaining walls or utility trench backfill should be moisture-conditioned at least wet of the optimum moisture content and compacted to at least 90 percent relative compaction (ASTM D1557). The upper 1 foot of soils below any flatwork should be compacted to at least 95 percent relative compaction. Fill should be placed in horizontal lifts not more than 8 inches in loose, uncompacted thickness.

Excavated on-site soils may be re-used as compacted fill, provided they are free of organics, deleterious materials, debris, and particles over 3 inches in largest dimension. Locally, particles up to 6 inches in largest dimension may be incorporated in the fill soils during grading based on specific approval and placement recommendations provided by the Geotechnical Engineer.

In the event that any soil materials are imported to the site, such soils should be sampled, tested, and approved by the Geotechnical Engineer of Record prior to arrival on-site. In general, any soils imported to the site for use as fill should be predominantly granular and have an Expansion Index less than 20. Additional recommendations for site grading are provided in the "General Site Grading Recommendations" section of this report.

8.5. Temporary Slopes and Excavations

Excavations are required to achieve the foundation subgrade along the alignment of the proposed ramp and the associated retaining wall. Sections below provide recommendations for construction of such excavations.

8.5.1. Sloped Excavations

The on-site soils are not expected to pose unusual excavation difficulties, and therefore, conventional earth-moving equipment may be used. However, due to the loose granular nature of the near surface sands sloughing/raveling should be anticipated. All trench and sloped excavations should be performed in accordance with Cal-OSHA regulations. The on-site soils within the expected excavation area may be considered Type C soils as defined by the Cal-OSHA soil classification.

Thus, unsurcharged excavations could be sloped back at an inclination of 1.5(H):1(V) or flatter. However, because of the need to excavate into the existing 2(H):1(V) and steeper slopes, sloped excavation is not expected to be practical and shoring or slope reinforcement will be necessary as recommended below.

Stockpiled materials should be placed no closer than 5 feet from the edge of the sloped excavation. No spoils should be placed on the upslope side of any excavation. A greater setback may be necessary when considering surcharge loads from equipment such as heavy vehicles, concrete trucks and cranes. Tetra Tech should be advised of such heavy loadings so that specific setback requirements can be established. Alternatively, a shoring system may be designed to allow reduction in the setback distance.

8.5.2. Excavation Stabilization with Push Plate Piles

In order to minimize the extent of excavation for the foundation subgrade for the retaining wall and the ramp, the existing slope above the proposed excavation may be stabilized by push plate Geopier SRT pile system. This proprietary system is design-build by the Specialty Contractor.

8.5.2.1. Design

Plate piles consist of a steel shaft with typically 2 feet wide 4 feet high steel plate on one end. The entire element is entirely pushed into ground steel shaft first. The plate than stabilizes the upper 3 to 5 feet of slope while the shaft anchors the plate in place. The plate piles are usually installed using medium to small size tracked excavators with a hydraulic vibratory hammer attachment. The design of the plate piles considers arching effects of the retained soils behind the plates and the force is resisted by the bending resistance of the steel shaft embedded in stable deeper soil. The plate piles will allow to excavate a near vertical cut at the excavation top up to about 4 feet high followed by about 1.5(H):1(V) cut slope descending to the bottom of the excavation. It is likely that some minor raveling will take place in between the plate piles while the excavation is open.

The plate piles should be installed before any excavation for the construction of the new ramp takes place. For preliminary consideration, it is estimated that the plate piles will be about 15 feet long, spaced about 4 feet on center in the direction parallel to the retaining wall alignment with a second plate pile row staggered about 5 to 7 feet above the first row. It is expected that the installation of the plate piles will take less than 5 days. Table 6 below summarizes the recommended geotechnical design parameters.

Table 6
Geotechnical Design Parameters
Plate Pile Design

Depth below EXISTING grade (measured vertically) (ft)	Material	Unit Weight (pcf)	c (psf)	ϕ (deg)
0-10	Sand	110	20	32
10-30			20	34

8.5.2.2. Performance Monitoring

Some means of monitoring the performance of the push plate pile system and nearby sidewalks and paved surfaces is recommended. The monitoring should consist of daily visual inspections focusing on identifying presence of cracks or excessive movements and of periodic lateral and vertical surveying of the plate pile tops and strategic survey points. It is recommended that the survey be performed immediately after the plate pile installation and then periodically as the excavation for the retaining walls proceeds. This office can prepare the monitoring plan and schedule, including establishment of action levels and response action, upon request under a separate authorization.

8.6. Rebuilding of Slope

The slope will need to be rebuilt following the removal of the existing retaining wall or to backfill the excavation behind the new retaining wall. Prior to placement of fill any slough or loose materials should be removed, the bottoms should be probed, and the slope grade be rebuilt with fill compacted wet of optimum to 90 percent relative compaction. Fill should be placed in horizontal lifts no more than 8 inches in loose uncompacted thickness. In order to adequately compact the face of the slope, it is strongly recommended to slightly overbuild the slope face and then trim the slope face back to a compacted core at the final configuration. If this method is not practical, the contractor must be prepared to skillfully compact the slope face to meet the compaction requirements.

8.7. Seismic Design Parameters

The seismic design coefficients provided below in Table 7 below are based on Chapter 16 Section 1613 of the 2022 CBC and obtained from the Structural Engineers Association of California (SEAOC) and the Office of Statewide Health Planning and Development (OSHPD) website application (https://www.seaoc.org). According to ASCE 7-16 Section 11.4.8, a site-specific ground motion hazard analysis shall be performed if structures on Site Class D have an S_1 greater than or equal to 0.2 unless the seismic coefficient *Cs* determined by Equation (12.8-2) is used for values of $T <= 1.5\ T_s$ and taken as equal to 1.5 times the value computed in accordance with either Equation (12.8-3) for $T_L >= T > 1.5\ T_s$ or Equation (12.8-4) for $T > T_L$. Tetra Tech can provide site-specific ground motion hazard analysis under a separate scope and budget.

Table 7
2022 CBC Site Coefficients

Site Class Table 20.3-1 ASCE 7-16		D
Maximum Considered Earthquake MCE_R	Short Period (0.2 seconds), S_{MS}	1.886*
	1 Second Period, S_{M1}	1.159**
Design Earthquake	Short Period (0.2 seconds), S_{DS}	1.257*
	1 Second Period, S_{D1}	0.773**
Site Modified Design Peak Ground Acceleration PGA_{MCER_Design}		0.503g
Site Modified Peak Ground Acceleration Geometric Mean PGA_M		0.917g*

* Values obtained from Structural Engineers Association of California (SEAOC) and the Office of Statewide Health Planning and Development (OSHPD) website application, https://www.seaoc.org based on ASCE7-16 and 2018 International Building Code.
** See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7-16.

8.8. Retaining Wall Foundations

The retaining walls can be supported on continuous footings established on competent subgrade prepared in accordance with recommendations provided in "Site Preparation" section of this report. Foundations should be designed and reinforced in accordance with the recommendations of the Structural Engineer and should conform to the 2022 CBC.

8.8.1. Continuous Footings

Footings for the proposed retaining walls can be designed based on the parameters presented in Table 8 below.

Table 8
Geotechnical Design Parameters
Continuous Footings

Continuous Strip Footings	
Dimensions (feet)	• At least 18 inches wide but less than 4 feet wide (to limit the effect of the descending slope)
Depth of Embedment	• Embedded at least 1.5 feet below the lowest adjacent grade
Allowable Bearing Pressure	• 1,900 psf
Allowable Bearing for Transient Live Loads	• The allowable bearing pressure value may be increased by one-third for transient live loads from wind or seismicity.
Estimated Settlement	• Approximately 1-inch total static settlement. • Approximately 0.75-inch differential settlement between over a distance of 30 feet.
Allowable Friction at the base (incorporates Factor of Safety of 1.5)	• 0.3
Allowable Lateral Passive Resistance (incorporates Factor of Safety of 2)	• See Table 8 • The passive resistance derived of the upper 12 inches should be neglected.
Allowable Combined Lateral Resistance	• Total allowable resistance to lateral loads can be calculated by combining lateral resistance due to the friction at the base and lateral passive resistance. • Passive resistance values may be increased by one-third when considering transient wind or seismic loading

8.8.2. Foundations Adjacent to Trenches

The bottom of any trenches that are required for any buried utilities and piping should be kept outside a zone defined by a 1(H):1(V) plane projected from the outside bottom edge of any existing or proposed foundation. Backfill materials and procedures shall conform to the recommendations provided in the "Site Preparation" and "General Site Grading" sections of this report. If any conduit needs to be placed within the zone of influence, the pipes should be designed to account for the increased surcharge from the applied foundation pressures and to withstand potential differential settlement between the surcharged and unsurcharged segments of the pipe. Generally, the pipes within the impacted zone should be protected with concrete encasement, utilidors, or other suitable form of protection. The piping and encasement should be designed to withstand differential settlements of up to 1 inch over a distance equal to half of the depth of the pipe below the bottom of the foundation. This office should be contacted to review any specific utility interaction configurations and their proposed mitigation.

8.8.3. Lateral Earth Pressures

The proposed retaining walls are unrestrained and free to rotate at least 0.002 radians (deflection at the top of the wall of at least 0.002 x H). Therefore, they may be designed for active pressure condition.

Based on the 2022 CBC, the design of retaining walls higher than 6 feet, as measured from the bottom of the footing, requires the inclusion of not only static lateral pressures but also of additional seismically induced lateral earth pressures. According to the 2022 CBC the dynamic seismic lateral earth pressures on retaining walls should be determined using the design earthquake ground motions. Based on the OSHPD website application (https://www.seaoc.org), the PGA from the Design Response Spectrum at the site is approximately 0.503g where the design PGA is calculated as $0.4*S_{DS,}$ where S_{DS} is the risk-targeted, maximum rotated acceleration direction, design response spectrum parameter for short periods. The seismic induced earth pressure increments based on the Design Earthquake Ground Motions were estimated using the method recommended by Agusti and Sitar (2013).

The total static and seismic ultimate lateral passive earth pressures were computed as recommended by Taciroglu (2013).

The static and seismic lateral pressures acting on the proposed retaining walls should be calculated based on the recommendations provided in Table 9. The effect of any surcharge (dead or live load) Q located within a 2(H):1(V) plane drawn upward from the heel of the wall foundation should be added to the lateral earth pressures as indicated in Table 9. Lateral earth pressures presented in this table are for a backfill with slope inclination of 2(H):1(V) and 1.5(H):1(V). The lateral pressures may be interpolated for intermediate gradients.

Backfill materials within a 2-foot zone immediately behind the retaining walls should have a Sand Equivalent of about 30, an Expansion Index of less than 20, and fines content (passing #200 sieve) of less than 15 percent. The on-site materials are considered to be generally suitable as backfill within this zone.

Table 9
Geotechnical Design Parameters
Lateral Pressures due to Static and Seismic Loads

Lateral ACTIVE Pressure for Yielding Walls with a Sloping Backfill		
Backfill slope:	**2(H):1(V)**	**1.5(H) :1(V)**
Static pressure (psf)	47z + 0.46Q	65z + 0.46Q
Seismic pressure increment (psf)	43z	78z
Lateral PASSIVE Resistance – Level grade in front of the wall toe		
Allowable static passive pressure (psf) Includes a Factor of Safety of 2	$195z_1$	
Ultimate total passive resistance for seismic conditions (psf) No Factor of Safety	$270z_1$	

Notes:
- Lateral Pressures due to seismic loading are based on a PGA=0.503g. The resulting total seismic force (active plus seismic increment) should be calculated by assuming a triangular equivalent fluid density distribution. The resulting force should be assumed to act at 1/3 of the height of the wall above the bottom of the wall.
- Pressures based on soil with $\phi = 32^o$, c = 20 psf, $\gamma_t = 120$ pcf

Legend:
z … Depth (ft) below the grade behind the wall – depth measured from the ground surface to the depth where the soil lateral pressure is being evaluated;
z_1 … Depth (ft) below the grade where passive conditions apply, i.e., usually in front of the wall, to the depth where the soil lateral pressure is being evaluated; disregard any contribution to the passive pressure from the upper 1 foot.
Q … Uniform surcharge (psf) within a 1(H):1(V) plane drawn upward from the heel of the wall footing

Retaining walls should be constructed to limit potential for hydrostatic pressure built-up behind the wall or be designed for it. If irrigation or precipitation infiltration is expected, adequate drainage is essential to provide a free-drained backfill condition to limit the hydrostatic pressure buildup behind the wall. If control of efflorescence on the air side of the wall due to moisture transmission through the wall is desired, the wall should be appropriately waterproofed. Retaining walls should be built with at least 1 foot of freeboard to provide a barrier for any sloughing of materials from the upslope area. The design of the wall should include the freeboard as part of the retained height.

Adequate drainage behind the wall may be provided by a backdrain consisting of a geosynthetic drainage composite such as TerraDrain, MiraDrain, or approved equivalent, placed against the entire backside of the wall. The drainage composite should be connected to a 4-inch-diameter perforated ABS or PVC Schedule 40 drainpipe, or an approved equivalent, placed at the heel of the wall. The drainpipe should be sloped at least 2 percent and be surrounded by 1 cubic foot per foot of Class II Permeable Material (Caltrans Standard Specifications - Section 68) or ¾-inch crushed rock (Standard Specification for Public Works Construction ("Greenbook") - Section 200-1.2) wrapped in suitable non-woven filter fabric, e.g., Mirafi 140NL or approved equivalent. Perforations in the drainpipe should have a maximum diameter of 0.25 inches or ⅜ inches for Class 2 Permeable Base or ¾-inch crushed rock drain material, respectively, spaced 3 inches on center, and be arranged in 2 rows at a radial spacing of approximately 120 degrees. The axis of the included angle between the perforation rows should be positioned downward to form a

flowline. The drainpipe should discharge through a solid pipe to appropriate outlets, such as the storm drain system or through the wall. The maximum length of the drainpipe between discharge outlets should not exceed 100 feet.

8.9. ADA Ramp Concrete Flatwork

Flatwork for the ramp path should be placed on subgrade prepared in accordance with the recommendations provided in the "Site Preparation" section of this report. A Structural Engineer or an Engineer specialized in concrete design should be consulted if cracking of the ramp flatwork is to be minimized. Although the ramp flatwork should be designed by the specialist Engineer, the following recommendations are provided to assist with the preliminary design. It is recommended that the ramp flatwork have a minimum thickness of 5 inches and be reinforced with at least No. 4 reinforcing bars placed longitudinally at 18 inches on center. Reinforcement should be properly placed and supported on blocks or "chairs". Welded wire mesh reinforcement is not recommended.

For the design of concrete slabs for the ramp, a modulus of subgrade reaction k_1 on a 1-foot by 1-foot square plate of 110 pci may be used. For the on-site sandy soils, the design modulus of subgrade reaction *k* in pci for a concrete flatwork rectangular panel can be determined as:

$$k = k_1 \frac{(B+1)^2}{4B^2} \frac{1 + 0.5\frac{B}{L}}{1.5}$$

Where *B* and *L* is the governing width and length of the concrete panel in feet, but no more than 14 times the thickness of the element.

Control joints in the slabs should be constructed in accordance with recommendations from the Structural Engineer and the Architect. For preliminary design considerations, control joints should be provided in all concrete slabs-on-grade as recommended by American Concrete Institute (ACI) guidelines and at a maximum spacing (in feet) of 2 to 3 times of the slab thickness (in inches), but generally no more than 10 feet. All joints should form approximately square patterns to reduce potential for randomly oriented shrinkage cracks. The control joints should be tooled at the time of the pour or sawcut to ¼ of slab depth within 6 to 8 hours of concrete placement. All joints in flatwork should be sealed to prevent moisture, vermin, or foreign material intrusion. Precautions should be taken to prevent curling of slabs in this semi-arid region. Reinforcement should extend through the control joints to reduce the potential for differential movement.

8.10. Soil Corrosion

The corrosion potential of the on-site materials to buried steel and concrete was evaluated based on laboratory testing on 1 representative soil samples. Table 10 below presents the results of the corrosivity testing.

Table 10
Corrosivity Test Results

Boring	Sample ID	Depth (feet)	pH	Resistivity (ohm-cm)	Chlorides (ppm/%)	Soluble Sulfate Content in Soil (ppm/%)
B-4	SK-1	2	8.5	10,568	29/0.0029	17 / 0.0017 Category S0 per 2022 CBC

Per 2022 CBC Section 1904.1, concrete subject to exposure to sulfates shall comply with the requirements set forth in ACI 318-19, Section 19.3. Based on the measured water-soluble sulfate test results the exposure of buried concrete to sulfate attack at the site should be considered "not a concern", i.e., exposure class S0 per ACI 318, Table 19.3.1.1. Consequently, injurious sulfate attack is not anticipated for concrete with a minimum 28-day compressive strength of 2,500 psi Per ACI 318-19, Section 19.3.1.1 the maximum permitted amount of water-soluble chloride ions incorporated into the concrete depends on the degree of exposure to an anticipated external source of moisture and chlorides. Because the concrete is exposed to moisture in a marine environment an exposure class C1 per ACI 318-19, Section 19.3 is assigned which requires that the maximum water-soluble chloride ion (Cl^-) content in concrete (percent by mass of cementitious materials) does not exceed 0.3 for non-prestressed concrete. Additional information on the effects of chlorides on the corrosion of steel reinforcement is provided in ACI 201.2R which provides guidance on concrete durability and ACI 222R which provides guidance on factors that impact corrosion of metals in concrete.

The evaluation of potential for corrosion of buried metals was based on the minimum resistivity per NACE (1984) and our experience with similar soils. The on-site soils are anticipated to likely have a "progressively less corrosive" potential to buried ferrous metals. A corrosion specialist should be consulted regarding suitable types of piping and necessary protection for underground metal conduits. The corrosion potential of the on-site soils should be verified during construction for each encountered soil type. Imported fill materials should be tested prior to placement to confirm that their corrosion potential is not more severe than the one assumed for the project.

9. GENERAL SITE GRADING RECOMMENDATIONS

The intent of this section is to provide general information regarding the site grading. Site grading operations should conform with applicable local building and safety codes and to the rules and regulations of those governmental agencies having jurisdiction over the subject construction.

The grading contractor is responsible for notifying governmental agencies, as required, and a representative of the Geotechnical Engineer at the start of site cleanup, at the initiation of grading, and any time that grading operations are resumed after an interruption. Each step of the grading should be accepted in a specific area by a representative of the Geotechnical Engineer, and where required, should be approved by the applicable governmental agencies prior to proceeding with subsequent work.

The following site grading recommendations should be regarded as minimal. The site grading recommendations should be incorporated into the project plans and specifications.

1. Prior to grading, existing vegetation, trash, surface structures and debris should be removed and disposed off-site at a legal dumpsite. Any existing utility lines, or other subsurface structures which are not to be utilized, should be removed, destroyed, or abandoned in compliance with current governmental regulations.

2. Subsequent to cleanup operations, and prior to initial grading, a reasonable search should be made for subsurface obstructions and/or possible loose fill or detrimental soil types. This search should be conducted by the contractor, with advice from and under the observation of a representative of the Geotechnical Engineer.

3. Prior to the placement of fill or foundations, the site should be prepared in accordance with the recommendations presented in the section “Site Preparation” of this report. All undocumented fill or disturbed soils should be removed and processed as recommended by the Geotechnical Engineer

4. The exposed subgrade and/or excavation bottom should be observed and approved by the Geotechnical Engineer for conformance with the intent of the recommendations presented in this report and prior to any further processing or fill placement. It should be understood that the actual encountered conditions may warrant excavation and/or subgrade preparation beyond the extent recommended and/or anticipated in this report.

5. Any imported fill material required for backfill or grading should be tested and approved prior to delivery to the site.

6. Visual observations and field tests should be performed during grading by the Geotechnical Engineer. This is necessary to assist the contractor in obtaining the proper moisture content and required degree of compaction. Wherever, in the opinion of the Geotechnical Engineer, an unsatisfactory condition is being created in any area, whether by cutting or filling, the work should not proceed in that area until the condition has been corrected.

10. DESIGN REVIEW AND CONSTRUCTION MONITORING

Geotechnical review of plans and specifications and participation during the construction are an integral part of the design practice. The following paragraphs present our recommendations relative to the review of construction documents and the monitoring of construction activities.

10.1. Plans and Specifications

Upon completion, the civil and structural design plans and specifications should be reviewed and approved by the Geotechnical Engineer prior to submittal for issuance of grading, building, and/or construction permits as the geotechnical recommendations may need to be re-evaluated based on the actual design configuration and loads. This review is intended to evaluate whether the recommendations contained in this report have been incorporated into the project plans and specifications as intended.

10.2. Construction Monitoring

The objective of the construction quality assurance (CQA) is to assist in the construction of the soils and soils-structure interaction components of the Project. Observation of site overexcavation, processing and assessment of fill materials, fill placement, and other site grading operations by the Geotechnical Engineer should be implemented during construction to allow for evaluation of the geotechnical-related conditions as they are encountered. This process provides the Geotechnical Engineer with the opportunity to recommend appropriate revisions as needed.

10.2.1. Construction Observations for Excavations

The Geotechnical Engineer should observe all temporary excavations and construction slopes, as well as the backfill operations so that appropriate modifications to the design criteria presented herein may be recommended, if necessary, due to encountered conditions differing from the design assumptions.

10.2.2. Construction Observations for Slope Stabilization

The Geotechnical Engineer should observe the installation of the installation the push plate piles to verify the depth of installation and observe the encountered conditions so that appropriate modifications to the design presented herein may be amended, if necessary.

10.2.3. Foundation Construction Observations

The Geotechnical Engineer should observe and evaluate the presence of satisfactory materials at the foundation subgrade prior to pouring of concrete.

10.3. Construction Quality Assurance Reporting

The following list is intended to provide basic minimum guidelines for the reporting during the excavation and backfilling operations:

- Daily Field Report should be generated each time a representative of the Geotechnical Engineer is performing a quality assurance (QA) work at the site.

- Daily Field Reports should contain, at a minimum, a detailed description of the field activities, utilized equipment, areas of work, date, time, weather, and locations and results of all observations and performed tests.

- Provisions should be made for vertical and horizontal control for recording observations and test locations.

- A complete set of Daily Field Reports should be submitted as a part of formal final reporting.

11. LIMITATIONS

The recommendations and opinions expressed in this report are based on Tetra Tech's review of background documents and on information obtained from the current geotechnical investigation. It should be noted that this study did not evaluate the presence of hazardous materials.

Due to the limited nature of the field explorations, conditions not observed and described in this report may be present on the site. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation and laboratory testing can be performed upon request. It should be understood that conditions different from those anticipated in this report may be encountered during grading operations, for example the extent of unsuitable soils and overexcavation, which may result in an additional mitigation effort.

Site conditions can change with time as a result of natural processes or the activities of man. Changes to the applicable laws, regulations, codes, and standards of practice may occur as a result of government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Tetra Tech has no control. Therefore, this report should be reviewed and recertified by Tetra Tech if it were to be used for a project design commencing more than one year after the date of issuance of this report.

Tetra Tech's recommendations for this site are, to a high degree, dependent upon appropriate quality control of subgrade preparation, fill placement, and foundation construction and on verification of the foundation conditions. Accordingly, the recommendations are made contingent upon the opportunity for Tetra Tech to observe all aspects of grading operations and foundation excavations for the proposed construction. If parties other than Tetra Tech are engaged to provide such services, Tetra Tech expressly ceases to be the Geotechnical Engineer of Record for the project and such parties are automatically assuming complete responsibility as the Geotechnical Engineer of Record for the Project and are deemed concurring with the recommendations provided in this report or are obligated to provide alternative recommendations.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the Project described herein. Tetra Tech should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. Reliance by others on the data presented herein or for purposes other than those stated in the text is authorized only if so permitted in writing by Tetra Tech. Such an authorization may incur additional expenses and charges.

Tetra Tech has endeavored to perform its evaluation using the degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical professionals with experience in this area in similar soil conditions. No other warranty, either expressed or implied, is made as to the conclusions and recommendations contained in this report.

12. SELECTED REFERENCES

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Figures

FIGURE 1

TETRA TECH
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TEL 909.860.7777 www.tetratech.com

ADA RAMP AT AVENUE A - REDONDO BEACH, CA

SITE LOCATION MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
DRAWN BY	TAC
CHECKED BY	SS

FIGURE 2

TETRA TECH
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ADA RAMP AT AVENUE A - REDONDO BEACH, CA

BORING LOCATION MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
DRAWN BY	TAC
CHECKED BY	SS

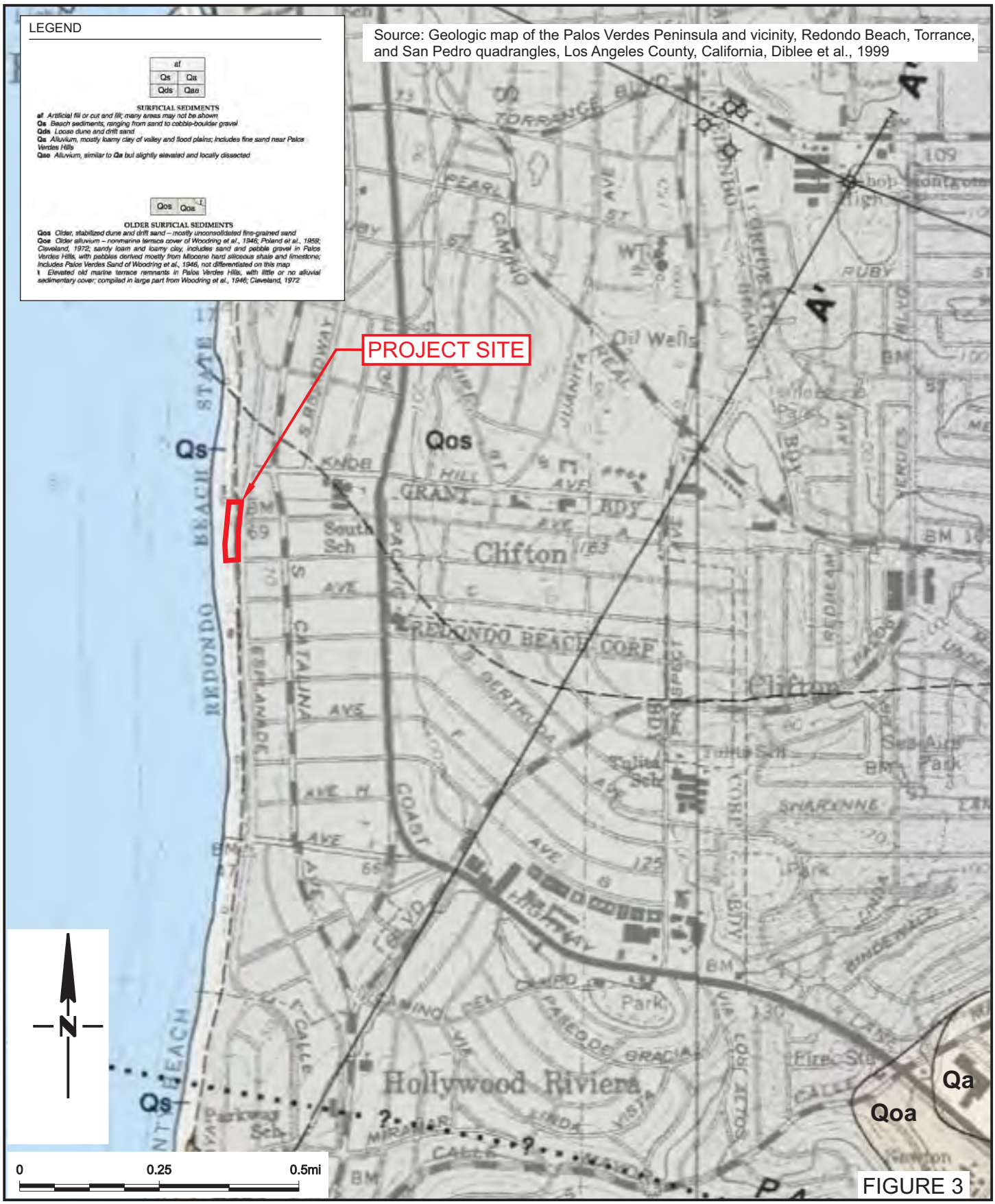

FIGURE 3

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ADA RAMP AT AVENUE A - REDONDO BEACH, CA

GEOLOGIC MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
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Source: Seismic Hazard Zone Report for the Redondo Beach 7.5-Minute quadrangle, Los Angeles County, CA, Plate 2.1

FIGURE 4

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ADA RAMP AT AVENUE A - REDONDO BEACH, CA

HISTORIC HIGH GROUNDWATER MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
DRAWN BY	TAC
CHECKED BY	SS

EARTHQUAKE EPICENTERS

M 5.0 to 5.9

M 6.0 to 6.9

M 7.0 to 7.9

HISTORIC EARTHQUAKE EVENTS

1)	1812 Wrightwood	M7
2)	1827 Ventura County	M6
3)	1855 Los Angeles	M6?
4)	1858 San Bernardino	M6?
5)	1880 San Bernardino	M6
6)	1889 Monrovia	M5.5
7)	1893 San Fernando Valley	M5.9
8)	1894 n/o Pomona	M6
9)	1899 Cajon Pass	M6.5
10)	1899 San Jacinto	M6.4
11)	1907 San Bernardino	M6
12)	1910 Elsinore	M6
13)	1918 San Jacinto-Hemet	M6.8
14)	1920 Inglewood	M4.9
15)	1923 Loma Linda	M6
16)	1930 Santa Monica Bay	M5.2
17)	1933 Long Beach	M6.4
18)	1941 Gardena	M4.8
19)	1971 San Fernando	M6.7
20)	1973 Pt. Mugu	M5.9
21)	1979 Malibu	M5.2
22)	1981 Pt. Mugu	M6.0
23)	1986 N Palm Sprins	M6.2
24)	1987 Whittier-Narrows	M5.9
25)	1988 Pasadena	M5.0
26)	1989 Malibu	M5.0
27)	1990 Pomona	M5.3
28)	1991 Sierra Madre	M5.8
29)	1994 Northridge	M6.7
30)	1992 Landers	M7.3
31)	1992 Big Bear	M6.2
32)	2005 Chino Hills	M5.2

Map Reference: Excerpt of Jennings, C.W., and Bryant, W.A., 2010, Fault activity map of California; California Geologic Survey, Date Map No. 6, map scale ~ 1:750,00

Used in permission from California Geologic Survey.

Earthquake epicenters from SP 116

PROJECT SITE

EXPLANATION

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION: ON LAND	DESCRIPTION: OFFSHORE
Quaternary	Late Quaternary	Historic	200			Displacement during historic time (e.g. San Andreas fault 1096). Includes areeas of known fault creep.	
		Holocene	11,700			Displacement during Holocene time.	Faults offsets sea floor sediments or strata of Holocene age.
		Pleistocene	700,000			Fault showing evidence of displacement during late Quaternary time.	Faults cuts strata of LatePleistocene age.
	Early Quaternary		1,600,000			Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,00 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Faults cuts strata of Quaternary age.
Pre-Quaternary				---?		Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Faults cuts strata of Pliocene or older age.

MAP SYMBOLS

- Triangle - termination portion data. Square - fault creep slippage. Hachure - linear extent of fault creep. (other symbols - see below)
- Approximate located trace
- Location uncertain
- Bar and ball on dowthrown side
- Arrows along fault indicate relative or apparent direction of lateral movement.
- Direction of fault dip
- Low angle fault (barbs on upper plate)
- 171 Numbers refer to annotations listed in explanatory text of map.
- Subject Site Location

0 5 10 mi

FIGURE 5

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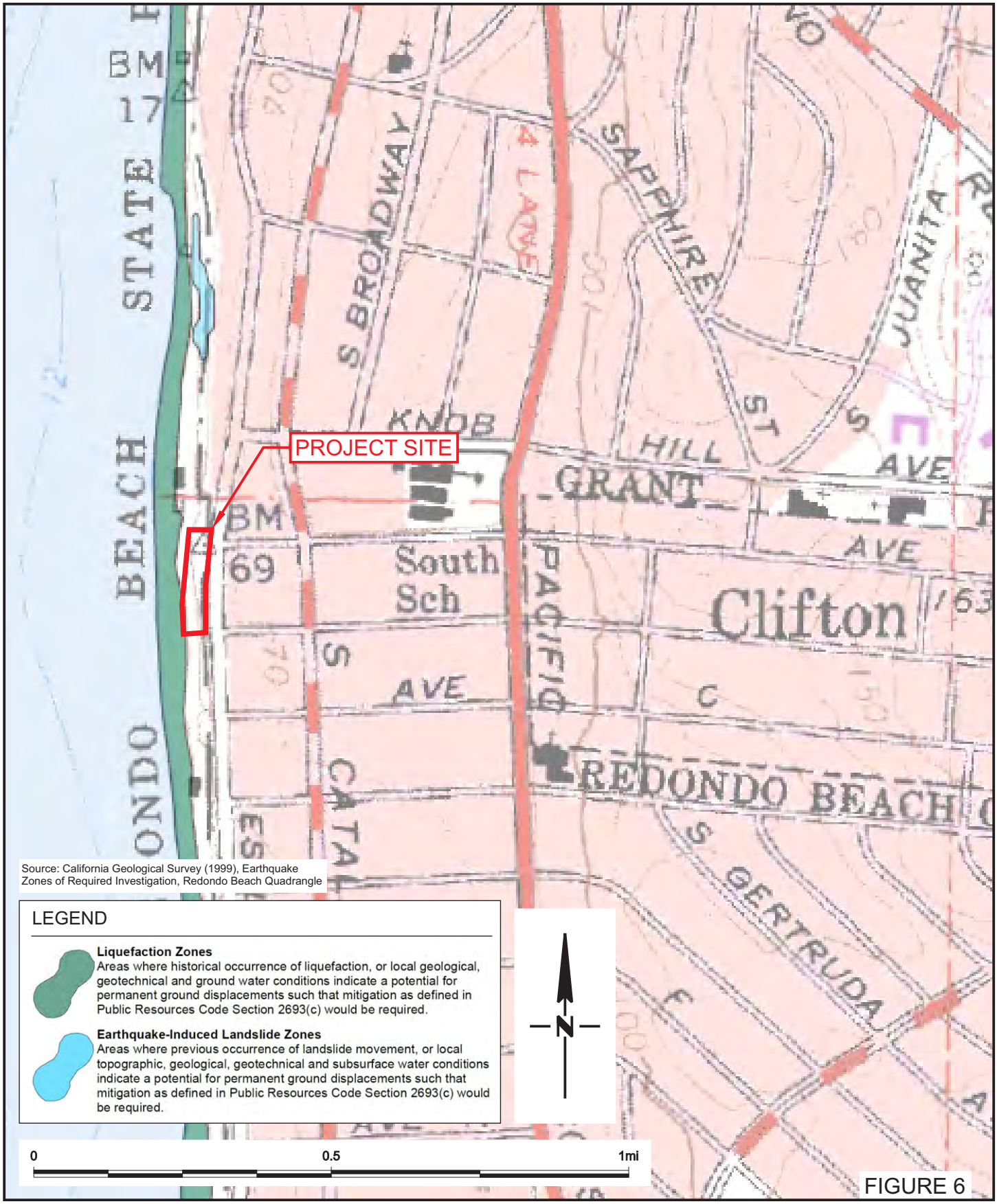
ADA RAMP AT AVENUE A - REDONDO BEACH, CA

REGIONAL FAULTS AND SEISMICITY MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
DRAWN BY	TAC
CHECKED BY	SS



Source: California Geological Survey (1999), Earthquake Zones of Required Investigation, Redondo Beach Quadrangle

LEGEND

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

FIGURE 6

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ADA RAMP AT AVENUE A - REDONDO BEACH, CA

SEISMIC HAZARD ZONES MAP

JOB NO.	TET 22-230E
DATE	MAR 2022
DRAWN BY	TAC
CHECKED BY	SS

Appendix A

Boring Logs

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BORING B-1

PROJECT NAME ADA Ramp (Avenue A) **CLIENT** County of LA Dept. of Beaches and Harbors **GROUND ELEVATION** 70.5 ft

PROJECT NUMBER 197-4552-0230 **PROJECT LOCATION** Redondo Beach, CA **GROUNDWATER DEPTH** Not encountered

DATES DRILLED 3/4/2022 **DRILLING CONTRACTOR** Tetra Tech **BOREHOLE DEPTH** 10.5 ft

LOGGED/CHECKED BY SMS/MAS/FC **DRILLING METHOD** Hand Auger **BOREHOLE DIAMETER** 6 in

COORDINATES 33.827649°, -118.390172° **HAMMER DATA** N/A **BACKFILL** Soil Cuttings

LOCATION DESCRIPTION Top of slope

Standard Penetration Test (SPT) | No Recovery | Shelby Tube | California-Type Ring Sample | No Recovery | Grab/Bulk Sample

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNT blows/6" (bpf)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	Notes	ELEVATION (ft)
0.0					[FILL] Artificial Fill (Af) Lean CLAY, olive brown (2.5Y 4/3), dry				70.0
				SM	Silty SAND, brown (10YR 4/3), dry, fine to medium grained				
2.5	SK-1			SP	[NATIVE] Dune and Drift Sands, Qos Poorly-graded SAND, yellowish brown (10YR 5/6), dry to slightly moist, fine to medium grained ...(3 ft) trace gravel				67.5
					...(4 ft) moist, slightly coarser grained, grey (N 6/1) clay nodule in cuttings				
5.0	SK-2								65.0
7.5	SK-3				...(7 ft) some clay seams, 0.25-inches thick			GSF2μ=0/98/2/0	62.5
					...(10 ft) yellowish brown (10YR 5/6), moist				
10.0	SK-4								60.0

Notes:
- Total depth of 10.5 ft
- Groundwater not encountered
-Backfilled with soil cuttings

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BORING B-2

PROJECT NAME ADA Ramp (Avenue A) **CLIENT** County of LA Dept. of Beaches and Harbors **GROUND ELEVATION** 58 ft

PROJECT NUMBER 197-4552-0230 **PROJECT LOCATION** Redondo Beach, CA **GROUNDWATER DEPTH** Not encountered

DATES DRILLED 3/4/2022 **DRILLING CONTRACTOR** Tetra Tech **BOREHOLE DEPTH** 10.5 ft

LOGGED/CHECKED BY SMS/MAS/FC **DRILLING METHOD** Hand Auger **BOREHOLE DIAMETER** 6 in

COORDINATES 33.827421°, -118.390252° **HAMMER DATA** N/A **BACKFILL** Soil Cuttings

LOCATION DESCRIPTION Upper 1/3 portion of slope, behind retaining wall

Standard Penetration Test (SPT) | No Recovery | Shelby Tube
California-Type Ring Sample | No Recovery | Grab/Bulk Sample

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNT blows/6" (bpf)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	Notes	ELEVATION (ft)
0.0				SP	[FILL] Artificial Fill (Af) Poorly-graded SAND, brown (10YR 4/3), slightly moist, fine to medium grained, trace silt, upper 6 inches disturbed				57.5
					...(2 ft) moist, some broken gravel (angular) of siltstone Poorly-graded SAND, yellowish brown (10YR 5/6), dry to slightly moist, fine to medium grained			Easy augering. No Recovery from ring samples; grab sample collected from auger cuttings	
2.5	SK-1								55.0
5.0	SK-2				...(5 ft) some gravel				52.5
7.5	SK-3				...(7.5 ft) moist, with gravel some rounded and some angular siltstone fragments, with fine grained sand and gravels up to 2 inches in diameter				50.0
				SP	[NATIVE] Dune and Drift Sands, Qos Poorly-graded SAND, loose, yellowish brown (10YR 5/6), dry.				
10.0	R-4							No sample recovery	47.5

Notes:
- Total depth of 10.5 ft
- Groundwater not encountered
-Backfilled with soil cuttings

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BORING B-3

Sheet 1 of 1

PROJECT NAME ADA Ramp (Avenue A) **CLIENT** County of LA Dept. of Beaches and Harbors **GROUND ELEVATION** 31 ft

PROJECT NUMBER 197-4552-0230 **PROJECT LOCATION** Redondo Beach, CA **GROUNDWATER DEPTH** Not encountered

DATES DRILLED 3/4/2022 **DRILLING CONTRACTOR** Tetra Tech **BOREHOLE DEPTH** 3.5 ft

LOGGED/CHECKED BY SMS/MM/FC **DRILLING METHOD** Hand Auger **BOREHOLE DIAMETER** 6 in

COORDINATES 33.827229°, -118.390421° **HAMMER DATA** N/A **BACKFILL** Soil Cuttings

LOCATION DESCRIPTION Mid portion of slope, approximately 2 feet in front of railing for ramp

Standard Penetration Test (SPT) | No Recovery | Shelby Tube
California-Type Ring Sample | No Recovery | Grab/Bulk Sample

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNT blows/6" (bpf)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	Notes	ELEVATION (ft)
0.0				SP	[FILL] Artificial Fill (Af) Poorly-graded SAND, brown (10YR 4/3), slightly moist, fine to medium grained, trace silt				30.0
2.5	SK-1			SP	[NATIVE] Dune and Drift Sands, Qos Poorly-graded SAND, yellowish brown (10YR 5/6), dry to slightly moist, fine to medium grained ...(2 ft) moist, some broken gravel (angular) of siltstone ...(3 ft) with fine gravel, rounded clasts, loose			EI=0 Easy augering. No Recovery from ring sample; grab sample collected from auger cuttings	27.5
	SK-2								

Notes:
- Total depth of 3.5 ft
- Groundwater not encountered
- Caving of loose coarse sands at 3 feet
- Backfilled with soil cuttings

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BORING B-4

Sheet 1 of 1

PROJECT NAME ADA Ramp (Avenue A) **CLIENT** County of LA Dept. of Beaches and Harbors **GROUND ELEVATION** 17 ft

PROJECT NUMBER 197-4552-0230 **PROJECT LOCATION** Redondo Beach, CA **GROUNDWATER DEPTH** Not encountered

DATES DRILLED 3/4/2022 **DRILLING CONTRACTOR** Tetra Tech **BOREHOLE DEPTH** 5 ft

LOGGED/CHECKED BY SMS/MM/FC **DRILLING METHOD** Hand Auger **BOREHOLE DIAMETER** 6 in

COORDINATES 33.826995°, -118.390550° **HAMMER DATA** N/A **BACKFILL** Soil Cuttings

LOCATION DESCRIPTION Lower 1/3 portion of slope, approximately 2 feet in front of railing for ramp

Standard Penetration Test (SPT) | No Recovery | Shelby Tube
California-Type Ring Sample | No Recovery | Grab/Bulk Sample

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNT blows/6" (bpf)	GRAPHIC LOG	USCS	MATERIAL DESCRIPTION	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	Notes	ELEVATION (ft)
0.0					Upper 3-inches disturbed, rootlets and ice plant			Easy augering. No Recovery from ring sample; grab sample collected from auger cuttings corr.	
				SP	[FILL] Artificial Fill (Af) Poorly-graded SAND, white (10YR 8/1), dry, fine to medium grained with some coarse grains				
				SP-SM	[NATIVE] Dune and Drift Sands, Qos Poorly-graded SAND with Silt, light yellowish brown (10YR 6/4), slightly moist, fine to coarse grained, with fine gravel				15.0
2.5	SK-1								
	SK-2				...(3 ft) moist, coarse grained, with rounded clasts			GSF2μ=4/88/8/0	
	SK-3			SW	Well-graded SAND, yellow (10YR 7/6), fine to coarse grained, rounded				12.5
5.0									

Notes:
- Total depth of 5 ft
- Groundwater not encountered
- Caving of loose sands at 4.5 ft
- Backfilled with soil cuttings

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BORING B-5

PROJECT NAME ADA Ramp (Avenue A) **CLIENT** County of LA Dept. of Beaches and Harbors **GROUND ELEVATION** 69 ft

PROJECT NUMBER 197-4552-0230 **PROJECT LOCATION** Redondo Beach, CA **GROUNDWATER DEPTH** Not encountered

DATES DRILLED 3/4/2022 **DRILLING CONTRACTOR** MR Drilling **BOREHOLE DEPTH** 50.8 ft

LOGGED/CHECKED BY SMS/FC **DRILLING METHOD** CME 75 HSA **BOREHOLE DIAMETER** 8 in

COORDINATES 33.827106°, -118.390162° **HAMMER DATA** 140 lbs Autohammer, 30" drop **BACKFILL** Cement/bentonite grout

LOCATION DESCRIPTION In the parking lane on the west side of Esplanade

Standard Penetration Test (SPT) | No Recovery | Shelby Tube
California-Type Ring Sample | No Recovery | Grab/Bulk Sample

DEPTH (ft)	SAMPLE TYPE NUMBER	BLOWCOUNT blows/6" (bpf)	USCS	MATERIAL DESCRIPTION	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	Notes	ELEVATION (ft)
0				Asphalt cover approximately 6-inches thick				
	SK-1		SP	[FILL] Artificial Fill (Af) Poorly-graded SAND, very loose to loose, brown (10YR 4/3), moist, fine to medium grained, massive/no apparent structure				
	SPT-2	1-2-2 (4)	SP	[NATIVE] Dune and Drift Sands, Qos Poorly-graded SAND, very loose to loose, dark brown (7.5YR 3/4), moist, fine to medium grained				
10	R-3	3-5-6 (11)	SM	Silty SAND, loose, dark brown (7.5YR 3/4), moist, medium grained	109.1	6.2	DS	60
	SPT-4	3-3-4 (7)					#200=13%	
20	R-5	7-9-15 (24)	SP	Poorly-graded SAND, medium dense, yellowish brown (10YR 5/6), damp	104.6	4.1	DS	50
	SPT-6	13-15-19 (34)		...(25 ft) dense, moist, coarse grained, with fine gravel			GSF2μ=3/92/5/0	
30	R-7	9-11-15 (26)		...(30 ft) medium dense	100.7	1.9	DS	40
	SPT-8	16-19-21 (40)		...(35 ft) dense, coarse grained, some silt				
40	R-9	14-30-50/4"		...(40 ft) very dense, slightly moist, fine to coarse grained	107.8	4.3	DS	30
	SPT-10	26-50/4"		...(45 ft) moist, fine with some medium grained, finely laminated, trace silt			minor caving	
50	R-11	27-50/4"	SM	Silty SAND, very dense, yellowish brown (10YR 5/6), moist, upward coarsening to medium, upward darkening to orange brown (10YR/6/3), with dark greyish brown (2.5YR 3/3) mottling				20

Notes:
- Total depth of 50.8 ft
- Groundwater not encountered
- Backfilled with cement/bentonite grout
- Soil cuttings collected and stored in drums for disposal

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Appendix B

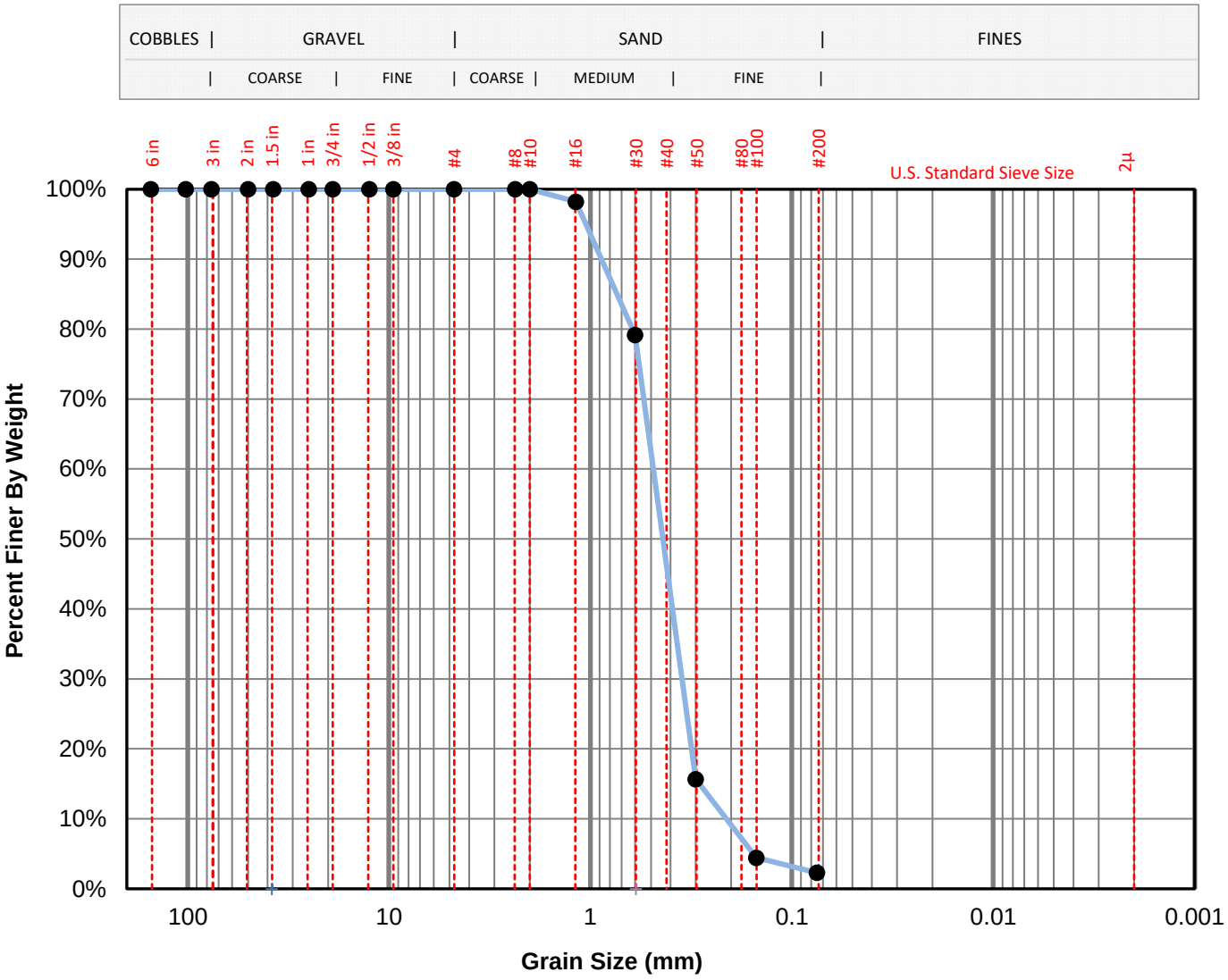
Laboratory Testing

TETRA TECH

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D7928/D6913

Job Name:	ADA, RAMP Rodando Beach	**Date Sampled:**	3/8/2022
Job Number:	TET-22-230E	**Date Completed:**	3/13/2022
Tested By:	MG	**Sample Identification:**	B-1, SK-3
Note:		**Sample Depth:**	7.5 ft
Sample Description:	Reddish brown poorly-graded SAND, SP (Native)		



Symbol	Boring No.	Sample No.	Depth	LL	PI	USCS	Cobbles	Gravel	Sand	Fines	2µ
●	B-1	SK-3	7.5 ft			SP	**0%**	**0%**	**98%**	**2%**	**0%**

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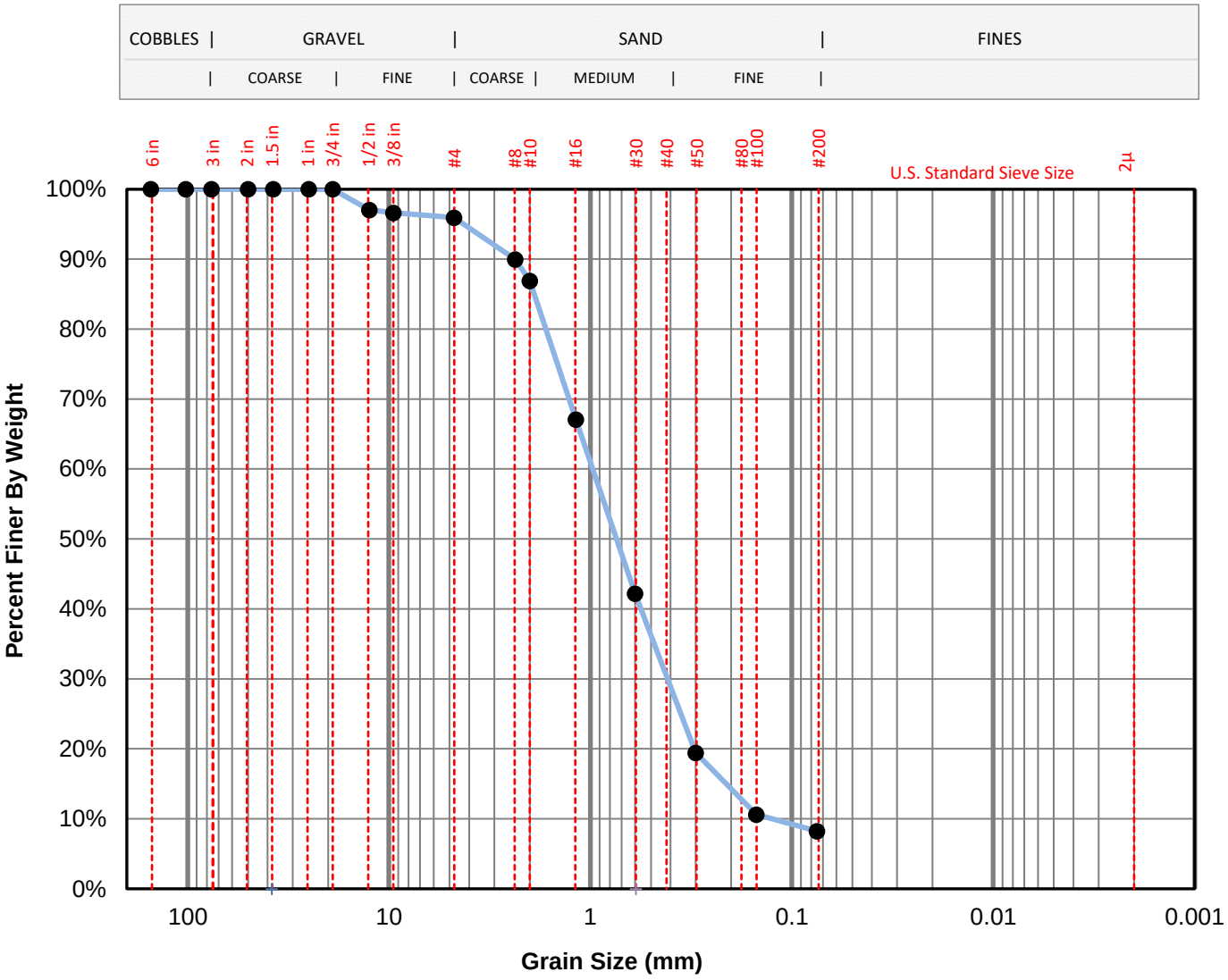
TETRA TECH

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D7928/D6913

Job Name:	ADA, RAMP Rodando Beach	**Date Sampled:**	3/8/2022
Job Number:	TET-22-230E	**Date Completed:**	3/13/2022
Tested By:	MG	**Sample Identification:**	B-4, SK-2
Note:		**Sample Depth:**	3 ft
Sample Description:	Reddish brown poorly-graded SAND with Silt, SP-SM		



Symbol	Boring No.	Sample No.	Depth	LL	PI	USCS	Cobbles	Gravel	Sand	Fines	2µ
●	B-4	SK-2	3 ft			SP-SM	**0%**	**4%**	**88%**	**8%**	**0%**

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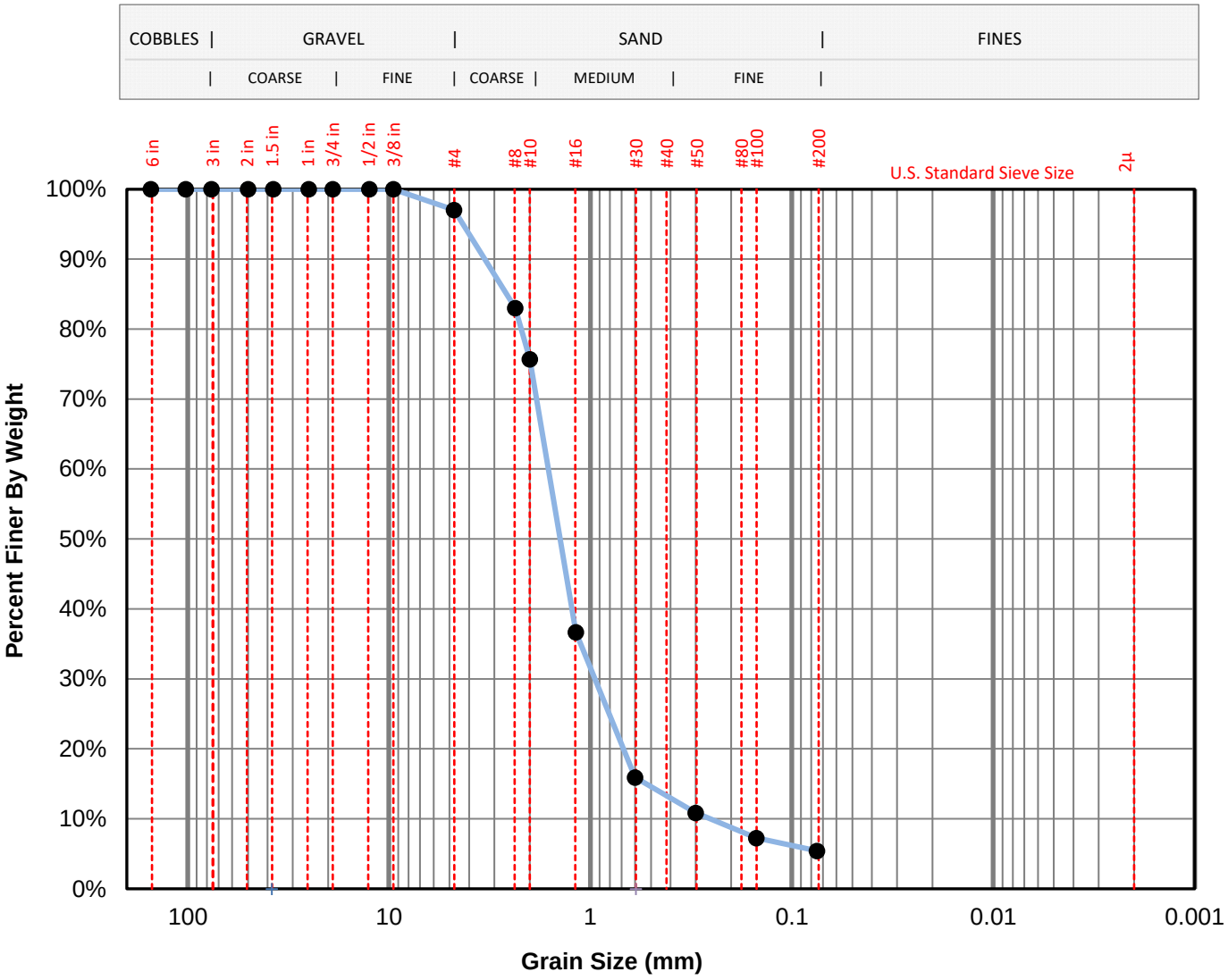
TETRA TECH

GRAIN SIZE DISTRIBUTION ANALYSIS

ASTM C136/C117/D7928/D6913

Job Name:	ADA, RAMP Rodando Beach	**Date Sampled:**	3/8/2022
Job Number:	TET-22-230E	**Date Completed:**	3/13/2022
Tested By:	MG	**Sample Identification:**	B-5, SPT-6
Note:		**Sample Depth:**	25 ft
Sample Description:	Reddish brown poorly-graded SAND with Silt, SP-SM (Native)		



Symbol	Boring No.	Sample No.	Depth	LL	PI	USCS	Cobbles	Gravel	Sand	Fines	2µ
●	B-5	SPT-6	25 ft			SP-SM	**0%**	**3%**	**92%**	**5%**	**0%**

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TETRA TECH

PERCENT PASSING # 200 SIEVE

ASTM D1140

Job Name:	ADA RAMP Redondo Beach	**Date Completed:**	3/8/2022
Job Number:	TET-22-230E	**Date Sampled:**	March 13, 2022
Note:			
Tested By :	MG		

Boring Number	Sample Number	Depth (ft)	Weight Before Wash - Dry (grams)	Weight After Wash - Dry (grams)	Percent Passing # 200 Sieve	USCS Classification
B-5	**SPT-4**	15 ft	476.7	412.7	13%	SM

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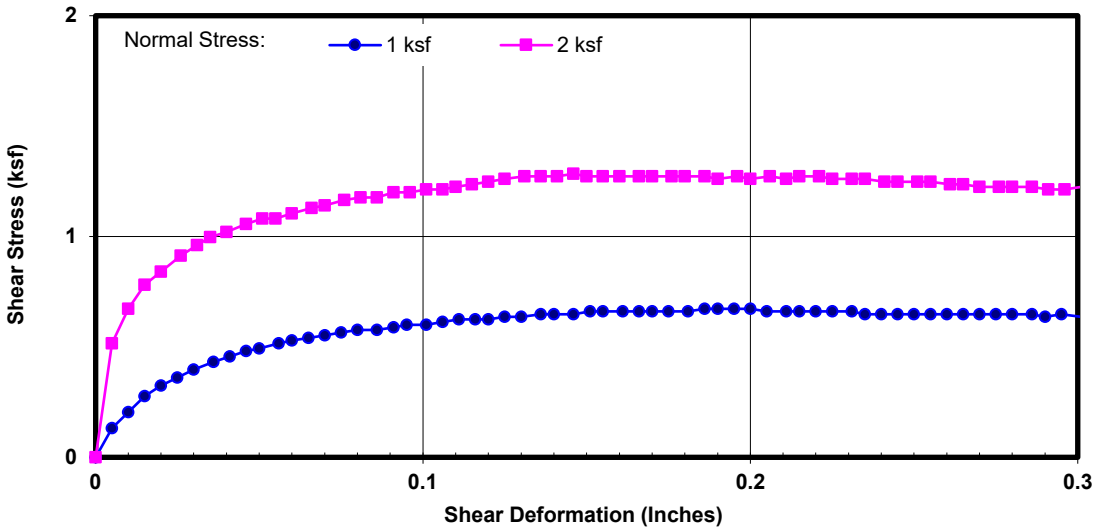
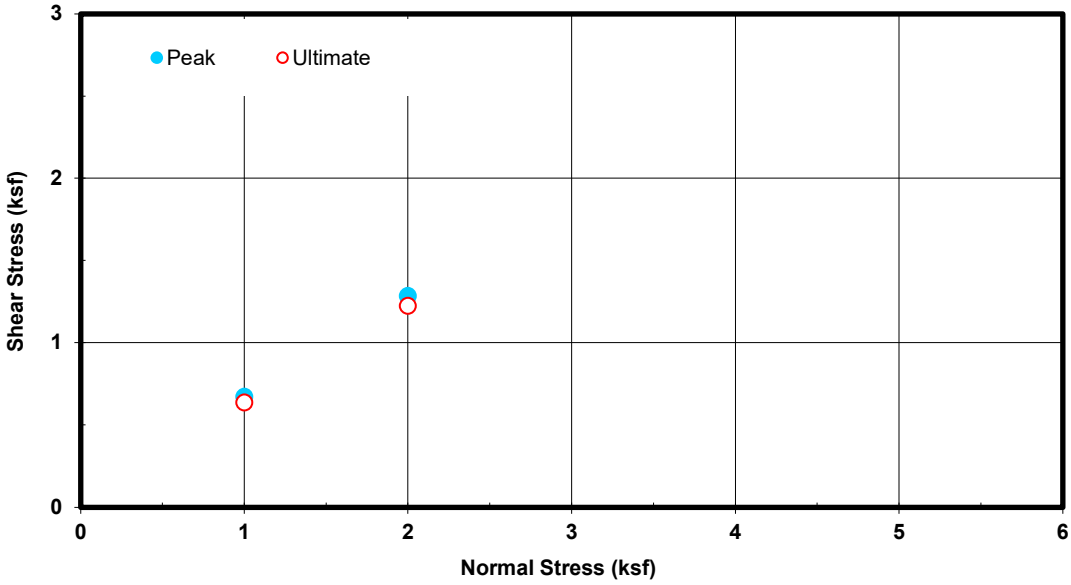
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Tetra Tech		**Tested By:**	LS	**Date:** 03/14/22
Project Name:	ADA Ramp (Avenue A) Redondo Beach, CA		**Computed By:**	NR	**Date:** 03/16/22
Project No.:	TET 22-230E		**Checked by:**	AP	**Date:** 03/16/22
Boring No.:	B-5				
Sample No.:	R-3	**Depth (ft):** 10			
Sample Type:	Mod. Cal.				
Soil Description:	Silty Sand				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
115.8	109.1	6.2	18.2	31	90	1	0.672	0.636
						2	1.284	1.224





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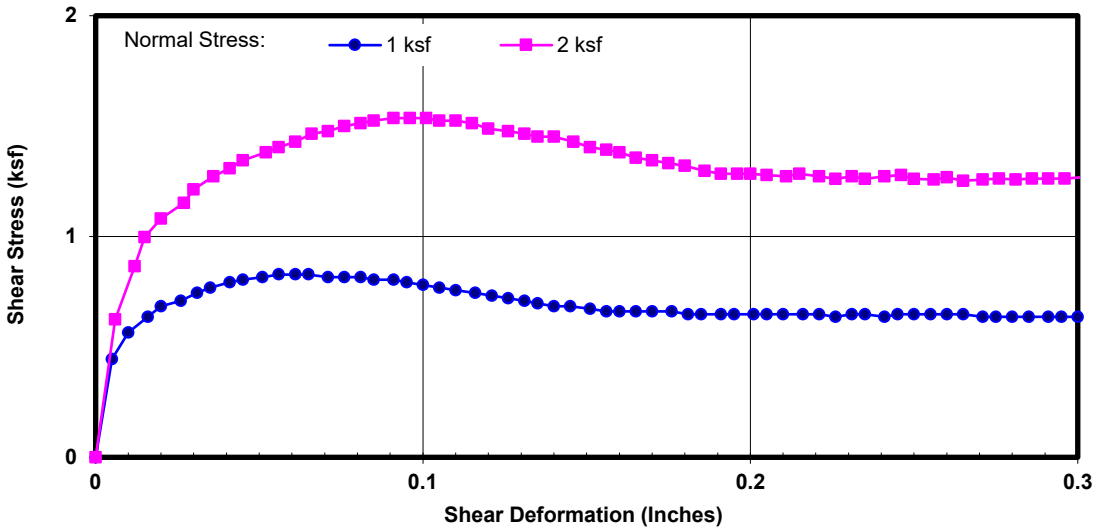
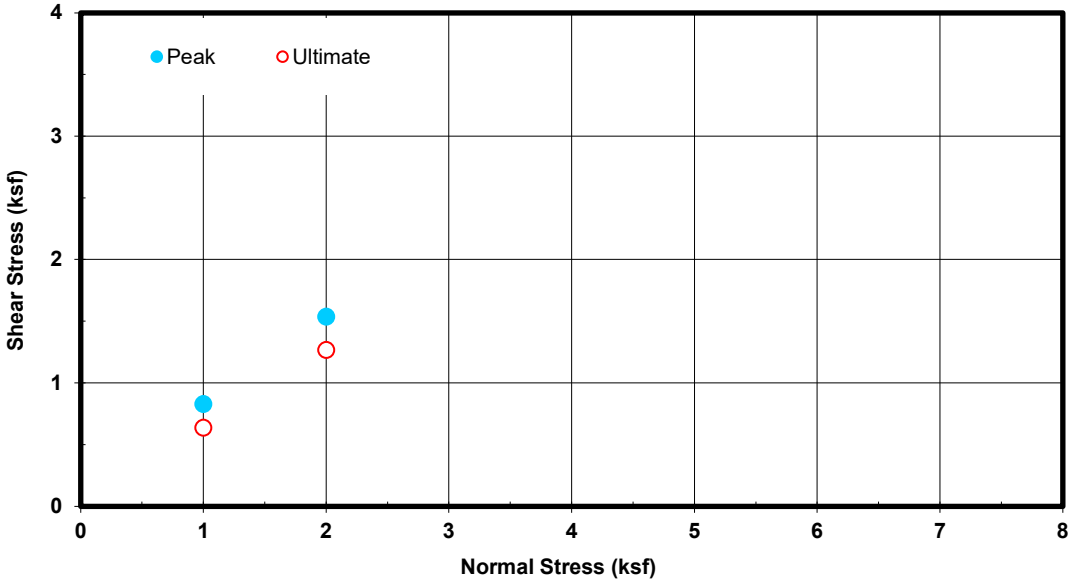
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Tetra Tech		**Tested By:**	ST	**Date:** 03/14/22
Project Name:	ADA Ramp (Avenue A) Redondo Beach, CA		**Computed By:**	NR	**Date:** 03/16/22
Project No.:	TET 22-230E		**Checked by:**	AP	**Date:** 03/16/22
Boring No.:	B-5				
Sample No.:	R-5	**Depth (ft):** 20			
Sample Type:	Mod. Cal.				
Soil Description:	Sand w/ Silt				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
108.9	104.6	4.1	20.6	18	91	1	0.828	0.636
						2	1.536	1.267





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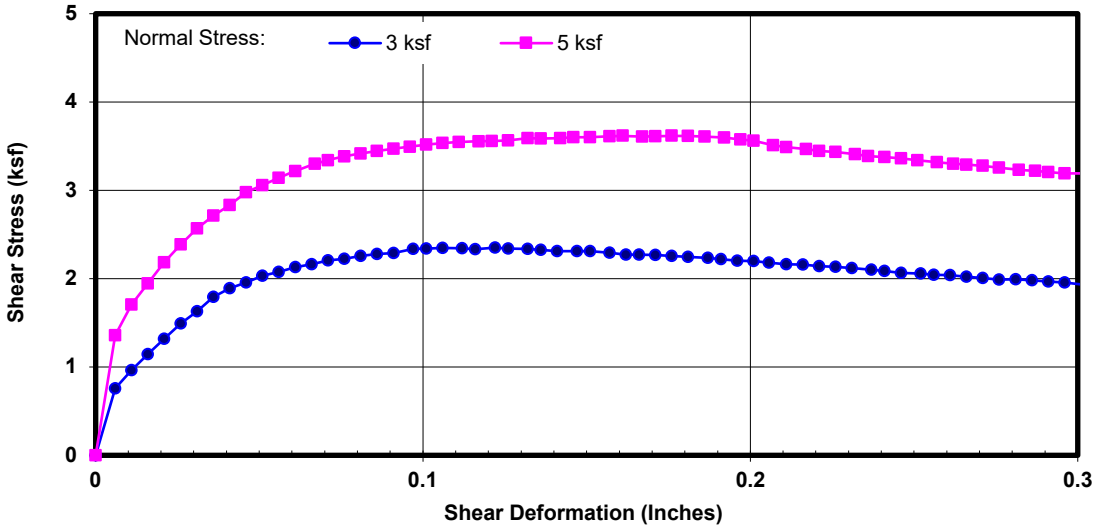
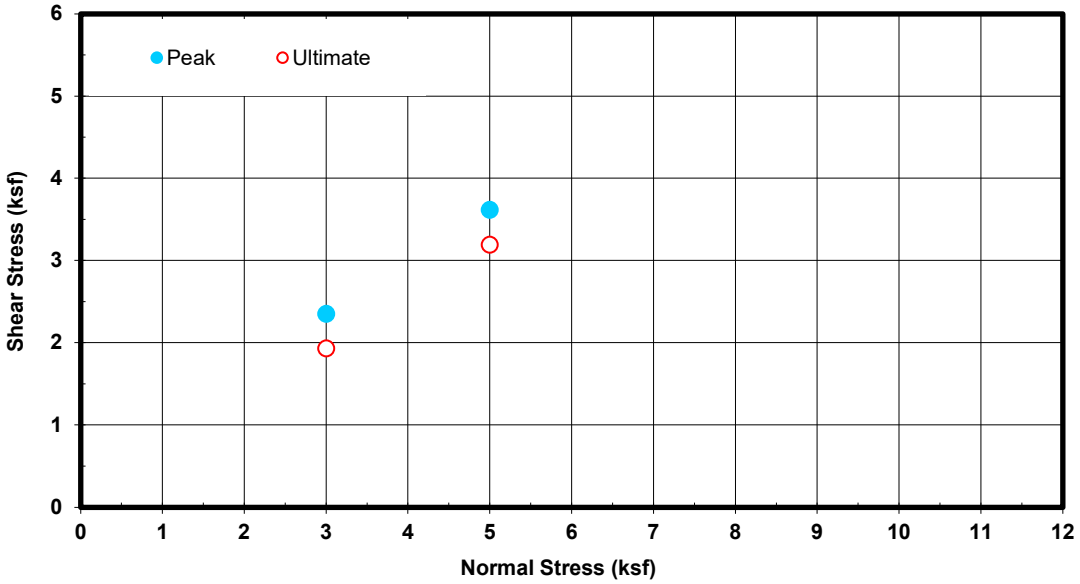
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Tetra Tech		**Tested By:**	LS	**Date:** 03/14/22
Project Name:	ADA Ramp (Avenue A) Redondo Beach, CA		**Computed By:**	NR	**Date:** 03/16/22
Project No.:	TET 22-230E		**Checked by:**	AP	**Date:** 03/16/22
Boring No.:	B-5				
Sample No.:	R-7	**Depth (ft):** 30			
Sample Type:	Mod. Cal.				
Soil Description:	Sand w/silt				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
102.6	100.7	1.9	22.2	8	89	3	2.351	1.933
						5	3.618	3.192





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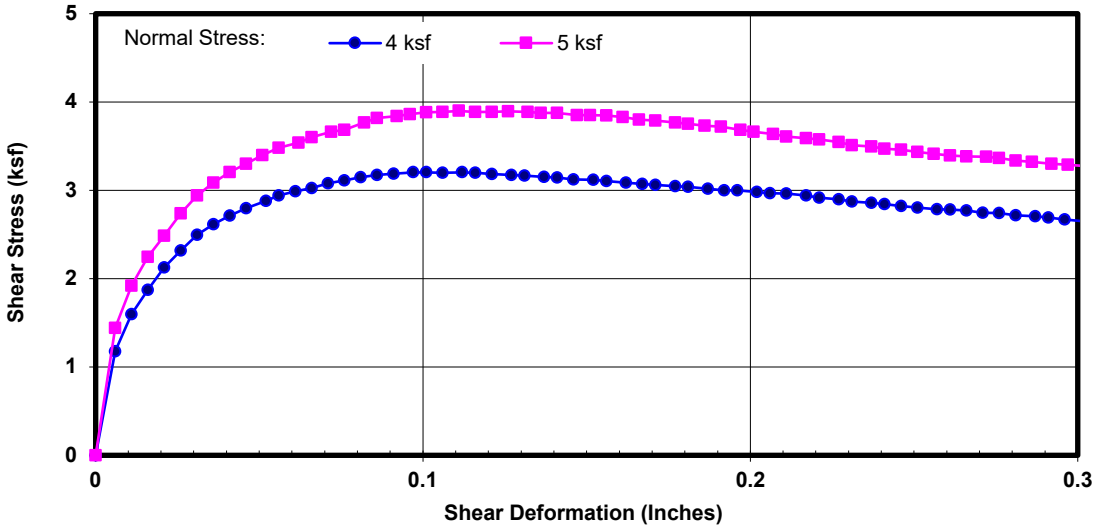
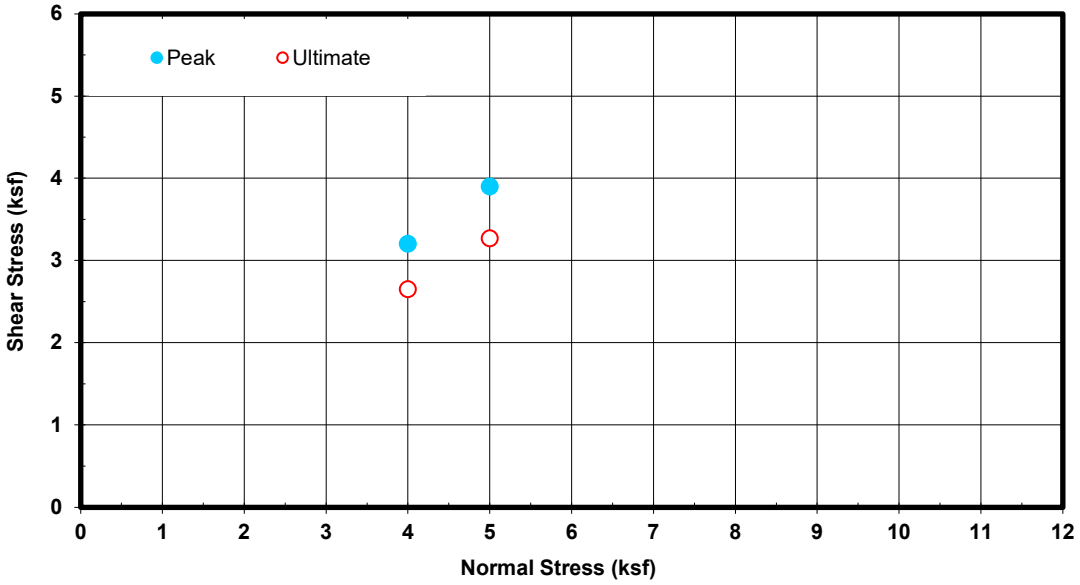
DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Tetra Tech		**Tested By:**	LS	**Date:** 03/15/22
Project Name:	ADA Ramp (Avenue A) Redondo Beach, CA		**Computed By:**	NR	**Date:** 03/16/22
Project No.:	TET 22-230E		**Checked by:**	AP	**Date:** 03/16/22
Boring No.:	B-5				
Sample No.:	R-9	**Depth (ft):** 40			
Sample Type:	Mod. Cal.				
Soil Description:	Sand w/ Silt				
Test Condition:	Inundated	**Shear Type:** Regular			

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
112.5	107.8	4.3	18.5	21	89	4	3.204	2.652
						5	3.900	3.270





TETRA TECH

EXPANSION INDEX

ASTM D4829

Job Name:	ADA RAMP	**Date Sampled:**	3/8/2022
Job Number:	TET-22-230E	**Date Completed:**	3/13/2022
Tested By:	MG	**Sample Identification:**	B-3, SK-1
Note:		**Sample Depth:**	7.5 ft
Sample Description:	Olive brown SP (Native)		

SAMPLE PROCESSING		
Percentage Passing #4 Sieve		
Total Air Dry Weight	*grams*	999.00
Weight Retained on #4	*grams*	1.00
*% Retained	*%*	0.10
***% Passing # 4 Sieve**	***%***	**99.9**

SAMPLE DIMENSIONS		
Sample Height	*inches*	1.00
Sample Diameter	*inches*	4.01

MOISTURE CALCS		INITIAL	FINAL
Tare ID or #		X56	P8
Wet Weight of Soil + Tare	*grams*	316.4	450.7
Dry Weight of Soil + Tare	*grams*	298.3	394.7
Weight of Tare	*grams*	10.5	10.5
* Moisture Weight	*grams*	18.1	56.0
* Weight of Dry Soil	*grams*	287.8	384.2
*** Moisture Content**	*%*	**6.3**	**14.6**

AFTER REMOLDING		INITIAL	FINAL
Weight of Ring and Sample	*grams*	619.8	619.6
Weight of Ring	*grams*	201.2	201.2
*Remolded Wet Weight	*grams*	418.6	418.4
*Wet Density	*pcf*	126.2	126.1
*Dry Density	*pcf*	118.7	110.1
Assumed/Measured Specific Gravity		2.7	2.7
***Degree of Saturation**	*%*	**40.5**	**74.2**

EXPANSION INDEX TEST			
DATE	**TIME**	**DIAL**	**Δ H %**
3/12/2022	12:30 PM	0.0363	0.0
	12:40 PM	0.0363	0.0
		0.0364	0.0
		0.0365	0.0
		0.0365	0.0
3/13/2022	8:00 AM	0.0365	0.0
3/13/2022	9:00 AM	0.0365	0.0
***Total**		**0.0365**	**0.0**

EI	Expansion Potential
0 to 20	Very Low
21 to 50	Low
51 to 90	Medium
90 to 130	High
>130	Very High

UNCORRECTED EXPANSION INDEX 0

CORRECTED EXPANSION INDEX **0**

For degrees of Saturation ≠ 50%, >40% and <60%

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CORROSION TEST RESULTS

Client Name: Tetra Tech
Project Name: ADA Ramp (Avenue A) Redondo Beach, CA
Project No.: TET 22-230E

AP Job No.: 22-0320
Date: 03/14/22

Boring No.	Sample No.	Depth (feet)	Soil Description	Minimum Resistivity (ohm-cm)	pH	Sulfate Content (ppm)	Chloride Content (ppm)
B-4	SK-1	2	Sand w/silt	10,568	8.5	17	29

NOTES: Resistivity Test and pH: California Test Method 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Requested

Appendix C

Seismic Demand

ADA Ramp Redondo BEach

Latitude, Longitude: 33.827353, -118.390161

Date	3/21/2022, 2:45:15 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	1.886	MCE_R ground motion. (for 0.2 second period)
S_1	0.682	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.886	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.257	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.834	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	0.917	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.886	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.125	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.256	Factored deterministic acceleration value. (0.2 second)
S1RT	0.682	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.768	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.847	Factored deterministic acceleration value. (1.0 second)
PGAd	0.942	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.888	Mapped value of the risk coefficient at short periods
C_{R1}	0.888	Mapped value of the risk coefficient at a period of 1 s

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Input

Edition

Dynamic: Conterminous U.S. 2014 (up…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.827353

Time Horizon

Return period in years

2475

Longitude

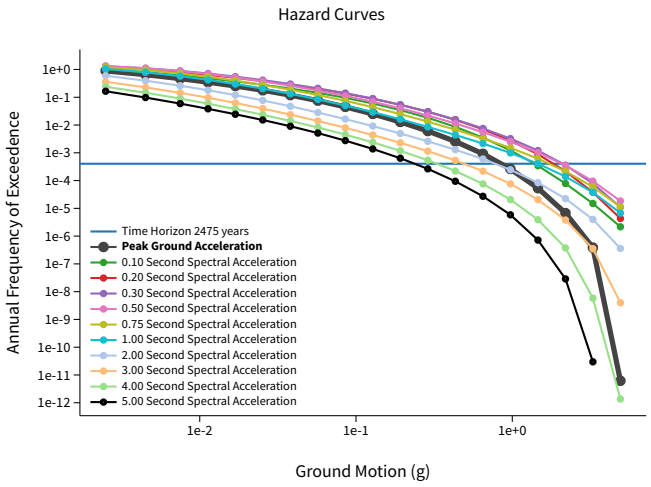
Decimal degrees, negative values for western longitudes

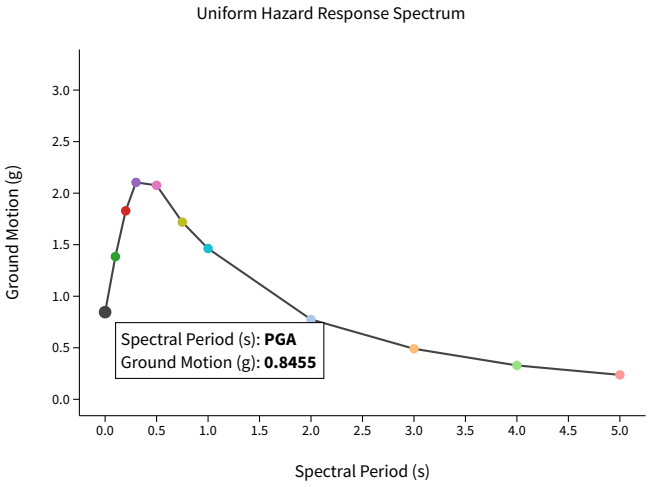
-118.390161

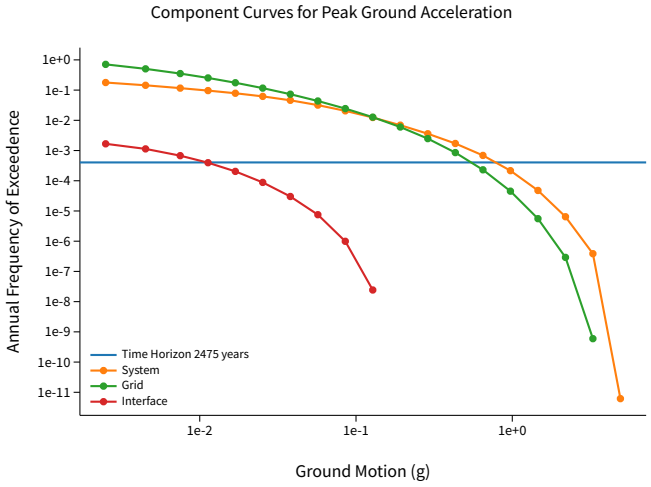
Site Class

259 m/s (Site class D)

Hazard Curve





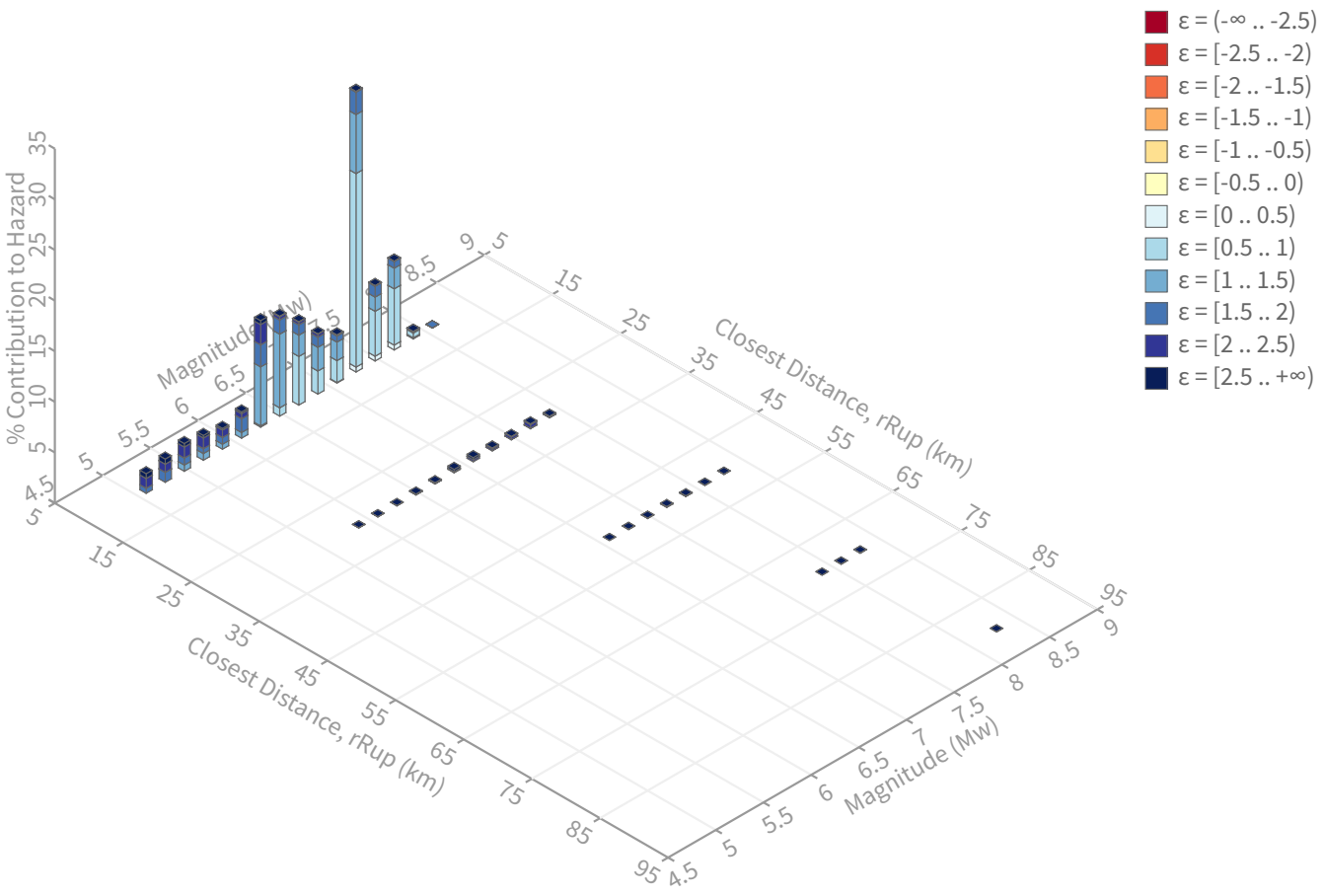


View Raw Data

Deaggregation

Component

Total



Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 2475 yrs
Exceedance rate: 0.0004040404 yr^{-1}
PGA ground motion: 0.84551015 g

Recovered targets

Return period: 2848.9966 yrs
Exceedance rate: 0.00035100078 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.04 %

Mean (over all sources)

m: 6.84
r: 5.07 km
ε_0: 1.25 σ

Mode (largest m-r bin)

m: 7.3
r: 2.91 km
ε_0: 0.94 σ
Contribution: 27.7 %

Mode (largest m-r-ε_0 bin)

m: 7.3
r: 2.8 km
ε_0: 0.8 σ
Contribution: 19.11 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							45.19
Palos Verdes [12]		1.94	7.15	0.94	118.403°W	33.821°N	239.36	23.11
Redondo Canyon alt 1 [1]		2.22	6.41	1.11	118.395°W	33.812°N	194.24	6.17
Compton [2]		6.93	7.41	1.05	118.374°W	33.851°N	29.83	5.66
Palos Verdes [13]		2.79	6.48	1.20	118.415°W	33.835°N	290.75	3.67
San Pedro Escarpment [0]		4.60	7.66	0.59	118.442°W	33.776°N	220.43	1.24
Palos Verdes [14]		8.97	6.30	2.01	118.463°W	33.880°N	311.00	1.11
UC33brAvg_FM32	System							36.74
Palos Verdes [12]		1.94	7.22	0.93	118.403°W	33.821°N	239.36	20.96
Compton [2]		6.93	7.40	1.05	118.374°W	33.851°N	29.83	6.31
Palos Verdes [13]		2.79	6.47	1.20	118.415°W	33.835°N	290.75	4.16
UC33brAvg_FM31 (opt)	Grid							9.13
PointSourceFinite: -118.390, 33.859		6.19	5.63	1.66	118.390°W	33.859°N	0.00	1.82
PointSourceFinite: -118.390, 33.859		6.19	5.63	1.66	118.390°W	33.859°N	0.00	1.82
PointSourceFinite: -118.390, 33.904		9.18	5.84	2.02	118.390°W	33.904°N	0.00	1.57
PointSourceFinite: -118.390, 33.904		9.18	5.84	2.02	118.390°W	33.904°N	0.00	1.57
UC33brAvg_FM32 (opt)	Grid							8.94
PointSourceFinite: -118.390, 33.859		6.20	5.62	1.66	118.390°W	33.859°N	0.00	1.83
PointSourceFinite: -118.390, 33.859		6.20	5.62	1.66	118.390°W	33.859°N	0.00	1.83
PointSourceFinite: -118.390, 33.904		9.18	5.84	2.02	118.390°W	33.904°N	0.00	1.51
PointSourceFinite: -118.390, 33.904		9.18	5.84	2.02	118.390°W	33.904°N	0.00	1.51

U.S. Geological Survey - Earthquake Hazards Program

Unified Hazard Tool

Please do not use this tool to obtain ground motion parameter values for the design code reference documents covered by the U.S. Seismic Design Maps web tools (e.g., the International Building Code and the ASCE 7 or 41 Standard). The values returned by the two applications are not identical.

Please also see the new USGS Earthquake Hazard Toolbox for access to the most recent NSHMs for the conterminous U.S. and Hawaii.

Input

Edition

Dynamic: Conterminous U.S. 2014 (u…

Spectral Period

Peak Ground Acceleration

Latitude

Decimal degrees

33.827353

Time Horizon

Return period in years

475

Longitude

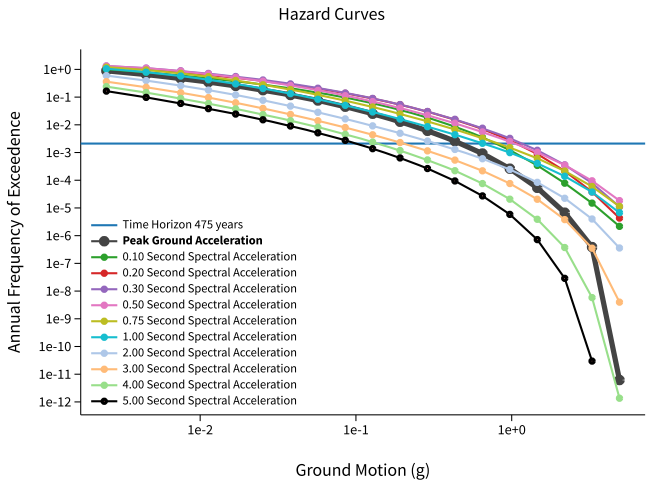
Decimal degrees, negative values for western longitudes

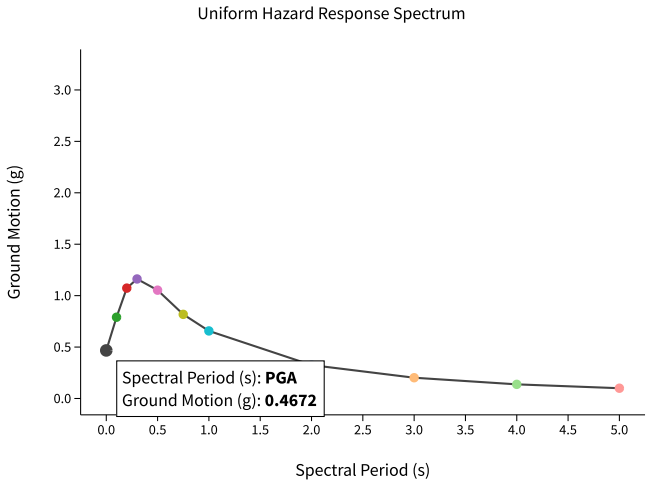
-118.390161

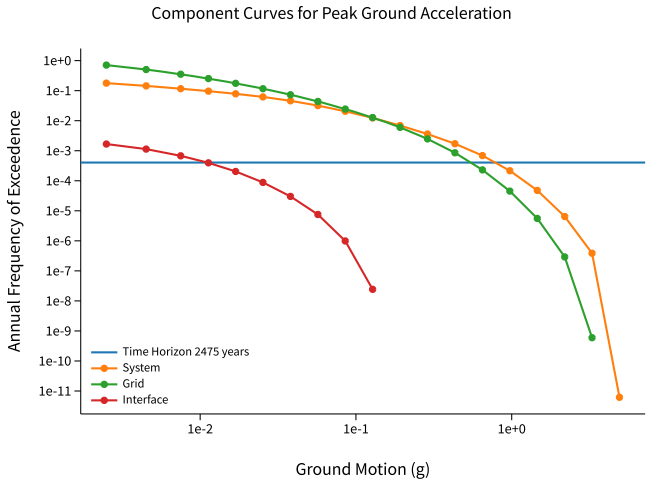
Site Class

259 m/s (Site class D)

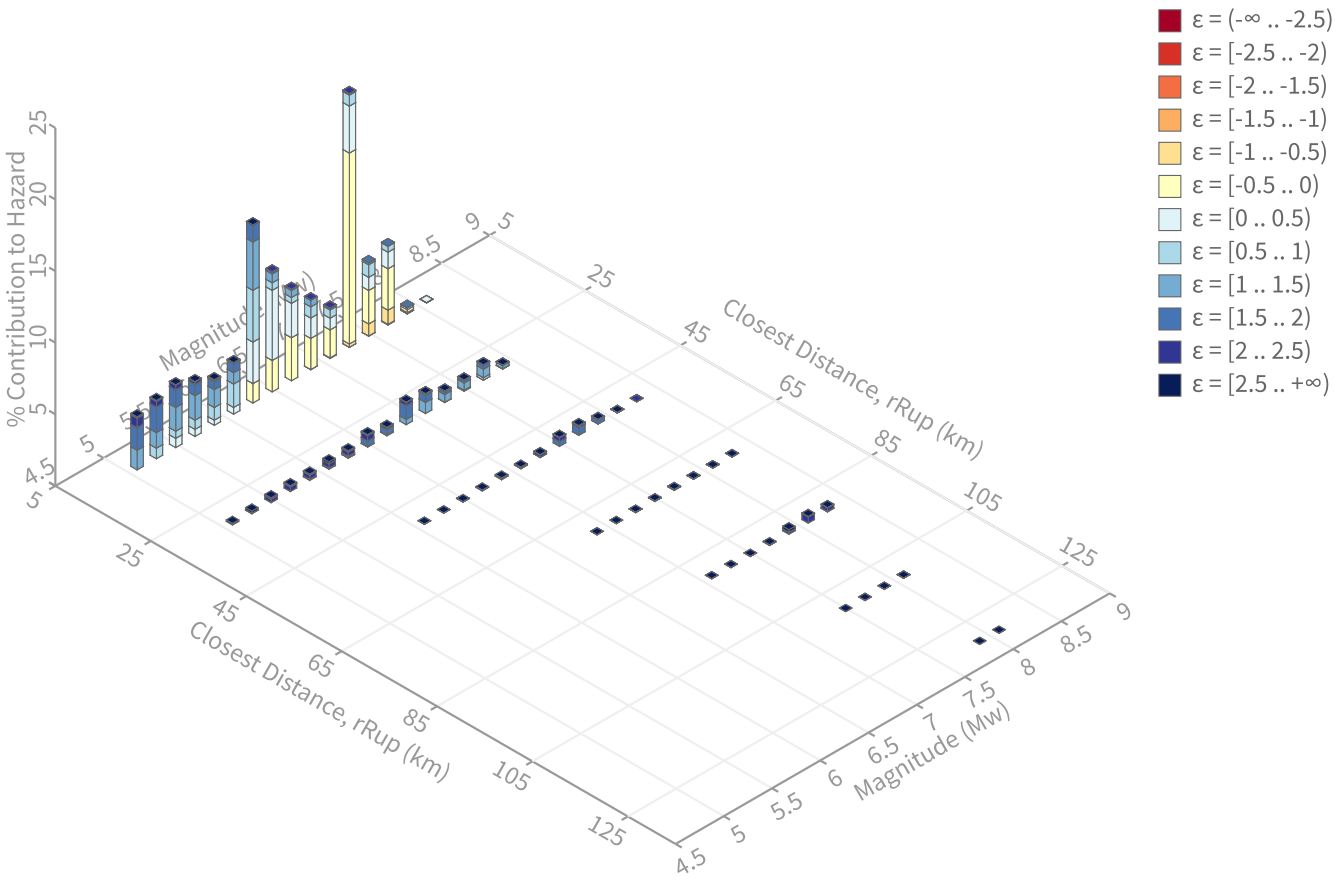
Hazard Curve







View Raw Data


ε = (-∞ .. -2.5)
ε = [-2.5 .. -2)
ε = [-2 .. -1.5)
ε = [-1.5 .. -1)
ε = [-1 .. -0.5)
ε = [-0.5 .. 0)
ε = [0 .. 0.5)
ε = [0.5 .. 1)
ε = [1 .. 1.5)
ε = [1.5 .. 2)
ε = [2 .. 2.5)
ε = [2.5 .. +∞)
% Contribution to Hazard
Closest Distance, rRup (km)
Magnitude (Mw)

Summary statistics for, Deaggregation: Total

Deaggregation targets

Return period: 475 yrs
Exceedance rate: 0.0021052632 yr^{-1}
PGA ground motion: 0.46723752 g

Recovered targets

Return period: 501.76765 yrs
Exceedance rate: 0.0019929543 yr^{-1}

Totals

Binned: 100 %
Residual: 0 %
Trace: 0.16 %

Mean (over all sources)

m: 6.65
r: 9.98 km
ε_0: 0.64 σ

Mode (largest m-r bin)

m: 7.3
r: 3.16 km
ε_0: -0.13 σ
Contribution: 17.71 %

Mode (largest m-r-ε_0 bin)

m: 7.3
r: 2.65 km
ε_0: -0.27 σ
Contribution: 13.33 %

Discretization

r: min = 0.0, max = 1000.0, Δ = 20.0 km
m: min = 4.4, max = 9.4, Δ = 0.2
ε: min = -3.0, max = 3.0, Δ = 0.5 σ

Epsilon keys

ε0: [-∞ .. -2.5)
ε1: [-2.5 .. -2.0)
ε2: [-2.0 .. -1.5)
ε3: [-1.5 .. -1.0)
ε4: [-1.0 .. -0.5)
ε5: [-0.5 .. 0.0)
ε6: [0.0 .. 0.5)
ε7: [0.5 .. 1.0)
ε8: [1.0 .. 1.5)
ε9: [1.5 .. 2.0)
ε10: [2.0 .. 2.5)
ε11: [2.5 .. +∞]

Deaggregation Contributors

Source Set ↳ Source	Type	r	m	ε_0	lon	lat	az	%
UC33brAvg_FM31	System							38.01
Palos Verdes [12]		1.94	7.13	-0.15	118.403°W	33.821°N	239.36	14.66
Redondo Canyon alt 1 [1]		2.22	6.37	0.07	118.395°W	33.812°N	194.24	4.44
Compton [2]		6.93	7.40	-0.02	118.374°W	33.851°N	29.83	3.93
Palos Verdes [13]		2.79	6.47	0.11	118.415°W	33.835°N	290.75	2.85
Palos Verdes [14]		8.97	6.29	0.99	118.463°W	33.880°N	311.00	1.74
Newport-Inglewood alt 1 [7]		13.71	6.36	1.41	118.316°W	33.933°N	30.22	1.51
Newport-Inglewood alt 1 [6]		13.28	7.18	0.88	118.277°W	33.900°N	52.51	1.18
San Pedro Basin [6]		20.91	7.02	1.45	118.571°W	33.715°N	233.34	1.07
UC33brAvg_FM32	System							31.56
Palos Verdes [12]		1.94	7.20	-0.16	118.403°W	33.821°N	239.36	13.23
Compton [2]		6.93	7.39	-0.02	118.374°W	33.851°N	29.83	4.38
Palos Verdes [13]		2.79	6.47	0.11	118.415°W	33.835°N	290.75	3.24
Palos Verdes [14]		8.97	6.29	0.99	118.463°W	33.880°N	311.00	1.41
UC33brAvg_FM31 (opt)	Grid							15.40
PointSourceFinite: -118.390, 33.904		9.48	5.72	1.19	118.390°W	33.904°N	0.00	2.41
PointSourceFinite: -118.390, 33.904		9.48	5.72	1.19	118.390°W	33.904°N	0.00	2.41
PointSourceFinite: -118.390, 33.859		6.23	5.58	0.79	118.390°W	33.859°N	0.00	1.85
PointSourceFinite: -118.390, 33.859		6.23	5.58	0.79	118.390°W	33.859°N	0.00	1.85
UC33brAvg_FM32 (opt)	Grid							15.03
PointSourceFinite: -118.390, 33.904		9.48	5.72	1.19	118.390°W	33.904°N	0.00	2.33
PointSourceFinite: -118.390, 33.904		9.48	5.72	1.19	118.390°W	33.904°N	0.00	2.33
PointSourceFinite: -118.390, 33.859		6.24	5.57	0.79	118.390°W	33.859°N	0.00	1.85
PointSourceFinite: -118.390, 33.859		6.24	5.57	0.79	118.390°W	33.859°N	0.00	1.85

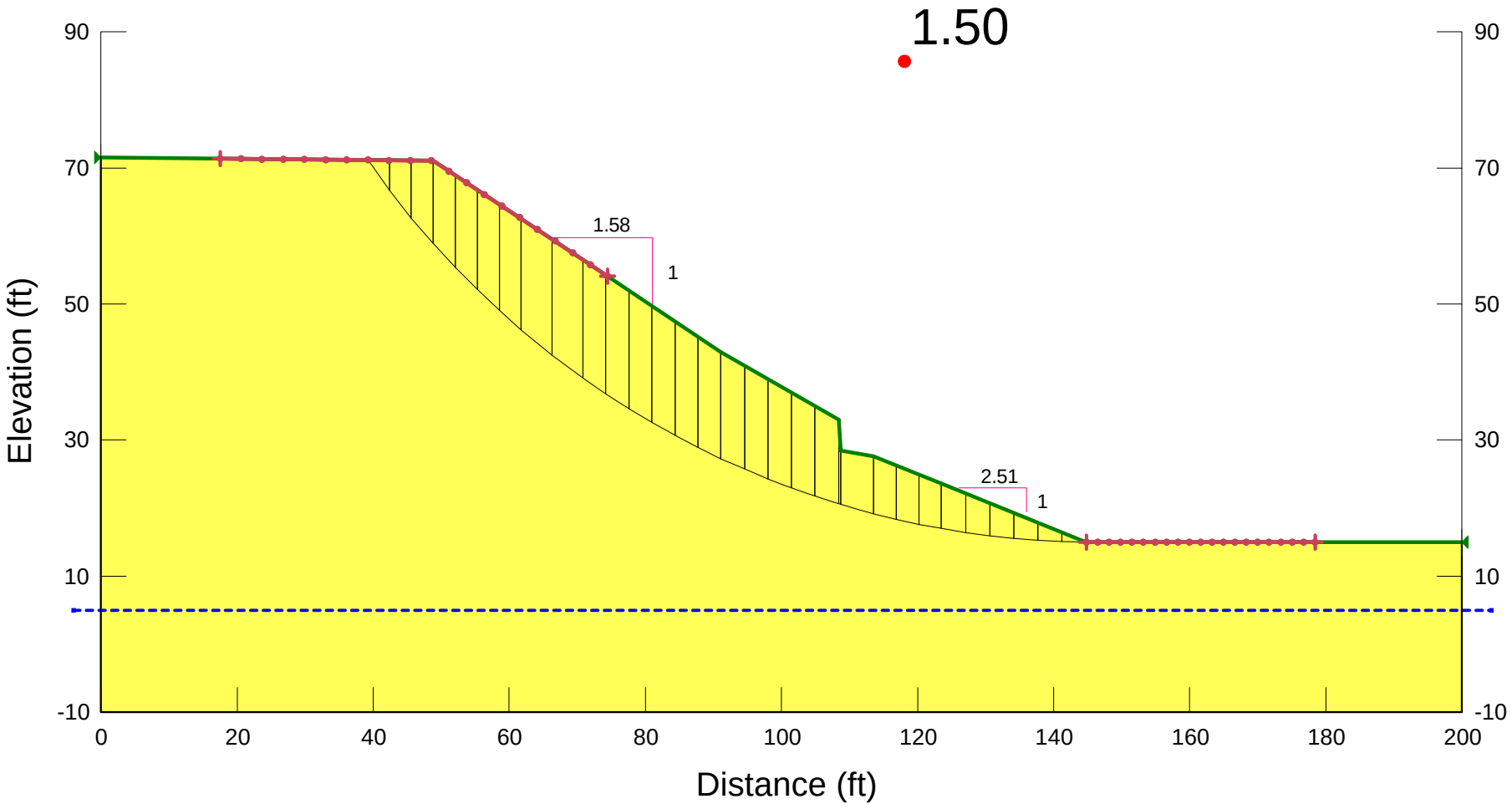
Appendix D

Slope Stability Analyses

Redondo Beach ADA Ramp Improvement
Slope Stability Evaluation
Design Cross-Section

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Alluvium	110	50	37

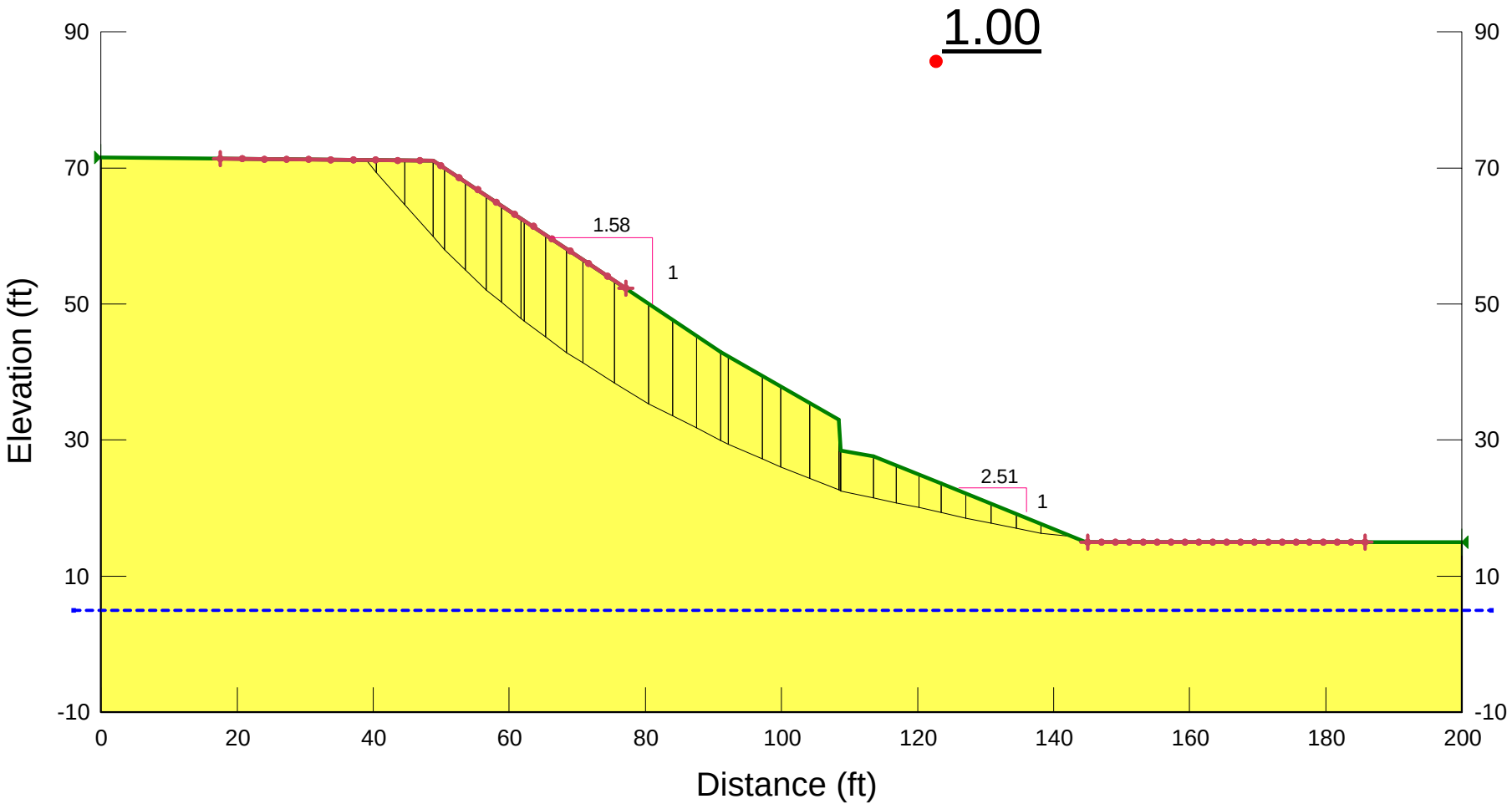
Description: Static slope stability - existing slope
Analysis Type: Spencer
PWP Conditions from: Piezometric Surfaces
Optimize Critical Slip Surface Location: Yes
Horz Seismic Coef.: 0
Date: 05/26/2023



Redondo Beach ADA Ramp Improvement
Slope Stability Evaluation
Design Cross-Section

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Alluvium	110	50	37

Description: Yield acceleration determination - existing slope
Analysis Type: Spencer
PWP Conditions from: Piezometric Surfaces
Optimize Critical Slip Surface Location: Yes
Horz Seismic Coef.: 0.205
Date: 05/26/2023



Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes

by Jonathan D. Bray and Jorge Macedo, UC Berkeley and Georgia Tech

Procedure for Estimating Shear-Induced Seismic Slope Displacement for Shallow Crustal Earthquakes, ASCE JG

SEE NOTES BELOW FOR GUIDANCE IN THE USE OF SPREADSHEET

Input Parameters		
Case	OrdinaryGM (EQ2&3)	*** Select Ordi**
Yield Coefficient (k_y) [(a)]	0.20	
Initial Fundamental Period (T_s) [(b)]	0.06	seconds
Degraded Period ($1.3T_s$)	0.07	seconds
Moment Magnitude (M_w)	7.3	
Spectral Acceleration ($S_a(1.3T_s)$) [(c)]	0.45	g
PGV Information	PGV is not used in this case, enter 1 below	
Peak Ground Velocity (PGV) [(d)]	45.0	cm/s
Percentile (if Pulse ground Motion) [(e)]	No Pulse	
Additional Input Parameters		
Probability of Exceedance #1 (P1)	84	%
Probability of Exceedance #2 (P2)	50	%
Probability of Exceedance #3 (P3)	16	%
Displacement Threshold (d_threshold)	10	cm

Intermediate Calculated Parameters		
Non-Zero Seismic Displacement Est (D)	2.3	cm
Standard Deviation of Non-Zero Seismic D	0.72	

Results		
Probability of Negligible Displ. (P(D=0))	**0.53**	
D1	**<0.5**	**cm**
D2	**<0.5**	**cm**
D3	**3.0**	**cm**
P(D>d_threshold)	**0.01**	

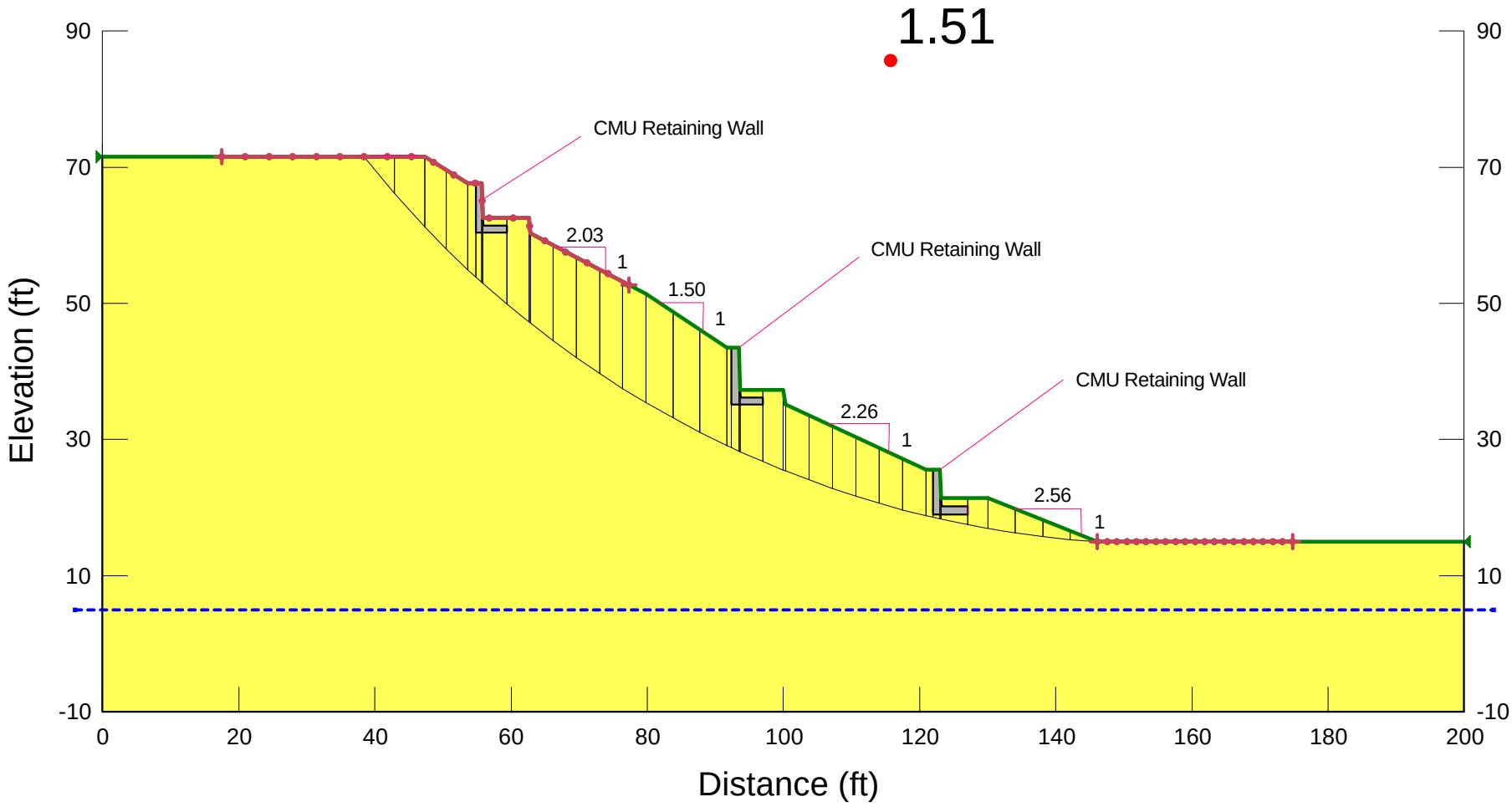
Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for $T_s < 0.05$ s, i.e. $T_s = 0.0$. If Ts is just less than 0.05 s, set $T_s = 0.050$ s
8. When a value for D is not calculated, D is < 0.5 cm
9. k_y should be estimated with a slope stability program; the simplified equations shown below provide approximate values.
10. Examples of how T_s is estimated are shown below.
11. V_s = weighted avg. shear wave velocity for the sliding mass, e.g., for 2 layers, $V_s = [(h1)(V_s1) + (h2)(V_s2)]/(h1 + h2)$

Redondo Beach ADA Ramp Improvement
Slope Stability Evaluation
Design Cross-Section

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Alluvium	110	50	37
	Concrete	145	1,500	45

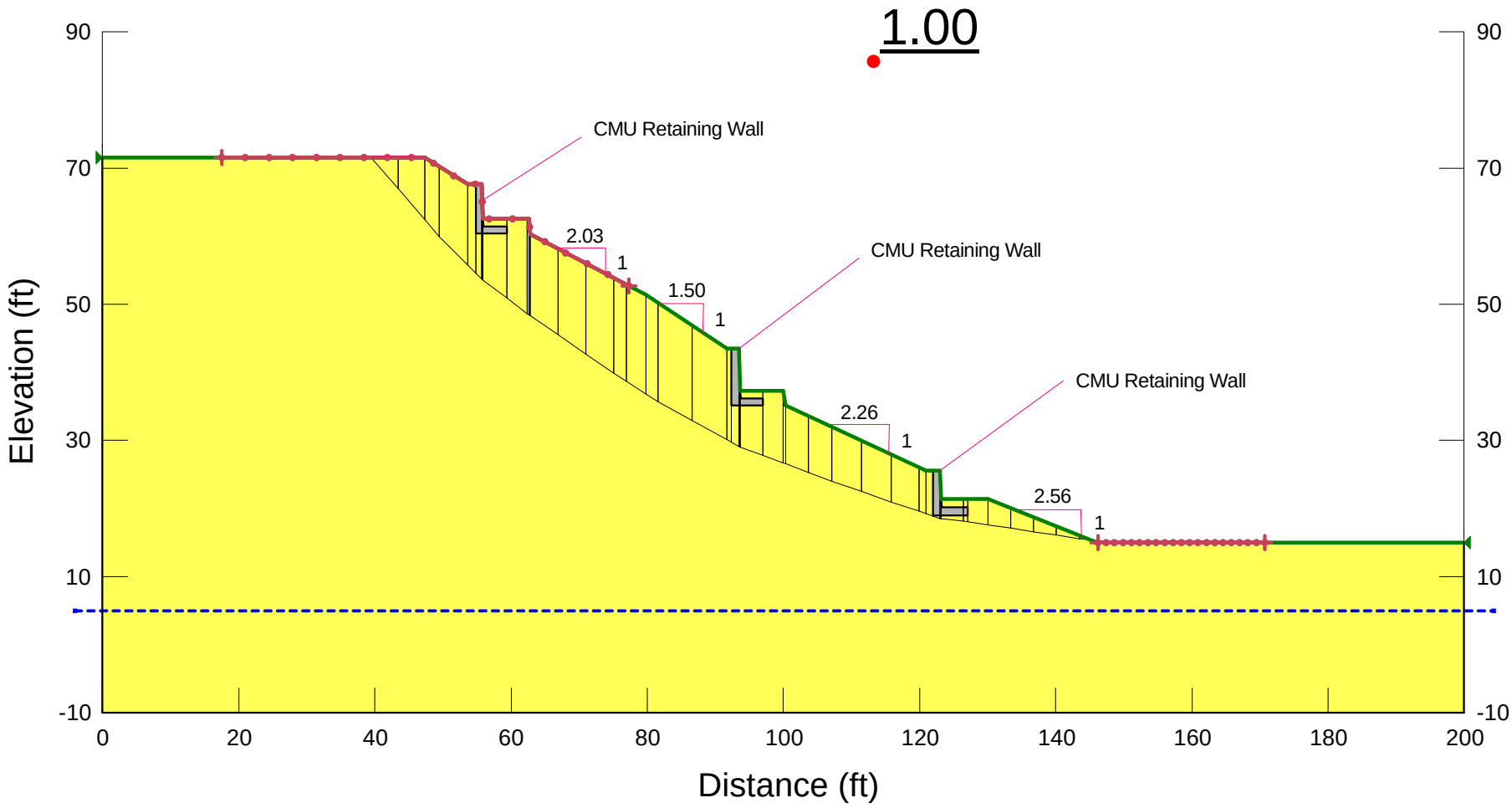
Description: Static slope stability - proposed slope
Analysis Type: Spencer
PWP Conditions from: Piezometric Surfaces
Optimize Critical Slip Surface Location: Yes
Horz Seismic Coef.: 0
Date: 05/26/2023



Redondo Beach ADA Ramp Improvement
Slope Stability Evaluation
Design Cross-Section

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Alluvium	110	50	37
	Concrete	145	1,500	45

Description: Yield acceleration determination - proposed slope
Analysis Type: Spencer
PWP Conditions from: Piezometric Surfaces
Optimize Critical Slip Surface Location: Yes
Horz Seismic Coef.: 0.21
Date: 05/26/2023



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Moment Magnitude (M_w)	7.3	
Spectral Acceleration ($S_a(1.3T_s)$) [(c)]	0.45	g
PGV Information	PGV is not used in this case, enter 1 below	
Peak Ground Velocity (PGV) [(d)]	45.0	cm/s
Percentile (if Pulse ground Motion) [(e)]	No Pulse	
Additional Input Parameters		
Probability of Exceedance #1 (P1)	84	%
Probability of Exceedance #2 (P2)	50	%
Probability of Exceedance #3 (P3)	16	%
Displacement Threshold (d_threshold)	10	cm

Intermediate Calculated Parameters		
Non-Zero Seismic Displacement Est (D)	2.1	cm
Standard Deviation of Non-Zero Seismic D	0.72	

Results		
Probability of Negligible Displ. (P(D=0))	**0.58**	
D1	**<0.5**	**cm**
D2	**<0.5**	**cm**
D3	**2.6**	**cm**
P(D>d_threshold)	**0.01**	

Notes

1. Values highlighted in blue are input parameters, and results are presented in the table with the yellow heading.
2. Probability of Exceedance is the desired probability of exceeding a particular displacement value.
3. Displacements D1, D2, and D3 correspond to P1, P2, and P3, respectively.
   (e.g., the probability of exceeding displacement D1 is P1 and it is referred to as the (100% - P1) percentile value.
4. The 16%, 50%, and 84% percentile displacement values at selected k_y values are shown to the right.
5. Calculated seismic displacements are due to deviatoric deformation only (add in volumetrically induced movement).
6. k_y may range between 0.01 and 0.8, T_s between 0 and 2 s, S_a between 0.002 and 4.5 g, M_w between 5.5 and 8.2
7. Rigid slope is assumed for $T_s < 0.05$ s, i.e. $T_s = 0.0$. If Ts is just less than 0.05 s, set $T_s = 0.050$ s
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