CITY OF
PALO
ALTO

MITIGATED NEGATIVE DECLARATION

CIRCULATION PERIOD	12/22/2017 to 1/31/2018
PROJECT NAME	Regional Water Quality Control Plant New Outfall Project
PROJECT LOCATION	2501 Embarcadero Way Palo Alto, CA 94303 Parcel Numbers: 008-03-029
PROJECT PROPONENT	Tom Kapushinski, P.E./LEED AP, Project Engineer City of Palo Alto, Public Works Department-Regional Water Quality Control Plant 2501 Embarcadero Way Palo Alto, CA 94303
CITY CONTACT	Tom Kapushinski, P.E./LEED AP, Project Engineer City of Palo Alto, 250 Hamilton Avenue, Ground Floor Palo Alto, CA 94301 Fax: 650.329.2240, Email: Tom.Kapushinski@cityofpaloalto.org

PROJECT DESCRIPTION

This City of Palo Alto (City), Public Works Water Quality Division, proposed project would install a new outfall pipe, rehabilitate the existing outfall pipe, and replace the Renzel Marsh Pump. The new outfall pipe would extend approximately 2,402 linear feet, starting at the Regional Water Quality Control Plant and ending immediately adjacent to the existing outfall pipe's discharge point in an unnamed slough. Installation of the new effluent outfall pipe would require open trenching and backfilling. The existing outfall pipe would be rehabilitated with flexible joint seals, but no open excavation would be required. A new pump would be installed to replace the existing pump that conveys treated water to the Renzel Marsh in order to improve efficiency.

DETERMINATION

In accordance with the City of Palo Alto's procedures for compliance with the California Environmental Quality Act (CEQA), the City has conducted an Initial Study to determine whether the proposed project could have a significant effect on the environment. On the basis of that study, the City makes the following determination:

☐ The proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION is hereby adopted.

☒ Although the project, as proposed, could have a significant effect on the environment, there will not be a significant effect on the environment in this case because mitigation measures have been added to the project and, therefore, a MITIGATED NEGATIVE DECLARATION is hereby adopted.

The attached initial study incorporates all relevant information regarding the potential environmental effects of the project and confirms the determination that an EIR is not required for the project. In addition, the following mitigation measures have been incorporated into the project:

AIR-1 ***Mitigation Measure AIR-1: Construction Emissions***

During any construction period ground disturbance, the applicant shall ensure that the project contractor implements measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District’s phone number shall also be visible to ensure compliance with applicable regulations.
9. The Contractor shall prepare a SWPPP, to be submitted and approved by the City prior to the start of construction
10. The Contractor shall install rumble strips for trucks exiting the site.

BIO-1 ***Mitigation Measure BIO-1***

Protocol level rare plant surveys shall be conducted within suitable habitat and during the blooming periods of Point Reyes bird's-beak, California seablite, and saline clover, in order to confirm the presence or absence of these species within the project site. Surveys for Point Reyes bird's beak and California seablite shall be conducted during the late season, June through October, and surveys for saline clover shall be conducted between April and June, based on the individual specie's blooming season. If these rare plant species are observed during surveys, they shall be avoided by construction if feasible. If avoidance is not feasible, seed shall be collected for replanting, or whole individuals transplanted to a nearby protected area containing suitable habitat prior to construction, or stored for replanting in the construction area following completion of construction. Transplanted or reseeded individuals shall be monitored for a minimum of two years following construction to ensure transplantation success. If transplanted individuals do not successfully establish, seed or individuals from established and healthy local populations shall be collected and planted at the project site.

BIO-2 ***Mitigation Measure BIO-2***

The measures listed below shall be implemented prior to or during construction activities within or adjacent to potential SMHM habitat:

a) Prior to ground disturbing activities within and adjacent to potential SMHM habitat, all vegetation within the Project footprint shall be removed using hand-operated tools in the presence of a qualified biological monitor (see below).

b) Following vegetation removal, exclusion barriers and/or fencing shall be installed to exclude individuals of this species from areas of active construction. The design of the exclusion barriers and fencing shall be approved by a qualified biologist and shall be installed in the presence of a qualified biological monitor. The fence shall be made of a material that does not allow SMHM to pass through, and the bottom shall be buried to a depth of a minimum of 4 inches so that these species cannot crawl under the fence. All support for the exclusion fencing shall be placed on the inside of the Project footprint.

c) A qualified biological monitor shall be present during wildlife exclusion fence installation and removal, and during all vegetation clearing and initial ground disturbance conducted in vegetation in and adjacent to marsh habitats. The monitor shall have demonstrated experience in biological construction monitoring and knowledge of the biology of the listed species that may be found in the Action Area, including SMHM and CRR. The monitor(s) shall have the authority to halt construction, if necessary, if noncompliance actions occur. The biological monitor(s) shall be the contact person for any employee or contractor who might inadvertently kill or injure a listed species or anyone who finds a dead, injured, or entrapped listed species. Following vegetation removal in potential habitat areas, fence installation, and initial ground disturbance, the biological monitor shall still conduct weekly site checks to provide guidance for fence maintenance, provide environmental sensitivity training, and document compliance with permit conditions.

d) The biological monitor shall provide an endangered species training program to all personnel involved in Project construction. At a minimum, the employee education program shall consist of a brief presentation by persons knowledgeable about the biology of listed species with potential to occur in the Action Area, and about their legislative protection to explain concerns to contractors and their employees involved with implementation of the Project. The program shall include a description of these species and their habitat needs; any reports of occurrences in the area; an explanation of the status of these species and their protection under State and Federal legislation; as well as a list of measures being taken to reduce impacts to these species during construction.

e) Food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in solid, closed containers (trash cans) and removed at the end of each work day from the investigation site to eliminate an attraction to predators of listed species.

f) At the end of each work period, all open trenches shall either be securely covered or shall have exit ramps installed to prevent entry and/or entrapment of SMHM.

g) If a listed species is observed at any time during construction, work shall not be initiated or shall be stopped immediately until the animal leaves the vicinity of the work area of its own volition. If the animal in question does not leave the work area, work shall not be reinitiated until the appropriate agency is contacted and has made a decision on how to proceed with work activities. The biological monitor shall direct the contractor on how to proceed accordingly. The biological monitor or any other persons at the site shall not pursue, capture, handle, or harass any species observed.

BIO-3 ***Mitigation Measure BIO-3***

Construction of the project within the RWQCP and airport grounds shall be timed to occur within the CRR nesting season so that construction in other areas closer to suitable habitat and outside of existing areas of disturbance may be completed outside of the nesting season. Construction of the new outfall pipeline that would occur within the existing levee and the small reach of construction that would occur within the unnamed slough would avoid the CRR nesting season. Protocol level surveys for CRR shall be completed prior to construction to provide information regarding the location of nesting rails. However, based on a variety of factors, construction shall occur both within and outside of the CRR breeding season. Specifically:

- Construction of the new outfall pipeline within the levee and in the unnamed slough (between Station 14+00 and 27+49) shall occur between September 1 and January 31 to avoid the CRR breeding season.
- In-water construction in the unnamed slough shall be completed between September 1 and November 30 to avoid the windows for both CRR and listed fish species.

BIO-4 ***Mitigation Measure BIO-4***

To avoid impacts to burrowing owl, a pre-construction burrowing owl survey shall be conducted by a qualified biologist of potential habitat areas (the Airport apron and along the adjacent levee berm top) at most 14 days from the initiation of project activities, irrespective of time of year. If burrowing owl is detected on the site, a no-disturbance buffer around the active burrow shall be enacted until work is finished or a qualified biologist confirms the burrow is no longer in use. This buffer shall be 250 feet if work is conducted in the area during the nesting season (February 1 – August 31) and 160 feet if work is conducted in the area outside of the nesting season. If the burrow cannot be avoided and work is to be conducted outside the nesting season, burrowing owls shall be passively excluded from the site following the procedures outlined in the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 2012).

BIO-5 ***Mitigation Measure BIO-5***

All in-water work (i.e., in tidal areas at the unnamed slough) shall be conducted between June 15 and November 30. Installation of sheet piles in tidal waters, if necessary, shall occur by the use of a vibratory hammer during low tide. If impact pile driving is necessary, an evaluation of potential hydroacoustic impacts to fish shall be required, and if necessary additional measures shall be employed to ensure that underwater sound is reduced to levels that are below those that will cause injury to fish. Such additional measures may include:

- Hydroacoustic monitoring by a sound engineer during in water pile driving work.
- Use of a "soft start" to clear fish from the area of acoustic effect.
- Use of a wood cushion block between the hammer and the pile.
- Use of a bubble curtain or other similar technique to reduce underwater noise.
- Complete all impact pile driving work at low tide.
- Limiting the number of pile strikes in a day to reduce the cumulative sound pressure impacts to fish.

BIO-6 ***Mitigation Measure BIO-6***

- All construction documents shall include requirements for the restoration of temporary excavations in wetlands back to preconstruction grade, and revegetation of temporarily disturbed areas using appropriate native vegetation. Appropriate native vegetation may include pickleweed, saltgrass, Atriplex, and other salt tolerant wetland plant species. Pickleweed and saltgrass may be selectively harvested from adjacent tidal marsh and seasonal wetland areas for transplantation to temporarily impacted areas for restoration.

- Limits of construction, wetlands, and buffers shall be clearly marked with high-visibility construction fencing.
- Site access of machinery shall be restricted to as few areas as possible to prevent soil compaction.
- Appropriate erosion control measures shall be used around soil stockpiles, graded slopes, and slurry management facilities. Erosion control materials shall be wildlife friendly and shall avoid the use of plastic netting or fixed aperture netting.
- A spill prevention and control plan shall be required as part of project specifications to minimize the chance of toxic spills. Spill kits shall be present for any work adjacent to open waters. All spills of oil and other hazardous materials shall be immediately cleaned u and contained. Any hazardous materials cleaned up or used on-site would be properly disposed of at an approved disposal facility.
- Litter and Waste Management – Waste collection areas shall be designated on-site. Only watertight dumpsters and trash cans shall be used and inspected for leaks. Dumpsters and cans shall be inspected at the end of each work day when it is raining or windy. Waste collection shall occur regularly. Litter shall be picked up daily.

CULT-1 ***Mitigation Measure CULT-1***

If buried materials are encountered, all soil disturbing work shall be halted at the location of any discovery until a qualified archaeologist or paleontologist completes a significance evaluation of the find(s) pursuant to Section 106 of the National Historic Preservation Act (36CFR60.4) and CEQA guidelines (§15064.5[f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

GEO-1 ***Mitigation Measure GEO-1***

Dewatering

The construction contractor shall implement a dewatering system to preserve the undisturbed bearing capacity of the existing subgrade soils at the bottom of excavations and shall meet the following minimum performance standards:

- Stable excavation walls and bottom shall be provided;
- A reasonably dry base of excavation shall be provided;
- Native soils shall be filtered and loss of ground from dispersion or erosion shall be prevented;
- Piping (boiling) of the excavation bottom shall be prevented;
- All dewatering and shoring systems shall be installed and removed in accordance with governing (e.g., County, State) requirements; and
- The contractor shall allow for the controlled release of groundwater to its static level in a manner that prevents disturbance of bottom soils and prevents flotation or movements of structures or pipelines.

The contractor shall be prepared to implement alternative systems should the initial dewatering system fail to achieve these minimum performance requirements. The contractor shall be prepared to locally dewater or modify construction excavations, if and where needed, to provide stable and reasonably dry excavations. The dewatering system shall be localized, targeted, and short-term (days) in order to prevent consolidation and subsidence from prolonged dewatering.

Shoring

The contractor shall be required to shore the anticipated 12-foot deep excavations with interlocking sheetpiles in accordance with California Division of Occupational Safety and Health (Cal/OSHA) regulations and all other recommendations provided in the site-specific Geotechnical report (Appendix D). All shoring plans shall be submitted to the City for review and approval prior to the start of construction activities. The construction shall ensure the shoring system meets all the minimum performance standards for shoring listed in the Geotechnical Report.

NOISE-1 ***Mitigation Measure NOISE-1***

The City shall provide all construction workers appropriate hearing protection.

TRAFFIC-1 ***Mitigation Measure TRAFFIC-1***

- Prior to issuance of a grading permit, the City shall prepare and submit a Traffic Control Plan for review and approval. The Traffic Control Plan shall include best management practices and traffic measures including but not limited to:
  - The City shall require the contractor to provide for passage of emergency vehicles through the project site at all times.
  - The City shall require the contractor to maintain access to all uses during project construction.
  - The City shall use traffic cones, signs, lighted barricades, lights, and flagmen as described and specified in the Caltrans Manual of Uniform Traffic Control Devices, current edition, California Supplement, Part 6 Temporary Traffic Control to provide for public safety and convenience during construction.
  - The contractor shall install advance warning signs to alert bicyclists and motorists of the work zone and lane closures. Advance warning signs may be reflective signs, changeable message boards, cones, and barricades.
  - Flagging and other means of traffic control shall be required to allow for the safe movement of traffic through the work zone. The contractor shall provide flaggers to temporarily hold traffic for staging equipment or construction.
  - The City shall provide advanced notice to area residents, schools and emergency agencies when employing temporary traffic control measures. In addition, prior to the start of construction, the City shall provide emergency services with the proposed construction schedule.
  - The City shall require the construction contractor to provide for passage of emergency vehicles through the project site at all times.
  - The City shall require the construction contractor to maintain convenient access to driveways and buildings near the work area unless otherwise approved by the City in advance.
  - The City shall restore pavement, curbs, gutters, and sidewalks, as necessary, to pre-disturbance conditions or better.
  - The temporary traffic control/detour portion of the project shall include one additional detour sign posted at the bicycle/pedestrian bridge across San Francisquito Creek between East Palo Alto and Palo Alto. Users approaching from East Palo Alto need to be directed to the detour route.

TRIBAL-1 ***Mitigation Measure TRIBAL-1:***

In the event that an unanticipated tribal cultural resource is exposed during project construction, work within 30 feet of the discovery shall stop until a City-approved cultural resources professional can identify and evaluate the significance of the discovery and develop recommendations.

Recommendations could include preparation of a Treatment Plan, which could require recordation, collection and analysis of the discovery; preparation of a technical report; and curation of the collection and supporting documentation in an appropriate depository.

Tom Kapushinski, PROJECT ENGINEER 12-18-17

Signature (Project Planner) *Title* *Date*

Adopted by City Council, Attested by *Title* *Date*
Director of Planning + Community Environment
(signed after MND has been approved)

WE, THE UNDERSIGNED, HEREBY ATTEST THAT WE HAVE REVIEWED THE INITIAL STUDY AND DRAFT MITIGATED NEGATIVE DECLARATION FOR THE PROJECT DESCRIBED ABOVE AND AGREE TO IMPLEMENT ALL MITIGATION MEASURES CONTAINED THEREIN.

Tom Kapushinski TOM KAPUSHINSKI 12-18-17

Signature (Project Applicant) *Printed Name* *Date*

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California Environmental Quality Act

INITIAL STUDY
Draft

Regional Water Quality Control Plant
New Outfall Project

CITY OF
PALO
ALTO

December 2017

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PROJECT DESCRIPTION

1. PROJECT TITLE

Regional Water Quality Control Plant New Outfall Project

Palo Alto, California

2. LEAD AGENCY NAME AND ADDRESS

City of Palo Alto

Department of Planning and Community Environment

250 Hamilton Ave.

Palo Alto, CA 94303

3. CONTACT PERSON AND PHONE NUMBER

Tom Kapushinski, P.E. / LEED AP, Project Engineer

City of Palo Alto

(650) 617-3130

4. PROJECT SPONSOR’S NAME AND ADDRESS

Tom Kapushinski, P.E. / LEED AP, Project Engineer

City of Palo Alto

Public Works Department - Regional Water Quality Control Plant

2501 Embarcadero Way

Palo Alto, CA 94303

5. APPLICATION NUMBER

N/A

6. PROJECT LOCATION

2501 Embarcadero Way

Palo Alto, CA 94303

Parcel Numbers: 008-03-029

The project site is located in the eastern, Bayshore portion of the City of Palo Alto (City), in the northern part of Santa Clara County, east of both U.S. Highway 101 and State Route 82 (El Camino Real), as shown on Figure 1, Regional and Vicinity Map. The project site is bounded by Mayfield Slough to the east, the San Francisco Bay (SF Bay), the Palo Alto Airport (Airport) to the west, and the City's Regional Water Quality Control Plant (RWQCP) to the south, as shown on Figure 2, Aerial Photograph of Project Area.

7. GENERAL PLAN DESIGNATION

The project site includes the following designations: "Major Institutional/Special Facilities" and "Publicly Owned Conservation Land" by the Palo Alto Comprehensive Plan Update 2030. The Major Institutional/Special Facilities land use designation includes institutional, academic, government and community service land uses, and overlays the Airport and the RWQCP. The "Publicly Owned Conservation Land" land use designation includes resource management, recreational, and educational uses and overlays the existing levee, San Francisquito Creek Trail, and the existing RWQCP outfall.

8. ZONING

The project site is zoned PF(D), Public Facilities/Site and Design Review Combining District. The PF(D) zone district is designed to accommodate government, public utility, educational, and community service or recreational facilities. The project is an allowed use in this zone district.

9. PROJECT DESCRIPTION

9.1 Background

The City's RWQCP currently operates a 54-inch diameter outfall pipe to discharge treated effluent to SF Bay. The outfall pipe is a 54-inch reinforced concrete pipe (RCP) extending from the RWQCP to an unnamed slough (Slough) just east of the San Francisquito Creek Trail next to the Airport. The 54-inch outfall exits the plant from an outfall box, and stop logs inside the outfall box normally direct all flow to this 54-inch outfall. The 54-inch outfall pipe was installed in approximately 1964 and consists of individual 10-foot-long concrete segments. The alignment of the existing outfall pipe travels east beneath the Airport apron and crosses under the existing levee to the Slough just south of the runway. The 54-inch outfall is 2,133-feet in length, with a transition to a 60-inch diameter corrugated metal pipe (CMP) for the final 24-foot run into the unnamed slough.

Figure 1. Regional and Vicinity Map

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

0 0.25 0.5
Miles

WRA ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 9/13/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - National Geographic
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 1 Location.mxd

wra
ENVIRONMENTAL CONSULTANTS

City of Palo Alto Regional Water Quality Control Plant New Outfall Project Palo Alto, California

Figure 2.

Aerial Photograph of Project Area

Map Prepared Date: 5/12/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 2 Study Area.mxd

The outfall pipe was originally installed in shallow earth using open trench construction methods with a few feet of cover and has no slope (i.e., the pipe was installed at the same invert along its entire length). Recent excavations to repair leaks in the outfall pipe revealed that the pipe's concrete cylinder appears to be in relatively good condition; however, the rubber gasket joints have begun to fail in a handful of locations, causing small leaks. The City believes subsidence over the past 50 years has contributed to leaks.

The existing outfall is operated by gravity flow and its capacity is influenced by tidal elevations in San Francisco Bay. Table 1 summarizes the plant effluent flows. In accordance with the City's Long Range Facilities Plan Report (Carollo Engineers, 2012), the RWQCP has the capacity to discharge 70 million gallons per day (MGD) under existing conditions when the water level in the Slough is at its Mean Higher High Water (MHHW) level. The report also indicated that when the water level in the Slough is at its Mean Lower Low Water (MLLW) level or at its MHHW, the 54-inch outfall does not provide the capacity to discharge the design peak wet weather flow of 80 MGD.

Table 1. Current outfall Flows and Velocities

	Flow	**Velocity in the 54-inch Outfall***
Average Dry Weather Flow (ADWF)	19 MGD	1.9 ft/s
Peak Dry Weather Flow (PDWF)	30-39 MGD	2.9 – 3.9 ft/s
Minimum Dry Weather Flow (MDWF)	5-10 MGD	0.5 – 1.0 ft/s
Peak Wet Weather Flow (PWWF)	80 MGD	7.8 ft/s
**When the pipe is full*		

Furthermore, the RWQCP is expected to lose additional discharge capacity with its current outfall pipe system due to anticipated sea level rise over the next 50 years. In accordance with the San Francisquito Creek Joint Power Authority (SFCJPA) preliminary SAFER Bay project report, the SAFER Bay project uses 36 inches of sea level rise over the next 50 years as the design standard for the proposed new levee improvement. The City has decided to use the same amount of sea level rise for the design of the proposed project.

To mitigate the issues rising from an aging outfall pipe and future sea level rise, and to prepare the RWQCP for a future peak wet weather event, the City is preparing to install a new outfall pipe to increase the discharge capacity and then rehabilitate the existing outfall to extend its service life.

9.2 Proposed Project

As described above, the City is proposing to install a new effluent outfall pipe, rehabilitate the existing outfall pipe, and replace the Renzel Marsh pump. These three components are collectively considered the proposed project and are described in more detail below.

New Effluent Outfall Pipe

The City is proposing to install approximately 2,402 linear feet of new 63-inch high density polyethylene (HDPE) outfall pipe between the RWQCP's existing outfall box and the Slough. In compliance with the City's National Pollutant Discharge Elimination System (NPDES) discharge permit, the new outfall pipe's downstream end would be located immediately adjacent to the existing outfall pipe's discharge point. The new effluent outfall pipe alignment would start from the existing outfall box, cross Embarcadero Road, then angle east through the existing Airport apron and parking lot, then turn north until it reaches the existing levee. The alignment then follows the levee alignment in a northwesterly direction for approximately 600 feet and then turns in a northeasterly direction until it reaches to the discharge point. This new outfall pipe alignment generally follows the Airport perimeter and is shown in Figure 3, Proposed Pipeline Alignment. It is important to note that the existing levee is not a U.S. Army Corps of Engineers or Federal Emergency Management Agency (FEMA) authorized or maintained levee.

The entire pipe would be constructed with open trench methods that would be about 12-feet deep where the outfall transitions into a parallel alignment with the existing levee. Where the levee separates the Airport property from the Baylands, excavations would be approximately 7-feet deep. Based on the geotechnical findings listed in the Geotechnical Report (Appendix D) prepared for the project, it is anticipated that the deeper 12-foot trench would be supported by sheetpiles driven down to exclude groundwater from entering the trench. The shallower seven-foot trench would utilize a benched or sloped open cut excavation. Based on the depth of groundwater and excavation depths, water-tight shoring would be use for the deeper trench excavation. Even where water-tight shoring is used, limited internal dewatering would be used to remove nuisance and minor seeps. Where the pipe crosses Embarcadero Road, the construction would maintain one lane open at all times by implementing a traffic control plan. Construction along the perimeter of the Airport would be reviewed and accepted by the Federal Aviation Administration (FAA).

A cofferdam in the Slough would be installed using interlocking sheet piles to allow for open-trench installation. Two holes would be cut in the sheet piles to allow the 60-inch storm drain and the 54-inch existing outfall to pipes to pass through. Temporary pipes would be installed through the holes to connect from the end of the 60-inch storm drain and the 54-inch existing outfall to pass beyond the temporary sheetpiles and allow flow bypass. The interlocking sheet piles would provide reasonable water-tightness so that dewatering could be achieved via a sump pump. Minimal soil is anticipated to be temporarily discharged into the Slough within the cofferdam during construction. All cut soil would be removed and disposed of off-site.

At the end of the new effluent outfall pipe, a new effluent monitoring station would be installed to monitor the effluent pH, dissolved oxygen (DO), and temperature. The effluent monitoring station would consist of a buried fiberglass or concrete box located just off the existing levee crest near the effluent outfall pipe discharge point. During the new effluent outfall installation, an electrical cable and a signal cable would be installed along the new outfall trench. The electrical cable would power the pH and DO meters. The signal cable would transmit data from the pH and DO meters to the Plant.

To allow for flow control, two new sluice gates would be installed on the existing RWQCP outfall box. The sluice gates would be installed at the outlets from the outfall box to the new effluent outfall and the existing outfall pipes. The sluice gates would be stainless steel construction with motorized actuators. The sluice gates would be locally operated and would not be connected to the Plant's SCADA system.

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City of Palo Alto Regional Water Quality Control Plant New Outfall Project Palo Alto, California

Figure 3.

Proposed Pipeline Alignment

N
W E
S

0 125 250 375

Feet

Map Prepared Date: 10/12/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2016
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 2 Pipeline Alignment.mxd

The combined capacity of both the new outfall and the existing outfall is estimated to be approximately 123 MGD at current high tide water level. This capacity is based on adding the new outfall pipe with a 63-inch outside diameter and 57-inch inside diameter and the HPDE pipe material. After 36-inch of sea level rise, the combined capacity of both the new outfall and the existing outfall would be reduced to just slightly below 80 MGD. However, since the City plans to use Renzel Marsh Pump to divert approximately 3 MGD of flow into Renzel Marsh, the total capacity, including both outfalls and the Renzel Marsh flow diversion, is approximately 82 MGD, which exceeds the Plant Peak Wet Weather Flow of 80 MGD.

Existing Outfall Pipe Rehabilitation

After the new effluent outfall pipe construction complete, the flow can be diverted to the new outfall pipe during summer months (dry season) and the existing outfall pipe can be rehabilitated. The rehabilitation would include installing interior flexible joint seals to seal the joints that may have the potential to leak. The flexible joint seals would be installed from the interior of the pipe, and there would be no open excavation at the surface above the pipe. The Contractor would first need to dewater the existing pipe, then enter the pipe, with adequate ventilation and safety measures, to install the flexible joint seal.

Renzel Marsh Pump Replacement

The City has an existing pump that is experiencing air entrainment, causing noise and operational difficulties. The Renzel Marsh Pump is located in the basement of the RWQCP's existing administrative building and pumps tertiary treated and UV disinfected effluent to Renzel Marsh. The pump suction consists of a long (i.e., over 700 feet) 12-inch diameter suction line, which connects to the existing outfall box. The water level inside the outfall box is influenced by the tidal water level in SF Bay. During very low tide, the suction line receives air and causes the Renzel Marsh Pump to cavitate, which generates noise and may damage the pump impeller over the long term.

In order to improve operation, a new submersible pump, maximum 30 horsepower (HP), would be installed in an existing concrete structure, referred to as the Chlorine Contact Tank (CCT) outlet box, located inside the RWQCP, near the existing outfall box. The existing structure is open to the atmosphere and receives tertiary treated wastewater. The water level in the CCT outlet box is higher than the water level in the outfall box, which provides sufficient water depth above the pump suction inlet and avoids the air entrainment issue. The City would increase the power of the pump to 60 HP within five to ten years.

A new variable frequency drive (VFD) would be mounted inside the UV system electrical room located just to the southeast of the CCT, on the southwest side of the UV structure. The new VFD would allow for variation in pump speeds, resulting in long-term energy efficient operation of the pump. A shallow electrical trench would be cut between the VFD in the UV electrical room and the new submersible pump installation location to allow for installation of the electrical conduit.

The Renzel Marsh pump improvement would also include:

- approximately 40 feet of 12-inch diameter, High Density Polyethylene (HDPE) piping to be installed below grade, and

- approximately 10 feet of exposed 12-inch diameter exposed ductile iron piping

The below grade piping would be installed in trenches within the RWQCP boundaries; the trench depth would be approximately 5-feet in length. Additionally, approximately 10 feet of the existing 12-inch diameter below grade HDPE piping would be removed or abandoned in place, all within the grounds of the existing RWQCP.

The new Renzel Marsh Pump would have the capacity to operate at 1.5 MGD for future flows, but would run at reduced speeds to provide 300 gpm (0.4 MGD). The existing Renzel Marsh pump located in the basement of the Administration building would be removed.

Commissioning of New Systems

The existing 54-inch outfall pipe would be maintained in service while the new effluent outfall pipe is being constructed. When the new outfall pipe is constructed and is ready to accept flow, it would then connect to the existing RWQCP outfall box. This construction activity would be scheduled during summer months (dry season). Temporary piping would be used to divert effluent into the existing 54-inch outfall pipe.

After the new effluent outfall pipe is in service, the effluent would then be diverted to the new effluent outfall pipe. The existing outfall can then be taken out of service to allow rehabilitation. Once the rehabilitation is complete, the City would use both the new effluent outfall pipe and the existing outfall pipe.

The new Renzel Marsh pump would be used to convey the tertiary treated and UV disinfected effluent to the Renzel Marsh. The new pump would typically be operated at all times to convey flow at a rate between 300 and 1,000 gallon per minute (gpm).

Construction Details

<u>Construction Equipment</u>

Construction equipment for the proposed project would likely include the vehicles and equipment listed in Table 2 below.

Table 2. Construction Equipment

Equipment	Estimated Quantity	Purpose
Medium to Large Excavator	1	Trench excavation, trench shoring installation, backfilling trench, and trench compaction
Medium to Large Dump Truck	2-3	Hauling excavated material and imported material for trench backfill
Concrete Truck	2	Delivering concrete material
Large Flatbed Truck	1	Delivering HDPE pipes
Large HDPE Pipe Welding Machine (i.e., McElroy Fusion Machine)	1	Fusing HDPE pipe joints
Medium to Large Pipe Layer or Boom Truck	1-2	Moving the HDPE pipe from ground to the trench

Construction Schedule

New outfall construction is anticipated to start in the third quarter of 2019. Construction of the new outfall pipeline and Renzel Marsh pump is anticipated to take approximately nine months, not accounting for pre-construction project coordination, which would mean no field work during this phase of preparation work, such as coordination with the Federal Aviation Administration (FAA), contractor submitting paperwork for insurance and shop drawings, etc. The existing outfall pipe rehabilitation would take approximately six months and is anticipated to be in 2020. Construction of the new outfall pipeline within the levee and in the unnamed slough (between Station 14+00 and 27+00) would occur between September 1 and January 31 to avoid the California Ridgway's Rail (CRR) breeding season. The proposed project would require a minimal amount of daily truck trips and would utilize the U.S. Route 101 Freeway via Embarcadero Road. The proposed project would not close any roads during construction. A traffic management plan would be prepared that would leave one lane open for through traffic, with flaggers controlling traffic, where the new outfall pipe crosses Embarcadero Road. Construction activities in this area would be limited to 9:30 a.m. to 3:30 p.m. Nighttime construction would be required for approximately three weeks during installation of the pipeline along the Airport apron and within the levee, as work in this area would require runway closure. All other construction would occur within daylight hours and would be limited to 8:00 a.m. to 6:00 p.m. Monday through Friday, and 9:00 a.m. to 6:00 p.m. on Saturday. Construction would be prohibited on Sundays and holidays. Signs identifying these hours would be posted at the site per the City Noise Ordinance.

Grading, Drainage, and Utilities

The proposed project would include trenching for the installation of a new effluent outfall pipe resulting in approximately 8,500 cubic yards of cut material to be exported from the site, as the excavated materials are generally not suitable for backfill and SFCJPA does not want pervious backfill around the pipe that is adjacent to their levee. In accordance with the SFCJPA and recommendations in the Geotechnical Report (Appendix D), the trenches would be backfilled with cementitious material with various unit weights, resulting in approximately the same load on the soils in the project site and minimizing any consolidation settlement. Therefore, approximately 6,250 cubic yards of cementitious material would be imported for the proposed project. As the average construction truck has a capacity of 10 cubic yards, the proposed project would result in approximately 850 truck trips to haul soil for export and 590 cement truck trips. Assuming a 6 day work week, for a total of nine months, the project would require seven daily truck trips on average. Actual truck trips per day may vary.

The trench would be located a sufficient distance from existing utilities to avoid lateral displacement of those utilities during construction. When crossing of existing utilities is required, a minimum of one foot of vertical clearance would be provided. Additionally, California’s Department of Drinking Water Regulations state that potable water pipelines shall maintain at least 10 feet horizontal and 1 foot vertical separation from any parallel primary or secondary treated sewage pipes (California Waterboards, 2016). PG&E, AT&T, and Comcast have already provided utility maps or stated they have no utilities in the area of the project.

<u>Tree Removal</u>

The proposed project would require the removal of three non-native trees near the RWQCP and Embarcadero Road. As the City is the project proponent, they are not subject to the formal requirements of the City’s tree ordinance. However, the City would replace the removed trees with tree species approved of as part of the 2012 RWQCP Landscaping Project.

<u>Staging, Access, and Detours</u>

All equipment, construction vehicles, and work crew vehicles would be staged in the lot adjacent to Embarcadero Road and the Airport terminal parking lot. Dump trucks would haul in backfill material and remove excavated soil from the site to an approved off-site disposal area. All equipment would access the site via Embarcadero Road, the existing levee top, and the San Franciscquito Creek Trail. The trucks would use the same access road, utilizing Embarcadero Road, which runs directly west to Highway 101. Access to Embarcadero Road would be available during the entire construction phase, as the traffic control plan would ensure one lane remains open at all times. Due to temporary closure of the Bay Trail during construction activities at the final reach of the pipeline and outfall for approximately two weeks, detour signage would be posted at Geng Road, the Lucy Evans Bayland Nature Interpretive Center, and on Embarcadero Road east of the RWQCP. See Figure 4, San Francisquito Trail Detour Route, for more details.

<u>Cumulative Projects</u>

As the local lead for flood improvement projects being studied by the U.S. Army Corps of Engineers, the SFCJPA is planning a levee enhancement project from San Francisquito Creek to the Palo Alto/Mountain View border. SFCJPA has planned to raise the crest of the levee paralleling the unnamed slough to 16 feet elevation. To ensure the SFCJPA was aware of the RWQCP’s new outfall project, the City reached out to the SFCJPA levee project. As a result of that outreach, the City has learned the levee project is still in the planning stages, with detailed design to come in future years. The SFCJPA has reviewed the new outfall project’s 90% design and is fully aware of this project. The SFCJPA main concern is that the new outfall design includes a backfill material around the pipe in the segment that is in immediate proximity to the improved levee, such that the new outfall pipe backfill would not act as a corridor for water, which could undermine the levee. This material would only need to be installed where the new outfall intersects the levee. SFCJPA does not anticipate that the RWQCP would need to relocate the new outfall above the flood elevation.

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ENVIRONMENTAL CONSULTANTS

City of Palo Alto
Regional Water Quality
Control Plant New
Outfall Project
Palo Alto, California

Figure 4.

San Francisquito Trail
Detour Route

N
W E
S

0 320 640 960
Feet

Map Prepared Date: 10/27/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2016
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig x Trail Detour.mxd

10. SURROUNDING LAND USES AND SETTING

The project site is bordered to the north and east by Mayfield slough, an unnamed slough at the existing outfall pipe discharge point, the Palo Alto Duck Pond, and the San Francisco Bay. The Palo Alto Airport borders the project site to the north and west. The RWQCP and other industrial facilities are located to the south and west of the site. Byxbee Park is also located south of the RWQCP.

11. OTHER PUBLIC AGENCIES

Bay Conservation and Development Commission (BCDC)

- BCDC Permit

San Francisco Bay Regional Water Quality Control Board (SFRWQCB)

- Section 401 Water Quality Certification
- Existing RWQCP National Pollutant Discharge Elimination System (NPDES) Permit

U.S. Army Corps of Engineers (USACE)

- Clean Water Act Section 404 Permit

Federal Aviation Administration (FAA)

- Review and Approval of Construction Safety Phasing Plan

San Francisquito Creek Joint Powers Authority (SFCJPA)

- Plan Review

City of Palo Alto

- Encroachment Permit waived

ENVIRONMENTAL CHECKLIST AND DISCUSSION OF IMPACTS

ENVIRONMENTAL FACTORS POTENTIALLY IMPACTED

The environmental factors checked below would be potentially impacted by the project. Complete this table after the checklist is filled out and check the boxes for categories that are potentially significant with or without mitigation incorporated.

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

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 a 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) "(Mitigated) 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 17, "Earlier Analysis," may be cross-referenced).

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

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

    b) 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.

    c) 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.

6) Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

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

8) The explanation of each issue should identify:

    a) the significance criteria or threshold, if any, used to evaluate each question; and

    b) the mitigation measure identified, if any, to reduce the impact to less than significance.

DISCUSSION OF IMPACTS

The following Environmental Checklist was used to identify environmental impacts, which could occur if the proposed project is implemented. The left-hand column in the checklist lists the source(s) for the answer to each question. The sources cited are identified at the end of the checklist. Discussions of the basis for each answer and a discussion of mitigation measures that are proposed to reduce potential significant impacts are included.

A. AESTHETICS

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Substantially degrade the existing visual character or quality of the area and its surroundings?	☐	☐	☒	☐	1
b) Significantly alter public viewsheds or view corridors or scenic resources (such as trees, rocks, outcroppings or historic buildings) along a scenic highway?	☐	☐	☒	☐	4, 5
c) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐	1
d) Substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 a.m. and 3:00 p.m. from September 21 to March 21?	☐	☐	☒	☐	1

ENVIRONMENTAL SETTING:

Aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. The City of Palo Alto's Comprehensive Plan, identifies several scenic resources, routes, and viewsheds within the City. Scenic routes within the City include Sand Hill Road, University Avenue, Embarcadero Road, Page Mill Road/Oregon Expressway, Arastradero Road, and Foothill Expressway-Junipero Serra Boulevard. Embarcadero Road east of Highway 101 is considered a scenic corridor and gateway with views of the Palo Alto Baylands (Baylands). Views of the Baylands are also considered a scenic resource within the City and design recommendations are included in the *Baylands Master Plan* for this area.

DISCUSSION:

a) Would the proposed project substantially degrade the existing visual character or quality of the area and its surroundings?

Less than Significant Impact. The proposed project site is located partially within the RWQCP, in the vicinity of the Palo Alto Airport and other industrial uses, and partially within the open space of the Palo Alto Baylands. During construction the project would result in a minor impact to the visual character of the area with the presence of construction equipment. Once completed, the proposed project elements including the new effluent outfall pipe, rehabilitation of the existing pipe, and Renzel Marsh pump would all be located completely underground and out of the line-of-sight. In addition, as described in the Project Description above, while construction of the new pipeline would require the removal of three trees, the proposed project includes the replacement of these trees per the RWQCP's planting palette. Therefore, once the project is completed, the visual character of the site would be similar to existing conditions. A less-than-significant impact would occur.

b) Would the proposed project significantly alter public viewsheds or view corridors or scenic resources (such as trees, rocks, outcroppings or historic buildings) along a scenic highway?

Less than Significant Impact. According to Caltrans California Scenic Highway Mapping System for Santa Clara County, no scenic highways are located within the vicinity of the project site.[1] However, the City's Comprehensive Plan identifies Embarcadero Road east of Highway 101 as a scenic corridor and gateway with views of the Palo Alto Baylands. The proposed project would require work within Embarcadero Road for approximately one week for the installation of the new pipeline with trenching across Embarcadero Road. As the proposed project would only require construction within this corridor for one week, impacts would be less than significant.

c) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant Impact. No lighting would be installed for use during the operational phase of the project. As the new effluent outfall pipe and, existing pipe, and Renzel Marsh pump would all be located underground, no materials would be installed that would create a new source of glare. The construction phase would occur mostly during daylight hours. However, due to the close proximity to the Airport, the stretch of new outfall pipe to be installed along the Airport apron and runway would require runway closure and approximately three weeks of nighttime construction with the use of headlights on trucks, and mobile lighting for the benefit of the construction crew. As this nighttime lighting would only be used for three weeks and would not be directed towards the sky, nighttime views in the area would not be adversely affected and impacts would be less than significant.

d) Would the proposed project substantially shadow public open space (other than public streets and adjacent sidewalks) between 9:00 a.m. and 3:00 p.m. from September 21 to March 21?

Less than Significant Impact. The project site is located within the vicinity of the RWQCP, Airport, San Francisquito Creek Trail, a golf course and the Palo Alto Baylands. The proposed project would include the rehabilitation of an existing pipeline below the ground surface, and the installation of a new pipe and pump below the ground surface. The proposed project would not involve the construction of any buildings or other structures that could potentially cast a substantial shadow on the previously listed aesthetic resources. During construction activities,

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1 *California Department of Transportation. California Scenic Highway Mapping System, Santa Clara County. Website: http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/. Accessed: March 29, 2017.*

the construction equipment would include mobile vehicles and would not substantially shadow public open space. . The proposed trees to be planted would replace trees that would be removed during construction activities and would be similar in size and species of all other trees planted at the RWQCP. Therefore, these trees would not significantly alter existing conditions related to shadows. A less-than-significant impact would occur.

Mitigation Measures: None Required.

B. AGRICULTURAL AND FOREST RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland.

Issues and Supporting Information Resources **Would the project:**	**Potentially Significant Impact**	**Less than Significant with Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**	**Sources**
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?	☐	☐	☐	☒	1, 6
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒	1, 7
c) Conflict with existing zoning for, or cause rezoning of, forest land[2], timberland[3], or timberland zoned Timberland Production[4]	☐	☐	☐	☒	1, 3
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒	1
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?	☐	☐	☐	☒	1
f) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒	1

2 *As defined in Public Resources Code section 12220(g)*
3 *As defined by Public Resources Code section 4526*
4 As defined by Government Code section 51104(g)

ENVIRONMENTAL SETTING:

The project site is located adjacent to Mayfield Slough and the Palo Alto Baylands of the San Francisco Bay, situated partially within and along the apron of the Palo Alto Airport. The project site is also partially within the RWQCP property. No agricultural uses are located on-site or in the surrounding vicinity. The project site is not located in an area designated as “Prime Farmland”, “Unique Farmland”, or “Farmland of Statewide Importance,” as documented on the California Resources Agency Farmland Mapping and Monitoring Program maps. The site is not zoned for agricultural use, and is not regulated by the California Land Conservation Act of 1965 (commonly referred to as the Williamson Act). The project site is not located within the vicinity of any forest land or timberland.

DISCUSSION:

a) ***Would the proposed project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use?***

No Impact. According to the State of California Department of Conservation, Important Farmland Finder, the project site is designated as “Urban and Built-Up Land”. Therefore, the proposed project would not convert Prime, Unique, or Farmland of Statewide Importance to a non-agricultural use. No impact would occur.

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

No Impact. The project site is zoned PF(D), which does not permit agricultural uses. Furthermore, according to the Santa Clara County Williamson Act FY 2015/2016 Map, developed by the California Department of Conservation, Division of Land Resource Protection, the project site is not under a Williamson Act Contract. Therefore, no impact would occur.

c) ***Would the proposed project conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland?***

No Impact. The project site is zoned PF (D) for Public Facilities/Site Design Review Combining District. The proposed project would install a new outfall pipe, rehabilitate the existing outfall pipe, and install new pump to pump treated water out to the Renzel Marsh. The proposed project would not include or result in the rezoning of forest land, timberland, or timberland zoned Timberland. No impact would occur.

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

No Impact. As described above, the proposed project is not located within the vicinity of forest land. Therefore, no forest land would be lost or converted to a non-forest use as a result of project implementation. No impact would occur.

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

No impact. The proposed project is not designated or within the vicinity of other lands that are designated as Farmland. Therefore, the conversion of Farmland to a non-agricultural use would not occur. The proposed project would have no impact.

f) Would the proposed project result in the loss of forest land or conversion of forest land to non-forest use?

No Impact. The project site is not designated as forest land or within the vicinity of any forest land. Therefore, the proposed project would not result in the conversion of forest land to a non-forest use. The proposed project would have no impact.

Mitigation Measures: None Required.

C. AIR QUALITY

Issues and Supporting Information Resources Would the project:	Potentially Significant Issues	Less than Significant with Mitigation	Less Than Significant Impact	No Impact	Sources
a) Conflict with or obstruct implementation of the applicable air quality plan (such as the 2010 Clean Air Plan or the 2001 Ozone Attainment Plan)?	☐	☐	☐	☒	1, 8, 19
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐	1, 8, 19
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐	1, 8, 19
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐	1, 8
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐	1, 8, 9

INTRODUCTION:

The following Air Quality analysis is based in part on air quality data prepared by Illingworth & Rodkin (Appendix A).

ENVIRONMENTAL SETTING:

The project is located in the northern portion of Santa Clara County within the San Francisco Bay Area Air Basin. Ambient air quality standards have been established at both the State and federal level. The Bay Area meets all ambient air quality standards with the exception of ground-level ozone, respirable particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$).

High ozone levels are caused by the cumulative emissions of reactive organic gases (ROG) and nitrogen oxides (NOx). These precursor pollutants react under certain meteorological conditions to form high ozone levels. Controlling the emissions of these precursor pollutants is the focus of the Bay Area's attempts to reduce ozone levels. The highest ozone levels in the Bay Area occur in the eastern and southern inland valleys that are downwind of air pollutant sources. High ozone levels aggravate respiratory and cardiovascular diseases, reduced lung function, and increase coughing and chest discomfort.

Particulate matter is another problematic air pollutant of the Bay Area. Particulate matter is assessed and measured in terms of respirable particulate matter or particles that have a diameter of 10 micrometers or less (PM_{10}) and fine particulate matter where particles have a diameter of 2.5 micrometers or less ($PM_{2.5}$). Elevated concentrations of PM_{10} and $PM_{2.5}$ are the result of both region-wide (or cumulative) emissions and localized emissions. High particulate matter levels aggravate respiratory and cardiovascular diseases, reduce lung function, increase mortality (e.g., lung cancer), and result in reduced lung function and growth in children.

Toxic air contaminants (TAC) are a broad class of compounds known to cause morbidity or mortality (usually because they cause cancer) and include, but are not limited to, the criteria air pollutants listed above. TACs are found in ambient air, especially in urban areas, and are caused by industry, agriculture, fuel combustion, and commercial operations (e.g., dry cleaners). TACs are typically found in low concentrations, even near their source (e.g., diesel particulate matter near a freeway). Because chronic exposure can result in adverse health effects, TACs are regulated at the regional, state, and Federal level.

Diesel exhaust is the predominant TAC in urban air and is estimated to represent about three-quarters of the cancer risk from TACs (based on the Bay Area average). According to the California Air Resources Board (CARB), diesel exhaust is a complex mixture of gases, vapors and fine particles. This complexity makes the evaluation of health effects of diesel exhaust a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde, have been previously identified as TACs by the CARB, and are listed as carcinogens either under the state's Proposition 65 or under the Federal Hazardous Air Pollutants programs.

REGULATORY SETTING:

2017 Clean Air Plan

The Bay Area 2017 Clean Air Plan (CAP) provides a regional strategy to protect public health and protect the climate. The 2017 Plan updates the most recent Bay Area ozone plan, the 2010 Clean Air Plan, pursuant to air quality planning requirements defined in the California Health & Safety Code. To fulfill state ozone planning requirements, the 2017 control strategy includes all feasible measures to reduce emissions of ozone precursors-reactive organic gases (ROG) and nitrogen oxides (NO_X)- and reduce transport of ozone and its precursors to neighboring air basins. In addition, the Plan builds upon and enhances the Air District's efforts to reduce emissions of fine particulate matter and toxic air contaminants. The Plan will ensure the Bay Area continues to meet fine PM standards, while continuing progress toward attaining state and national ozone standards (BAAQMD, April 2017).

BAAQMD CEQA Guidelines

The Bay Area Air Quality Management District (BAAQMD) CEQA Air Quality Guidelines published in 2017 contain recommended thresholds of significance for regional criteria pollutants (ROG, NO_X,

PM_{10}, and $PM_{2.5}$) and community risk criteria, which were used in this assessment.

Significance Thresholds

In June 2010, BAAQMD adopted thresholds of significance to assist in the review of projects under CEQA. These thresholds were designed to establish the level at which BAAQMD believed air pollution emissions would cause significant environmental impacts under CEQA and were posted on BAAQMD's website and included in BAAQMD's updated CEQA Guidelines (updated May 2017). The significance thresholds identified by BAAQMD and used in this analysis are summarized in Table 3.

Table 3. Air Quality Significance Thresholds

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (pounds/day)	**Average Daily Emissions (pounds/day)**	**Annual Average Emissions (tons/year)**
Criteria Air Pollutants			
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82	82	15
$PM_{2.5}$	54	54	10
CO	Not Applicable	9.0 ppm (8-hour average) or 20.0 ppm (1-hour average)	
Fugitive Dust	Construction Dust Ordinance or other Best Management Practices	Not Applicable	
Health Risks and Hazards for Single Sources			
Excess Cancer Risk	10 per 1 million		
Chronic or Acute Hazard Index	1.0		
Incremental annual average $PM_{2.5}$	0.3 µg/m³		
Health Risks and Hazards for Cumulative Sources (Cumulative from all Sources within 1,000-Foot Zone of Influence)			
Excess Cancer Risk	100 per 1 million		
Chronic or Acute Hazard Index	10.0		
Annual Average $PM_{2.5}$	0.8 µg/m³		
Greenhouse Gas Emissions			
Greenhouse Gas Annual Emissions	1,100 metric tons or 4.6 metric tons per service population		

Note: ROG = reactive organic gases, NOx = nitrogen oxides, PM_{10} = coarse particulate matter or particulates with an aerodynamic diameter of 10 micrometers (µm) or less, $PM_{2.5}$ = fine particulate matter or particulates with an aerodynamic diameter of 2.5 µm or less; CO = carbon monoxide, ppm = parts per million, µg/m³ = micrograms per cubic meter. Source: BAAQMD, 2017.

DISCUSSION:

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

No Impact. The most recent clean air plan is the Bay Area 2017 Clean Air Plan (CAP). The proposed project would not conflict with the latest Clean Air planning efforts since the project would have emissions well below the BAAQMD thresholds (see b and c below) and would not interfere with implementation of any of the plan measures. The proposed project would not conflict with the latest Clean Air planning efforts since the project would result in minimal and temporary construction emissions and would ultimately reduce operational emissions from the RWQCP with a more efficient pump to the Renzel Marsh. In addition, the project does not require any General Plan amendments that would change land use assumptions in the 2017 Plan, upon which region-wide emissions were estimated. The proposed project would have no impact related to the implementation of the 2017 CAP.

b) Would the proposed project violate any air quality standard or contribute to an existing or projected air quality violation?

Less than Significant with Mitigation Incorporated.

<u>Construction Period Emissions</u>

The California Emissions Estimator Model Version 2016.3.1 (CalEEMod) provided construction emissions for the project. A statewide model designed to provide a uniform platform to quantify air quality emissions from land use projects, CalEEMod provides emission estimates for both on-site and off-site construction activities. On-site activities are primarily made up of construction equipment emissions from site preparation and grading, trenching and open cut, pump installation, the existing outfall rehabilitation, and paving, while off-site activity includes worker, hauling, and vendor traffic. A construction build-out scenario, including equipment list and schedule, was based on information provided by the project applicant. The proposed project land use was input into CalEEMod as "User Defined Industrial" on 2.4 acres. A square footage of 38,120 sf was entered to account for ROG emissions from repaving.

The anticipated cubic yardage of material import and export and cement truck trips by phase were entered into the model (see Appendix A). This included 14,729 cubic yards of total material import and export and 589 total cement truck round trips. The CalEEMod model assumes 16 cy/truck. It was assumed that there would be approximately three vendor trips per day to deliver the new pipe on average. Average daily emissions are shown in Table 4 for emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ during construction of the project. The CalEEMod input and output values for construction emissions are found in Appendix A. In addition, annual emissions are also shown in Table 4. As indicated in Table 4, computed project construction period emissions would not exceed the BAAQMD average daily significance thresholds.

Table 4. Construction Period Emissions

Scenario	ROG	NOx	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
Annual construction emissions (tons)	0.09 tons	1.21 tons	0.04 tons	0.03 tons
Average daily emissions (pounds)[1]	1.4 lbs.	18.3 lbs.	0.6 lbs.	0.5 lbs.
BAAQMD Thresholds (pounds per day)	*54* lbs.	*54* lbs.	*82* lbs.	*54* lbs.
Exceed Threshold?	**No**	**No**	**No**	**No**
Notes: [1]Assumes 132 workdays. Source: Illingworth & Rodkin, Inc., 2017.				

Construction activities, particularly during site preparation and grading, would temporarily generate fugitive dust in the form of PM_{10} and $PM_{2.5}$. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. The BAAQMD CEQA Air Quality Guidelines consider these impacts to be less than significant if best management practices are implemented to reduce these emissions. Mitigation Measure AIR-1 would implement BAAQMD-recommended best management practices including a SWPPP and installation of rumble strips for trucks exiting the site.

Operational Period Emissions

Operational air emissions from the proposed would be generated primarily from the new pump and maintenance vehicle trips. However, the replacement pump would not be larger in horsepower than the existing pump and maintenance vehicle trips would be limited. Net emissions from operation of the project would not be substantial, as proposed project emissions would be similar to existing levels. This would be a less-than-significant impact.

c) Would the proposed project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors?

Less than Significant with Mitigation Incorporated. The San Francisco Bay Area Air Basin is currently designated as in "nonattainment" for both federal and state ozone standards and state particulate matter standards. This nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. As stated in the BAAQMD 2017 Guidelines, "by its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the project's impact on air quality would be considered significant." As described above, operation of the proposed project would not result in significant emissions that would violate applicable air quality standards or contribute substantially to an existing or projected air quality violation. With implementation of Mitigation Measure AIR-1, construction-related air quality emissions would be reduced to less-than-significant levels and would be temporary in nature. Therefore, the proposed project would have a less-than-significant contribution to cumulative air quality impacts with implementation of Mitigation Measure AIR-1.

d) ***Would the proposed project expose sensitive receptors to substantial pollutant concentrations?***

Less Than Significant Impact. Project impacts related to increased community risk can occur either by introducing a new sensitive receptor, such as a residential use, in proximity to an existing source of TACs or by introducing a new source of TACs with the potential to adversely affect existing sensitive receptors in the project vicinity. The project would not introduce new receptors. Also, review of the project area did not reveal any sensitive receptors within 1,000 feet of the project site, which BAAQMD uses as a screening distance for potential impacts. Therefore, the proposed project would not have a less-than-significant impact with respect to exposure of receptors to substantial pollutant concentrations.

e) ***Would the proposed project create objectionable odors affecting a substantial number of people?***

Less than Significant Impact. The 2017 BAAQMD CEQA Guidelines identify potential sources of objectionable odors including wastewater treatment plant, manufacturing plants, landfills, and agricultural and industrial operations. The project would generate localized emissions of diesel exhaust during construction equipment operation and truck activity. These emissions may be noticeable from time to time by adjacent receptors. Operation of the proposed project would include a new effluent outfall pipe, however, this new pipe would be subject to the same regulations stipulated in the RWQCP's National Pollutant Discharge Elimination System (NPDES) Permit (NPDES No. CA0037834) waste discharge requirements (WDRs), which includes regulation of objectionable odors from waste discharge. However, they would be localized and are not likely to adversely affect people off-site by resulting in confirmed odor complaints. The project would not include any sources of significant odors that would cause complaints from surrounding uses. This would be a less-than-significant impact.

Mitigation Measures:

Mitigation Measure AIR-1: Construction Emissions

During any construction period ground disturbance, the applicant shall ensure that the project contractor implements measures to control dust and exhaust. Implementation of the measures recommended by BAAQMD and listed below would reduce the air quality impacts associated with grading and new construction to a less-than-significant level. The contractor shall implement the following best management practices that are required of all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).

5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.

6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.

8. Post a publicly visible sign with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

9. The Contractor shall prepare a SWPPP, to be submitted and approved by the City prior to the start of construction

10. The Contractor shall install rumble strips for trucks exiting the site.

D. BIOLOGICAL RESOURCES

Issues and Supporting Information Resources **Would the project:**	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
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 Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐	1, 10
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐	1, 10
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐	1, 10
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?	☐	☐	☐	☒	1, 10
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or as defined by the City of Palo Alto's Tree Preservation Ordinance (Municipal Code Section 8.10)?	☐	☐	☒	☐	1, 3, 10

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
f) Conflict with the provisions of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒	1, 11

INTRODUCTION:

The following Biological Resources analysis is based in part on the Biological Resources Survey Report prepared by WRA, Inc. in June 2017 (Appendix B).

ENVIRONMENTAL SETTING:

Approximately half of the project footprint is located within the Palo Alto Airport and adjacent to the RWQCP, and half of the project footprint would occur on and within a levee separating the Airport from adjacent tidal areas. The Palo Alto Airport is among the busiest of all General Aviation airports in the United States, and air traffic is a source of consistent background visual and auditory disturbance for wildlife species. The RWQCP must operate 24 hours per day and seven days a week to provide water quality treatment in accordance with federal laws. Maintenance and operations occur at the RWQCP at any time during these operational hours, and the plant must be lit a night to accommodate safe and reliable operations and maintenance. The Airport operates from 7AM to 9PM, seven days a week, and must also utilize night lighting for safety. The tidal areas outboard of the levees surrounding the Airport support tidal wetlands, known populations of sensitive wildlife species, and contain potential habitat for sensitive plant species. The proposed project would occur in areas outside of and adjacent to these tidal areas. The background conditions described above are an important consideration when evaluating the potential for indirect impacts to sensitive species in the context of the project.

Special-Status Plant Species

Based on the database search for special-status plants, 12 special-status species have been documented within five miles of the project site (Figure 5, CNDDB Special-Status Plants). Of the special-status plant species recorded in the vicinity, three plant species have the potential to occur in the project site due to the presence of potentially suitable tidal salt marsh habitat. None of these plant species were observed during a survey of the approximately 27-acre Study Area by WRA biologists on May 2, 2017. The remaining special-status plant species have no potential or are unlikely to be found in the project site due to lack of suitable habitat. While none of the following special-status plant species were observed on-site by WRA biologists on March 27, 2017, rare plant surveys are recommended prior to construction during the blooming period of these special-status species with moderate or high potential to be found in the project site.

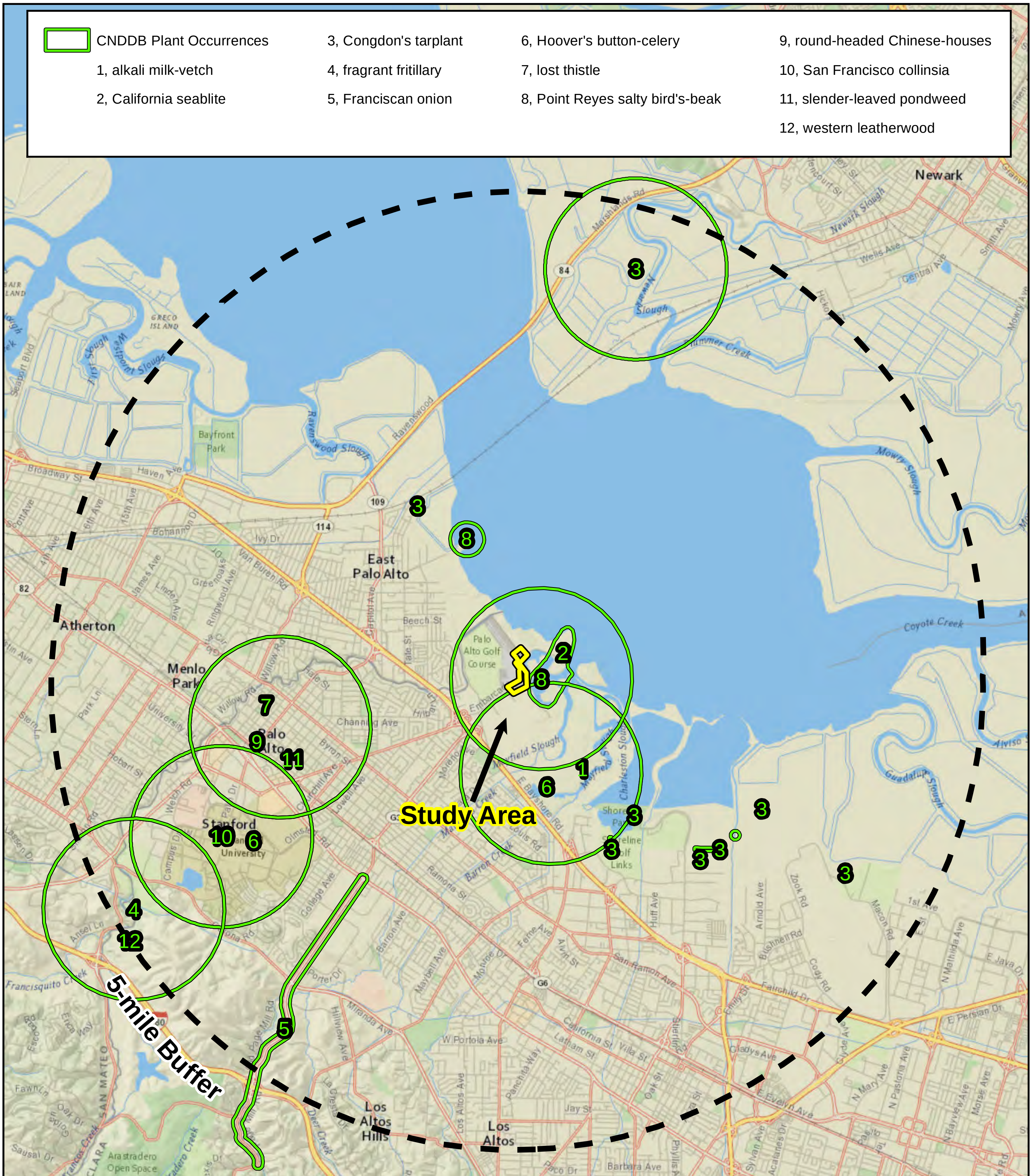

Figure 5. Special-status Plants Documented within 5 Miles of the Study Area

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City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

0 0.5 1 2
Miles

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Map Prepared Date: 5/12/2017
Map Prepared By: czumwalt
Base Source: National Geographic
Data Source(s): CNDDB January 2017

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 3 CNDDB Plant.mxd

- Point Reyes bird's-beak (*Chloropyron maritimum ssp. palustre*). State Endangered, Rank 1B.1.
- California seablite (*Suaeda californica*). Federally Endangered, State Endangered, Rank 1B.1.
- Saline clover (*Trifolium hydrophilum*). State Endangered, Rank 1B.2.

Surveys for Point Reyes bird's beak and California seablite are recommended to occur during the late season from June to October and surveys for saline clover are recommended to occur from April through June. More information on these species and their blooming periods are provided below.

<u>Point Reyes bird's beak</u>

Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*) is a hemiparasitic annual herb found in coastal salt marshes and swamps. It typically blooms from June through October at elevations from zero to 10 meters in elevation (CNPS 2015). The tidal wetlands and pickleweed mats may provide suitable habitat for this species within the Study Area.

<u>California seablite</u>

California seablite (*Suaeda californica*) is a perennial evergreen shrub found in coastal salt marshes and swamps. It typically blooms from July through October at elevations ranging from zero to 15 meters (CNPS 2015). The tidal salt marsh and pickleweed mats may provide suitable habitat for this species within the Study Area. The nearest documented occurrence for this species is located in the baylands adjacent and to the southeast of the project site (CDFW 2015).

<u>Saline clover</u>

Saline clover (*Trifolium Hydrophilum*) is an annual herb found in salt marshes, open areas in alkaline soils, and alkaline grasslands. It typically blooms between April and June in elevations of zero to 300 meters. The tidal salt marsh and annual grasslands may provide suitable habitat for this species.

Special-Status Wildlife Species

Based on the literature and database search, a total of 20 special-status wildlife species have been documented within five miles of the Study Area (Figure 6, CNDDB Special-Status Wildlife). Of the special-status wildlife species recorded in the vicinity of the Study Area, most have no potential or are unlikely to occur within the Study Area due to the absence of suitable habitats, including forest, riparian, open grassland, chaparral, and fresh waters. However, the Study Area has several habitat features including tidal salt marsh and slough habitat that may support 16 special-status species. One individual California Ridgway's Rail (CRR) was observed foraging in the Study Area by WRA biologists on March 27, 2017. No other special status species were observed.

Figure 6. Special-status Wildlife Documented within 5 Miles of the Study Area

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

0 0.5 1 2
Miles

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Map Prepared Date: 5/19/2017
Map Prepared By: czumwalt
Base Source: National Geographic
Data Source(s): CNDDB January 2017

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Salt Marsh Harvest Mouse and Salt-Marsh Wandering Shrew

SMHM and salt-marsh wandering shrew have the potential to occur within the project site due to the presence of tidal wetlands and pickleweed mats. Suitable habitat for SMHM and salt-marsh wandering shrew includes dense vegetation in tidal wetlands in the San Francisco Bay Area. SMHM may also be present in diked wetlands if suitably dense vegetation is present. In tidal areas, these species require upland refugia to escape high tides, and SMHM is known to opportunistically forage in uplands up to 330 feet from their primary wetland habitat (USFWS 2013). Therefore, the pickleweed mats adjacent to the Airport runway may also provide suitable habitat for these species as upland refugia with vegetation. These two species are known to occur in the wetlands along the Palo Alto shoreline, and SMHM has been documented in marshes outboard of the Palo Alto Airport along the San Francisquito Creek Trail (CDFW 2017).

California Ridgway's Rail (CRR) and Black Rail (CBR)

CRR and CBR have the potential to occur in a small portion of the project site, specifically in the unnamed slough near the proposed new RWQCP outfall location. CRR and CBR are found in lowland wetlands in the San Francisco Bay Area. CBR is more restricted to tidal salt marsh habitats than CBR, which may also be found in diked wetlands with suitable vegetation composition. Both of these species have been documented in the marshes outboard of the Palo Alto Airport along the San Francisquito Creek Trail (CDFW 2017). CRR is known to breed there and an individual CRR was observed by WRA biologists during the March 27, 2017 site visit (CDFW 2017). CBR breeds rarely in south San Francisco Bay, but this species has been detected in the marshes adjacent to the project site in April, during the nesting season and may thus use these marshes within and adjacent to the project site for nesting (CDFW 2017).

Burrowing Owl

Burrowing owl has the potential to occur in the project site due to the presence of grasslands with the Airport apron and along the adjacent levee berm top. Burrowing owl inhabit small mammal burrows year-round, primarily those of the California ground squirrel (*Otospermophilus beecheyi*) in the region, or other suitable burrow surrogates such as pipes, culverts, and some debris piles. This species typically occupies burrows in annual grassland habitats or other open spaces with sparse or non-existent tree or shrub canopies and short vegetation, usually under 18 inches in height. This species has been previously documented at the Palo Alto Airport in 1983 and at Byxbee Park southwest of the project site (CDFW 2017). However, no breeding occurrences have been documented at these locations. Ground squirrels are active in the grassy portion of the Study Area south of the Airport terminal. If this vegetation is regularly mowed, in these areas, conditions are suitable to support burrowing owl.

Other Special-Status Bird Species

The remaining special-status bird species with potential to occur in the Study Area all nest in wetland vegetation, and are known to the vicinity (CDFW 2017, Shuford and Gardali 2008). These birds may forage or nest within the salt marshes and adjacent uplands within the Study Area.

Special-Status Lamprey and Fish Species

The two lamprey species (pacific lamprey and river lamprey) and three fish species (green sturgeon, white sturgeon, and steelhead) listed above are known to occur widely in San Francisco Bay waters. These species may be opportunistically present in the unnamed slough within the project site adjacent to the San Francisquito Creek Trail, near the location of the proposed RWQCP outfall. Adult and juvenile fish may enter the existing outfall location from bay waters to forage or for shelter. However, the outfall location does not contain or connect to spawning habitat for any of these species, and does not provide foraging or sheltering habitat or any particular value and any occurrences of these fish species would be incidental and short-lived duration.

Wetlands and Waters

Wetlands within the project site include tidal salt marsh and non-tidal seasonal wetlands. Based on a preliminary wetlands and waters delineation prepared by WRA biologists to support regulatory permits, the Study Area includes: 0.35 acre of non-wetland tidal waters; 1.32 acres of non-tidal seasonal wetlands; and 0.80 acre of tidal salt marsh (Figure 7, Preliminary Wetland and Waters Delineation). Tidal salt marsh within the project site is located outboard of the levee, adjacent to the unnamed slough, in the vicinity of the existing outfall. This community is dominated by hydrophytic plant species including pickleweed (*Salicornia pacifica*), salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), Italian rye grass (*Festuca perennis*), barley (*Hordeum marinum*), broadleaved pepperweed (*Lepidium latifolium*), and alkali bulrush (*Bolboschoenus maritimus*). Overall the tidal wetlands were dominated by obligate, facultative wetland, and facultative species, and were inundated or saturated at the time of the site visit. Soil samples taken within the project site provided evidence of hydric soils and wetland hydrology. The boundary between tidal wetland and upland areas was demarcated by a transition to dominance of upland species and subtle changes in elevation.

Non-tidal seasonal wetlands are located within the project site within the Airport runway infield area adjacent to the southern edge of the Airport runway. Non-tidal wetlands within this area are characterized as pickleweed mats (non-tidal), and consist predominately of pickleweed, salt grass, and broadleaved pepperweed. Several other species are associated with the pickleweed mats on the project site, including iceplant (Carpobrotus spp.), Australian saltbush (Atriplex semibaccata), and saltgrass. Wetland hydrology is driven primarily by runoff originating from adjacent lands during precipitation events, including portions of the Airport tarmac and runway. Shallow groundwater also contributes to wetland hydrology in the non-tidal wetlands, though to a lesser extent than surface-driven hydrology.

Non-wetland tidal waters in the project site include un-vegetated aquatic areas below the HTL elevation. Non-wetland tidal waters are located in the unnamed slough, where no vegetation is present. The HTL in the project site was identified based on the approximate highest predicted tide using National Oceanic and Atmospheric Administration (NOAA) predicted tide levels for the Palo Alto Yacht Harbor (Station ID 9414525) (NOAA 2017). Based on this data, the HTL was 9.31 feet NAVD88.

Trees

An arborist survey was conducted on May 2, 2017 by WRA to identify trees that are regulated or protected under the City of Palo Alto Municipal Code, Title 8, Trees & Vegetation and Title 18, Zoning Code. The regulated trees of Palo Alto refer to all those trees or groups of trees included in the following three categories: 1) Protected Trees, 2) Street Trees and 3) Designated Trees. These categories are discussed further in the City of Palo Alto's *Tree Technical Manual*, which also provides information regarding the City's tree permits and mitigation requirements. The arborist survey identified 65 trees within the project site, shown in Figure 8, Arborist Survey, below. These species included:

- Kurrajong (*Brachychiton populneus*)
- She-oak (*Casurina cunninghamiana*)
- Loquat (*Eriobotrya japonica*)
- River red bum (*Eucalyptus camaldulensis*)
- Blue gum (*Eucalyptus globulus*)
- White ironbark (*Eucalyptus leucoxylon*)
- Swamp gum (*Eucalyptus rudis*)
- Manna gum (*Eucalyputus viminalis*)
- Honey myrtle (*Melaleuca nesophila*)
- Lollypop tree (*Myoporum laetum*)
- Breeder River yellowwood (*Podocarpus elongatas*)Coast live oak (Quercus agrifolia)
- Italian buckhorn (*Rhamnus alaternus*)

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City of Palo Alto
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Quality Control
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Palo Alto, California

Figure 7.

Preliminary Wetland
and Waters Delineation

Map Prepared Date: 9/13/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 1 Delineation.mxd

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Quality Control
Plant New Outfall
Project
Palo Alto, California

Figure 8.
Arborist Survey

N
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0 20 40 60
Feet

Map Prepared Date: 5/8/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

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REGULATORY SETTING:

Special-Status Species

Special-status species that require evaluation in CEQA documentation include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed species and those that are formal candidates for listing. The federal Bald and Golden Eagle Protection Act also provides broad protections to both eagle species that are roughly analogous to those of listed species. Additionally, CDFW Species of Special Concern, CDFW California Fully Protected species, USFWS Birds of Conservation Concern, and CDFW Special-status Invertebrates are all considered special-status species. Bat species are also evaluated for conservation status by the Western Bat Working Group (WBWG), a non-governmental entity; bats named as a "High Priority" or "Medium Priority" species for conservation by the WBWG are typically considered special-status and also considered under CEQA. In addition to regulations for special-status species, most native birds in the United States (including non-status species) are protected by the Migratory Bird Treaty Act of 1918 (MBTA) and the California Fish and Game Code (CFGC), i.e., sections 3503, 3503.5 and 3513. Under these laws, deliberately destroying active bird nests, eggs, and/or young is illegal.

Plant species included within the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (Inventory) with California Rare Plant Rank (Rank) of 1 and 2 are also considered special-status plant species and must be considered under CEQA. Very few Rank 3 or Rank 4 plant species meet the definitions of Section 1901 Chapter 10 of the Native Plant Protection Act or Sections 2062 and 2067 of the CDFW Code that outlines CESA. However, CNPS and CDFW strongly recommend that these species be fully considered during the preparation of environmental documentation relating to CEQA. This may be particularly appropriate for the type locality of a Rank 4 plant, for populations at the periphery of a species range or in areas where the taxon is especially uncommon or has sustained heavy losses, or from populations exhibiting unusual morphology or occurring on unusual substrates.

Critical Habitat

Critical habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. The ESA requires federal agencies to consult with the USFWS to conserve listed species on their lands and to ensure that any activities or projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must also ensure that their activities or projects do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species by the ESA jeopardy standard. However, areas that are currently unoccupied by the species but which are needed for the species' recovery are protected by the prohibition against adverse modification of critical habitat.

Sensitive Biological Communities

Sensitive biological communities include habitats that fulfill special functions or have special values, such as wetlands, streams, or riparian habitat. These habitats are protected under federal regulations such as the Clean Water Act (CWA); state regulations such as the Porter-Cologne Act, the CDFW Streambed Alteration Program, and CEQA; or local ordinances or policies such as city or county tree ordinances, Special Habitat Management Areas, and General Plan Elements.

Waters of the United States

The U.S. Army Corps of Engineers (Corps) regulates "Waters of the United States" under Section 404 of the CWA. Waters of the U.S. are defined in the Code of Federal Regulations (CFR) as waters susceptible to use in commerce, including interstate waters and wetlands, all other waters (intrastate waterbodies, including wetlands), and their tributaries (33 CFR 328.3). Potential wetland areas, according to the three criteria used to delineate wetlands as defined in the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), are identified by the presence of (1) hydrophytic vegetation, (2) hydric soils, and (3) wetland hydrology. Areas that are inundated at a sufficient depth and for a sufficient duration to exclude growth of hydrophytic vegetation are subject to Section 404 jurisdiction as "other waters" and are often characterized by an ordinary high water mark (OHWM) in non-tidal waters and a high tide line (HTL) in tidal waters. Other waters, for example, generally include lakes, rivers, and streams. The placement of fill material into Waters of the U.S generally requires an individual or nationwide permit from the Corps under Section 404 of the CWA.

In addition, the Rivers and Harbors Appropriation Act of 1899 regulates the placement of fill in navigable waterways. Under Section 10 of the Rivers and Harbors Act, Corps jurisdiction extends up to the mean high water (MHW) of navigable waterways including all tidal waters.

Waters of the State

The term "Waters of the State" is defined by the Porter-Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The Regional Water Quality Control Board (RWQCB) protects all waters in its regulatory scope and has special responsibility for wetlands, riparian areas, and headwaters. These waterbodies have high resource value, are vulnerable to filling, and are not systematically protected by other programs. RWQCB jurisdiction includes "isolated" wetlands and waters that may not be regulated by the Corps under Section 404. Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require a Corps permit, or fall under other federal jurisdiction, and have the potential to impact Waters of the State, are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activities under its state authority in the form of Waste Discharge Requirements.

Streams, Lakes, and Riparian Habitat

Streams and lakes, as habitat for fish and wildlife species, are subject to jurisdiction by CDFW under Sections 1600-1616 of CFGC. Alterations to or work within or adjacent to streambeds or lakes generally require a 1602 Lake and Streambed Alteration Agreement. The term "stream", which includes creeks and rivers, is defined in the California Code of Regulations (CCR) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life [including] watercourses having a surface or subsurface flow that supports or has supported riparian vegetation" (14 CCR 1.72). In addition, the term "stream" can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream dependent terrestrial wildlife (CDFG 1994). "Riparian" is defined as "on, or pertaining to, the banks of a stream." Riparian vegetation is defined as "vegetation which occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself" (CDFG 1994). Removal of riparian vegetation also requires a Section 1602 Lake and Streambed Alteration Agreement from CDFW.

San Francisco Bay and Shoreline

The San Francisco Bay Conservation and Development Commission (BCDC) has regulatory jurisdiction, as defined by the McAteer-Petris Act, over the Bay and its shoreline, which generally consists of the area between the shoreline and a line 100 feet landward of and parallel to the shoreline. Within the Project Area, BCDC has two areas of jurisdiction: San Francisco Bay and the Shoreline Band. Definitions of these areas, as described in the McAteer-Petris Act (PRC Section 66610), are given below.

> **San Francisco Bay:** all areas that are subject to tidal action from the south end of the Bay to the Golden Gate (Point Bonita-Point Lobos) and to the Sacramento River line (a line between Stake Point and Simmons Point, extending northeasterly to the mouth of Marshall Cut), including all sloughs, and specifically, the marshlands lying between mean high tide and five feet above mean sea level; tidelands (land lying between mean high tide and mean low tide); and submerged lands (land lying below mean low tide).
>
> **Shoreline Band:** all territory located between the shoreline of San Francisco Bay as defined above and a line 100 feet landward of and parallel with that line, but excluding any portions of such territory which are included in other areas of BCDC jurisdiction, provided that the Commission may, by resolution, exclude from its area of jurisdiction any area within the shoreline band that it finds and declares is of no regional importance to the Bay.

Essential Fish Habitat

Essential Fish Habitat (EFH) is regulated through the National Marine Fisheries Service (NMFS), a division of the National Oceanic and Atmospheric Administration (NOAA). Protection of EFH is mandated through changes implemented in 1996 to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) to protect the loss of habitat necessary to maintain sustainable fisheries in the United States. The Magnuson-Stevens Act is applicable to areas occupied by specific fisheries managed by NMFS and defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" [16 USC 1802(10)]. NMFS further defines essential fish habitat as areas that "contain habitat essential to the long-term survival and health of our nation's fisheries" (NMFS 2007). EFH can include the water column, certain bottom types such as sandy or rocky bottoms, vegetation such as eelgrass or kelp, or structurally complex coral or oyster reefs. Under regulatory guidelines issued by NMFS, any federal agency that authorizes, funds, or undertakes action that may affect EFH is required to consult with NMFS (50 CFR 600.920).

Other Sensitive Biological Communities

Other sensitive biological communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW. CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its California Natural Diversity Database (CNDDB; CDFW 2015). Sensitive plant communities are also identified by CDFW (CDFG 2010). CNDDB vegetation alliances are ranked 1 through 5 based on NatureServe's (2010) methodology, with those alliances ranked globally (G) or statewide (S) as 1 through 3 considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or those identified by the CDFW or USFWS must be considered and evaluated under CEQA (CCR Title 14, Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in city or county general plans or ordinances.

San Francisco Estuary Project Comprehensive Conservation and Management Plan

The federal Clean Water Act established the San Francisco Estuary Project (SFEP) in 1987, as part of the National Estuary Program, to protect and the 2007 Comprehensive Conservation and Management Plan (CCMP) serves as the SFEP's implementation tool. The CCMP promotes watershed management through objectives and corrective actions, including comprehensive long-term management strategies; enhanced wildlife habitat biodiversity; recreational access to the Bay that protects wildlife habitat; and a regional program for coordinated signage, education, and outreach (SFEP 2007).

City of Palo Alto Tree Ordinance

The City of Palo Alto Municipal Code provides protection for regulated trees under Title 8 of the City's Municipal Code. As described above, regulated trees can fall under three broad categories; protected public and private trees, street trees, and designated public and private trees. Regulated trees are specifically defined as follows:

- **Protected Trees:** All Coast Live Oak (*Quercus agrifolia*) Valley Oak (*Quercus lobata*) trees that are 11.5-inches or greater in diameter and Coast Redwood (*Sequoia sempervirens*) that are 18-inches in diameter or great and Heritage Trees as designated by City Council. The project site contains one Coast live oak, however it is only 2.4-inches in diameter and is therefore not considered Protected.

- **Public/Street Trees:** All trees growing within the street right-of-way (publically-owned) outside of private property. All trees surveyed within the Study Area are located on public property.

- **Designated Trees:** All trees, when associated with a development project, that are designated by the City to be saved and protected on a public or private property which is subject to a discretionary development review. The proposed outfall and pipeline would be subject to site design review and approval. If the City were to designate any trees within the Study Area as a "Designated Tree", approval from the City's Planning Division would be required to remove the designated tree.

However, City-sponsored projects are not required to comply with the ordinance, and it is up to the City as to whether or not the removed trees would be replaced.

DISCUSSION:

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

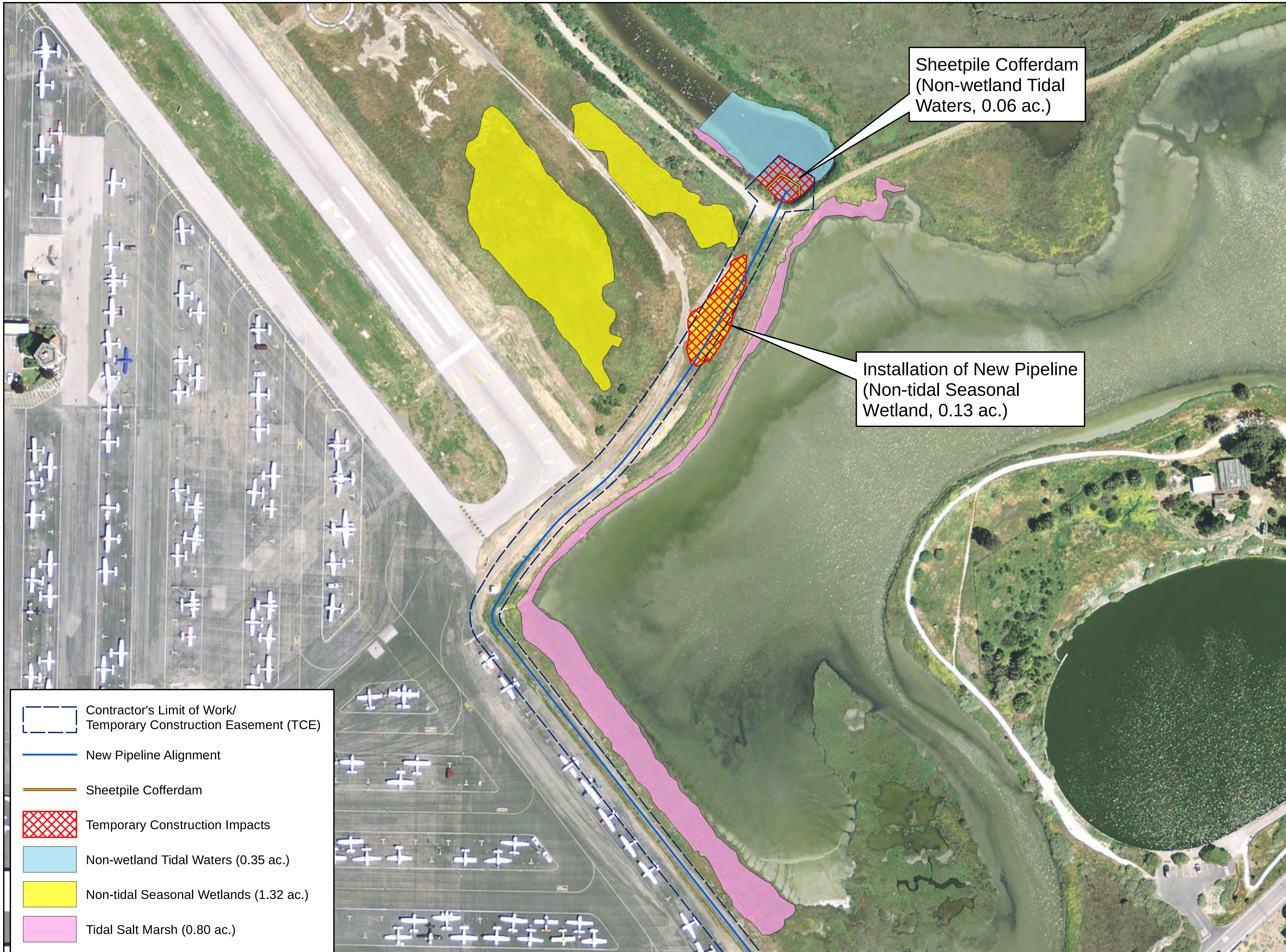
Less than Significant with Mitigation Incorporated. The proposed project would have a significant impact if it would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service. As stated above, the project site may have suitable habitat for three special-status plants and therefore the construction phase of the proposed project could result in potentially significant impacts to special-status plant species. Implementation of Mitigation Measure BIO-1 would reduce potentially significant impacts to these special-status plants to less than significant.

In addition, the project site contains suitable habitat for special-status wildlife species including SMHM, CRR, CBR, and Burrowing Owl. Grading and construction activities required for the proposed project could therefore result potentially significant impacts to these species. Implementation of Mitigation Measures BIO-2, BIO-3, and BIO-4 would reduce potentially significant impacts to these species to less than significant. Other special-status wildlife species with the potential to occur within the project site include special-status fish species that may occur incidentally within the unnamed slough at the proposed outfall location. Implementation of Mitigation Measure BIO-5 would reduce potentially significant impacts to special-status fish species to less than significant.

In addition, the occurrence of shrubs and trees on the project site provides sufficient habitat to support nesting birds protected by the MBTA. To avoid disturbance to active nests, construction and/or vegetation removal can be scheduled to be initiated outside of the breeding bird season (February 1 through August 31). Disturbance of these birds would create a significant impact; however, the applicant would be required to avoid the breeding bird season or conduct pre-construction surveys in compliance with this federal law.

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

Less than Significant with Mitigation Incorporated. The project contains two sensitive natural communities: tidal salt marsh (0.80 acre) and non-tidal seasonal wetlands (pickleweed mats, 1.32 acres). Due to the proposed pipeline alignment, the project would result in temporary ground disturbance in 0.13 acre of non-tidal seasonal wetlands and 0.06 acre of non-wetland tidal waters) (Figure 9, Temporary Biological Resources Impacts). However, implementation of Mitigation Measure BIO-6 would reduce these impacts to less than significant.



wra ENVIRONMENTAL CONSULTANTS

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

Figure 9.

Temporary Biological Resources Impacts

Map Prepared Date: 9/12/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 3 Temp Impacts.mxd *c)* ***Would the proposed project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***

Less than Significant with Mitigation Incorporated. The proposed project would involve some temporary work within federally protected wetlands, subject to Corps jurisdiction under Section 404 of the Clean Water Act and waters of the San Francisco Bay, which would both be regulated by the RWQCB under Section 401 of the Clean Water Act. As shown in Figure 9, Temporary Biological Resources Impacts, the project would result in temporary impacts to 0.13 acre of non-tidal seasonal wetlands and 0.06 acre of non-wetland tidal waters. Impacts from trenching and outfall pipe installation to wetlands and waters are therefore potentially significant. However, these impacts would be reduced to less than significant with implementation of Mitigation measure BIO-7.

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

No Impact. Wildlife movement corridors are described as pathways or habitat linkages that connect discrete areas of natural open space otherwise separated or fragmented by topography, changes in vegetation, and other natural or human inducted factors such as urbanization. The project travels through developed areas, including the RWQCP and the Airport. As stated above, two special-status lamprey and three special-status fish species have the potential to occur opportunistically in the unnamed slough at the proposed outfall location. Adult and juvenile fish may enter the existing outfall location from the San Francisco Bay to forage or for shelter. However, the outfall does not contain spawning habitat and does not provide any habitat connectivity as a migratory corridor. Furthermore, as the proposed project would include installation of a pipe outfall and the rehabilitation of the existing pipe outfall, these elements would all be placed below the ground and no elements of the proposed project would interfere with habitats during operation. Therefore, no impacts to wildlife movement or native nursery sites would occur.

d) ***Would the proposed project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or as defined by the City of Palo Alto's Tree Preservation Ordinance (Municipal Code Section 8.10)?***

Less than Significant Impact. The City of Palo Alto provides protection for "Protected Trees", 'Street Trees", and "Designated Trees". No trees observed within the project site are considered "Protected Trees" under City of Palo Alto's Municipal Code based on species and diameter requirements. The project site includes street trees within the City's right-of-way that are regulated under the City's Tree Ordinance. The proposed pipeline alignment would require the removal of three trees within the RWQCP property. As this is a City-sponsored project, compliance with the City tree ordinance is not required. Furthermore, as described in the Project Description, the proposed project includes the replacement of these trees based on the RWQCP tree planting palette. Therefore, the proposed project would have a less-than-significant impact.

f) ***Would the proposed project conflict with the provisions of an adopted Habitat Conservation***

Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impact. No state, regional or federal habitat conservation plans or Natural Community Conservation plans have been adopted for the project site. Furthermore, although not adopted regulatory documents, the Comprehensive Conservation and Management Plan (CCMP) for the San Francisco Estuary Project (SFEP) and Palo Alto Baylands Master Plan contain include recommendations and long-term goals for Bay habitats potentially affected by project activities. The proposed project is intended to install a new outfall pipeline that conveys treated effluent immediately adjacent to the existing outfall pipe's discharge point into an unnamed slough of San Francisco Bay. The project occurs entirely within developed lands adjacent to the Bay, and would not conflict with any provisions of these non-regulatory documents. Therefore, the proposed project would have no impact related to consistency with conservation plans.

Mitigation Measures:

Mitigation Measure BIO-1

Protocol level rare plant surveys shall be conducted within suitable habitat and during the blooming periods of Point Reyes bird's-beak, California seablite, and saline clover, in order to confirm the presence or absence of these species within the project site. Surveys for Point Reyes bird's beak and California seablite shall be conducted during the late season, June through October, and surveys for saline clover shall be conducted between April and June, based on the individual specie's blooming season. If these rare plant species are observed during surveys, they shall be avoided by construction if feasible. If avoidance is not feasible, seed shall be collected for replanting, or whole individuals transplanted to a nearby protected area containing suitable habitat prior to construction, or stored for replanting in the construction area following completion of construction. Transplanted or reseeded individuals shall be monitored for a minimum of two years following construction to ensure transplantation success. If transplanted individuals do not successfully establish, seed or individuals from established and healthy local populations shall be collected and planted at the project site.

Mitigation Measure BIO-2

The measures listed below shall be implemented prior to or during construction activities within or adjacent to potential SMHM habitat:

a) Prior to ground disturbing activities within and adjacent to potential SMHM habitat, all vegetation within the Project footprint shall be removed using hand-operated tools in the presence of a qualified biological monitor (see below).

b) Following vegetation removal, exclusion barriers and/or fencing shall be installed to exclude individuals of this species from areas of active construction. The design of the exclusion barriers and fencing shall be approved by a qualified biologist and shall be installed in the presence of a qualified biological monitor. The fence shall be made of a material that does not allow SMHM to pass through, and the bottom shall be buried to a depth of a minimum of 4 inches so that these species cannot crawl under the fence. All support for the exclusion fencing shall be placed on the inside of the Project footprint.

c) A qualified biological monitor shall be present during wildlife exclusion fence installation and removal, and during all vegetation clearing and initial ground disturbance conducted in vegetation in and adjacent to marsh habitats. The monitor shall have demonstrated experience in biological construction monitoring and knowledge of the biology of the listed species that may be found in the Action Area, including SMHM and CRR. The monitor(s) shall have the authority to halt construction, if necessary, if noncompliance actions occur. The biological monitor(s) shall be the contact person for any employee or contractor who might inadvertently kill or injure a listed species or anyone who finds a dead, injured, or entrapped listed species. Following vegetation removal in potential habitat areas, fence installation, and initial ground disturbance, the biological monitor shall still conduct weekly site checks to provide guidance for fence maintenance, provide environmental sensitivity training, and document compliance with permit conditions.

d) The biological monitor shall provide an endangered species training program to all personnel involved in Project construction. At a minimum, the employee education program shall consist of a brief presentation by persons knowledgeable about the biology of listed species with potential to occur in the Action Area, and about their legislative protection to explain concerns to contractors and their employees involved with implementation of the Project. The program shall include a description of these species and their habitat needs; any reports of occurrences in the area; an explanation of the status of these species and their protection under State and Federal legislation; as well as a list of measures being taken to reduce impacts to these species during construction.

e) Food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in solid, closed containers (trash cans) and removed at the end of each work day from the investigation site to eliminate an attraction to predators of listed species.

f) At the end of each work period, all open trenches shall either be securely covered or shall have exit ramps installed to prevent entry and/or entrapment of SMHM.

g) If a listed species is observed at any time during construction, work shall not be initiated or shall be stopped immediately until the animal leaves the vicinity of the work area of its own volition. If the animal in question does not leave the work area, work shall not be reinitiated until the appropriate agency is contacted and has made a decision on how to proceed with work activities. The biological monitor shall direct the contractor on how to proceed accordingly. The biological monitor or any other persons at the site shall not pursue, capture, handle, or harass any species observed.

Mitigation Measure BIO-3

Construction of the project within the RWQCP and airport grounds shall be timed to occur within the CRR nesting season so that construction in other areas closer to suitable habitat and outside of existing areas of disturbance may be completed outside of the nesting season. Construction of the new outfall pipeline that would occur within the existing levee and the small reach of construction that would occur within the unnamed slough would avoid the CRR nesting season. Protocol level surveys for CRR shall be completed prior to construction to provide information regarding the location of nesting rails. However, based on a variety of factors, construction shall occur both within and outside of the CRR breeding season. Specifically:

- Construction of the new outfall pipeline within the levee and in the unnamed slough (between Station 14+00 and 27+49) shall occur between September 1 and January 31 to avoid the CRR breeding season.
- In-water construction in the unnamed slough shall be completed between September 1 and November 30 to avoid the windows for both CRR and listed fish species.

Mitigation Measure BIO-4

To avoid impacts to burrowing owl, a pre-construction burrowing owl survey shall be conducted by a qualified biologist of potential habitat areas (the Airport apron and along the adjacent levee berm top) at most 14 days from the initiation of project activities, irrespective of time of year. If burrowing owl is detected on the site, a no-disturbance buffer around the active burrow shall be enacted until work is finished or a qualified biologist confirms the burrow is no longer in use. This buffer shall be 250 feet if work is conducted in the area during the nesting season (February 1 – August 31) and 160 feet if work is conducted in the area outside of the nesting season. If the burrow cannot be avoided and work is to be conducted outside the nesting season, burrowing owls shall be passively excluded from the site following the procedures outlined in the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game 2012).

Mitigation Measure BIO-5

All in-water work (i.e., in tidal areas at the unnamed slough) shall be conducted between June 15 and November 30. Installation of sheet piles in tidal waters, if necessary, shall occur by the use of a vibratory hammer during low tide. If impact pile driving is necessary, an evaluation of potential hydroacoustic impacts to fish shall be required, and if necessary additional measures shall be employed to ensure that underwater sound is reduced to levels that are below those that will cause injury to fish. Such additional measures may include:

- Hydroacoustic monitoring by a sound engineer during in water pile driving work.

- Use of a “soft start” to clear fish from the area of acoustic effect.

- Use of a wood cushion block between the hammer and the pile.

- Use of a bubble curtain or other similar technique to reduce underwater noise.

- Complete all impact pile driving work at low tide.

- Limiting the number of pile strikes in a day to reduce the cumulative sound pressure impacts to fish.

Mitigation Measure BIO-6

- All construction documents shall include requirements for the restoration of temporary excavations in wetlands back to preconstruction grade, and revegetation of temporarily disturbed areas using appropriate native vegetation. Appropriate native vegetation may include pickleweed, saltgrass, Atriplex, and other salt tolerant wetland plant species. Pickleweed and saltgrass may be selectively harvested from adjacent tidal marsh and seasonal wetland areas for transplantation to temporarily impacted areas for restoration.

- Limits of construction, wetlands, and buffers shall be clearly marked with high-visibility construction fencing.

- Site access of machinery shall be restricted to as few areas as possible to prevent soil compaction.

- Appropriate erosion control measures shall be used around soil stockpiles, graded slopes, and slurry management facilities. Erosion control materials shall be wildlife friendly and shall avoid the use of plastic netting or fixed aperture netting.

- A spill prevention and control plan shall be required as part of project specifications to minimize the chance of toxic spills. Spill kits shall be present for any work adjacent to open waters. All spills of oil and other hazardous materials shall be immediately cleaned u and contained. Any hazardous materials cleaned up or used on-site would be properly disposed of at an approved disposal facility.

- Litter and Waste Management – Waste collection areas shall be designated on-site. Only watertight dumpsters and trash cans shall be used and inspected for leaks. Dumpsters and cans shall be inspected at the end of each work day when it is raining or windy. Waste collection shall occur regularly. Litter shall be picked up daily.

Significance after Mitigation: Less than Significant.

E. CULTURAL RESOURCES

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Adversely affect a historic resource listed or eligible for listing on the National and/or California Register, or listed on the City's Historic Inventory?	☐	☐	☐	☒	1, 2, 18
b) Eliminate important examples of major periods of California history or prehistory?	☐	☐	☐	☒	1, 18
c) Cause damage to an archaeological resource pursuant to 15064.5?	☐	☒	☐	☐	1, 18
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☒	☐	1, 18
e) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐	1, 18
f) Directly or indirectly destroy a local cultural resource that is recognized by City Council resolution?	☐	☐	☐	☒	1, 2, 18

INTRODUCTION:

The following Cultural Resources analysis is based in part on the Historical Resources Study prepared by Tom Origer & Associates in September 2017 (Appendix C).

ENVIRONMENTAL SETTING:

Geology and Soils

The study area is located in northwestern Santa Clara County, in the City of Palo Alto. It consists of about 0.5 linear miles of flat, land. The land was once bay marsh that has been filled to contain the Airport, the RWQCP, and various other industrial buildings (Sowers 2004). The nearest freshwater source prior to development of the area was San Francisquito Creek which flowed through the (Area of Potential Affect (APE). The boundaries of the APE are provided in Appendix C. San Francisquito Creek has been channelized and now flows north of the Airport. Review of the geologic maps for the APE shows that the geology of the study area consists of Holocene epoch (11,700 years ago to present) estuarine organic clay and silty clay (bay mud) (Dibblee 2007; Helley and LaJoie 1979).

Soils mapped for the study area are Aquic Xerorthents (SoilWeb 2017). Aquic Xerorthents consist of very deep, poorly draining bay mud. This soil is found in bay marshes. Cordgrass, pickleweed, and alkali heath are the chief vegetation supported by Aquic Xerorthents soils, and parcels with these soils have been used primarily for salt production (Gardner 1958: 125; Reed 2015:32).

Cultural Setting

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson *et al.* 2007). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on the extended family unit. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears to be coeval with the development of sedentism and population growth and expansion.

Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

At the time of European settlement, the study area was situated in an area controlled by the Ohlone, who are also referred to as Costanoans (Levy 1978:485-495). The Ohlone were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures (Levy 1978:485-495; Kroeber 1925:462-473). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near fresh water sources and in ecotones where plant life and animal life were diverse and abundant.

Historically, the study area lies within the lands owned by Mission Santa Clara de Asis which was located 14 miles southeast of the APE near the San Jose Airport. The mission was moved five times, eventually to its current location on what is now the Santa Clara University campus after the Guadalupe River flooded twice and two earthquakes (Hoover *et al.* 2002:422). The area around Palo Alto and Menlo Park was used as the mission's sheep grazing ranch (Hoover *et al.* 2002:431).

After secularization the APE was located within the Las Pulgas and the Rinconada del Arroyo de San Francisquito land grants (General Land Office [GLO] 1856, 1861). The Rancho de Las Pulgas wasinitially granted to José Darío Argüello and known as "Cachanigtac" but was later known as Las Pulgas (the fleas) (Hoover *et al.* 2002:402). The land consisted of 12 square leagues (over 69,000 acres). The western boundary of the land was disputed and 1856 a patent for 32,240 acres was finally issued to Argüello's widow, his two sons, and the attorney who provided his services in the dispute, Simon Monserrate Mezes (Hoover *et al.* 2002:403).

The Rinconada del Arroyo de San Francisquito land grant was granted to Rafael Soto in 1835 (Gullard and Lund 1989:45). The land consisted of 2,230 acres. Soto had sailed up San Francisquito Creek and established a pier (embarcadero) at the end of the bay marsh and higher ground. Soto and his family lived in the Palo Alto area for several years (Hoover et al. 2002:431).

The City of Palo Alto was officially established in 1894 (Hoover *et al*. 2002:445; Sawyer 1922:284). It was founded by Leland Stanford, Sr. following the death of his son. Stanford had bought land in the Palo Alto area to establish a horse ranch (Gullard and Lund 1989:82). After their son's death in 1884 Stanford and his wife Jane decided to build a university near their home to commemorate their son

(Gullard and Lund 1989:82). When the nearby town of Mayfield refused to stop selling liquor and close its saloons, Stanford, through Timothy Hopkins, purchased additional land for the establishment of a city for students of Stanford University to use (Gullard and Lund 1989:59; Hoover et al. 2002:445.)

In 1938 William Hewlett and David Packard began using Packard's one-car garage as a laboratory. Within 20 years Hewlett-Packard Company became the leader in manufacturing electronic and computer devices which lead to the beginning of "Silicon Valley" (Hoover *et al.* 2002:446). The draw of the technology industry in combination with the post-World War II population boom that the San Francisco Bay Area experienced, caused Palo Alto to expand. Like much of the San Francisco Bay Area, the 1950s and 1960s were a time when many orchards and farms turned into suburbs. Eventually, the town of Mayfield was subsumed into Palo Alto. In addition to the increase in houses, infrastructure, services, and industrial buildings were constructed to service and employ the larger population.

Native American Outreach

A request was sent to the State of California's Native American Heritage Commission seeking information from the sacred lands files and the names of Native American individuals and groups that would be appropriate to contact regarding this project. Letters were also sent to the following groups:

The following groups were also contacted by mail:

- Amah Mutsun Tribal Band of Mission San Juan Bautista
- Indian Canyon Mutsun Band of Costanoan
- Muwekma Ohlone Indian Tribe of the SF Bay Area
- North Valley Yokuts Tribe
- The Ohlone Indian Tribe

The purpose of contacting these groups was to provide notification of the proposed project so that they would have an opportunity to comment, if desired. It was not intended as, and does not constitute, consultation with tribes under AB52. More details about tribal consultation under AB52 is provided in Section Q (Tribal Cultural Resources) below.

The Native American Heritage Commission replied with a letter dated August 23, 2017, in which they indicated that the sacred land file has no information about the presence of Native American cultural resources in the project area. No other comments have been received as of the date of this report. A log of contact efforts and copies of correspondence are provided in Appendix C.

In addition to the contact efforts conducted by Tom Origer & Associates, the City of Palo Alto received an AB52 request to consult from the Torres Martinez Desert Cahuilla Indians. However, subsequent communication between the Torres Martinez Desert Cahuilla Indians and the City of Palo Alto resulted in the tribe determining that the City of Palo Alto was outside their ancestral territory and they no longer had a wish to consult on projects overseen by the City.

Archival Study

On August 24, 2017, Julia Franco completed a review of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park (NWIC File No. 17-0516). Archival research also included an examination of the library and project files at Tom Origer & Associates. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012).

The Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s (e.g., GLO) to topographic maps issued by the United States Geological Survey (USGS) and the United States Army Corps of Engineers (USACE). In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed.

Field Survey

An intensive field survey was completed by Taylor Alshuth on September 1, 2017. The project area was examined by walking in a zigzag fashion within corridors 15 meters wide. Ground visibility was good to poor with vegetation, asphalt, and imported gravel being the chief hindrances. A hoe was used, as necessary, to clear small patches of vegetation so that the soil could be inspected.

Based on the results of the pre-field research, it was anticipated that prehistoric resources, and to a lesser degree historic-period resources, could be found within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

REGULATORY SETTING:

Section 106 of the National Historic Preservation Act

Under Section 106, when a federal agency is involved in an undertaking, it must take into account the effects of the undertaking on historic properties (36CFR Part 800). Compliance with Section 106 requires that agencies make an effort to identify historic properties that might be affected by a project, and gather information to evaluate their eligibility for inclusion on the National Register of Historic Places (National Register).

CEQA Guidelines

CEQA also requires that historical resources be considered during the environmental review process through an inventory of historical resources within a study area, and an assessment of potential project impacts to those resources. Note, the term “Historical Resources" encompasses prehistoric and historical archaeological sites and elements of the built environment (e.g., buildings, bridges, canals). Revisions to CEQA enacted in July 2015 call out a separate class of resources termed “Tribal Cultural Resources” (Public Resources Code Section 21074). Tribal cultural resources are those that are of specific concern to California Native American tribes, and are identified through direct and confidential consultation between the Tribe and the lead agency (PRC §21080.3.1).

Significance Criteria

For purposes of the National Register, the importance of a historic resource is evaluated in terms of criteria put forth in 36CFR60, as follows:

The quality of significance is present in properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in prehistory or history.

DISCUSSION:

a) Would the proposed project adversely affect a historical resource listed or eligible for listing on the National and/or California Register, or listed on the City’s Historic Inventory?

No Impact. According to the cultural resources survey prepared for the proposed project, there are no buildings or structures located on the project site that are listed or eligible for listing on the National and/or California Register or City’s Historic Inventory. Therefore, the proposed project would have no impact on historic resources.

b) Would the proposed project eliminate important examples of major periods of California history or prehistory?

No Impact. As stated above, there are no buildings or structures on the project site that are listed or eligible for listing on the National and/or California Register or City’s Historic Inventory. In addition, no prehistoric or historical archaeological deposits were found during the survey. Therefore, implementation of the proposed project would have no impact on examples of major periods of California history or prehistory.

c) Would the proposed project cause damage to an archaeological resource pursuant to 15064.5?

Less than Significant with Mitigation Incorporated. As described in the cultural resource survey report, no archaeological site deposits or indicators were found during the survey. However, consideration was given to the possibility of buried archaeological sites within the study area. A model for predicting a location's sensitivity for buried archaeological sites was formulated by Meyer and Kaijankoski (2017) based on the age of the landform and the presence of certain environmental elements. A location is considered to have high sensitivity if it is on a Holocene-era landform with relatively gentle terrain (slope of 1 to 8 percent), and is within 100 meters of water. Given those criteria, there is the possibility that the study area could contain buried archaeological sites. However, because the landform was bay marsh until the 20th century, it would have been subjected to daily inundation due to tides; therefore there is a <1% probability of there being buried cultural resources within the project site. However, Mitigation Measure CULT-1 would reduce any potentially significant impacts to buried cultural resources in the event of unanticipated discovery.

d) Would the proposed project disturb any human remains, including those interred outside of formal cemeteries?

Less than Significant Impact. No evidence of human remains or formal cemeteries was identified in the cultural resources survey report for the proposed project. However, if human remains are discovered on the project site during implementation of the proposed project, the applicant would be responsible for compliance with all applicable federal, state, and local laws related to human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity. Therefore, as the project site has no evidence of human remains and discovery of such would require compliance with federal, state, and local laws, the proposed project would have a less-than-significant impact related to disturbance of human remains.

e) Would the proposed project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Less than Significant with Mitigation Incorporated. The proposed replacement of the Renzel Marsh pump and rehabilitation of the existing outfall would not require any soil disturbance. The new proposed effluent outfall pipe would be installed mainly within Embarcadero Road and the existing levee. Therefore, the majority of ground work required for the proposed project would occur within previously disturbed soils. As described in the cultural resources survey report, the geology of the project site consists of Holocene epoch (11,700 years ago to present) estuarine organic clay and silty clay (bay mud) (Dibblee 2007; Helley and LaJoie 1979). However, no fossils were recorded in the archival records search or were found on-site during the field survey. While the proposed project is not anticipated to directly or indirectly affect a paleontological resource or geologic feature, unanticipated discovery of such a resource may result in a potentially significant impact. Therefore, with implementation of Mitigation Measure CULT-1, impacts to paleontological resources and geologic features would be less than significant.

f) Would the proposed project directly or indirectly destroy a local cultural resource that is recognized by City Council resolution?

No Impact. According to Map L-5 of the Palo Alto Comprehensive Plan, there are no local cultural or historic resources located within the project site. Therefore, there are no local cultural resources recognized by the City of Palo Alto within the project site. The proposed project would have no impact on local cultural resources.

Mitigation Measures:

Mitigation Measure CULT-1

If buried materials are encountered, all soil disturbing work shall be halted at the location of any discovery until a qualified archaeologist or paleontologist completes a significance evaluation of the find(s) pursuant to Section 106 of the National Historic Preservation Act (36CFR60.4) and CEQA guidelines (§15064.5[f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

Significance after Mitigation: Less Than Significant

F. GEOLOGY, SOILS AND SEISMICITY

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Expose people or structures to substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐	1, 13
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☒	☐	☐	1, 16
ii) Strong seismic ground shaking?	☐	☒	☐	☐	1, 13
iii) Seismic-related ground failure, including liquefaction?	☐	☒	☐	☐	1, 17
iv) Landslides?	☐	☒	☐	☐	1, 17
v) Expansive soils?	☐	☒	☐	☐	1, 17
b) Expose people or property to major geologic hazards that cannot be mitigated through the use of standard engineering design and seismic safety techniques?	☐	☒	☐	☐	1
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?	☐	☒	☐	☐	1, 17
d) Cause substantial soil erosion or siltation?	☐	☐	☒	☐	1, 9, 10
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒	1

INTRODCUTION:

A Geotechnical Engineering Investigation Report (Geotechnical Report; Appendix D) was prepared for the project site by McMillen Jacobs Associates (June 2017) and provides information on the geotechnical setting of the site including groundwater, faulting, ground shaking, and liquefaction and provides recommendations for construction of the proposed project.

ENVIRONMENTAL SETTING:

Seismicity

Palo Alto is located in a geologically active part of the world. The San Andreas Fault— long considered the major seismic risk in California—passes through the community. The San Andreas Fault is believed capable of producing a magnitude 8.4 earthquake. This would cause very violent groundshaking in much of Palo Alto, with fault rupture possible along the San Andreas, Monte Vista, and Hermit Faults, and other fault traces around the Stanford Campus. Past land use decisions in Palo Alto have not always taken such hazards into consideration. Moreover, older buildings and infrastructure reflect the construction and engineering standards of their era, which in most cases fall short of current standards for seismic safety. As a result, a significant portion of the City would be at risk in the event of a major earthquake. The primary risks are building damage or collapse; disruption of lifelines, including water, sewer, gas, electric, and telephone; fire or explosion; and damage to transportation infrastructure.

While the project site is located within a seismically-active region, no active faults are located within the project site. The nearest active fault is the San Andreas Fault, located approximately six miles southwest of the project site.

Liquefaction

Liquefaction occurs when soils lose internal strength and because of increased pore pressure generated by cyclic loading. Liquefaction hazards are significant in the area east of Highway 101 due to the porous nature and high water content of the soil. According to the Association of Bay Area Governments' (ABAG) Resilience Program, the project site is mapped as within an area having "very high susceptibility" to liquefaction.

Landslides

Other geologic hazards in Palo Alto may or may not be associated with seismic events. Landsliding may result from heavy rain, erosion, removal of vegetation, or human activities. It is a common hazard in the foothills and its severity depends on slope, soil, and underlying geology. Landslide hazards are increased during earthquakes, particularly if the ground is saturated. The project site's topography is predominantly flat and does not include any landslides.

Soils

The Geotechnical Report (Appendix D) describes the project site as consisting of Artificial Fill overlying soft Young Bay Mud, which in turn overlies stronger Old Bay Mud. Artificial fill is a man-made accumulation of various materials including soil and rock fragments, organic material, concrete, asphalt, debris and rubbish. Bay Muds are typically very soft, lightweight, organic-rich, highly compressible and weak silty clay estuarine deposits that are corrosive to concrete and steel and which have been accumulating within the limits of the San Francisco Bay for several thousands of years.

DISCUSSION:

a-i) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?***

Less than Significant Impact. According to the Association of Bay Area Governments (ABAG, Resilience Program, the proposed project is not within an Alquist-Priolo Earthquake Fault Zone. The closest fault to the project site is within the San Andreas Fault zone, Peninsula section, approximately six miles southwest of the site. In addition, no new structures are proposed as a component of the project and operation of the proposed pipe outfall would not increase the number of people at the project site. Therefore, the proposed project would result in a less-than-significant impact related to exposing people or structures to loss, injury, or death involving fault rupture.

a-ii) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?***

Less than Significant with Mitigation Incorporated. Due to the project site's location within the San Francisco Bay Area, the project site would be subject to strong ground shaking during earthquakes due to nearby faults. The intensity of the ground shaking that would occur on the project site would be dependent upon the earthquake magnitude, its distance, surrounding topography, and the geometric relationships and seismic response of the underlying soil and bedrock. Earthquake shaking has been amplified in areas underlain by Bay Muds during historic earthquakes. Failure of the effluent outfall pipe due to seismic groundshaking would result in a potentially significant impact. To ensure the proposed pipeline is installed with adequate support, the outfall pipe would be encapsulated in a low density cellular backfill and would incorporate the additional design requirements listed in the Geotechnical Report (Appendix D). Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level. The project would also be required to comply with the City's adopted seismic safety restrictions from the California Building Code (CBC). This would ensure the proposed pipe outfall would not be subject to adverse effects resulting from seismic ground shaking. In addition, the proposed project does not include any structures and would not increase the number of people visiting the project site. Therefore, a less-than-significant impact would occur after mitigation.

a-iii) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?***

Less than Significant with Mitigation Incorporated. According to ABAG's Liquefaction Study Zone Map, the project site is located within a "very high susceptibility" liquefaction hazard zone. Failure of the proposed effluent outfall pipe due to seismic-related ground failure, including liquefaction, would result in a potentially significant impact. The proposed project would include recommendations of the site-specific Geotechnical Report (Appendix D), and would be constructed in compliance with all standard engineering practices and the CBC standards adopted by the City of Palo Alto. Specifically, the excavated trenches for the proposed outfall pipe would be backfilled with low density cellular material to prevent additional load on the site and prevent settlement or seismic ground failure. Furthermore, Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level. Therefore, the proposed outfall pipe would not experience adverse effects related to seismic-related ground failure including liquefaction. In addition, the proposed project does not include any structures and would not increase the number of people visiting the project site once built. Therefore, a less-than-significant impact would occur.

a-iv) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?***

Less than Significant with Mitigation Incorporated. The project site is located within an area of relatively flat topography, which would not provide the necessary setting for a landslide to occur. However, the project would require benched or sloped open cut trenching for placement of the proposed pipe within the existing levee. All earthwork would proceed in accordance with the recommendations of the site-specific Geotechnical Report prepared by licensed engineering and geologic personnel (Appendix D). Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level. The proposed project would not create any new slopes on the project site. Risk of landslide during the operational phase would be considered low due to the flat nature of the project site. Therefore, a less-than-significant impact would occur.

a-v) ***Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving expansive soils?***

Less than Significant with Mitigation Incorporated. The project site consists of soils that have been identified as able to be suppressed over time or otherwise unstable. Project components, such as the outfall pipe and pump, could be damaged by expansive soils if improperly designed and constructed. The project would be built in compliance with all recommendations listed in the Geotechnical Report, which includes recommendations to ensure all aspects of the proposed pipeline alignment are appropriately designed and constructed, and that a low density cellular backfill is used to avoid increasing the net load on the soils within the project site avoiding any consolidation settlement from the proposed project. Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level. The proposed project would also comply with all Federal, State and local regulations including the CBC. A less-than-significant impact would occur.

b) ***Would the project expose people or property to major geologic hazards that cannot be mitigated through the use of standard engineering design and seismic safety techniques?***

Less than Significant with Mitigation Incorporated. All anticipated geologic hazards that could result from project implementation would be mitigated through the use of standard engineering design and seismic safety techniques. As described in more detail in item (c) below, trenching within the project site may result in in subsidence of soils, impacts related to unstable soils would be potentially significant. However, implementation of Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level.

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

Less than Significant with Mitigation Incorporated. As described in the Geotechnical Report (Appendix D), the project site is partially located within the Palo Alto Bayland Preserve and is located on Artificial Fill and Bay Mud soils. Loads on the compressible Young Bay Mud cause the Bay Mud to consolidate or settle. These soils are generally saturated and could, as a result of a seismic activity, become unstable and result in lateral spreading, subsidence or liquefaction. The portion of the outfall alignment that would be include deep trenching (12 feet in depth) would utilize sheetpiles driven down into Old Bay Clays to provide a groundwater cutoff and stabilize the soils. The lower portion of these sheetpiles would be sacrificed when the trench is backfilled to avoid ground disturbance. To ensure adequate support for both the shallow trench (seven feet in depth) in the existing levee and the deeper trench, the entirety of the outfall pipe trenching would be encapsulated by low density cellular backfill as this would provide no new net load to the soils, per the recommendations of the Geotechnical Report. As trenching within the project site may result in in subsidence of soils, impacts related to unstable soils would be potentially significant. However, implementation of Mitigation Measure GEO-1 would implement the recommendations provided in the Geotechnical Report and would reduce these impacts to a less-than-significant level.

d) Would the project cause substantial soil erosion or siltation?

Less than Significant Impact. Project implementation would involve site clearing, grading, trenching and backfill placement that could contribute to accelerated erosion. BMPs recommended by the Santa Clara Valley Urban Runoff Pollution Prevention Program and compliance with the San Francisco Bay Region Municipal Regional Stormwater NPDES Permit would be implemented to minimize potential erosion and siltation. In compliance with the NPDES Construction General Permit, the City would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) including BMPs for stormwater runoff, erosion, and siltation both during construction and for the life of the project. Once construction is completed the project site would be revegetated and restored to existing conditions. With implementation of the SWPPP, associated BMPs, and site revegetation, a less-than-significant impact would occur.

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

No Impact. The proposed project does not include the construction of septic tanks or alternative wastewater disposal systems. No impact would occur.

Mitigation Measures:

Mitigation Measure GEO-1

Dewatering

The construction contractor shall implement a dewatering system to preserve the undisturbed bearing capacity of the existing subgrade soils at the bottom of excavations and shall meet the following minimum performance standards:

- Stable excavation walls and bottom shall be provided;
- A reasonably dry base of excavation shall be provided;
- Native soils shall be filtered and loss of ground from dispersion or erosion shall be prevented;
- Piping (boiling) of the excavation bottom shall be prevented;
- All dewatering and shoring systems shall be installed and removed in accordance with governing (e.g., County, State) requirements; and
- The contractor shall allow for the controlled release of groundwater to its static level in a manner that prevents disturbance of bottom soils and prevents flotation or movements of structures or pipelines.

The contractor shall be prepared to implement alternative systems should the initial dewatering system fail to achieve these minimum performance requirements. The contractor shall be prepared to locally dewater or modify construction excavations, if and where needed, to provide stable and reasonably dry excavations. The dewatering system shall be localized, targeted, and short-term (days) in order to prevent consolidation and subsidence from prolonged dewatering.

Shoring

The contractor shall be required to shore the anticipated 12-foot deep excavations with interlocking sheetpiles in accordance with California Division of Occupational Safety and Health (Cal/OSHA) regulations and all other recommendations provided in the site-specific Geotechnical report (Appendix D). All shoring plans shall be submitted to the City for review and approval prior to the start of construction activities. The construction shall ensure the shoring system meets all the minimum performance standards for shoring listed in the Geotechnical Report.

Significance after Mitigation: Less than Significant.

G. GREENHOUSE GAS EMISSIONS

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐	1, 19
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gas?	☐	☐	☒	☐	1, 8, 19

INTRODUCTION:

The following Greenhouse Gas analysis is based in part on greenhouse gas data prepared by Illingworth & Rodkin (Appendix A).

ENVIRONMENTAL SETTING:

Gases that trap heat in the atmosphere, greenhouse gases, or GHGs, regulate the earth's temperature. This phenomenon, known as the greenhouse effect, is responsible for maintaining a habitable climate. The most common GHGs are carbon dioxide (CO_2) and water vapor but there are also several others, most importantly methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). These are released into the earth's atmosphere through a variety of natural processes and human activities. Sources of GHGs are generally as follows:

- CO_2 and N_2O are byproducts of fossil fuel combustion.
- N_2O is associated with agricultural operations such as fertilization of crops.
- CH_4 is commonly created by off-gassing from agricultural practices (e.g., keeping livestock) and landfill operations.
- Chlorofluorocarbons (CFCs) were widely used as refrigerants, propellants, and cleaning solvents but their production has been stopped by international treaty.
- HFCs are now used as a substitute for CFCs in refrigeration and cooling.
- PFCs and sulfur hexafluoride emissions are commonly created by industries such as aluminum production and semi-conductor manufacturing.

Each GHG has its own potency and effect upon the earth's energy balance. This is expressed in terms of a global warming potential (GWP), with CO_2 being assigned a value of 1 and sulfur hexafluoride being several orders of magnitude stronger. In GHG emission inventories, the weight of each gas is multiplied by its GWP and is measured in units of CO_2 equivalents (CO_2e).

An expanding body of scientific research supports the theory that global warming is currently affecting changes in weather patterns, average sea level, ocean acidification, chemical reaction rates, and precipitation rates, and that it will increasingly do so in the future. The climate and several naturally occurring resources within California are adversely affected by the global warming trend. Increased precipitation and sea level rise increases coastal flooding, saltwater intrusion, and degradation of wetlands. Mass migration and/or loss of plant and animal species could also occur. Potential effects of global climate change that could adversely affect human health include more extreme heat waves and heat-related stress; an increase in climate-sensitive diseases; more frequent and intense natural disasters such as flooding, hurricanes and drought; and increased levels of air pollution.

The 2017 version of the BAAQMD CEQA Air Quality Guidelines provides a significance threshold of 1,100 metric tons per year of greenhouse gases, measured as CO_2e, that is used to judge the significance of a project's operational impact.

DISCUSSION:

a) ***Would the proposed project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?***

Less than Significant Impact. Greenhouse gases emitted by construction of the project were computed, as described above under impacts b and c for Air Quality (Appendix A). The same CalEEMod model run that was used to compute criteria air pollutant emissions was also used to compute GHG emissions from implementation of the project. Results of modeling indicate that project construction emissions would be 221 metric tons of CO_2e. Neither the City nor BAAQMD have an adopted threshold of significance for construction-related GHG emissions, though BAAQMD recommends quantifying emissions and disclosing that GHG emissions would occur during construction. It should be noted that this would, however, be below the operational significance threshold of 1,100 metric tons per year recommended by BAAQMD. BAAQMD also encourages the incorporation of best management practices to reduce GHG emissions during construction where feasible and applicable. Best management practices assumed to be incorporated into construction of the proposed project include, but are not limited to: using local building materials of at least 10 percent and recycling or reusing at least 50 percent of construction waste or demolition materials. Impacts would be less than significant.

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

Less than Significant Impact. AB 32, the Global Warming Solutions Act of 2006, codifies the State of California's GHG emissions target by directing CARB to reduce the state's global warming emissions to 1990 levels by 2020. AB 32 was signed and passed into law by Governor Schwarzenegger on September 27, 2006. Since that time, CARB, CEC, the California Public Utilities Commission (CPUC), and the Building Standards Commission have all been developing regulations that will help meet the goals of AB 32 and Executive Order S-3-05. A Scoping Plan for AB 32 was adopted by CARB in December 2008. It contains the State of California's main strategies to reduce GHGs from BAU emissions projected in 2020 back down to 1990 levels. BAU is the projected emissions in 2020, including increases in emissions caused by growth, without any GHG reduction measures. The Scoping Plan has a range of GHG reduction actions, including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. It required CARB and other state agencies to develop and adopt regulations and other initiatives reducing GHGs by 2012.

The proposed project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing GHG emissions. As the proposed project would not increase population or traffic on roadways beyond temporary construction equipment, the project would not conflict with implementation of AB 32. Impacts would be less than significant.

Mitigation Measures: None Required.

H. HAZARDS AND HAZARDOUS MATERIALS

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Create a significant hazard to the public or the environment as a result of the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐	1
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐	1, 9
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒	1
d) Create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of ground soil and groundwater cleanup goals developed for the site or from location on listed hazardous materials sites compiled pursuant to Government Code Section 65962.5?	☐	☐	☒	☐	1, 14
e) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires?	☐	☐	☒	☐	1, 13
f) Result in a safety hazard from a public airport for people residing or working within the project area?	☐	☐	☒	☐	1, 15
g) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working the project area?	☐	☐	☐	☒	1
h) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐	1

ENVIRONMENTAL SETTING:

"Hazardous materials" are defined in this Initial Study as substances with certain chemical and physical properties that could pose a substantial present or future hazard to human health or the environment if improperly handled, stored, disposed, or otherwise managed. A material is considered hazardous if it appears on a list of hazardous materials prepared by a federal, state, or local agency or if it has characteristics defined as hazardous by such an agency. A hazardous material is defined in Title 22 of the California Code of Regulations as follows:

> A substance or combination of substances which, because of its quantity, concentration, or physical, chemical or infectious characteristics, may either (1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (2) pose a substantial present or potential hazard to human health or environment when improperly treated, stored, transported or disposed of or otherwise managed (California Code of Regulations, Title 22, Section 66261.10).

Chemical and physical properties cause a substance to be considered hazardous. Such properties include toxicity, ignitability, corrosivity, and reactivity (as defined in California Code of Regulations, Title 22, Sections 66261.20-66261.24). The release of hazardous materials into the environment could potentially contaminate soils, surface water, and groundwater supplies. Under Government Code Section 65962.5, the California Department of Toxic Substances Control (DTSC) maintains a list of hazardous substance sites on their EnviroStor database. This list, referred to as the "Cortese List," includes CALSITE hazardous material sites, sites with leaking underground storage tanks, and landfills with evidence of groundwater contamination.

No hazardous materials have been documented by the DTSC in the EnviroStor database within the project site and there are no hazardous substances sites included on the Cortese List in the project vicinity. In addition, the State Water Resource Control Board (SWRCB) Geo Tracker database was accessed to determine if there are any hazardous material sites in the vicinity of the project site. According to the GeoTracker database, no hazardous materials are located at or near the site. The Palo Alto Airport is listed on the GeoTracker database with the cleanup status as "Complete – Case Closed as of 1/31/2014" and is therefore no longer considered a cleanup site.[5]

If improperly handled, hazardous materials can result in public health hazards through human contact with contaminated soils or groundwater, or through airborne releases in vapors, fumes, or dust. There may also be a potential for accidental or unauthorized releases of hazardous materials that would pose a public health concern.

Construction workers typically have the greatest risk of exposure to contaminated soil or groundwater. If contamination at a site remains undetected, workers and the public may be at risk of exposure if precautions are not taken during site development. Accidents or spills during transport of hazardous materials or wastes can also expose the general public and the environment to these substances.

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[5] *SWRCB. 2015. GeoTracker, Palo Alto Airport (T10000004161). Available at: https://geotracker.waterboards.ca.gov/profile_report?global_id=T10000004161*

DISCUSSION:

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

Less than Significant Impact. Small amounts of hazardous materials such as fuel, solvents, and oils, would be used during project construction activities for equipment use and maintenance, re-paving the trenched portion of Embarcadero Road, and trenching for pipe installation. Use of hazardous materials would be limited to the construction phase and would be in compliance with all local, state and federal standards associated with the handling and storage of hazardous materials. As the proposed project includes the installation of a new effluent outfall pipe, rehabilitation of the existing effluent outfall, and a new pump, there would be no routine transport, use, or disposal of hazardous materials associated with operation of the project. Impacts would be less than significant.

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

Less than Significant Impact. Hazardous materials for construction and equipment maintenance would not be stored or used where they could affect nearby residences or sensitive receptors, but would be stored in the staging area, which is an empty lot adjacent to the Airport parking lot. Furthermore, the project would be required to prepare a SWPPP for compliance with the City's Municipal Stormwater NPDES permit, including measures to minimize potential contamination from accidental spills and protect water quality at the site. Therefore, with compliance of the SWPPP as well as all local, State, and Federal regulations regarding hazardous materials, impacts associated with reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment would be less than significant.

c) ***Would the proposed project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?***

No Impact. The proposed project is not within one-quarter mile of a school. The closest educational facility is Hope Technology School, located approximately 0.54 miles southeast of the project site. The surrounding land uses of the project site including the Airport, a golf course, the San Francisco Bay and Palo Alto Baylands, and industrial facilities such as the RWQCP. Therefore, the proposed project would have no impact related to emission or handling of hazardous materials within one-quarter mile of existing or proposed schools.

d) ***Would the proposed project create a significant hazard to the public or the environment from existing hazardous materials contamination by exposing future occupants or users of the site to contamination either in excess of ground soil and groundwater cleanup goals developed for the site or from location on listed hazardous materials sites compiled pursuant to Government Code Section 65962.5?***

Less than Significant Impact. According to EnviroStor, the DTSC database, the project site is not located on a site that is designated as a hazardous material site, but it is within the vicinity of one site that is in need of evaluation. The site that has yet to be evaluated is currently inactive and is approximately 0.15 miles away from the project site and project construction would not occur within this site. According to the SWRCB GeoTracker database, the Airport is listed with the cleanup status as "Complete – Case Closed as of 1/31/2014" and is therefore no longer considered a cleanup site. Therefore, project construction and operation would not create a significant hazard to the public due to being located on any hazardous material sites. A less-than-significant impact would occur.

e) Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires?

Less than Significant Impact. According to the ABAG Wildland Urban Interface Map, a portion of the site is designated as within the "Wildland Urban Interface" interface. However, once completed, the proposed project would be completely underground and therefore not be at risk for fire. Short-term construction activities would not significantly increase the risk of wildlife near an urban area. In addition, the contractor specifications include a list of fire prevention BMPs that the contractor would be required to implement as part of the proposed project. These BMPs include the following, but are not limited to: provide spark arrestors on all internal combustion engines, store and handle flammable liquids in accordance with the Flammable and Combustible Liquids Code, and provide fire extinguishers at hazardous locations or operations, such as welding. A less-than-significant impact would occur.

f) Would the project result in a safety hazard from a public airport for people residing or working within the project area?

Less than Significant Impact. The project site is located directly adjacent to the Palo Alto Airport. According to the Palo Alto Airport Compatible Land Use Plan (CLUP), portions of the project site are located within the Turning Safety Zone, Sideline Safety Zone, Inner, Safety Zone, and Runway Protection Zone. The CLUP states that specifically the Runway Zone should be clear of all objects, structures, and activities. As such, the City would be required to submit a Construction Safety Phasing Plan to the FAA for review and approval prior to construction. This required Construction Safety Phasing Plan would include best management practices and procedures to ensure construction worker safety during all construction activities within airport safety zones. The proposed project would not alter the land use or zoning designations of the project site and would not result in any structures above the ground level. Therefore, operation of the project would not result in any safety hazards from a public airport. Impacts would be less than significant.

g) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

No Impact. The proposed project is not located within the vicinity of a private airstrip. Therefore, no impact would occur.

h) Would the proposed project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less than Significant with Mitigation Incorporated. Construction activities would require temporary lane closures along Embarcadero Road in order to place a small stretch of pipeline within the roadway. Minor delays may be experienced for access to or evacuation from the land uses adjacent to the area; however, the trenches used to install the new pipeline could be quickly covered in the event of an emergency to allow vehicles to drive through the work area. This would ensure the project does not prevent emergency access to or evacuation plan. With implementation of Mitigation Measure TRAFFIC-1 impacts would be reduced to a less-than-significant level.

Mitigation Measures:

Implement Mitigation Measure TRAFFIC-1 as described in Section P (Transportation and Traffic) below.

Significance after Mitigation: Less than Significant.

I. HYDROLOGY AND WATER QUALITY

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐	1, 9
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)	☐	☐	☒	☐	1
c) Substantially increase the rate, volume, or flow duration of storm water runoff or alter the existing drainage pattern of the site or area, including altering the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, including increase in-stream erosion?	☐	☐	☒	☐	1
d) Result in stream bank instability	☐	☐	☒	☐	1, 17
e) Significantly increase the rate, volume, or flow duration of storm water runoff in a manner which would result in new or increased flooding on-or off-site	☐	☐	☒	☐	1
f) 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	☐	☐	☒	☐	1
g) Provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality	☐	☐	☒	☐	1
h) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate	☐	☐	☐	☒	1

	Map or other flood hazard delineation map					
i)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows	☐	☐	☒	☐	1, 16
j)	Expose people or structures to a significant risk of loss, injury or death involve flooding by placing housing or other development within a 100-year flood hazard area or a levee or dam failure inundation area	☐	☐	☐	☒	1, 16
k)	Inundation by seiche, tsunami, or mudflow	☐	☐	☒	☐	1, 13, 2

ENVIRONMENTAL SETTING:

The project site lies within the Matadero Creek watershed within Santa Clara County. The Matadero Creek watershed watershed covers an area of about 14 square miles, of which approximately 11 square miles are mountainous land, and three square miles are gently sloping valley floor. Matadero Creek originates in the foothills of the Santa Cruz Mountains and flows in a northeasterly direction for approximately eight miles until it discharges into the Palo Alto Flood Basin, and then drains into the Lower South San Francisco Bay. Major tributaries to Matadero Creek are Arastradero and Deer Creeks and Stanford Channel.[6]

Climate

Palo Alto has a Mediterranean-type climate with almost all precipitation falling between the months of October and May. The average annual rainfall is about 15.21 inches. Temperatures tend to be fairly mild, with the hottest temperatures occur in July and August and the coldest temperatures occurring in January.

Flooding

The Federal Emergency Management Agency (FEMA) prepares maps of the 100-year flood hazard area of US communities. Areas within the 100-year flood hazard area are subject to 100-year flood, which means that in any given year, the risk of flooding in the designated area is 1 percent. Maps are also available for 500-year floods, which mean that in any given year, the risk of flooding in the designated area is 0.2 percent. Depth of flooding is determined by subtracting the land's height above sea level from the base flood elevation. Areas within the 100-year flood hazard area are subject to mandatory federal insurance requirements, which include building standards to reduce flood damage. According to FEMA, the project site is located within flood zone AE, which is defined as an area subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods.[7]

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[6] *Santa Clara Valley Urban Runoff Pollution Prevention Program. Matadero Creek. Available at: http://www.scvurppp-w2k.com/ws_matadero.shtml.*

[7] *Federal Emergency Management Agency. 2009. Federal Insurance Rate Map. Number:06085C003OH Panel 30 of 830. Available at: https://msc.fema.gov/portal/search?AddressQuery=Palo%20alto%20airport#searchresultsanchor.*

Groundwater

The Geotechnical Report prepared for the proposed project analyzed the depth to groundwater with test borings and regional groundwater map. The regional map indicates the groundwater at the project site may be found at depths less than five feet from the surface. The test boring measured the depth to which groundwater accumulated to be nine feet below ground surface.

REGULATORY FRAMEWORK

This section describes the regulatory setting as it relates to hydrology and water quality in the project site. There is a well-established regulatory framework of federal and State laws for floodplain management and protection of water quality, which would apply to the project site. These regulations establish requirements for projects in flood-prone areas and water quality criteria for the protection of human health and the environment, including storm water discharges to surface water. The regulations are discussed below.

Federal Agencies, Programs and Regulations

Federal Emergency Management Agency (FEMA)

FEMA issues Flood Insurance Rate Maps FIRMs that identify which land areas are subject to flooding. These maps provide flood information and identify flood hazard zones in the community. The design standard for flood protection is established by FEMA. FEMA's minimum level of flood protection for new development is the 100-year flood event, also described as a flood that has a 1-in-100 (1 percent) chance of occurring in any given year. The area with this designation is also referred to as the 100-year flood plain. FEMA also designates the area with a 1-in-500 chance (0.2 percent) of flooding in a given year, or the 500-year flood plain.

The map is dated August 3, 2009 and there have been no amendments since that time. The 2009 FIRM shows the project site as Zone VE, "Coastal flood zone with velocity hazards (wave action)."

FEMA administers the National Flood Insurance Program (NFIP) to provide subsidized flood insurance to communities that comply with FEMA regulations limiting development in floodplains. The insurance rate offered to communities is based on the designations shown on the FIRMs and recorded in the updates known as Letters of Determination.

Clean Water Act (CWA)

The Clean Water Act (CWA) of 1972 is the primary federal law that governs and authorizes water quality control activities by the U.S. Environmental Protection Agency (EPA) as well as the states. Various elements of the CWA address water quality, and they are discussed below. Wetland protection is administered by the USACE under Section 404 of the CWA, including permits to dredge or fill wetlands.

Section 401: Wetland Filling

Under Section 401 of the CWA, an applicant for a Section 404 permit to discharge dredged or fill material into waters of the United States must first obtain a certificate from the appropriate State agency stating that the fill is consistent with the State's water quality standards and criteria. In California, the authority to either grant water quality certification or waive the requirement is delegated by the State Water Resources Control Board (SWRCB) to the nine Regional Water Quality Control Boards (RWQCBs).

Section 303: Water Quality Standards and Total Maximum Daily Loads (TMDLs)

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. As defined by the CWA, water quality standards consist of two elements: (1) designated beneficial uses of the water body in question; and (2) criteria that protect the designated uses. Water Quality standards applicable to the project site are listed in the Water Quality Control Plan for the San Francisco Bay Basin. Section 303(d) of the CWA requires states to make a list of waters that are not attaining standards and requires them to develop a set of Total Maximum Daily Loads (TMDLs) (see below under State Water Resources Control Board (SWRCB)). San Francisco Bay Central is on the Section 303(d) list as impaired by: chlordane, DDT, dieldrin, dioxin compounds, exotic species, furan compounds, mercury, PCBs, and selenium.

National Pollutant Discharge Elimination System

The National Pollutant Discharge Elimination System (NPDES) permit program was established by the CWA to regulate municipal and industrial discharges to surface waters of the United States from their municipal separate storm sewer systems. NPDES permit regulations have been established for broad categories of discharges, including point-source municipal waste discharges and nonpoint-source stormwater runoff. NPDES permits generally identify limits on allowable concentrations in the effluent and receiving water, and/or mass emissions of pollutants contained in the discharge; prohibitions on discharges not specifically allowed under the permit; and provisions that describe required actions by the discharger, including industrial pretreatment, pollution prevention, self-monitoring and other activities. NPDES permits are issued by the SWRCB (see below).

State Plans, Policies, and Regulations

<u>Porter-Cologne Water Quality Control Act</u>

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) of 1969 is California's statutory authority for the protection of water quality. Under the Act, the State must adopt water quality policies, plans and objectives that protect the State's waters for the use and enjoyment of the people. The Act sets forth the obligations of the SWRCB and RWQCBs to adopt and periodically update water quality control plans (Basin Plans). Basin Plans are the regional water quality control plans required by both the CWA and Porter-Cologne Act in which beneficial uses, water quality objectives and implementation programs are established for each of the nine regions in California. The project site falls under the San Francisco Bay Region Hydrologic Basin Planning Area Map.

The Act also requires waste dischargers to notify the RWQCBs of their activities through the filing of Reports of Waste Discharge (RWD) and authorizes the SWRCB and RWQCBs to issue and enforce waste discharge requirements (WDRs), NPDES permits, Section 401 water quality certifications, or other approvals.[8]

State Water Resources Control Board (SWRCB)

In California, the SWRCB has broad authority over water quality control issues for the State. The SWRCB is responsible for developing statewide water quality policy and exercises the powers delegated to the State by the federal government under the CWA. Regional authority for planning, permitting and enforcement is delegated to the nine RWQCBs. The regional boards are required to formulate and adopt water quality control plans for all areas in the region and establish water quality objectives in the plans.

NPDES Construction General Permit

The SWRCB permits all regulated construction activities under the NPDES General Permit for Storm Water Discharges Associated with Construction Activity.[9] The permit is administered at the County level. Construction activities that disturb one acre or more of land must comply with a Construction General Permit that regulates storm water leaving construction sites. The project applicant must file Permit Registration Documents (PRDs) before beginning construction, including filing a Notice of Intent (NOI), and a SWPPP.

The SWPPP must be implemented and monitored to ensure its effectiveness. The plan, which must also address control of pollutants in stormwater post-construction, must be on-site and available to inspectors. A SWPPP must include "Best Management Practices" (BMPs) designed to reduce potential impacts to surface water quality through the construction and life of the project. Under the 2009 revision to the Construction General Permit, for discharges to water bodies that have beneficial uses such as fish spawning and fish migration, the project would at least be a Risk Level 2 project subject to Numeric Action Levels and some additional monitoring requirements. If erosion potential is considered high, the project could be determined to be a Risk Level 3 project subject to Numeric Effluent Limits, and more rigorous monitoring requirements, including receiving water monitoring or bioassessment.

NPDES Post-Construction Stormwater Quality

Post-construction stormwater management is covered by a different set of BMPs under the NPDES permit system. The intent of these regulations is to rigorously control the quality and quantity of stormwater runoff from any new development that creates or replaces impervious area over 10,000 square feet, so that receiving waters downstream are not adversely impacted.

To comply with these requirements, new projects are required to install water quality, stormwater runoff BMPs that filter or treat rainfall runoff generated from storm events up to approximately the 85th percentile rainfall event (or approximately the 1-inch storm event) before discharging into storm drains or natural drainage systems. Projects over 10,000 square feet are required to capture 100 percent of rainfall runoff from new impervious surfaces and to treat it in post-construction stormwater systems.

8 *Porter-Cologne Water Quality Act's website. http://ceres.ca.gov/wetlands/permitting/porter.html, accessed September 8, 2009.*
9 *Order No. 2009-009-DWQ, NPDES No. CAR000002, adopted September 2, 2009.*

Projects that begin after December 2012 must reuse the water on-site, unless that reuse is proven to be "infeasible." If the water is reused in irrigation, it is returned to the aquifer.

California Fish and Wildlife Code

The CDFW protects streams, water bodies and riparian corridors through the streambed alteration agreement process under Section 1601 to 1606 of the California Fish and Wildlife Code. The CDFW stipulates that it is "unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake" without notifying the Department, incorporating necessary mitigation and obtaining a streambed alteration agreement. CDFW's jurisdiction extends to the top of banks and often includes the outer edge of riparian vegetation canopy cover.

Regional and County Programs and Regulations

Regional Water Quality Control Board (San Francisco Bay Region)

The project site is within the jurisdiction of the San Francisco Bay RWQCB. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the San Francisco RWQCB's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives.

Basin Plan for San Francisco Bay

The Basin Plan established water quality objectives for total dissolved solids (TDS), mineral constituents, and turbidity on a watershed-by-watershed basis within the region, while objectives for total and fecal coliform bacteria, nutrients (total nitrogen and total phosphorus), pH, dissolved oxygen, and un-ionized ammonia are set on a region-wide basis.

Total Maximum Daily Loads (TMDLs)

Under section 303(d) of the Clean Water Act, States, territories, and authorized tribes are required to develop lists of impaired waters. These are waters that are too polluted or otherwise degraded to meet the water quality standards set by the relevant regulatory agency. The law requires that these jurisdictions establish priority rankings for waters on the lists and develop a calculation of the maximum amount of a pollutant that the impaired water body can receive and still safely meet water quality standards.[10] This calculation is called a Total Maximum Daily Load (TMDL). The TMDL approach provides a framework for evaluating pollution control efforts and for coordination between federal, State, and local efforts to meet water quality standards. TMDLs are adopted as amendments to the Basin Plan.

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[10] *U.S. Environmental Protection Agency (EPA). Impaired Waters and Total Maximum Daily Loads, http://www.epa.gov/OWOW/tmdl/, accessed on February 25, 2010.*

San Francisco Bay Conservation and Development Commission (BCDC)

McAteer-Petris Act

The McAteer-Petris Act is a provision under California law that preserves San Francisco Bay from indiscriminate filling. The act established the San Francisco Bay Conservation and Development Commission (BCDC) as the agency in-charge with preparing a plan for the long-term use of the Bay and regulating development in and around the Bay while the plan was being prepared. The San Francisco Bay Plan, completed in January 1969, includes policies on 18 issues critical to the wise use of the Bay, ranging from ports and public access to design considerations and weather. The McAteer-Petris Act authorizes BCDC to incorporate the policies of the Bay Plan into state law. The Bay Plan has two features: policies to guide future uses of the Bay and shoreline, and maps that apply these policies to the bay and the shoreline. BCDC conducts the regulatory process in accordance with the Bay Plan policies and maps. These policies guide the protection and development of the bay and its tributary waterways, marshes, managed wetlands, salt ponds, and shoreline.

BCDC has jurisdiction over areas within “a shoreline band that consists of all territory located between the shoreline of the Bay and a line 100 feet landward of and parallel with that line.”[11] The proposed project includes activity within the Bay and within the 100-foot shoreline band and is therefore subject to BCDC requirements.

Local Plans, Policies, and Regulations

Santa Clara Valley Urban Runoff Pollution Prevention Program

The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) is an association of thirteen cities and towns in Santa Clara Valley, the County of Santa Clara, and the Santa Clara Valley Water District that share a common NPDES permit to discharge stormwater to South San Francisco Bay. The program incorporates regulatory, monitoring, and outreach measures aimed at reducing pollution to the “maximum extent practicable” to improve the water quality of South San Francisco Bay and the streams of Santa Clara Valley. Participating agencies (including the City of Palo Alto) must meet the provisions of the Municipal Regional Stormwater Permit by ensuring that new development and redevelopment mitigate water quality impacts to stormwater runoff both during the construction and operation of projects. Other provisions include construction site control, water quality monitoring program, pollutants of concern control programs, watershed management, and industrial and commercial site controls.

DISCUSSION:

a) Would the proposed project violate any water quality standards or waste discharge requirements?

Less than Significant Impact. During construction, project activities, including site clearing and excavation, could result in sedimentation and erosion potentially increasing the input of sediment into the adjacent unnamed slough. The operation of construction equipment and presence of

11 *BCDC (2007). The San Francisco Bay Plan. http://www.bcdc.ca.gov/plans/sfbay_plan.html*

gasoline and other hazardous materials on-site could also contribute to an adverse effect to water quality. The City would be required to prepare and implement a SWPPP, as required by the City's NPDES Construction General Permit. The SWPPP would include provisions to control erosion and sedimentation, as well as a Spill Prevention, Control, and Countermeasure Plan to avoid and clean up any accidental spills of hazardous materials. With the SWPPP and associated measures in place, impacts related to the degradation of water quality during construction would be less than significant. During operation, the proposed project would continue to convey treated effluent water to the unnamed slough via the proposed pipeline. Construction activities related to the repair of the existing pipeline and replacement of the Renzel Marsh pump would not contribute to erosion or sedimentation, as they would not require ground disturbance. Therefore, the proposed project would result in a less-than-significant impact related to water quality.

b) ***Would the proposed project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?***

Less than Significant Impact. The proposed project would not require the use of groundwater for construction or operation. The installation of a new pipeline, would be the only component of the project that could potentially impact groundwater recharge, as the trench would be backfilled with impervious cementitious material. During construction minor dewatering of the shallow water table may occur. This would result in temporary, short-term, localized fluctuations in groundwater levels, but would not result in long-term impacts to the groundwater supply. The proposed project would place a 63-inch HDPE outfall pipe in the ground at a depth of 12-feet for a portion of the alignment and at a depth of seven feet where the pipeline alignment would be located within the existing levee. Groundwater recharge would not be impacted as water would be redirected around the pipe and would percolate into surrounding soils. The minimal addition of impervious material above the pipeline within the levee would not prevent groundwater recharge from recharge of surrounding soils. Therefore, groundwater recharge is not anticipated to be negatively affected by the project. A less-than-significant impact would result.

c) ***Would the proposed project substantially increase the rate, volume, or flow duration of storm water runoff or alter the existing drainage pattern of the site or area, including altering the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site, including increase in-stream erosion?***

Less than Significant Impact. The proposed project is not anticipated to impact stormwater runoff or alter the existing drainage pattern of the site. A minimal amount of impervious surfaces would be added to the surface of the site that would not result in an increase in the rate, or alter the flow of stormwater runoff. As the impervious material would be used to backfill the levee, the levee is designed in a manner to prevent stormwater from gathering on the trail, causing erosion, and impacted the levees integrity. Storm-water runoff would continue to flow towards the unnamed slough at a similar rate as under existing conditions as the levee would be re-graded to existing conditions. Any areas that require vegetation removal would be revegetated after construction activities are complete to prevent erosion and siltation of the site.

Additionally, the measures included in the SWPPP would ensure impacts related to erosion on-or off-site would be less than significant.

d) Would the proposed project result in stream bank instability?

Less than Significant Impact. The proposed project would be constructed in accordance with all recommendations listed in the site specific geotechnical report prepared for the proposed project. Implementation of all of the recommendations would ensure the stability of the bank of the unnamed slough during the construction and operational phases. These recommendations include the use of sheetpile walls and shoring methods to ensure the stability of the levee and outfall location. The project site is not located along any other stream banks or water bodies. A less-than-significant impact would result.

e) Would the proposed project significantly increase the rate, volume, or flow duration of storm water runoff in a manner which would result in new or increased flooding on-or off-site?

Less than Significant Impact. The project would include minimal new impervious surfaces and would not alter the existing drainage patterns or slopes on the project site. All slopes impacted by trenching of the proposed pipeline would be backfilled and restored to their existing grade. The levee would be backfilled with impervious cement material; however, this minimal backfill along the levee would continue to direct stormwater runoff to the unnamed slough, allowing for percolation in surrounding soils and would keep runoff away from the Airport. Additionally, any areas requiring vegetation removal on the site during construction activities would be revegetated after the conclusion of construction, ensuring minimal erosion would occur. Therefore, the proposed project is not anticipated to result in any new or increased flooding on-or off-site. A less-than-significant impact would occur.

f) Would the proposed project 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. Runoff from the project site currently percolates into the ground, flows into storm drains along Embarcadero Road, or flows into the unnamed slough immediately adjacent to the outfall pipeline and Bay Trail. The proposed project would add a minimal amount of impervious surfaces to the project site that would not substantially increase runoff into the storm drains or the unnamed slough. Furthermore, drainage at the project site would remain similar to existing conditions as the site would be backfilled and regraded to match the existing slopes. Therefore, the proposed project would not adversely affect capacity of the existing off-site stormwater drainage system. This is considered a less-than-significant impact.

g) Would the proposed project provide substantial additional sources of pollutants associated with urban runoff or otherwise substantially degrade water quality?

Less than Significant Impact. The proposed project would not affect water quality by any means other than what was previously identified above. Therefore, impacts would be less than significant.

h) ***Would the proposed project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?***

No Impact. The proposed project does not include the construction of any housing that would be exposed to flooding hazards. No impact would occur.

i) ***Would the proposed project place within a 100-year flood hazard area structures which would impede or redirect flood flows?***

Less than Significant Impact. According to the FEMA FIRM Map Number 06085C0030H, the project site is located within the 100-year flood zone and is designated zones AE (base flood elevations determined) and VE (coastal flood zone with velocity hazard). The proposed pipeline, existing pipeline, and Renzel Marsh pump would all operate underground and would therefore not impede or redirect flood flows. The project site would also be backfilled and graded to match existing conditions after the conclusion of construction activities. Therefore, the proposed project would not redirect flood flows. A less-than-significant impact would result.

j) ***Would the proposed project expose people or structures to a significant risk of loss, injury or death involve flooding by placing housing or other development within a 100-year flood hazard area or a levee or dam failure inundation area?***

No Impact. While the project site is located within the 100-year flood hazard zone, the proposed project does not include the construction of any structures above ground, nor would the proposed wastewater infrastructure improvements result in an increase of visitors to the project site. In addition, no impact to people or structures is anticipated to occur as a result of levee or dam failure, as there are no dams or levees within the immediate vicinity of the project site. Therefore, the proposed project would have no impact related to loss, injury or death involving flooding.

k) ***Would the proposed project cause inundation by seiche, tsunami, or mudflow?***

Less than Significant Impact. Due to the project site's location along the San Francisco Bay, the project site has the potential to be inundated by a seiche, tsunami, or mudflow. According to ABAG's Resilience Program Hazard Mapping, the project site is within a tsunami inundation zone. No structures are proposed as a component of the project that could be damaged by a seiche or tsunami, as the wastewater infrastructure improvements would all be located below the ground surface. The National Warning System would provide warning to the City and the City would rely on its community alerting system to communicate to its' residents the state of emergency. Therefore, the impact would be less than significant.

Mitigation Measures: None Required.

J. LAND USE AND PLANNING

Issues and Supporting Information Resources Would the project:	Potentially Significant Issues	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Physically divide an established community?	☐	☐	☐	☒	1
b) Conflict with any applicable City land use plan, policy, or regulation (including but not limited to the Comprehensive Plan, CAP, or the City's Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect by:	☐	☐	☒	☐	1, 3, 2
i) Substantially adversely change the type or intensity of existing or planned land use patterns in the area?	☐	☐	☒	☐	1
ii) Be incompatible with adjacent land uses or with the general character of the surrounding area, including density and building height?	☐	☐	☒	☐	1
c) Would the proposed project conflict with any applicable habitat conservation plan or natural communities conservation plan?	☐	☐	☐	☒	1

ENVIRONMENTAL SETTING:

Palo Alto is located in the northern part of Santa Clara County, in the portion of the Bay Area known as the Mid-Peninsula. The City shares a boundary with San Mateo County and six cities. The project site is located near the Palo Alto Baylands, starting at the RWQCP, and running through the existing levee adjacent to the Palo Alto Airport. The project site terminates at an unnamed slough within the San Francisco Bay.

REGULATORY SETTING:

City of Palo Alto Comprehensive Plan

Land Use and Design

POLICY L-1.1: Limit future urban development to currently developed lands within the urban service area. The boundary of the urban service area is otherwise known as the urban growth boundary. Retain undeveloped land west of Foothill Expressway and Junipero Serra as open space, with allowances made for very low-intensity development consistent with the open space character of the area. Retain undeveloped land northeast of Highway 101 as open space. POLICY L-5.4: Maintain the East Bayshore and San Antonio Road/Bayshore Corridor areas as diverse business and light industrial districts, consistent with the approved 2012 East Meadow Circle Concept Plan (Appendix Y of this Comprehensive Plan)..

POLICY L-7.14: Protect Palo Alto's archaeological resources, including natural land formations, sacred sites, the historical landscape, historic habitats and remains of settlements here before the founding of Palo Alto in the 19th century..

Natural Environment

POLICY N-1.5: Preserve and protect the Bay, marshlands, salt ponds, sloughs, creeks, and other natural water or wetland areas as open space, functioning habitats, and elements of a larger, interconnected wildlife corridor, consistent with the Baylands Master Plan, as periodically amended, which is incorporated here by reference. .

POLICY N-4.12: Encourage Low Impact Development (LID) measures to limit the amount of pavement and impervious surface in new development and increase the retention, treatment and infiltration of urban stormwater runoff. Include LID measures in major remodels, public projects and recreation projects where practical.

POLICY N-5.4: All potential sources of odor and/or toxic air contaminants should be adequately buffered, or mechanically or otherwise mitigated to avoid odor and toxic impacts that violate relevant human health standards.

POLICY N-40: Apply site planning and architectural design techniques that reduce overall noise pollution and reduce noise impacts on proposed and existing projects within Palo Alto and surrounding communities..

POLICY N-6.7: While a proposed project is in the development review process, the noise impact of the project on existing residential land uses, public open spaces and public conservation land should be evaluated in terms of the increase in existing noise levels for the potential for adverse community impact, regardless of existing background noise levels. If an area is below the applicable maximum noise guideline, an increase in noise up to the maximum should not necessarily be allowed.

Palo Alto Baylands Master Plan

Overall Environmental Quality Policies

2. Recognize and maintain the relationship between the urbanized Embarcadero Road corridor in the northwest and the remaining recreation-oriented three-quarters of the Baylands. Allow no more urban intrusion.

5. Keep marshes open to the Bay along the entire shoreline.

6. Control access to environmentally sensitive marshland and upland meadow habitat.

7. Restore the diversity of plants and animals to disturbed upland sites.

13. Follow guidelines established in the *Site Assessment and Design Guidelines, Palo Alto Baylands Natural Preserve* published in 2005.

14. Comply with *Airport Comprehensive Land Use Plan* (CLUP) adopted by the Santa Clara Airport Land Use Commission (ALUC) (*Mandated by State*).

San Francisco Bay Conservation and Development Commission (BCDC) San Francisco Bay Plan

The San Francisco Bay Plan was completed and adopted by the San Francisco Bay Conservation and Development Commission in 1968 and submitted to the California Legislature and Governor in January 1969. The Bay Plan was prepared by the Commission over a three-year period pursuant to the McAteer-Petris Act of 1965 which established the Commission as a temporary agency to prepare an enforceable plan to guide the future protection and use of San Francisco Bay and its shoreline. In 1969, the Legislature acted upon the Commission's recommendations in the Bay Plan and revised the McAteer-Petris Act by designating the Commission as the agency responsible for maintaining and carrying out the provisions of the Act and the Bay Plan for the protection of the Bay and its great natural resources and the development of the Bay and shoreline to their highest potential with a minimum of Bay fill.

The McAteer-Petris Act directs the Commission to exercise its authority to issue or deny permit applications for placing fill, extracting materials, or changing the use of any land, water, or structure within the area of its jurisdiction, in conformity with the provisions and policies of both the McAteer-Petris Act and the San Francisco Bay Plan. Thus the Commission is directed by the Act to carry out its regulatory process in accord with the Bay Plan policies and Bay Plan maps which guide the protection and development of the Bay and its tributary waterways, marshes, managed wetlands, salt ponds, and shoreline.

To keep pace with changing conditions and to incorporate new information concerning the Bay, the McAteer-Petris Act specifies that the Commission should make a continuing review of the Bay Plan and may amend or make other changes to the Bay Plan provided the changes are consistent with provisions of the Act. The Act and the Commission's administrative regulations further specify that a Bay Plan amendment may be proposed by the Commission or any other person, and that a descriptive notice of the proposed amendment must be given in advance of a public hearing concerning the amendment, after which the Commission may vote whether or not to amend the Plan. An affirmative vote of two-thirds of the Commission members (18 members) is required under the Act to change the Bay Plan.

Since its adoption by the Commission in 1968, the Bay Plan has been amended periodically and the Commission continues to systematically review the Plan to keep it current. The date of the most recent amendment adopted by the Commission is printed at the end of any amended policy section.

From its studies of the San Francisco Bay, the Commission has concluded that the most important uses of the Bay are those providing substantial public benefits and treating the Bay as a body of water, not as real estate. The Commission also concluded that all desirable, high-priority uses of the Bay and shoreline can be fully accommodated without substantial Bay filling, and without loss of large natural resource areas. But shoreline areas suitable for priority uses—ports, water-related industry, airports, wildlife refuges, and water-related recreation—exist only in limited amount, and should be reserved for these purposes.

The Bay Plan designates the project area as "Waterfront Park, Beach" as the priority use.

DISCUSSION:

a) Would the proposed project physically divide an established community?

No Impact. The proposed project would install a new pipeline and outfall and would rehabilitate the existing outfall pipe for the RWQCP. The proposed project would also replace the existing Renzel Marsh Pump. Once completed, the entire project would be underground and would continue to service the same community as under existing conditions. Therefore, the proposed project would not physically divide an established community. No impact would occur.

b) Would the proposed project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the Comprehensive Plan, CAP, or the City's Zoning Ordinance) adopted for the purpose of avoiding or mitigating an environmental effect by:

i) Substantially adversely change the type or intensity of existing or planned land use patterns in the area?

Less than Significant Impact. The project site is zoned PF(D), Public Facilities/Site and Design Review Combining District. The PF(D) zone district is designed to accommodate government, public utility, educational, and community service or recreational facilities. The proposed project consists of wastewater infrastructure improvements and is an allowed use in this zone district. The project site includes the following land use designations from the Comprehensive Plan: "Major Institutional/Special Facilities" and "Publicly Owned Conservation Land" by the Palo Alto Comprehensive Plan Update 2030. The Major Institutional/Special Facilities land use designation includes institutional, academic, government and community service land uses, and overlays the Palo Alto Airport and the RWQCP. The "Publicly Owned Conservation Land" land use designation includes resource management, recreational, and educational uses and overlays the existing levee, San Francisquito Creek Trail, and the existing RWQCP outfall.

Per Title 14 of the California Code of Regulation, minor repairs and improvements include any activity for which a BCDC permit is required and that is necessary to the health, safety, or welfare of the public in the entire Bay Area and is consistent with the San Francisco Bay Plan (14 CCR § 10601). These activities may include routine repairs, reconstruction, replacement, removal, and maintenance that do not involve any substantial enlargement or change in use within the Bay and the Shoreline Band. The project is a public utility line placed under the bottom of the Bay and below ground within the shoreline band. In addition, the project is the replacement of an existing utility line that does not involve a change in use in either the Bay or the shoreline band. The trail access closure is temporary in nature and would not permanently alter public access to the Bay and shoreline. Therefore, impacts would be less than significant.

ii) Be incompatible with adjacent land uses or with the general character of the surrounding area, including density and building height?

Less than Significant Impact. The project site is bordered to the north and east by Mayfield slough, an unnamed slough at the existing outfall pipe discharge point, the Palo Alto Duck Pond, and the San Francisco Bay. The Palo Alto Airport borders the project site to the north and west. The RWQCP and other industrial facilities are located to the south and west of the site. Byxbee Park is also located south of the RWQCP. The proposed wastewater infrastructure improvements would all be placed below the ground surface and would not be incompatible with the land uses and general character of the surrounding area. Therefore, impacts would be less than significant.

c) Would the proposed project conflict with any applicable habitat conservation plan or natural communities conservation plan?

No Impact. No habitat conservation or natural community conservation plans encompass the project site. No impact would occur.

Mitigation Measures: None required.

K. MINERAL RESOURCES

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
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?	☐	☐	☐	☒	1
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?	☐	☐	☐	☒	1, 2

ENVIRONMENTAL SETTING:

The project would traverse 2,402 linear feet of land, starting at the RWQCP, traveling north, to parallel the eastern side of the Airport, until emptying into an unnamed slough within the San Francisco Bay. According to the Mineral Resources Data System, managed by the U.S. Geological Survey (USGS), there are no mineral resources known or prospect within the project site.[12]

DISCUSSION:

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

No Impact. According to USGS, no mineral resources or known or prospect within the project site. Therefore, the project would not result in the loss of availability of a known mineral resource that would be of value of the region or residents of the state. No impact would occur.

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

No Impact. The Palo Alto General Plan, Natural Environment Chapter specifically mentions that Palo Alto does not contain any mineral deposits of significance. Therefore, the project would have no impact in terms of locally important mineral resources. The proposed project would not impact known mineral or locally important mineral resources.

Mitigation Measures: None Required.

12 *USGS (2011). Mineral Resource Data System (MRDS). Website: http://mrdata.usgs.gov/general/map.html*

L. NOISE

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Exposure of persons to or generation of excessive ground borne vibrations or ground borne noise levels?	☐	☐	☒	☐	1, 3
b) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or the municipal code, state standards, or applicable standards of other agencies, including but not limited to:	☐	☐	☒	☐	1, 3, 15
i) Result in indoor noise levels for residential development to exceed an Ldn of 45 dB?	☐	☐	☒	☐	1, 3, 15
ii) Result in instantaneous noise levels of 50dB or more in a bedroom or 55 dB or more measures from other rooms inside a house?	☐	☐	☒	☐	1, 3, 15
c) Would the proposed project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including:	☐	☐	☒	☐	1
i) Cause the average 24-hour noise level (Ldn) to increase by 5.0 decibels (dB) or more in an existing residential area, even if the Ldn would remain below 60 dB?	☐	☐	☒	☐	1
ii) Cause the Ldn to increase by three dB or more in an existing residential area, thereby causing the Ldn in the area to exceed 60dB?	☐	☐	☒	☐	1
iii) Cause an increase of three dB or more in an existing residential area where the Ldn currently exceeds 60dB?	☐	☐	☒	☐	1
d) 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, would the project expose people	☐	☒	☐	☐	1, 3

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
residing or working in the project area to excessive noise levels?					
e) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒	1, 3

ENVIRONMENTAL SETTING:

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady “background” noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. Those can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- Leq – An Leq, or equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the Leq of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- Lmax – The maximum instantaneous noise level experienced during a given period of time.
- Lmin – The minimum instantaneous noise level experienced during a given period of time.
- CNEL – The Community Noise Equivalent Level is a 24-hour average Leq with a 5 dBA “weighting” during the hours of 7:00 P.M. to 10:00 P.M. and a 10 dBA “weighting added to noise during the hours of 10:00 P.M. to 7:00 A.M. to account for noise sensitivity in the

evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24 hour Leq would result in a measurement of 66.7 dBA CNEL.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. For residential uses, environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60–70 dBA range, and high above 70 dBA.[13] Noise levels greater than 85 dBA can cause temporary or permanent hearing loss. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet suburban residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate level noise environments are urban residential or semi-commercial areas (typically 55– 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60–75 dBA) or dense urban or industrial areas (65–80 dBA).

It is widely accepted that in the community noise environment the average healthy ear can barely perceive CNEL noise level changes of 3 dBA. CNEL changes from 3 to 5 dBA may be noticed by some individuals who are extremely sensitive to changes in noise. A 5 dBA CNEL increase is readily noticeable, while the human ear perceives a 10 dBA CNEL increase as a doubling of sound.

Noise levels from a particular source generally decline as distance to the receptor increases. Other factors, such as the weather and reflecting or barriers, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically “hard” locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically “soft” locations (i.e., the area between the source and receptor is normal earth or has vegetation, including grass). Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels are also generally reduced by 1 dBA for each 1,000 feet of distance due to air absorption. Noise levels may also be reduced by intervening structures – generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. The normal noise attenuation within residential structures with open windows is about 17 dBA, while the noise attenuation with closed windows is about 25 dBA.10

The project would take place within existing roadway and levee along the apron of the Palo Alto Airport. The nearest residential properties to the project are situated approximately 0.60 miles west of the project. Table 5 summarizes typical ambient noise levels based on population density. The vicinity of the project area is most similar to that of “adjoining freeway or near a major airport” setting with an expected typical noise level of 80-90 dBA.

[13] *Office of Planning and Research, State of California General Plan Guidelines, October 2003 (in coordination with the California Department of Health Services)*

Table 5. Population Density and Associated Ambient Noise Levels

Population Density Type	dBA, Ldn
Rural Suburban	40–50
Quiet suburban residential or small town	45–50
Normal suburban residential urban	50–55
Normal urban residential	60
Noisy urban residential	65
Very noisy urban residential	70
Downtown, major metropolis	75–80
Under flight path at major airport, 0.5 to 1 mile from runway	78–85
Adjoining freeway or near a major airport	80–90
Sources: Cowan 1984, Hoover and Keith 1996	

REGULATORY SETTING:

City of Palo Alto Municipal Code

Section 9.10.060 (a): General Daytime Exception. Any noise source which does not produce a noise level exceeding 70 dBA at a distance of 25 feet under its most noisy condition of use shall be exempt from the provisions of Section 9.10.030(a), 9.10.040, and 9.10.050(a) between the hours of 8:00 a.m. and 8:00 p.m. Monday through Friday, 9:00 a.m. and 8:00 p.m. on Saturday, except Sundays and holidays, when the exemption herein shall apply between 10:00 a.m. and 6:00 p.m.

Section 9.10.060 (b) Construction. Except for construction activities on residential property as described in subsection (c) of this section, construction, alteration, and repair activities which are authorized by a valid city building permit shall be prohibited on Sundays and holidays and shall be prohibited except between the hours of 8:00 a.m. and 6:00 p.m. Monday through Friday, 9:00 a.m. and 6:00 p.m. on Saturday provided that the construction, demolition or repair activities during those hours meet the following standards:

> (1) No individual piece of equipment shall produce a noise level exceeding 110 dBA at a distance of 25 feet. If the device is house within a structure on the property, the measurement shall be made out-side the structure at a distance as close to 25 feet from the equipment as possible.
>
> (2) The noise level at any point outside of the property plane of the project shall not exceed 110 dbA.

(3) The holder of a valid construction permit for a construction project in a non-residential zone shall post a sign at all entrances to the construction site upon commencement of construction, for the purpose of informing all construction contractors and subcontractors, their employees, agents, materialmen, and all other persons at the construction site, of the basic requirements of this chapter.

Palo Alto Comprehensive Plan

While a proposed project is in the development review process, the noise impact of the project on existing residential land uses, public open spaces and public conservation land should be evaluated in terms of the increase in existing noise levels for the potential for adverse community impact, regardless of existing background noise levels. If an area is below the applicable maximum noise guideline, an increase in noise up to the maximum should not necessarily be allowed.

DISCUSSION:

a) ***Would the proposed project cause exposure of persons to or generation of excessive ground borne vibrations or ground borne noise levels?***

Less than Significant Impact. The construction of the proposed project may generate groundborne vibration when heavy impact tools are used. Construction activities would include site preparation work, dewatering, excavation, and sheetpile installation. While project construction activities, such as sheetpile installation may generate substantial vibration in the immediate vicinity, this work would occur within the existing levee. The nearest sensitive (residential) receptors are located approximately 0.60 miles to the west of the project site located on the western side of the Palo Alto Airport and the Palo Alto Golf Course. Therefore, construction crew members would be the only persons exposed to groundborne vibration during these construction activities. Furthermore, as the sheetpiles to be installed are for the purposes of dewatering and are not permanent features of the project, installation of these piles would not require the use of an impact pile driver. Due the project site's proximity to the Palo Alto Airport and applicable height restrictions, large cranes would not be used during construction. As these sheetpiles would be installed with the use of smaller construction equipment, the project would not result in the generation of excessive groundborne vibration or groundborne noise levels. Impacts would be less than significant.

b) ***Would the proposed project cause exposure of persons to or generation of noise levels in excess of standards established in the local general plan or the municipal code, state standards, or applicable standards of other agencies, including but not limited to:***

   i) ***Result in indoor noise levels for residential development to exceed an Ldn of 45 dB?***

   ii) ***Result in instantaneous noise levels of 50dB or more in a bedroom or 55 dB or more measures from other rooms inside a house?***

   Less than Significant Impact. The proposed project would include improvements to existing wastewater treatment infrastructure for the RWQCP, and operation of the proposed improvements would not result in the generation of noise, beyond existing conditions. Furthermore, the replacement of the Renzel Marsh Pump would reduce noise levels at the RWQCP as the existing pump is experiencing air entrainment resulting in excess noise. The City would comply with Municipal Code requirements related to construction timing and signage posted on-site. However, the proposed project would require approximately three weeks of nighttime construction, outside of those times allowed by the Municipal Code, due to the project's proximity to the Palo Alto Airport and runway. Although the project would require temporary nighttime construction, the nearest residential development is located approximately 0.60 miles west of the project site and would not be impacted by these nighttime construction activities. Due to the distance of the nearest residential development, the proposed project would not result in an instantaneous noise levels of 50 dB or more in a bedroom or 55 dB or more in other rooms inside a house. As stated above, the ambient noise environment for an area located near a major airport is expected to be between 80-90 dBA. Due to the ambient noise environment at the project site and the nature of the proposed improvements, the proposed project would have a less-than-significant impact related to indoor noise levels for residential development.

d) ***Would the proposed project cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including:***

iv) ***Cause the average 24-hour noise level (Ldn) to increase by 5.0 decibels (dB) or more in an existing residential area, even if the Ldn would remain below 60 dB?***

v) ***Cause the Ldn to increase by three dB or more in an existing residential area, thereby causing the Ldn in the area to exceed 60dB?***

vi) ***Cause an increase of three dB or more in an existing residential area where the Ldn currently exceeds 60dB?***

Less than Significant Impact. As stated above, the nearest residential area is located approximately 0.60 miles west of the project site. Furthermore, the ambient noise environment for an area located near a major airport is expected to be between 80-90 dBA. Due to the high level of ambient noise at the project site and the nature of the proposed improvements, neither construction nor operation of the proposed project would result in a substantial temporary or permanent increase in ambient noise levels in the project vicinity, above levels existing without the project. Impacts would be less than significant.

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, would the project expose people residing or working in the project area to excessive noise levels?***

Less than Significant with Mitigation Incorporated. The proposed project is located within the Palo Alto Airport land use plan area and would travel through areas designated as within the 55, 60 and 65 Noise Contours (CNEL). As the proposed project would require construction workers to work in all three zones temporarily, the proposed project has the potential to expose the workers to excessive noise levels. However, as described the Project Description, the City is required to prepare a Construction Safety Phasing Plan for review and approval by the FAA prior to the start of construction activities. In addition to the Construction Safety and Phasing Plan, Mitigation Measure NOISE-1 would be implemented to reduce impacts to a less-than-significant level.

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

No Impact. No private airstrips are located within the vicinity of the project site. This condition precludes the possibility of the project site being exposed to adverse aviation noise from a private airstrip. No impact would occur.

Mitigation Measures:

Mitigation Measure NOISE-1:

The City shall provide all construction workers appropriate hearing protection.

Significance after Mitigation: Less than Significant.

M. POPULATION AND HOUSING

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Induce substantial 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)?	☐	☐	☐	☒	1
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒	1
d) Create a substantial imbalance between employed residents and jobs?	☐	☐	☐	☒	1

ENVIRONMENTAL SETTING:

According to the City of Palo Alto's Housing Element adopted in 2014, between 2000 and 2013, Palo Alto was one of the fastest growing cities in the County, with an overall 13 percent increase. Throughout Santa Clara County, population increased by nine percent during the same period. Estimates of future growth indicate a moderate and steady increase in population over the next 20 years. The current population, is assumed to be approximately 66,642 persons. By the year 2035, ABAG estimates that the population of Palo Alto will reach 84,000.[14]

DISCUSSION:

a) Would the proposed project induce substantial 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 proposed project would not include residential housing, nor would it create permanent job opportunities that would necessitate workers and their families to move to the area. The proposed project would create temporary construction jobs; however, it is anticipated that the local labor force would fill those positions. The proposed project would create an additional outfall to convey reclaimed water from the RWQCP; however, it would replace the existing outfall, which would serve only to supplement regular wastewater flows and provide

14 *City of Palo Alto. 2015-2023 Housing Element. 2014. Website: https://www.cityofpaloalto.org/civicax/filebank/documents/37935. Accessed: March 30, 2017.*

additional capacity for the future when taking into account sea level rise. While the proposed project would increase the capacity of the wastewater conveyance at the RWQCP, this is intended to address the face the existing pipeline does not have the capacity for peak wet weather flows and the anticipated loss in capacity from future sea level rise. The proposed project is not intended to allow for increased service connections for wastewater conveyance and would not directly or indirectly induce population growth. No impact would occur.

b) Would the proposed project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

No Impact. A portion of the project site is located in an area dominated by industrial uses, including the existing RWQCP and the Airport. No residential housing is within the vicinity of the project site, nor are any houses planned for removal as a result of project implementation. Therefore, the proposed project would not create a need to construct replacement housing. No impact would occur.

c) Would the proposed project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

No Impact. No houses or structures are planned for removal in order to implement the proposed project. Therefore, no people would be displaced, and no replacement housing demanded.

d) Would the proposed project create a substantial imbalance between employed residents and jobs?

No Impact. As stated above, the proposed project would not result in any permanent employment opportunities. A few temporary construction jobs would be staffed by the local population, but these would not result in a substantial imbalance between employed residents and jobs. No impact would occur.

Mitigation Measures: None required.

N. PUBLIC SERVICES

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Result in an adverse physical impact from the construction of additional school facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒	1
b) Result in an adverse physical impact from the construction of additional fire protection facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒	1
c) Result in an adverse physical impact from the construction of additional police protection facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒	1
d) Result in an adverse physical impact from the construction of additional parks and recreation facilities in order to maintain acceptable performance standards?	☐	☐	☒	☐	1
e) Result in an adverse physical impact from the construction of additional library facilities in order to maintain acceptable performance standards?	☐	☐	☐	☒	1

ENVIRONMENTAL SETTING:

Fire Protection Services

Fire protection services in the project area are provided by the Palo Alto Fire Department. The Department operates seven fire stations around the City and staff 6 Fire Engines, 1 Truck and 3 ambulances. During July-October, an eighth station is staffed in response to the heightened wildfire dangers. The Department employs 121 personnel, including line, prevention and staff positions.[15]

Police Services

Law enforcement services in the project area are provided by the Palo Alto Police Department, located adjacent to City Hall and in a substation in the Ventura neighborhood opened in 1996. In 1995, Palo Alto had approximately 40 crimes per 1,000 residents, a rate very close to the rate for Santa Clara

[15] *City of Palo Alto Fire Department. Website: http://www.cityofpaloalto.org/gov/depts/fir/default.asp. Accessed: March 27, 2017.*

County as a whole and other similarly sized communities such as Mountain View. The Department had 173 employees in 1997, with 100 sworn officers including reserves. It shares Special Weapons and Tactical (SWAT) Teams with the cities of Los Altos and Mountain View and provides dispatching to the Stanford University Police through the City's Communications Center. A key challenge for the Department over the life of the Comprehensive Plan includes implementation of the community policing program, a philosophy that is intended to get the community involved in problem solving relating to police protection and crime prevention. Other challenges for the future include the potential increase in white collar crime, and the continued need for interagency cooperation.

Schools

Palo Alto's public schools are operated by the Palo Alto Unified School District (PAUSD). PAUSD operates one preschool, twelve K-5 elementary schools, three 6-8 middle schools, two 9- 12 high schools, a continuation school, a self-supporting adult school, the Children's Hospital School at Lucile Salter Packard Children's Hospital, and a summer school. PAUSD serves approximately 12,000 students in Palo Alto, Stanford, and part of Los Altos Hills.[16]

Parks

The City owns and operates 29 neighborhood and district parks that total approximately 190 acres. They include ten "mini-parks" that range in size from one-half acre to two acres. These parks generally include small playgrounds for children and/or grass and landscape areas for playing or sitting. Most of the other parks are "neighborhood" parks and provide a mix of active and passive recreational areas. There are also three "district" parks that serve larger areas and contain a wider range of facilities. The district parks provide playing fields, picnic grounds, and community centers. The City also owns and operates several large open space preserves such as Palo Alto Baylands, Byxbee Park, and Foothills Park. These are described in the Natural Environment Element. Because of the "built-out" nature of the community, it is unlikely that many new parks will be created in Palo Alto. Maintenance and rehabilitation of existing facilities will continue to be the City's primary concern relating to parks.

DISCUSSION:

a) Would the proposed project result in adverse physical impact from the construction of additional school facilities in order to maintain acceptable performance standards?

No Impact. The proposed project would not create any residential housing developments or create any permanent jobs that would result in a population increase within the City of Palo Alto. Temporary construction employment opportunities would be available; however, it is assumed that the local workforce would fill those positions. Therefore, as no population growth would result, no increase in school enrollment would occur. The proposed project would have no impact on schools.

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16 *Palo Alto Unified School District. Website: https://www.pausd.org/explore-pausd/our-district. Accessed: March 27, 2017.*

b) ***Would the proposed project result in adverse physical impact from the construction of additional fire protection facilities in order to maintain acceptable performance standards?***

No Impact. The proposed project includes wastewater infrastructure improvements for the existing RWQCP. No increase in demand for fire or emergency services as a result of the project is anticipated, due to the nature of the proposed project. Therefore, an expansion of current fire facilities or the construction of a new fire facility would not result from project implementation. No impact would occur.

c) ***Would the proposed project result in adverse physical impact from the construction of additional police protection facilities in order to maintain acceptable performance standards?***

No Impact. The proposed project would result in improvements to the existing wastewater infrastructure of the RWQCP. An increase in demand for police services is not anticipated to occur due to the nature of the proposed project. Additionally, the current facilities are assumed to be sufficient to serve the community after the project has been implemented. No expansions to current facilities or construction of new facilities would be needed. No impact would occur.

d) ***Would the proposed project result in adverse physical impact from the construction of additional parks and recreation facilities in order to maintain acceptable performance standards?***

Less than Significant Impact. Project implementation would not result in increased usage of the City's park facilities. The project site is located partially within the Bay Trail and Palo Alto Baylands; however, the proposed wastewater infrastructure improvements would not result in an increase in visitors to the area. Construction activities would result in a temporary closure of the Bay Trail for approximately two weeks for installation of the last segment of pipeline and the outfall. As described in the Project Description, a detour would be provided allowing pedestrians and cyclists to access either side of the Bay Trail extending from the project site. Therefore, no additional park facilities would be needed during temporary construction activities or once the project is implemented. Impacts to parks and recreation facilities would be less than significant.

e) ***Would the proposed project result in adverse physical impact from the construction of additional library facilities in order to maintain acceptable performance standards?***

No Impact. The proposed project does not include any residential development, and therefore would not create new residential population that could create additional demands on other public facilities, such as libraries. As described above, the proposed project would also not result in any permanent employment opportunities or a significant number of temporary opportunities. Therefore, the project is not anticipated to add to the current population and no impact would occur.

Mitigation Measures: None required.

O. RECREATION

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
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?	☐	☐	☐	☒	1
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☒	☐	1

ENVIRONMENTAL SETTING:

Over one-third of Palo Alto's land area consists of open space preserves. These preserves are primarily located in the southern foothills but also extend along the Bay on the northeastern edge of the City. Major foothill area open spaces include the 1,400-acre Foothill Park, 2,200 acres of Montebello Open Space Preserve, the 610-acre Arastradero Preserve, and 200 acres of Los Trancos Open Space Preserve. Foothill and Arastradero Parks are owned and operated by the City, while Montebello and Los Trancos are operated by the Mid-Peninsula Open Space District. Along the San Francisco Bay shoreline, open space is also contained in what is generally called the Palo Alto Baylands. Furthermore, the City owns and operates 29 neighborhood and district parks that total approximately 190 acres. The "neighborhood" parks and provide a mix of active and passive recreational areas. There are also three "district" parks that serve larger areas and contain a wider range of facilities. The district parks provide playing fields, picnic grounds, and community centers.

DISCUSSION:

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 proposed project would not affect existing neighborhood or district parks or facilities as it would not induce population growth that could use such facilities. The proposed project would install a new outfall to improve reclaimed water conveyance from the RWQCP to the San Francisco Bay, as well as rehabilitate the existing outfall pipeline and replace the existing Renzel Marsh pump. While construction activities would result in a temporary closure of a portion of the Bay Trail, detours would be provided for approximately two weeks to allow for access to the Bay Trail both north and south of the minor temporary closure. Therefore, no impact on neighborhood or regional parks or facilities would occur.

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

Less than Significant Impact. The proposed project includes wastewater infrastructure improvements for the existing RWQCP. The proposed project would not increase use of the recreational facilities within the City and therefore would not require the construction or expansion of recreational facilities to compensate for potential impacts resulting from project implementation. While construction activities would result in a temporary closure of a portion of the Bay Trail, detours would be provided for approximately two weeks to allow for access to the Bay Trail both north and south of the minor temporary closure. Any impacts to the Bay Trail resulting from the use of heavy construction equipment and groundwork would be restored to pre-construction conditions. Therefore, no recreational facilities would be constructed or expanded due to construction impacts to the Bay Trail and impacts would be less than significant.

Mitigation Measures: None required.

P. TRANSPORTATION AND TRAFFIC

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Cause an intersection to drop below its level of service standard, or if it is already operating at a substandard level of service, deteriorate by more than a specified amount.	☐	☐	☒	☐	1
b) Cause a roadway segment to drop below its level of service standard, or deteriorate operations that already operate at a substandard level of service	☐	☒	☐	☐	1
c) Cause a freeway segment or ramp to operate at LOS F or contribute traffic in excess of 1 percent of segment capacity to a freeway segment or ramp already operating at LOS F.	☐	☐	☒	☐	1, 2
d) Impede the development or function of planned pedestrian or bicycle facilities.	☐	☒	☐	☐	1
e) Increase demand for pedestrian and bicycle facilities that cannot be met by current or planned services.	☐	☒	☐	☐	1
f) Impede the operation of a transit system as a result of congestion or otherwise decrease the performance of safety of such facilities?	☐	☐	☐	☒	1
g) Create demand for transit services that cannot be met by current or planned services?	☐	☐	☐	☒	1
g) Create the potential demand for through traffic to use local residential streets? i) Cause any change in traffic that would increase the Traffic Infusion on Residential Environment (TIRE) index by 0.1 or more?	☐	☐	☐	☒	1
i) Create an operational safety hazard?	☐	☐	☐	☒	1

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
j) Result in inadequate emergency access?	☐	☒	☐	☐	1
k) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☒	☐	1
l) Cause queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity? Queuing impacts include, but are not limited to, spillback queues at project access locations; queues at turn lanes at intersections that block through traffic; queues at lane drops; queues at one intersection that extend back to impact other intersections, and spillback queues on ramps.	☐	☐	☒	☐	1

ENVIRONMENTAL SETTING:

The proposed project is located within a developed area of Palo Alto. The proposed outfall pipeline would be constructed beginning at the wastewater treatment plant, extending across Embarcadero Road, wrapping around the perimeter of the Airport until it reaches an unnamed slough within the San Francisco Bay. The only street that would be impacted by the project is Embarcadero Road, which provides access to the RWQCP, a parking lot for the Airport and the Bay Trail.

Additional traffic from construction vehicles would be temporary in nature, only lasting for the duration of the construction period, approximately nine months. This traffic would generally include work vehicles and trucks traveling to and from the site. Construction would only occur during the hours of 8:00 a.m. - 6:00 p.m. Monday - Friday in compliance with the City's Noise Ordinance. The proposed project would also require 20 days of night work for construction activities requiring runway closure. No new vehicle trips would be associated with operation of the proposed wastewater infrastructure improvements.

DISCUSSION:

a) ***Would the proposed project cause an intersection to drop below its level of service standard, or if it is already operating at a substandard level of service, deteriorate by more than a specified amount?***

Less than Significant Impact. Construction traffic (equipment and materials transport and daily worker traffic) would slightly increase traffic on local roads during the temporary construction phase of the proposed project. Temporary construction traffic would be limited to equipment delivery and material transport, and a few employee vehicles on a daily basis. The temporary construction-related traffic would not result in a noticeable increase in traffic on local roads and is not expected to reduce the level of service (LOS) for local intersections. The main intersection that would be impacted by the proposed project would be Embarcadero Road and East Bayshore Road prior to the U.S. Route 101 on-ramp. This intersection was not analyzed for LOS in the 2030 Palo Alto Comprehensive Plan and does not operate at a substandard LOS. Due to the minimal number of daily truck trips required for construction that would come and go from the project site at different times, the proposed project would not cause this intersection to drop below its LOS standard and the construction traffic would be temporary. Therefore, impacts related to intersection LOS would be less than significant.

b) ***Would the*** prop***osed project cause a roadway segment to drop below its level of service standard, or deteriorate operations that already operate at a substandard level of service?***

Less than Significant with Mitigation Incorporated. As stated above, construction traffic (equipment and materials transport and daily worker traffic) would slightly increase traffic on local roads during the temporary construction phase of the proposed project. The temporary construction-related traffic would not result in a noticeable increase in traffic on local roads and is not expected to reduce the LOS for any roadway segment. Large vehicles transporting equipment and materials to the project site could cause slight delays for travelers as the construction vehicles stop to unload. The only temporary lane closure would be during trenching within Embarcadero Road, which would only last for four weeks. However, the closure of this lane would represent a potentially significant impact. In addition to the temporary nature of this work, Mitigation Measure TRAFFIC-1 would require the construction contractor to prepare a Traffic Control Plan and one lane would remain open during all construction activities. With implementation of Mitigation Measure TRAFFIC-1, potentially significant impacts related to intersection level of service would be reduced to less than significant.

c) ***Would the proposed project cause a freeway segment or ramp to operate at LOS F or contribute traffic in excess of 1 percent of segment capacity to a freeway segment or ramp already operating at LOS F?***

Less than Significant Impact. As stated above, construction traffic (equipment and materials transport and daily worker traffic) would slightly increase traffic on local roads during the temporary construction phase of the proposed project. The temporary construction-related traffic would not result in a noticeable increase in traffic on local roads and is not expected to reduce the LOS for any freeway segment or ramp. The proposed project would require a minimal amount of daily truck trips and would utilize the U.S. Route 101 Freeway via Embarcadero Road. The U.S. 101 segment from Embarcadero northbound to University Avenue currently operates at an LOS F for both AM and PM peak hours and Embarcadero southbound to Oregon Expressway operates at an LOS E for AM peak hour and LOS F for PM peak hour. The capacity for both of these freeway segments is 9700. The proposed project would not contribute traffic in excess of 1% of segment capacity and would not cause the southbound Embarcadero Road segment to operate at an LOS F for the AM peak hour. Therefore, impacts to freeway segments and ramps would be less than significant.

d) Would the proposed project impede the development or function of planned pedestrian or bicycle facilities?

Less than Significant with Mitigation Incorporated. As stated in the Project Description, the proposed project would require the temporary closure of the Bay Trail for approximately two weeks. However, the City would install detour signs prior to the start of construction to direct pedestrian and bicycle traffic to adjacent segments of the Bay Trail. Pedestrian and bicycle access would also be available across Embarcadero Road during project construction with the implementation of the Traffic Control Plan included in Mitigation Measure TRAFFIC-1. The proposed wastewater infrastructure improvements would not impede the development of any planned pedestrian or bicycle facilities. Potentially significant impacts related to the function of these facilities would be reduced to less than significant with implementation of Mitigation Measure TRAFFIC-1.

e) Would the proposed project increase demand for pedestrian and bicycle facilities that cannot be met by current or planned services?

Less than Significant with Mitigation Incorporated. The proposed project includes improvements to existing wastewater infrastructure for the existing RWQCP and operation of the project would not increase the demand for pedestrian or bicycle facilities. Construction of the proposed project would require minor temporary detours for access to the Bay Trail and minor delays at Embarcadero Road. Implementation of Mitigation Measure TRAFFIC-1 would ensure pedestrian and bicycle access across Embarcadero Road is available during construction. Therefore, potentially significant impacts to pedestrian and bicycle facilities would be reduced to less than significant.

f) Would the proposed project impede the operation of a transit system as a result of congestion or otherwise decrease the performance of safety of such facilities?

No Impact. The project site is not located in an area where any transit system facilities operate. Therefore, the proposed project would not impact the operation or otherwise decrease the performance of safety of such facilities. No impact would occur.

g) Would the proposed project create demand for transit services that cannot be met by current or planned services?

No Impact. The proposed project includes wastewater infrastructure improvements for the existing RWQCP. As operation of the proposed would not result in an increase in population, no additional transit services would be required. Therefore, no impact would occur.

h) ***Create the potential demand for through traffic to use local residential streets? i) Cause any change in traffic that would increase the Traffic Infusion on Residential Environment (TIRE) index by 0.1 or more?***

No Impact. The proposed project includes wastewater infrastructure improvements for the existing RWQCP. Construction trucks would utilize Embarcadero Road to U.S. Route 101 and would not impact residential streets. Therefore, no impact would occur.

i) ***Would the proposed project create an operational safety hazard?***

No Impact. The proposed project includes wastewater infrastructure improvements and would include trenching within Embarcadero Road. However, the proposed project would not alter the design of the roadway and all trenching would be backfilled and restored to pre-construction conditions. Vehicular circulation and emergency access for the project site would remain the same during project construction and operation. Therefore, the proposed project would have no impact related to creating an operational safety hazard.

j) ***Would the proposed project result in inadequate emergency access?***

Less than Significant with Mitigation Incorporated. Construction activities would require temporary lane closures along Embarcadero Road to accommodate the proposed pipeline installation. Minor delays may be experienced for emergency access along this segment of roadway, however, Mitigation Measure TRAFFIC-1 includes a Traffic Control Plan to reduce delays and ensure adequate emergency access is provided. In the event of an emergency, the trenches used to install the pipeline could be quickly covered to allow vehicles to drive through the work area. This is a short-term construction related impact that would cease upon project completion. Operation of the proposed wastewater infrastructure improvements would have no impact on emergency access. The implementation of Mitigation Measure TRAFFIC-1 would reduce potentially significant impacts to emergency access to less than significant.

k) ***Would the proposed project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?***

Less than Significant Impact. The proposed project would be installed along the perimeter of the Airport, and would include work within the runway safety zone. Work within this area would require runway closures and nighttime construction work would be utilized to reduce the number of runway closures. As described in the Project Description, the City is required to submit a Construction Safety Phasing Plan to the FAA for Review and Approval. The proposed project would therefore not result in a significant safety risk due to change in air traffic patterns, and impacts would be less than significant.

l) ***Would the proposed project cause queuing impacts based on a comparative analysis between the design queue length and the available queue storage capacity? Queuing impacts include, but are not limited to, spillback queues at project access locations; queues at turn lanes at intersections that block through traffic; queues at lane drops; queues at one intersection that extend back to impact other intersections, and spillback queues on ramps?***

Less than Significant Impact. As discussed in the Project Description and analyses above, the proposed project would generate approximately 11 daily truck trips during the nine months of construction and would not result in any additional traffic during operation. This minimal increase in truck trips during construction would also not occur all at once and would be spread throughout the workday. Therefore, the proposed project would not result in queuing impacts such as spillback queues and blocked intersections. Impacts to queuing would be less than significant.

Mitigation Measures:

Mitigation Measure TRAFFIC-1

- Prior to issuance of a grading permit, the City shall prepare and submit a Traffic Control Plan for review and approval. The Traffic Control Plan shall include best management practices and traffic measures including but not limited to:

    - The City shall require the contractor to provide for passage of emergency vehicles through the project site at all times.

    - The City shall require the contractor to maintain access to all uses during project construction.

    - The City shall use traffic cones, signs, lighted barricades, lights, and flagmen as described and specified in the Caltrans Manual of Uniform Traffic Control Devices, current edition, California Supplement, Part 6 Temporary Traffic Control to provide for public safety and convenience during construction.

    - The contractor shall install advance warning signs to alert bicyclists and motorists of the work zone and lane closures. Advance warning signs may be reflective signs, changeable message boards, cones, and barricades.

    - Flagging and other means of traffic control shall be required to allow for the safe movement of traffic through the work zone. The contractor shall provide flaggers to temporarily hold traffic for staging equipment or construction.

    - The City shall provide advanced notice to area residents, schools and emergency agencies when employing temporary traffic control measures. In addition, prior to the start of construction, the City shall provide emergency services with the proposed construction schedule.

    - The City shall require the construction contractor to provide for passage of emergency vehicles through the project site at all times.

    - The City shall require the construction contractor to maintain convenient access to driveways and buildings near the work area unless otherwise approved by the City in advance.

    - The City shall restore pavement, curbs, gutters, and sidewalks, as necessary, to pre-disturbance conditions or better.

- The temporary traffic control/detour portion of the project shall include one additional detour sign posted at the bicycle/pedestrian bridge across San Francisquito Creek between East Palo Alto and Palo Alto. Users approaching from East Palo Alto need to be directed to the detour route.

Significance after Mitigation: Less than Significant.

Q. TRIBAL CULTURAL RESOURCES

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resource Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:					
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☒	☐	☐	1
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐	1

ENVIRONMENTAL SETTING

In September 2014, the California Legislature passed Assembly Bill ("AB") 52, which added provisions to the Public Resources Code ("PRC") concerning the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, AB 52 now requires lead agencies to analyze a project's impacts on "tribal cultural resources," separately from archaeological resources (PRC Section 21074; 21083.09). Under AB 52, "tribal cultural resources" include "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" that are either (1) listed, or determined to be eligible for listing, on the state or local register of historic resources; or (2) a resource that the lead agency chooses, in its discretion, to treat as a tribal cultural resource (PRC Section 21074). AB 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (PRC Sections 21080.3.1, 21080.3.2, 21082.3). If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document must discuss (1) whether the proposed project has a significant impact on an identified tribal cultural resource and (2) whether feasible alternatives or mitigation measures avoid or substantially less the impact on the identified tribal cultural resource (PRC Section 21082.3(b)). Finally, AB 52 required the Office of Planning and Research to update Appendix G of the CEQA Guidelines by July 1, 2016 to provide sample questions regarding impacts to tribal cultural resources (PRC Section 21083.09). AB 52's provisions apply to projects that have a notice of preparation filed on or after July 1, 2015.

In May 2016 the City received a single request from a tribe to be contacted in accordance with AB 52. However, through subsequent correspondence with the tribe, it was concluded that the tribe had contacted the Palo Alto in error and did not wish to be contacted regarding future projects within the City's jurisdiction. The tribe, the Torres Martinez Desert Cahuilla Indians, is not traditionally or culturally affiliated with the geographic area within the City of Palo Alto. Because no other tribes have requested to be contacted, no notices in accordance with AB 52 were sent and no further action is required.

Additional outreach to local Native American tribes and the Native American Heritage Commission was conducted as part of the cultural resources survey for the proposed project (Appendix C).

DISCUSSION:

a-i) Would the proposed project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resource Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

Less than Significant with Mitigation Incorporated. Based on the results of consultation with local Native American tribes, no tribal cultural resources were identified on-site that are listed or eligible for listing on the California Register of Historical Resources or in a local register of historical resources. In addition, the majority of groundwork for the proposed project would occur within previously disturbed areas. However, the possibility remains that the grading and construction phase of the proposed project could result in a substantial adverse change to unknown tribal cultural resources. Implementation of Mitigation Measure TRIBAL-1 would reduce this potentially significant impact to a less-than-significant level.

a-ii) Would the proposed project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resource Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Less than Significant with Mitigation Incorporated. The City of Palo Alto, as the lead agency, has not identified any resources on the site in which they have determined to be significant to a

California Native American tribe. However, the possibility remains that the grading and construction phase of the proposed project could result in a substantial adverse change to unknown tribal cultural resources. Implementation of Mitigation Measure TRIBAL-1 would reduce this potentially significant impact to a less-than-significant level.

Mitigation Measures:

Mitigation Measure TRIBAL-1:

In the event that an unanticipated tribal cultural resource is exposed during project construction, work within 30 feet of the discovery shall stop until a City-approved cultural resources professional can identify and evaluate the significance of the discovery and develop recommendations. Recommendations could include preparation of a Treatment Plan, which could require recordation, collection and analysis of the discovery; preparation of a technical report; and curation of the collection and supporting documentation in an appropriate depository.

Significance after Mitigation: Less than Significant.

R. UTILITIES AND SERVICE SYSTEMS

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Need new or expanded entitlements to water supply?	☐	☐	☒	☐	1
b) Result in adverse physical impacts from new or expanded utility facilities due to increase use as a result of the project?	☐	☒	☐	☐	1
c) Result in a substantial physical deterioration of a utility facility due to increased use as a result of the project?	☐	☐	☐	☒	1
d) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒	1
e) Result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒	1
f) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐	1
g) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐	1
h) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐	1
i) Result in a substantial increase in natural gas and electrical service demands that would require the new construction of energy supply facilities and distribution infrastructure or capacity enhancing alterations to existing facilities?	☐	☐	☒	☐	1

ENVIROMENTAL SETTING:

The project site is located within the City of Palo Alto and the following utility and service agencies that serve the project area are described below:

Water Service

Palo Alto's water supply comes from the San Francisco Public Utilities Commissions (SFPUC). The high quality water supply consists almost entirely of Sierra Nevada snowmelt, and the rest comes from local watersheds in Alameda and Santa Clara counties.[17] The City of Palo Alto and the SFPUC are required by law to adhere to strict health and safety standard for potable drinking water. City staff periodically flush water mains and hydrants with fresh water to prevent the water quality from degrading.[18]

Wastewater Service

Palo Alto is the lead agency of the City's RWQCP partnership. The RWQCP provides wastewater treatment for six agencies (Los Altos, Los Altos Hills, Mountain View, Palo Alto, Stanford University and East Palo Alto Sanitary District). The City is confident that the RWQCP can adequately meet the demands of future needs, according to ABAG's growth projections for the member agencies. Additionally, the City Council recently approved a 25-year master plan for upgrades and expansion of the RWQCP. The RWQCP incinerates sludge collected from its partner agencies and the City of Palo Alto. Palo Alto RWQCP is developing plans to move toward more environmentally conscious biosolid waste management practices.[19]

Stormwater Service

The City's stormwater system is managed and maintained by the City's Public Works Department. Palo Alto is engaged in efforts to ensure they meet new federal and state stormwater management requirements. These efforts include intercepting trash at the downstream ends of the Matadero and Adobe creeks and imposing a new plastic bag ordinance to limit the number of bags that end up in area creeks. The City reports that it is compliant with NPDES standards.[20]

Solid Waste

GreenWaste of Palo Alto has a franchise agreement to provide solid waste services in the City of Palo Alto. Palo Alto offers food waste and green waste and yard trimming disposal, and recycling of mixed paper, bottles, cans and other recyclable materials. According to the City's Comprehensive Plan, the waste stream is transferred to the regional Sunnyvale Material and Recovery Transfer (SMaRT) Station. There, waste is sorted to remove recyclable goods for sale at market rates. Waste that cannot be recycled is deposited at the Kirby Canyon Landfill in San Jose.

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17 *City of Palo Alto Utilities. Out Water Quality Annual Report 2014.*

18 *City of Palo Alto. Water Supply and Quality. Website: http://www.cityofpaloalto.org/gov/depts/utl/business/water/water_supply_and_quality.asp. Accessed: March 30, 2017.*

19 *Santa Clara Local Agency Formation Commission. LAFCO of Santa Clara County: City of Palo Alto. 2014.*

20 *Ibid.*

DISCUSSION:

a) ***Would the proposed project need new or expanded entitlements to water supply?***

Less than Significant Impact. The proposed project includes improvements to wastewater infrastructure for the existing RWQCP and would not require any water once implemented. A dust control plan would be prepared for the proposed project during construction, which may include minor watering. As excavated soils on-site would not be kept for backfill and would be exported off-site, the project would not require dust suppression for large stockpiles on-site. Therefore, the existing water supplies would not need to be adjusted and no new or expanded entitlements would be required. Impacts would be less than significant.

b) ***Would the proposed project result in adverse physical impacts from new or expanded utility facilities due to increase use as a result of the project?***

Less than Significant with Mitigation Incorporated. The proposed project includes infrastructure improvements for the existing RWQCP. These proposed improvements would serve to expand the capacity of the RWQCP to account for future sea level rise and increased wastewater flows. Implementation of these expanded wastewater utilities would result in potentially significant impacts to Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hydrology and Water Quality, Noise, and Transportation and Traffic. However, implementation of the mitigation measures listed within this Initial Study would reduce impacts to a less-than-significant level.

c) ***Would the proposed project result in a substantial physical deterioration of a utility facility due to increased use as a result of the project?***

No Impact. The proposed project includes infrastructure improvements for the existing RWQCP. These improvements include the rehabilitation of an existing deteriorated outfall pipe and failing pump. The improvements also intend to increase capacity of the existing system to address sea level rise and future increases. Neither construction nor operation of these improvements would result in the physical deterioration of a utility facility. No impact would occur.

d) ***Would the proposed project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?***

No Impact. As the proposed project includes improvements to wastewater infrastructure, the proposed project itself would not create any wastewater once implemented, nor would wastewater be generated during construction. The outfall and associated pipeline would convey reclaimed wastewater to an unnamed slough and would continue to operate under the existing wastewater permits of the RWQCP. No impact would occur regarding exceedance of wastewater treatment requirements.

e) ***Would the proposed project result in a determination by the wastewater treatment provider that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments?***

No Impact. As the proposed project includes improvements to wastewater infrastructure, the proposed project itself would not create any wastewater once implemented, nor would wastewater be generated during construction. The proposed project would serve to increase the capacity of the existing RWQCP as the City's wastewater treatment provider. Therefore, the RWQCP would have adequate capacity to serve existing communities and no impact would occur.

f) ***Would the proposed project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?***

Less than Significant Impact. The proposed project includes wastewater infrastructure improvements and would not require any stormwater drainage facilities. The project components would be placed underground and the ground surface would be graded and returned to existing conditions. Although an insubstantial increase in impervious surfaces would occur within the existing levee, the grade and design of the levee would not alteration of drainage patterns or result in erosion impacts. Therefore, no new stormwater drainage facilities or expansion of existing facilities would be required. Impacts would be less than significant.

g) ***Would the proposed project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?***

Less than Significant Impact. The proposed project may generate a small quantity of solid waste during construction; however, the waste would be disposed of or recycled at the appropriate facilities that have adequate capacity. Operation of the proposed wastewater infrastructure improvements would not result in the generation of solid waste. A less-than-significant impact would occur.

h) ***Would the proposed project comply with federal, state, and local statutes and regulations related to solid waste?***

Less than Significant Impact. The proposed project would generate a small amount of solid waste during construction activities; however, all of the waste would be disposed of in accordance to all federal, state and local statues. A less-than-significant impact would occur.

i) ***Would the proposed project result in a substantial increase in natural gas and electrical service demands that would require the new construction of energy supply facilities and distribution infrastructure or capacity enhancing alterations to existing facilities?***

Less than Significant Impact. The proposed project would include the replacement of the existing Renzel Marsh Pump. The replacement pump would use a 30 HP motor, as under existing conditions. However, within five to ten years, the City would increase the power of the pump and would have increased energy usage with a 60 HP motor, as compared to the existing 30 horsepower motor. However, the pump would run at reduced speeds to provide 2 MGD of flow, and would be used for 3 MGD flow in the future to account for future increased wastewater flows. In addition, the replacement pump would include a new variable frequency drive that would allow for variation in pump speeds, resulting in long-term energy efficient operation. Therefore, the proposed project would not result in a substantial increase in electrical service demand that would require the construction of new or enhancement of existing facilities. The proposed project does not include the use of natural gas. Therefore, impacts would be less than significant.

Mitigation Measures: None required.

S. ENERGY CONSERVATION

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Would the proposed project have an energy impact? Energy impacts may include:	☐	☐	☒	☐	**1**
i) impacts resulting from amount and fuel type used for each stage of the project	☐	☐	☒	☐	**1**
ii) impacts on local and regional energy supplies and on requirements for additional capacity	☐	☐	☒	☐	**1**
iii) impacts on peak and base period demands for electricity and other forms of energy	☐	☐	☒	☐	**1**
iv) impacts to energy resources	☐	☐	☒	☐	**1**
v) impacts resulting from the project's projected transportation energy use requirements	☐	☐	☒	☐	**1**

DISCUSSION:

a) Would the proposed project have an energy impact? Energy impacts may include:

i. impacts resulting from amount and fuel type used for each stage of the project

ii. impacts on local and regional energy supplies and on requirements for additional capacity

iii. impacts on peak and base period demands for electricity and other forms of energy

iv. impacts to energy resources

v. impacts resulting from the project's projected transportation energy use requirements

Less than Significant Impact. The proposed project includes improvements to wastewater infrastructure for the existing RWQCP. Construction of the proposed project would require the use of construction equipment and fuel and electricity. Transportation energy use would also result from construction activities including trucks used to export excavated materials as well as construction worker vehicle trips. Energy usage related to project construction would be minor and temporary in nature, as construction activities would be phased and are only expected to occur for nine months. Operation of the proposed project would include minimal increased energy usage as the replacement pump for the Renzel Marsh Pump would be 30 HP as under existing conditions. However, within five to ten years the City would increase the pump power to 60 HP. This pump would run at reduced speeds to provide 2 MGD of flow, and would be used for 3 MGD flow in the future to account for future increased wastewater flows. In addition, the replacement pump would include a new variable frequency drive that would allow for variation in pump speeds, resulting in long-term energy efficient operation. Energy use during the construction and operation phases of the project would not result in a substantial adverse impact related to the amount of fuel required, local or regional energy supplies, peak period demands for electricity or other forms of energy, or impacts to energy resources. Impacts would be less than significant.

Mitigation Measures: None required.

T. MANDATORY FINDINGS OF SIGNIFICANCE

Issues and Supporting Information Resources Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact	Sources
a) Does the project have the potential to 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, 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?	☐	☒	☐	☐	1
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)?	☐	☒	☐	☐	1
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐	1

DISCUSSION:

a) ***Does the project have the potential to 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, 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 with Mitigation Incorporated. As stated above, the project site may have suitable habitat for three special-status plants and for special-status wildlife species including SMHS, CRR, CBR, and Burrowing Owl. Implementation of Mitigation Measure BIO-1, BIO-2, BIO-3 and BIO-4 would reduce potentially significant impacts to these special-status species to less than significant. Other special-status wildlife species with the potential to occur within the project site include special-status fish species that may occur incidentally within the unnamed slough at the proposed outfall location. Implementation of Mitigation Measure BIO-5 would reduce potentially significant impacts to special-status fish species to less than significant.

Furthermore, no historic or prehistoric resources have been identified on the site. Implementation of Mitigation Measure CULT-1 would reduce any potentially significant impacts to buried cultural resources and tribal cultural resources in the event of unanticipated discovery.

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 with Mitigation Incorporated. The proposed project includes mitigation measures to minimize the temporary impacts of construction activities, and no long-term adverse impacts are anticipated. As presented in the analysis for Air Quality, Biological Resources, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Public Service, Transportation and Traffic, and Utilities and Service Systems any potentially significant impacts have been reduced to less-than-significant levels.

Section 15130 of the CEQA Guidelines requires an evaluation of potential environmental impacts when the project's incremental effect is cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual 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. These impacts can result from a combination of the proposed project together with other projects causing related impacts. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects.

A significant impact may occur if a project, in conjunction with other related projects in the area of the project, would result in impacts which are less than significant when viewed separately, but would be significant when viewed together. The project includes mitigation measure to minimize temporary impacts of construction activities, and no long-term adverse impacts are anticipated. With these measures, the project would result in individually minor impacts and would not contribute substantially to cumulative impacts in conjunction with the implementation of other projects in the area such as the SFCJPA levee enhancement project and the Palo Alto Airport paving project. As discussed in the Project Description, the City has coordinated with the SFCJPA to ensure no cumulative impacts would occur with implementation of the proposed project and the proposed future levee enhancement project. The Airport paving project is anticipated to be finished prior to implementation of the proposed project and would be a minor effort that would not result in any cumulative impacts. Therefore, impacts would remain project specific in nature and would be less than significant with the incorporation of the mitigation measures included in this Initial Study.

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

Less than Significant with Mitigation Incorporated. Construction related impacts to Air Quality, Geology and Soils, Hazardous and Hazardous Materials, Noise, and Traffic and Transportation have the potential to cause substantial adverse impacts to human beings. With implementation of the various construction measures, BMPs, and Mitigation Measures included in this Initial Study, the proposed project would not result in substantial adverse effects to human beings, either directly or indirectly.

SOURCE REFERENCES

1. Professional judgment and expertise of the environmental/technical specialists evaluating the project, based on a review of existing conditions and project details, including standard construction measures

2. City of Palo Alto Comprehensive Plan (2017)

3. City of Palo Alto Zoning Map and Municipal Code

4. Palo Alto Baylands Master Plan (2008)

5. Caltrans Scenic Highway Program

6. California Department of Conservation, Division of Land Resource Protection (2012) Santa Clara County Important Farmland Map 2012. Farmland Mapping and Monitoring Program

7. California Department of Conservation, Division of Land Resources Protection (2016) Santa Clara County Williamson Act FY 2015/2016.

8. 2017 Bay Area Air Quality Management District (BAAQMD) Clean Air Plan (CAP), 2017 BAAQMD CEQA Guidelines

9. NPDES Permit (2014)

10. Santa Clara Valley Urban Runoff Pollution Prevention Program (2004) Urban Runoff Management Plan

11. WRA Biological Report (2017)

12. San Francisco Estuary Project (2016) Comprehensive Conservation and Management Plan

13. Association of Bay Area Governments (ABAG) (2015) Resilience Program Hazard Mapping

14. Department of Toxic Substances (2016) EnviroStor Cleanup Sites or Hazardous Waste Facilities Database

15. Palo Alto Airport Land Use Compatibility Plan

16. Federal Emergency Management Agency (FEMA) (2009) Flood Insurance Rate Map (FIRM)

17. McMillen Jacobs Associates (2017) Geotechnical Engineering Investigation Report

18. Tom Origer & Associates (Origer) (2017) Historical Resources Study for the City of Palo Alto Regional Water Quality Control Plant's New 63-Inch Outfall Project

19. Illingworth & Rodkin (2017) Regional Water Quality Control Plant Air Quality and Greenhouse Gas Emissions.

DETERMINATION

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	X
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed project MAY have a "potentially significant impact" or "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 proposed 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 proposed project, nothing further is required.	

<Note: Project Planner signs upon completion of analysis but Director shall sign when the Negative Declaration or Mitigated Negative Declaration is adopted - after circulation, comment period over>

Tom Kagawalli ______________________ 12-18-17 ______________

Project Planner **Date**

______________________ ______________

Director of Planning and **Date**

Community Environment

APPENDIX A

REGIONAL WATER QUALITY CONTROL PLANT NEW OUTFALL PROJECT AIR QUALITY AND GREENHOUSE GAS EMISSIONS

Project Name: **RWQCP New Outfall Project**

Project Size **2,402** **LF pipe** **2.4** **total project acres disturbed**

38,120 **s.f. paved area**

Qty	Description	HP	Load Factor	Dates	Hours/day	Total Work Days	Avg. Hours per day	Annual Hours	Construction Hours	Comments
	New Outfall									
	Site Preparation	**Start Date:**		**7/8/2019**	**Total phase:**	**20**			**8am-6pm**	**Overall Import/Export Volumes**
		End Date:		**8/2/2019**						
1	Medium Size Graders				10	10	5	100		
1	Tractors/Loaders/Backhoes				10	5	2.5	50		
1	Medium Size On-highway Truck				10	5	2.5	50		
	Open Cut Pipe Installation Cross Embarcadero Road	**Start Date:**		**8/5/2019**	**Total phase:**	**20**			**9:30am-3:30pm**	
	Station 3+47 to Station 4+50	**End Date:**		**8/31/2019**						
1	Asphalt Pavement Saw				6	1	0.3	6		**Hauling Volume**
2	Medium to Large Size Dump Truck				6	20	6	240		Soil Export Volume = **426** cubic yards
1	Medium to Large size Excavators				6	15	4.5	90		Concrete Import Volume = **308** cubic yards
1	Tractors/Loaders/Backhoes				6	20	6	120		AC/AB Pavement demolished and hauled: **35 cubic yards**
1	Medium to Large size Pipe layer				6	16	4.8	96		AC/AB pavement Import Volume : **35 cubic yards**
1	Small Size Road Roller				6	2	0.6	12		
1	HPDE Fusing Machine				6	2	0.6	12		**Cement Trucks: 28 Total Round-Trips**
1	Large Flatbed Truck				6	2	0.6	12		
2	Medium Size Concrete Truck				6	5	1.5	60		
1	Medium Size Graders				6	5	1.5	30		
	Open Cut Pipe Installation on Paved Surface	**Start Date:**		**9/2/2019**	**Total phase:**	**30**			**8am-6pm**	
	Station 4+50 to Station 13+00	**End Date:**		**10/11/2019**						
1	Asphalt Pavement Saw				10	1	0.3	10		**Hauling Volume**
2	Medium to Large Size Dump Truck				10	30	10	600		Soil Export Volume = **3,520** cubic yards
1	Medium to Large size Excavators				10	30	10	300		Concrete Import Volume = **2,545** cubic yards
1	Tractors/Loaders/Backhoes				10	30	10	300		AC/AB Pavement demolished and hauled: **290 cubic yards**
1	Medium to Large size Pipe layer				10	20	6.7	200		AC/AB pavement Import Volume : **290 cubic yards**
1	Small Size Road Roller				10	5	1.7	50		
1	HPDE Fusing Machine				10	5	1.7	50		**Cement Trucks: 255 Total Round-Trips**
1	Large Flatbed Truck				5	20	3.3	100		
2	Medium Size Concrete Truck				10	20	6.7	400		
1	Medium Size Graders				10	30	10	300		
	Open Cut Pipe Installation on Unpaved Surface - Nighttime work	**Start Date:**		**10/16/2019**	**Total phase:**	**20**			**9pm-6am**	
	Station 13+00 to Station 26+00	**End Date:**		**11/12/2019**						
2	Medium to Large Size Dump Truck				8	20	8	320		**Hauling Volume**
1	Medium to Large Size Excavators				8	20	8	160		Soil Export Volume = **3,580** cubic yards
1	Tractors/Loaders/Backhoes				8	20	8	160		Concrete Import Volume = **2,540** cubic yards
1	HPDE Fusing Machine				8	5	2	40		
1	Large Flatbed Truck				5	15	3.75	75		
2	Medium Size Concrete Truck				8	20	8	320		
1	Medium to Large Size Pipe layer				8	20	8	160		**Cement Trucks: 254 Total Round-Trips**
1	Medium Size Graders				8	10	4	80		
	Open Cut Pipe Installation on Unpaved Surface - Daytime Work with Height Restriction	**Start Date:**		**10/30/2019**	**Total phase:**	**10**			**8am-6pm**	
	Station 26+00 to Station 27+49	**End Date:**		**11/12/2019**						
2	Medium to Large Size Dump Truck				10	10	10	200		**Soil Hauling Volume**
1	Medium to Large Size Excavators				10	10	10	100		Export volume = **640** cubic yards.
1	Tractors/Loaders/Backhoes				10	10	10	100		Import volume = **520** cubic yards.
1	HPDE Fusing Machine				8	1	0.8	8		
1	Large Flatbed Truck				10	1	1	10		
2	Medium Size Concrete Truck				5	2	1	20		**Cement Trucks: 52 Total Round-Trips**
1	Medium to Large Size Pipe layer				10	5	5	50		
1	Medium Size Graders				10	5	5	50		
	Renzel Pump									
	Renzel Pump Installation	**Start Date:**		**7/8/2019**	**Total phase:**	**60**			**8am-6pm**	
		End Date:		**9/27/2019**						
1	Small Size BobCat Excavator				10	10	1.7	100		
1	Small Size Link Belt Boom Truck				10	10	1.7	100		
	Existing Outfall Rehabilitation									
	Existing Outfall Rehabilitation	**Start Date:**		**11/14/2019**	**Total phase:**	**30**			**8am-6pm**	
		End Date:		**12/25/2019**						
1	Medium to Large Size On-highway Truck				10	30	10	300		

RWQCP New Outfall Project Construction

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	2.40	38,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 38,120 sf represents area for paving

Construction Phase - anticipated phasing schedule provided by project applicant

Off-road Equipment -

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Off-road Equipment - Proposed equipment provided by applicant

Grading -

Trips and VMT - Embarcadeo: 804cy material + 56 cement =158 trips. Paved: 6,645cy material + 510 cement = 1,342. Nighttime: 6,120cy material + 508 cement = 1,274. Day: 1,160cy + 104 cement = 250. Bldg: 3 vendor trips/day

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	60.00
tblConstructionPhase	NumDays	6.00	20.00
tblConstructionPhase	NumDays	10.00	30.00
tblConstructionPhase	PhaseEndDate	7/7/2019	9/27/2019
tblConstructionPhase	PhaseEndDate	7/7/2019	8/2/2019
tblConstructionPhase	PhaseEndDate	7/7/2019	10/11/2019
tblConstructionPhase	PhaseStartDate	7/8/2019	9/2/2019
tblLandUse	BuildingSpaceSquareFeet	0.00	38,120.00
tblLandUse	LandUseSquareFeet	0.00	38,120.00
tblLandUse	LotAcreage	0.00	2.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
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tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	LoadFactor	0.34	0.34
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tblOffRoadEquipment	LoadFactor	0.34	0.34

tblOffRoadEquipment	LoadFactor	0.41	0.41
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tblOffRoadEquipment	LoadFactor	0.34	0.34
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tblOffRoadEquipment	LoadFactor	0.38	0.38
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tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Rollers
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment

tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
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tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Aerial Lifts
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tblOffRoadEquipment	UsageHours	8.00	5.00
tblProjectCharacteristics	OperationalYear	2018	2021
tblTripsAndVMT	HaulingTripNumber	0.00	1,342.00
tblTripsAndVMT	HaulingTripNumber	0.00	158.00
tblTripsAndVMT	HaulingTripNumber	0.00	1,274.00
tblTripsAndVMT	HaulingTripNumber	0.00	250.00
tblTripsAndVMT	VendorTripNumber	6.00	3.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0861	1.2149	0.6381	2.3600e-003	0.0395	0.0362	0.0757	0.0102	0.0334	0.0436	0.0000	220.4904	220.4904	0.0351	0.0000	221.3669
Maximum	**0.0861**	**1.2149**	**0.6381**	**2.3600e-003**	**0.0395**	**0.0362**	**0.0757**	**0.0102**	**0.0334**	**0.0436**	**0.0000**	**220.4904**	**220.4904**	**0.0351**	**0.0000**	**221.3669**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.0861	1.2149	0.6381	2.3600e-003	0.0395	0.0362	0.0757	0.0102	0.0334	0.0436	0.0000	220.4903	220.4903	0.0351	0.0000	221.3668
Maximum	**0.0861**	**1.2149**	**0.6381**	**2.3600e-003**	**0.0395**	**0.0362**	**0.0757**	**0.0102**	**0.0334**	**0.0436**	**0.0000**	**220.4903**	**220.4903**	**0.0351**	**0.0000**	**221.3668**

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

Quarter	**Start Date**	**End Date**	**Maximum Unmitigated ROG + NOX (tons/quarter)**	**Maximum Mitigated ROG + NOX (tons/quarter)**
1	**7-8-2019**	**9-30-2019**	0.1091	0.1091
		Highest	0.1091	0.1091

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Building Construction	Building Construction	7/8/2019	9/27/2019	5	60	
2	Site Prep/Grading	Grading	7/8/2019	8/2/2019	5	20	
3	Open Cut - Paved Surface	Paving	9/2/2019	10/11/2019	5	30	
4	Open Cut - Embarcadero	Trenching	8/5/2019	8/30/2019	5	20	
5	Open Cut - Nighttime	Trenching	10/16/2019	11/12/2019	5	20	
6	Open Cut - Daytime	Trenching	10/30/2019	11/12/2019	5	10	
7	Existing Outfall Rehabilitation	Trenching	11/14/2019	12/25/2019	5	30	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Prep/Grading	Off-Highway Trucks	1	2.50	402	0.38
Open Cut - Paved Surface	Cement and Mortar Mixers	0	8.00	9	0.56
Open Cut - Embarcadero	Concrete/Industrial Saws	1	0.30	81	0.73
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Cranes	0	8.00	231	0.29
Building Construction	Forklifts	0	7.00	89	0.20
Open Cut - Embarcadero	Excavators	1	4.50	158	0.38
Open Cut - Paved Surface	Pavers	0	8.00	130	0.42
Open Cut - Paved Surface	Rollers	1	1.70	80	0.38
Open Cut - Embarcadero	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Site Prep/Grading	Rubber Tired Dozers	0	8.00	247	0.40

Building Construction	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Open Cut - Embarcadero	Other General Industrial Equipment	1	4.80	88	0.34
Site Prep/Grading	Tractors/Loaders/Backhoes	1	2.50	97	0.37
Open Cut - Paved Surface	Tractors/Loaders/Backhoes	1	10.00	97	0.37
Open Cut - Embarcadero	Rollers	1	0.60	80	0.38
Site Prep/Grading	Graders	1	5.00	187	0.41
Open Cut - Paved Surface	Paving Equipment	0	8.00	132	0.36
Open Cut - Embarcadero	Other General Industrial Equipment	1	0.60	88	0.34
Building Construction	Welders	0	8.00	46	0.45
Open Cut - Embarcadero	Graders	1	1.50	187	0.41
Open Cut - Paved Surface	Concrete/Industrial Saws	1	0.30	81	0.73
Open Cut - Paved Surface	Excavators	1	10.00	158	0.38
Open Cut - Paved Surface	Other General Industrial Equipment	1	6.70	88	0.34
Open Cut - Paved Surface	Other General Industrial Equipment	1	1.70	88	0.34
Open Cut - Paved Surface	Graders	1	10.00	187	0.41
Open Cut - Nighttime	Excavators	1	8.00	158	0.38
Open Cut - Nighttime	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Open Cut - Nighttime	Other General Industrial Equipment	1	2.00	88	0.34
Open Cut - Nighttime	Other General Industrial Equipment	1	8.00	88	0.34
Open Cut - Nighttime	Graders	1	4.00	187	0.41
Open Cut - Daytime	Excavators	1	10.00	158	0.38
Open Cut - Daytime	Tractors/Loaders/Backhoes	1	10.00	97	0.37
Open Cut - Daytime	Other General Industrial Equipment	1	0.80	88	0.34
Open Cut - Daytime	Other General Industrial Equipment	1	5.00	88	0.34
Open Cut - Daytime	Graders	1	5.00	187	0.41
Building Construction	Excavators	1	1.70	158	0.38
Building Construction	Aerial Lifts	1	1.70	63	0.31
Existing Outfall Rehabilitation	Off-Highway Trucks	1	10.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Open Cut - Embarcadero	7	18.00	0.00	158.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	2	16.00	3.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Open Cut - Nighttime	5	13.00	0.00	1,274.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Prep/Grading	3	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Open Cut - Paved Surface	7	18.00	0.00	1,342.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Open Cut - Daytime	5	13.00	0.00	250.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Existing Outfall Rehabilitation	1	3.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.9300e-003	0.0215	0.0278	4.0000e-005		9.3000e-004	9.3000e-004		8.6000e-004	8.6000e-004	0.0000	3.9266	3.9266	1.2400e-003	0.0000	3.9576
Total	**1.9300e-003**	**0.0215**	**0.0278**	**4.0000e-005**		**9.3000e-004**	**9.3000e-004**		**8.6000e-004**	**8.6000e-004**	**0.0000**	**3.9266**	**3.9266**	**1.2400e-003**	**0.0000**	**3.9576**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.4000e-004	0.0114	3.0500e-003	2.0000e-005	5.9000e-004	8.0000e-005	6.7000e-004	1.7000e-004	8.0000e-005	2.5000e-004	0.0000	2.3675	2.3675	1.2000e-004	0.0000	2.3704
Worker	1.7400e-003	1.3000e-003	0.0134	4.0000e-005	3.8100e-003	3.0000e-005	3.8300e-003	1.0100e-003	2.0000e-005	1.0400e-003	0.0000	3.3700	3.3700	9.0000e-005	0.0000	3.3723
Total	**2.1800e-003**	**0.0127**	**0.0165**	**6.0000e-005**	**4.4000e-003**	**1.1000e-004**	**4.5000e-003**	**1.1800e-003**	**1.0000e-004**	**1.2900e-003**	**0.0000**	**5.7375**	**5.7375**	**2.1000e-004**	**0.0000**	**5.7427**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.9300e-003	0.0215	0.0278	4.0000e-005		9.3000e-004	9.3000e-004		8.6000e-004	8.6000e-004	0.0000	3.9266	3.9266	1.2400e-003	0.0000	3.9576
Total	**1.9300e-003**	**0.0215**	**0.0278**	**4.0000e-005**		**9.3000e-004**	**9.3000e-004**		**8.6000e-004**	**8.6000e-004**	**0.0000**	**3.9266**	**3.9266**	**1.2400e-003**	**0.0000**	**3.9576**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	4.4000e-004	0.0114	3.0500e-003	2.0000e-005	5.9000e-004	8.0000e-005	6.7000e-004	1.7000e-004	8.0000e-005	2.5000e-004	0.0000	2.3675	2.3675	1.2000e-004	0.0000	2.3704

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Worker	1.7400e-003	1.3000e-003	0.0134	4.0000e-005	3.8100e-003	3.0000e-005	3.8300e-003	1.0100e-003	2.0000e-005	1.0400e-003	0.0000	3.3700	3.3700	9.0000e-005	0.0000	3.3723
Total	**2.1800e-003**	**0.0127**	**0.0165**	**6.0000e-005**	**4.4000e-003**	**1.1000e-004**	**4.5000e-003**	**1.1800e-003**	**1.0000e-004**	**1.2900e-003**	**0.0000**	**5.7375**	**5.7375**	**2.1000e-004**	**0.0000**	**5.7427**

3.3 Site Prep/Grading - 2019

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.3100e-003	0.0000	3.3100e-003	3.6000e-004	0.0000	3.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0000e-003	0.0710	0.0312	9.0000e-005		2.6300e-003	2.6300e-003		2.4200e-003	2.4200e-003	0.0000	8.3264	8.3264	2.6300e-003	0.0000	8.3923
Total	**6.0000e-003**	**0.0710**	**0.0312**	**9.0000e-005**	**3.3100e-003**	**2.6300e-003**	**5.9400e-003**	**3.6000e-004**	**2.4200e-003**	**2.7800e-003**	**0.0000**	**8.3264**	**8.3264**	**2.6300e-003**	**0.0000**	**8.3923**

<u>Unmitigated Construction Off-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.2000e-004	2.2300e-003	1.0000e-005	6.3000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5617	0.5617	2.0000e-005	0.0000	0.5621
Total	**2.9000e-004**	**2.2000e-004**	**2.2300e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.4000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5617**	**0.5617**	**2.0000e-005**	**0.0000**	**0.5621**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.3100e-003	0.0000	3.3100e-003	3.6000e-004	0.0000	3.6000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0000e-003	0.0710	0.0312	9.0000e-005		2.6300e-003	2.6300e-003		2.4200e-003	2.4200e-003	0.0000	8.3264	8.3264	2.6300e-003	0.0000	8.3923
Total	**6.0000e-003**	**0.0710**	**0.0312**	**9.0000e-005**	**3.3100e-003**	**2.6300e-003**	**5.9400e-003**	**3.6000e-004**	**2.4200e-003**	**2.7800e-003**	**0.0000**	**8.3264**	**8.3264**	**2.6300e-003**	**0.0000**	**8.3923**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.9000e-004	2.2000e-004	2.2300e-003	1.0000e-005	6.3000e-004	0.0000	6.4000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5617	0.5617	2.0000e-005	0.0000	0.5621
Total	**2.9000e-004**	**2.2000e-004**	**2.2300e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.4000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5617**	**0.5617**	**2.0000e-005**	**0.0000**	**0.5621**

3.4 Open Cut - Paved Surface - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Off-Road	0.0235	0.2641	0.1791	3.3000e-004		0.0128	0.0128		0.0118	0.0118	0.0000	29.8133	29.8133	9.3600e-003	0.0000	30.0472
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0235**	**0.2641**	**0.1791**	**3.3000e-004**		**0.0128**	**0.0128**		**0.0118**	**0.0118**	**0.0000**	**29.8133**	**29.8133**	**9.3600e-003**	**0.0000**	**30.0472**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1000e-003	0.2089	0.0413	5.3000e-004	0.0114	8.0000e-004	0.0122	3.1300e-003	7.7000e-004	3.8900e-003	0.0000	51.7103	51.7103	2.4200e-003	0.0000	51.7708
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	7.3000e-004	7.5400e-003	2.0000e-005	2.1400e-003	1.0000e-005	2.1600e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.8956	1.8956	5.0000e-005	0.0000	1.8969
Total	**7.0800e-003**	**0.2096**	**0.0488**	**5.5000e-004**	**0.0135**	**8.1000e-004**	**0.0143**	**3.7000e-003**	**7.8000e-004**	**4.4700e-003**	**0.0000**	**53.6059**	**53.6059**	**2.4700e-003**	**0.0000**	**53.6678**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0235	0.2641	0.1791	3.3000e-004		0.0128	0.0128		0.0118	0.0118	0.0000	29.8133	29.8133	9.3600e-003	0.0000	30.0472
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	0.0235	0.2641	0.1791	3.3000e-004		0.0128	0.0128		0.0118	0.0118	0.0000	29.8133	29.8133	9.3600e-003	0.0000	30.0472

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	6.1000e-003	0.2089	0.0413	5.3000e-004	0.0114	8.0000e-004	0.0122	3.1300e-003	7.7000e-004	3.8900e-003	0.0000	51.7103	51.7103	2.4200e-003	0.0000	51.7708
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.8000e-004	7.3000e-004	7.5400e-003	2.0000e-005	2.1400e-003	1.0000e-005	2.1600e-003	5.7000e-004	1.0000e-005	5.8000e-004	0.0000	1.8956	1.8956	5.0000e-005	0.0000	1.8969
Total	**7.0800e-003**	**0.2096**	**0.0488**	**5.5000e-004**	**0.0135**	**8.1000e-004**	**0.0143**	**3.7000e-003**	**7.8000e-004**	**4.4700e-003**	**0.0000**	**53.6059**	**53.6059**	**2.4700e-003**	**0.0000**	**53.6678**

3.5 Open Cut - Embarcadero - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2500e-003	0.0640	0.0556	9.0000e-005		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	7.7567	7.7567	2.4000e-003	0.0000	7.8168
Total	**6.2500e-003**	**0.0640**	**0.0556**	**9.0000e-005**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**7.7567**	**7.7567**	**2.4000e-003**	**0.0000**	**7.8168**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.2000e-004	0.0246	4.8600e-003	6.0000e-005	1.3400e-003	9.0000e-005	1.4300e-003	3.7000e-004	9.0000e-005	4.6000e-004	0.0000	6.0881	6.0881	2.9000e-004	0.0000	6.0952
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.9000e-004	5.0300e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2638	1.2638	3.0000e-005	0.0000	1.2646
Total	**1.3700e-003**	**0.0251**	**9.8900e-003**	**7.0000e-005**	**2.7700e-003**	**1.0000e-004**	**2.8700e-003**	**7.5000e-004**	**1.0000e-004**	**8.5000e-004**	**0.0000**	**7.3518**	**7.3518**	**3.2000e-004**	**0.0000**	**7.3598**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	6.2500e-003	0.0640	0.0556	9.0000e-005		3.7100e-003	3.7100e-003		3.4200e-003	3.4200e-003	0.0000	7.7566	7.7566	2.4000e-003	0.0000	7.8168
Total	**6.2500e-003**	**0.0640**	**0.0556**	**9.0000e-005**		**3.7100e-003**	**3.7100e-003**		**3.4200e-003**	**3.4200e-003**	**0.0000**	**7.7566**	**7.7566**	**2.4000e-003**	**0.0000**	**7.8168**

Mitigated Construction Off-Site

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

Hauling	7.2000e-004	0.0246	4.8600e-003	6.0000e-005	1.3400e-003	9.0000e-005	1.4300e-003	3.7000e-004	9.0000e-005	4.6000e-004	0.0000	6.0881	6.0881	2.9000e-004	0.0000	6.0952
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.5000e-004	4.9000e-004	5.0300e-003	1.0000e-005	1.4300e-003	1.0000e-005	1.4400e-003	3.8000e-004	1.0000e-005	3.9000e-004	0.0000	1.2638	1.2638	3.0000e-005	0.0000	1.2646
Total	**1.3700e-003**	**0.0251**	**9.8900e-003**	**7.0000e-005**	**2.7700e-003**	**1.0000e-004**	**2.8700e-003**	**7.5000e-004**	**1.0000e-004**	**8.5000e-004**	**0.0000**	**7.3518**	**7.3518**	**3.2000e-004**	**0.0000**	**7.3598**

3.6 Open Cut - Nighttime - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0107	0.1128	0.0902	1.5000e-004		6.1800e-003	6.1800e-003		5.6900e-003	5.6900e-003	0.0000	13.3015	13.3015	4.2100e-003	0.0000	13.4068
Total	**0.0107**	**0.1128**	**0.0902**	**1.5000e-004**		**6.1800e-003**	**6.1800e-003**		**5.6900e-003**	**5.6900e-003**	**0.0000**	**13.3015**	**13.3015**	**4.2100e-003**	**0.0000**	**13.4068**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.7900e-003	0.1983	0.0392	5.1000e-004	0.0108	7.6000e-004	0.0116	2.9700e-003	7.3000e-004	3.7000e-003	0.0000	49.0901	49.0901	2.3000e-003	0.0000	49.1476
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.5000e-004	3.6300e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0400e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9127	0.9127	2.0000e-005	0.0000	0.9133

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Total	**6.2600e-003**	**0.1987**	**0.0428**	**5.2000e-004**	**0.0118**	**7.7000e-004**	**0.0126**	**3.2400e-003**	**7.4000e-004**	**3.9800e-003**	**0.0000**	**50.0028**	**50.0028**	**2.3200e-003**	**0.0000**	**50.0609**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0107	0.1128	0.0902	1.5000e-004		6.1800e-003	6.1800e-003		5.6900e-003	5.6900e-003	0.0000	13.3015	13.3015	4.2100e-003	0.0000	13.4067
Total	**0.0107**	**0.1128**	**0.0902**	**1.5000e-004**		**6.1800e-003**	**6.1800e-003**		**5.6900e-003**	**5.6900e-003**	**0.0000**	**13.3015**	**13.3015**	**4.2100e-003**	**0.0000**	**13.4067**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.7900e-003	0.1983	0.0392	5.1000e-004	0.0108	7.6000e-004	0.0116	2.9700e-003	7.3000e-004	3.7000e-003	0.0000	49.0901	49.0901	2.3000e-003	0.0000	49.1476
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.7000e-004	3.5000e-004	3.6300e-003	1.0000e-005	1.0300e-003	1.0000e-005	1.0400e-003	2.7000e-004	1.0000e-005	2.8000e-004	0.0000	0.9127	0.9127	2.0000e-005	0.0000	0.9133
Total	**6.2600e-003**	**0.1987**	**0.0428**	**5.2000e-004**	**0.0118**	**7.7000e-004**	**0.0126**	**3.2400e-003**	**7.4000e-004**	**3.9800e-003**	**0.0000**	**50.0028**	**50.0028**	**2.3200e-003**	**0.0000**	**50.0609**

3.7 Open Cut - Daytime - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	5.5600e-003	0.0605	0.0479	8.0000e-005		3.1000e-003	3.1000e-003		2.8500e-003	2.8500e-003	0.0000	7.3455	7.3455	2.3200e-003	0.0000	7.4036
Total	**5.5600e-003**	**0.0605**	**0.0479**	**8.0000e-005**		**3.1000e-003**	**3.1000e-003**		**2.8500e-003**	**2.8500e-003**	**0.0000**	**7.3455**	**7.3455**	**2.3200e-003**	**0.0000**	**7.4036**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1400e-003	0.0389	7.6900e-003	1.0000e-004	2.1200e-003	1.5000e-004	2.2700e-003	5.8000e-004	1.4000e-004	7.3000e-004	0.0000	9.6331	9.6331	4.5000e-004	0.0000	9.6443
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.8000e-004	1.8200e-003	1.0000e-005	5.2000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4564	0.4564	1.0000e-005	0.0000	0.4567
Total	**1.3800e-003**	**0.0391**	**9.5100e-003**	**1.1000e-004**	**2.6400e-003**	**1.5000e-004**	**2.7900e-003**	**7.2000e-004**	**1.4000e-004**	**8.7000e-004**	**0.0000**	**10.0894**	**10.0894**	**4.6000e-004**	**0.0000**	**10.1010**

Mitigated Construction On-Site

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

Off-Road	5.5600e-003	0.0605	0.0479	8.0000e-005		3.1000e-003	3.1000e-003		2.8500e-003	2.8500e-003	0.0000	7.3455	7.3455	2.3200e-003	0.0000	7.4036
Total	**5.5600e-003**	**0.0605**	**0.0479**	**8.0000e-005**		**3.1000e-003**	**3.1000e-003**		**2.8500e-003**	**2.8500e-003**	**0.0000**	**7.3455**	**7.3455**	**2.3200e-003**	**0.0000**	**7.4036**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.1400e-003	0.0389	7.6900e-003	1.0000e-004	2.1200e-003	1.5000e-004	2.2700e-003	5.8000e-004	1.4000e-004	7.3000e-004	0.0000	9.6331	9.6331	4.5000e-004	0.0000	9.6443
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.8000e-004	1.8200e-003	1.0000e-005	5.2000e-004	0.0000	5.2000e-004	1.4000e-004	0.0000	1.4000e-004	0.0000	0.4564	0.4564	1.0000e-005	0.0000	0.4567
Total	**1.3800e-003**	**0.0391**	**9.5100e-003**	**1.1000e-004**	**2.6400e-003**	**1.5000e-004**	**2.7900e-003**	**7.2000e-004**	**1.4000e-004**	**8.7000e-004**	**0.0000**	**10.0894**	**10.0894**	**4.6000e-004**	**0.0000**	**10.1010**

3.8 Existing Outfall Rehabilitation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0134	0.1355	0.0753	2.5000e-004		4.9300e-003	4.9300e-003		4.5300e-003	4.5300e-003	0.0000	22.3554	22.3554	7.0700e-003	0.0000	22.5322
Total	**0.0134**	**0.1355**	**0.0753**	**2.5000e-004**		**4.9300e-003**	**4.9300e-003**		**4.5300e-003**	**4.5300e-003**	**0.0000**	**22.3554**	**22.3554**	**7.0700e-003**	**0.0000**	**22.5322**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	1.2000e-004	1.2600e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3159	0.3159	1.0000e-005	0.0000	0.3162
Total	**1.6000e-004**	**1.2000e-004**	**1.2600e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3159**	**0.3159**	**1.0000e-005**	**0.0000**	**0.3162**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0134	0.1355	0.0753	2.5000e-004		4.9300e-003	4.9300e-003		4.5300e-003	4.5300e-003	0.0000	22.3553	22.3553	7.0700e-003	0.0000	22.5322
Total	**0.0134**	**0.1355**	**0.0753**	**2.5000e-004**		**4.9300e-003**	**4.9300e-003**		**4.5300e-003**	**4.5300e-003**	**0.0000**	**22.3553**	**22.3553**	**7.0700e-003**	**0.0000**	**22.5322**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	1.2000e-004	1.2600e-003	0.0000	3.6000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3159	0.3159	1.0000e-005	0.0000	0.3162
Total	**1.6000e-004**	**1.2000e-004**	**1.2600e-003**	**0.0000**	**3.6000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3159**	**0.3159**	**1.0000e-005**	**0.0000**	**0.3162**

APPENDIX B

BIOLOGICAL RESOURCES SURVEY REPORT

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Biological Resources Survey Report

RWQCP Primary Outfall Line Design
Palo Alto, California

Prepared for:
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Contact:
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Date:
June 2017

Revised:
November 2017

ENVIRONMENTAL CONSULTANTS

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1.0 INTRODUCTION

The purpose of this Biological Resources Survey Report is to provide an overview of biological resource constraints in the vicinity of the City of Palo Alto Regional Water Quality Control Plant (RWQCP) and adjacent baylands. This report includes a description of the biological communities, findings from the wetland survey, and an evaluation of other biological or permitting constraints that warrant special scheduling, best management practices, or other special treatment during construction. This report will also provide an analysis of the anticipated methods for managing these constraints during construction based on the current conceptual project design. This information can also be used in the environmental analysis for the proposed RWCQP Primary Outfall Line Design Project (Project) or subsequent projects within the surveyed area pursuant to the California Environmental Quality Act (CEQA).

An approximately 27-acre Study Area was surveyed during a site visit by WRA biologists on March 27, 2017 (Figures 1 and 2) and by a WRA arborist on May 2, 2017. The Study Area includes part of the RWQCP, land adjacent to the Palo Alto Duck Pond, a parking lot of the City of Palo Alto Airport, a levee berm that runs along the airport, and the existing RWQCP outfall in an unnamed slough below the San Francisquito Creek Trail.

Based on our review of the Study Area, the primary biological resources and permitting concerns include: (1) restoration of temporary construction impacts to wetlands; (2) avoidance and minimization of potential impacts to salt marsh harvest mouse; (3) known locally nesting California Ridgway's rail and California black rail and potential applicability of standard seasonal avoidance measures within 700 feet of tidal marsh areas; (4) project design to account for public access and sea level rise. These constraints are discussed in more detail in the following sections.

2.0 REGULATORY FRAMEWORK

Based on the anticipated need to complete work within waters of San Francisco Bay and the shoreline, the following resource regulatory agencies have potential jurisdiction within the Study Area:

- San Francisco Bay Conservation and Development Commission (BCDC)
- U.S. Army Corps of Engineers (Corps)
- San Francisco Bay Regional Water Quality Control Board (RWQCB)
- National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)

A general description of the regulatory permitting process and policy issues relevant to projects within the Study Area are provided below. In tidal areas, the boundary of resource agency jurisdiction is established by the elevation of the tides and the location of wetlands.

Figure 1. Regional Location Map

N
W E
S

0 0.25 0.5
Miles

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

wra
ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 9/13/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - National Geographic
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 1 Location.mxd

ENVIRONMENTAL CONSULTANTS

City of Palo Alto
Regional Water Quality
Control Plant New
Outfall Project
Palo Alto, California

Figure 2.

Study Area Map

N
W
E
S

0 140 280 420

Feet

Map Prepared Date: 5/12/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

Path: L:\Acad 2000 Files\26000\26188\GIS\ArcMap\Fig 2 Study Area.mxd

Table 1 provides a summary of potential regulatory agency jurisdiction in the Study Area.

Table 1. Resource Agency Jurisdiction in the Study Area

Resource Agency	Description of Jurisdiction
BCDC	Bay Jurisdiction: All tidal waters up to the elevation of 5 feet above Mean Sea Level (8.77 feet NAVD88). Shoreline Band Jurisdiction: All areas within 100 feet of BCDC Bay jurisdiction.
Corps/RWQCB	All tidal waters up to the elevation of the HTL (9.31 feet NAVD88) and all tidal marshes and wetlands.

2.1 San Francisco Bay Conservation and Development Commission

BCDC administers the State of California McAteer-Petris Act and is the administering agency in San Francisco Bay for the federal Coastal Zone Management Act. BCDC "Bay jurisdiction" within the Study Area consists of all tidal waters of the San Francisco Bay, up to the elevation of MHW (where no tidal marsh vegetation is present) and to the elevation of 5 feet above Mean Sea Level (where tidal marsh is present). BCDC jurisdiction also includes all areas within 100 feet shoreward of the elevation of the Bay jurisdiction (BCDC "shoreline band jurisdiction"). BCDC issues permits for activities within their Bay jurisdiction and shoreline band jurisdiction.

BCDC permits are classified as "major" or "minor" permits based on the type and scope of activity. Amendments to permits are classified as "material" or "non-material" depending on the scope of the change. Major permits and material amendments require a vote by the BCDC Board of Commissioners at a public hearing to approve. Minor permits and non-material amendments can be processed administratively.

The City of Palo Alto holds an existing BCDC permit for the airport site. A minor non-material amendment to the existing BCDC permit may be possible, but a thorough review of the existing permit and confirmation with BCDC would be necessary prior to moving forward with that permitting approach. Outfall construction and portions of the pipeline that are installed within 100-foot shoreline band would require a permit from BCDC. BCDC review of the permit amendment request would involve a thorough review of the project's impacts upon public use of the shoreline, including any temporary public access impacts during construction. If a separate BCDC permit governs the use and maintenance of public access in the Palo Alto Baylands, the project may also need to be reviewed for consistency with that BCDC permit.

Due to the location of the outfall along the San Francisquito Creek Trail, the BCDC permit application will be required to address the temporary impacts to public access including detours required during construction. The BCDC permit amendment would also include a detailed description of avoidance and minimization measures implemented to reduce potential impacts from detour routes on public access or surrounding habitats. As the site is also located within a "site design and review" zoning district, design review and approval, if required, shall be secured prior to issuance of any permit and this review will be incorporated into the BCDC permit application. A certified CEQA document, RWQCB permit, and USFWS/NMFS consultation would be required before BCDC can consider an application to be complete. BCDC also requires that an applicant provide adequate "property interest documentation" for any work authorized by a BCDC permit. This can include fee title, easements, or similar property ownership documentation. In cases of public trust land grants, reference to the legislation or specific resolution governing the property ownership may be sufficient.

2.2 U.S. Army Corps of Engineers

The Corps issues permits under Clean Water Act Section 404 for construction or placement of materials in “Waters of the U.S.”, including tidal waters up to the elevation of the HTL and wetlands. They also issue permits under Rivers and Harbors Act Section 10, which is limited to construction below the elevation of MHW within “navigable waters”, which includes the San Francisco Bay.

The Corps issues permits through a variety of vehicles and it is anticipated that this project will qualify for authorization by a “Nationwide Permit”. Nationwide Permits are programmatic level permits that can be processed under relatively short time frames and do not require independent public notice or project-specific National Environmental Protection Act (NEPA) review. To be authorized by a Nationwide Permit, a project must meet the General and Regional Conditions of the permit.

Based on the wetland delineation for the project, temporary impacts in wetlands and other waters of the U.S. may be required for the purpose of outfall construction within a tidal canal and trenching of the pipeline alignment through seasonal wetlands located on airport property south of Runway 31. In the tidal canal, the USACE regulates fill material placed below the plane of the high tide line, and within the lateral extent of wetlands adjacent to the open water portion of the canal. The project is anticipated to qualify under the Nationwide Permit (NWP) program for the Nationwide Permit No. 12, which authorizes *Utility Line Activities*. In addition, if outfall construction work is to occur in flowing waters, and dewatering of the outfall area is required as part of its construction, authorization under NWP 33, which covers *Temporary Construction, Access, and Dewatering*, may also be granted. A Pre-Construction Notification (PCN) must be submitted to the Corps for consideration under the NWP12 and NWP33. The notification requirements and the conditions that must be met will need to be addressed in the PCN.

Temporary impacts to wetlands are not defined by regulation, but are generally considered to be impacts that remain in place for up to 90 days and are restored to pre-existing conditions after construction. Temporary impacts are typically required to be restored to the same elevation and drainage, and are required to be revegetated using appropriate native wetland vegetation. Post-construction documentation for the restoration of pre-construction contours and re-vegetation may be required. Importantly, no permanent loss of aquatic resources is anticipated to result from the project, therefore, compensatory mitigation to replace permanent aquatic resource losses is not anticipated.

Other considerations for NWP12 include regional conditions that require excess material be removed from a trench, associated with utility line construction, and that excess material shall be disposed of in an upland site away from any wetlands or other waters of the U.S. so as to prevent this material from being washed into aquatic areas. Temporary sidecasting and stockpiling of excavated materials in wetlands may be allowed, with similar requirements for the restoration of pre-construction grades, drainage, and native vegetation.

The Corps is required to ensure that their action in issuing a permit is consistent with requirements of other federal laws and regulations, including the Endangered Species Act (see NMFS and USFWS sections below). Any work affecting jurisdictional waters or wetlands would require a Corps permit.

2.3 Regional Water Quality Control Board

The RWQCB is responsible for administering two laws related to placement of fill into jurisdictional waters: the state Porter-Cologne Act and the federal Clean Water Act. Compliance with both laws can be obtained in San Francisco Bay through issuance of a Water Quality Certification. The

Water Quality Certification is obtained through permit application to the RWQCB. In the Study Area, wetlands and all waters of San Francisco Bay below the elevation of the HTL are regulated by the RWQCB under Section 401 of the Clean Water Act and Porter-Cologne Act.

The Regional Water Quality Control Board (RWQCB) must certify the use of the NWP from the USACE and will process a 401 Water Quality Certification for the project. The 401 Certification is a separate application form, but can be completed based on information contained in the NWP application. CEQA documentation must be complete prior to the issuance of a Water Quality Certification.

Any work affecting jurisdictional waters or wetlands would require a Water Quality Certification.

2.4 National Marine Fisheries Service and U.S. Fish and Wildlife Service

NMFS and USFWS are responsible for managing species listed under the Federal Endangered Species Act (FESA). NMFS is also responsible for administering requirements of the Magnuson-Stevens Fisheries Conservation and Management Act, which requires evaluation of potential project effects to “Essential Fish Habitat” (EFH). Both agencies are also responsible for ensuring that activities or projects do not adversely modify designated Critical Habitat to the point that it will no longer aid in the species’ recovery. Consultation for EFH and the Endangered Species Act is anticipated to occur via the Corps’ permit process via a Section 7 and EFH Consultation. Per federal regulations, the Corps is required to initiate consultations with NMFS and USFWS for activities that they determine have the potential to affect EFH, endangered species or habitat for endangered species. Take under the FESA is defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct.” Take extends to impacts to habitat, which result in take of listed species indirectly.

Consultation with NMFS and USFWS may occur as either a formal consultation or informal consultation. A formal consultation typically entails preparation of a Biological Assessment and results in the issuance of a Biological Opinion. Informal consultation may entail preparation of a letter or a Biological Assessment, and results in the issuance of a Letter of Concurrence. The type of consultation required is dependent on specific project activities as they relate to the potential to result in take of species or habitat. Typically, consultations involving salt marsh harvest mouse are processed as formal consultations.

The tidal canal and Bay within the Study Area are considered EFH, as are all tidally influenced areas in San Francisco Bay. Potential effects to EFH can be evaluated in the project Biological Assessment or endangered species consultation letter. In accordance with the Magnuson-Stevens Fishery Conservation and Management Act Provisions for EFH, NMFS has established guidelines to assist in the identification of adverse effects to EFH and has identified actions required to conserve and enhance EFH. NMFS’ regulations detail procedures for federal agencies to coordinate, consult, or provide recommendations on actions that may adversely affect EFH, 50 C.F.R. pt. 600. It is not anticipated that any adverse effects to EFH will occur as a result of the project.

In addition, critical habitat for federally-listed California central coast steelhead (*Oncorhynchus mykiss*), and green sturgeon (*Acipenser medirostris*) is present within the Mayfield slough, and consultation with NMFS would be required for the installation of the outfall. Wetlands within and adjacent to the project site may support the federally listed salt marsh harvest mouse (SMHM; *Reithrodontomys raviventris*, Federal Endangered, State Endangered, California Fully Protected), and California ridgway’s rail (CRR; *Rallus obsoletus obsoletus,* Federal Endangered, State Endangered, California Fully Protected), requiring consultation with the USFWS.

2.5 Special-status Plant and Wildlife Species Requiring CEQA Evaluation

Special-status species that require evaluation in CEQA documentation include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed species and those that are formal candidates for listing. The federal Bald and Golden Eagle Protection Act also provides broad protections to both eagle species that are roughly analogous to those of listed species. Additionally, CDFW Species of Special Concern, CDFW California Fully Protected species, USFWS Birds of Conservation Concern, and CDFW Special-status Invertebrates are all considered special-status species. Bat species are also evaluated for conservation status by the Western Bat Working Group (WBWG), a non-governmental entity; bats named as a “High Priority” or “Medium Priority” species for conservation by the WBWG are typically considered special-status and also considered under CEQA. In addition to regulations for special-status species, most native birds in the United States (including non-status species) are protected by the Migratory Bird Treaty Act of 1918 (MBTA) and the California Fish and Game Code (CFGC), i.e., sections 3503, 3503.5 and 3513. Under these laws, deliberately destroying active bird nests, eggs, and/or young is illegal.

Plant species included within the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (Inventory) with California Rare Plant Rank (Rank) of 1 and 2 are also considered special-status plant species and must be considered under CEQA. Very few Rank 3 or Rank 4 plant species meet the definitions of Section 1901 Chapter 10 of the Native Plant Protection Act or Sections 2062 and 2067 of the CDFW Code that outlines CESA. However, CNPS and CDFW strongly recommend that these species be fully considered during the preparation of environmental documentation relating to CEQA. This may be particularly appropriate for the type locality of a Rank 4 plant, for populations at the periphery of a species range or in areas where the taxon is especially uncommon or has sustained heavy losses, or from populations exhibiting unusual morphology or occurring on unusual substrates.

3.0 BIOLOGICAL SITE INVENTORY AND CONSTRAINTS CONCLUSIONS

The Study Area was assessed by WRA for sensitive biological resources, including sensitive habitats and special-status species on March 27, 2017. In addition, on May 2, 2017 WRA conducted an arborist survey of the trees located within the Study Area in accordance with Title 8 of the City of Palo Alto Municipal Code. The primary biological resource constraints affecting the Study Area are:

- **Non-tidal wetlands, tidal waters and tidal salt marsh habitat.** Permits are required for Project work affecting non-tidal wetlands, tidal waters and tidal salt marsh habitat. It is anticipated that permits will require that temporary impacts be restored and anticipated that post-construction monitoring will be required to document restoration success. However, as long as impacts to wetlands are only temporary in nature, no additional mitigation is anticipated.

- **Special-status plants.** Rare plant surveys are recommended for three rare plants with potential to occur in the Study Area, as discussed below. Survey windows for these species are June through October for Point Reyes bird’s-beak (*Chloropyron maritimum ssp. palustre*), July through October for California seablite (*Suaeda californica*), and April through June for Saline clover (*Trifolium Hydrophilum*), and may be accomplished prior to construction.

- **Special-status wildlife.** The Study Area has the potential to provide habitat for several special-status wildlife species, as discussed in the sections below. The species presenting the most significant constraints for construction are salt marsh harvest mouse and Ridgway's rail.

A literature and database search was conducted to assess the potential for special-status plant and wildlife species in the region to occur in the Study Area. Sources queried for this search included the California Natural Diversity Database (CNDDB; CDFW 2017), USFWS ECOS database (USFWS 2017b), and California Native Plant Society (CNPS) Electronic Inventory (CNPS 2017) for the 9 U.S. Geological Survey (USGS) 7.5 minute quadrangles that include and surround the Study Area (Mountain View, Palo Alto, Redwood Point, Newark, Niles, Milpitas, San Jose West, Cupertino, and Mindego Hill), as well as other CDFW publications (Shuford and Gardali 2008). Special-status plant species occurrences documented in the vicinity of the Study Area are shown on Figure 3 and special-status wildlife species are shown on Figure 4.

3.1 Wetlands and Waters

Wetlands within the Study Area include tidal salt marsh and non-tidal seasonal wetlands. Tidal salt marsh within the Study Area is located outboard of the levee, adjacent to the unnamed slough, in the vicinity of the existing outfall.. This community is dominated by hydrophytic plant species including pickleweed (*Salicornia pacifica*), salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), Italian rye grass (*Festuca perennis*), barley (*Hordeum marinum*), broadleaved pepperweed (*Lepidium latifolium*), and alkali bulrush (*Bolboschoenus maritimus*). Overall the tidal wetlands were dominated by obligate, facultative wetland, and facultative species, and were inundated or saturated at the time of the site visit. Soil samples taken within the Study Area provided evidence of hydric soils and wetland hydrology. The boundary between tidal wetland and upland areas was demarcated by a transition to dominance of upland species and subtle changes in elevation.

Non-tidal seasonal wetlands are located within the Study Area within the airport runway infield area adjacent to the southern edge of the airport runway. Non-tidal wetlands within this area are characterized as picklweed mats (non-tidal), and consist predominately of pickleweed, salt grass, and broadleaved pepperweed. Several other species are associated with the pickleweed mats on the project site, including iceplant (Carpobrotus spp.), Australian saltbush (Atriplex semibaccata), and saltgrass. Wetland hydrology is driven primarily by runoff originating from adjacent lands during precipitation events, including portions of the airport tarmac and runway. Shallow groundwater also contributes to wetland hydrology in the non-tidal wetlands, though to a lesser extent than surface-driven hydrology.

Non-wetland tidal waters in the Study Area include un-vegetated aquatic areas below the HTL elevation. Non-wetland tidal waters are located in the unnamed slough, where no vegetation is present. The HTL in the Study Area was identified based on the approximate highest predicted tide using National Oceanic and Atmospheric Administration (NOAA) predicted tide levels for the Palo Alto Yacht Harbor (Station ID 9414525) (NOAA 2017). Based on this data, the HTL was 9.31 feet NAVD88. Tidal elevations are provided in Table 2 below.

Table 2. Summary of Tidal Elevations in the Vicinity of the Study Area

Tidal Datum	Abbreviation	Ft NAVD88
High Tide Line	HTL	9.31
Mean Higher High Water	MHHW	7.61
Mean High Water	MHW	6.99
Mean Sea Level	MSL	3.77
Mean Low Water	MLW	0.77
Mean Lower Low Water	MLLW	0.00
Elevations presented are based on Palo Alto Yacht Harbor (NOAA 2017).		

3.2 Upland Vegetation Communities

There are both sensitive and non-sensitive vegetation communities within the Study Area. Non-sensitive vegetation communities include Ruderal/Disturbed, Landscaped, and California Annual Grasslands. Two sensitive vegetation communities are located in the Study Area: Tidal Salt Marsh and Pickleweed Mats (non-tidal wetlands).

Non-Sensitive Vegetation Communities

Ruderal/Developed

Ruderal habitat includes land disturbed by grading, cultivation, or other extensive human activities, typically left to become colonized by invasive herbaceous species. Ruderal habitat within the Study Area is found adjacent to the San Francisquito Creek Trail, including upland areas adjacent to the existing City of Palo Alto Regional Water Quality Control Plant (RWQCP) outfall location. Vegetation at this location is comprised predominately of coyote brush (*Baccharis pilularis*) and California fennel (*Foeniculum vulgare*), and non-native annual grasses. Developed site characteristics within the Study Area include the parking lot, fencing, airport tarmac and runway.

Landscaped

Landscaped vegetation within the Study Area is found along both sides of Embarcadero Road, and immediately north of the RWQCP. Vegetation in these communities consists of many non-native, ornamental trees and shrubs, including eucalyptus (*Eucalyptus sp.)*, lollypop tree (*Myoporum laetum*), breeder river yellowwood (*Podocrapus elongatas*), Italian buckthorn (*Rhamnus alaternus*), honey myrtle (*Melaleuca nesophila*), kurrajong (*Brachychiton populneus*), and loquat (*Eriobotrya japonica*).

California Annual Grasslands

California annual grassland land cover type consists primarily of nonnative annual grasses and annual forbs. This land cover type occurs in several areas of the Study Area, including the uplands along the airport runway and tarmac, and levee berm adjacent to the Palo Alto Duck Pond along the eastern edge of the Study Area. Dominant species in this habitat include wild oat (*Avena* spp.), bromes (*Bromus* spp.), mustard (*Brassica nigra*), and Italian thistle (*Carduus pycnocephalus*).

Several shrubs, including coyote brush and golden fleece (*Ericameria arborescense*), occur within this land cover type on the levee berm separating the airport from Palo Alto Duck Pond. The levee berm includes upland transitional habitat adjacent to tidal salt marsh at this location.

3.3 Special-status Plants

Based on the database search for special-status plants, 12 special-status species have been documented within five miles of the Study Area, as seen in Figure 3. Of the special-status plant species recorded in the vicinity, three plant species have the potential to occur in the Study Area due to the presence of potentially suitable tidal salt marsh habitat. The remaining special-status plant species have no potential or are unlikely to be found in the Study Area due to lack of suitable habitat. Rare plant surveys are recommended prior to construction during the blooming period of the following special-status species with moderate or high potential to be found in the Study Area.

- Point Reyes bird's-beak (*Chloropyron maritimum ssp. palustre*). State Endangered, Rank 1B.1.
- California seablite (*Suaeda californica*). Federally Endangered, State Endangered, Rank 1B.1.
- Saline clover (*Trifolium hydrophilum*). State Endangered, Rank 1B.2.

Surveys for Point Reyes bird's beak and California seablite would occur during the late season from June to October and surveys for saline clover would occur from April through June. More information on these species and their blooming periods are provided below.

Point Reyes bird's beak

Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*) is a hemiparasitic annual herb found in coastal salt marshes and swamps. It typically blooms from June through October at elevations from zero to 10 meters in elevation (CNPS 2015). The tidal wetlands and pickleweed mats may provide suitable habitat for this species within the Study Area.

California seablite

California seablite (*Suaeda californica*) is a perennial evergreen shrub found in coastal salt marshes and swamps. It typically blooms from July through October at elevations ranging from zero to 15 meters (CNPS 2015). The tidal salt marsh and pickleweed mats may provide suitable habitat for this species within the Study Area. The nearest documented occurrence for this species is located in the baylands adjacent and to the southeast of the project site (CDFW 2015).

Saline clover

Saline clover (*Trifolium Hydrophilum*) is an annual herb found in salt marshes, open areas in alkaline soils, and alkaline grasslands. It typically blooms between April and June in elevations of zero to 300 meters. The tidal salt marsh and annual grasslands may provide suitable habitat for this species.

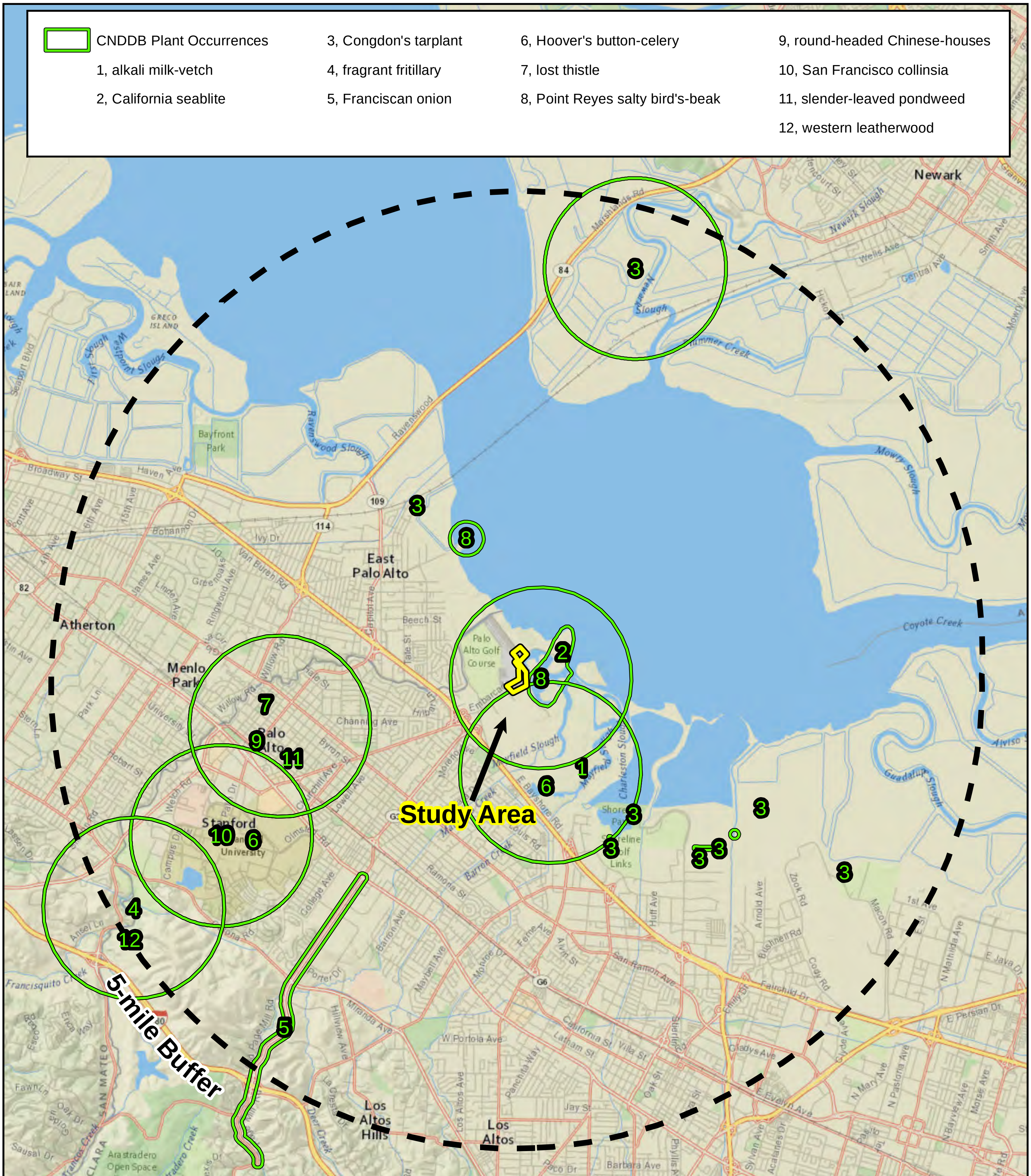

Figure 3. Special-status Plant Documented within 5 Miles of the Study Area

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

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ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 5/12/2017
Map Prepared By: czumwalt
Base Source: National Geographic
Data Source(s): CNDDB January 2017

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3.4 Special-status Wildlife

Based on the literature and database search, a total of 20 special-status wildlife species have been documented within five miles of the Study Area. Of the special-status wildlife species recorded in the vicinity of the Study Area, most have no potential or are unlikely to occur within the Study Area due to the absence of suitable habitats, including forest, riparian, open grassland, chaparral, and fresh waters. However, the Study Area has several habitat features including tidal salt marsh and slough habitat that may support 16 special-status species. These species which may utilize the Study Area are listed and are briefly discussed below.

- Salt-marsh harvest mouse (SMHM; *Reithrodontomys raviventris*). Federal Endangered, State Endangered, California Fully Protected.
- Salt-marsh wandering shrew (*Sorex vagrans halicoetes*). CDFW Species of Special Concern
- California black rail (CBR; *Laterallus jamaicensis coturniculus*). State Threatened, California Fully Protected, USFWS Bird of Conservation Concern.
- California Ridgway's rail (CRR; *Rallus obsoletus obsoletus*). Federal Endangered, State Endangered, California Fully Protected.
- Saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*). CDFW Species of Special Concern, USFWS Bird of Conservation Concern.
- Alameda song sparrow (*Melospiza melodia pusillula*). CDFW Species of Special Concern, USFWS Bird of Conservation Concern.
- Bryant's savannah sparrow (*Passerculus sandwichensis alaudinus*). CDFW Species of Special Concern.
- Northern harrier (*Circus cyaneus*). CDFW Species of Special Concern.
- Short-eared owl (*Asio flammeus*). CDFW Species of Special Concern.
- Burrowing owl (*Athene cunicularia*). CDFW Species of Special Concern.
- Loggerhead shrike (*Lanius ludovicianus*). CDFW Species of Special Concern, USFWS Bird of Conservation Concern.
- Pacific lamprey (*Entosphenus* (=*Lampetra*) *tridentatus*). CDFW Species of Special Concern.
- River lamprey (*Lampetra ayresi*). CDFW Species of Special Concern.
- Green sturgeon (*Acipenser medirostris*). Federal Threatened, CDFW Species of Special Concern, Critical Habitat.
- White sturgeon (*Acipenser transmontanus*). CDFW Species of Special Concern.
- Steelhead - central California coast DPS (*Oncorhynchus mykiss).* Federal Threatened, Critical Habitat.

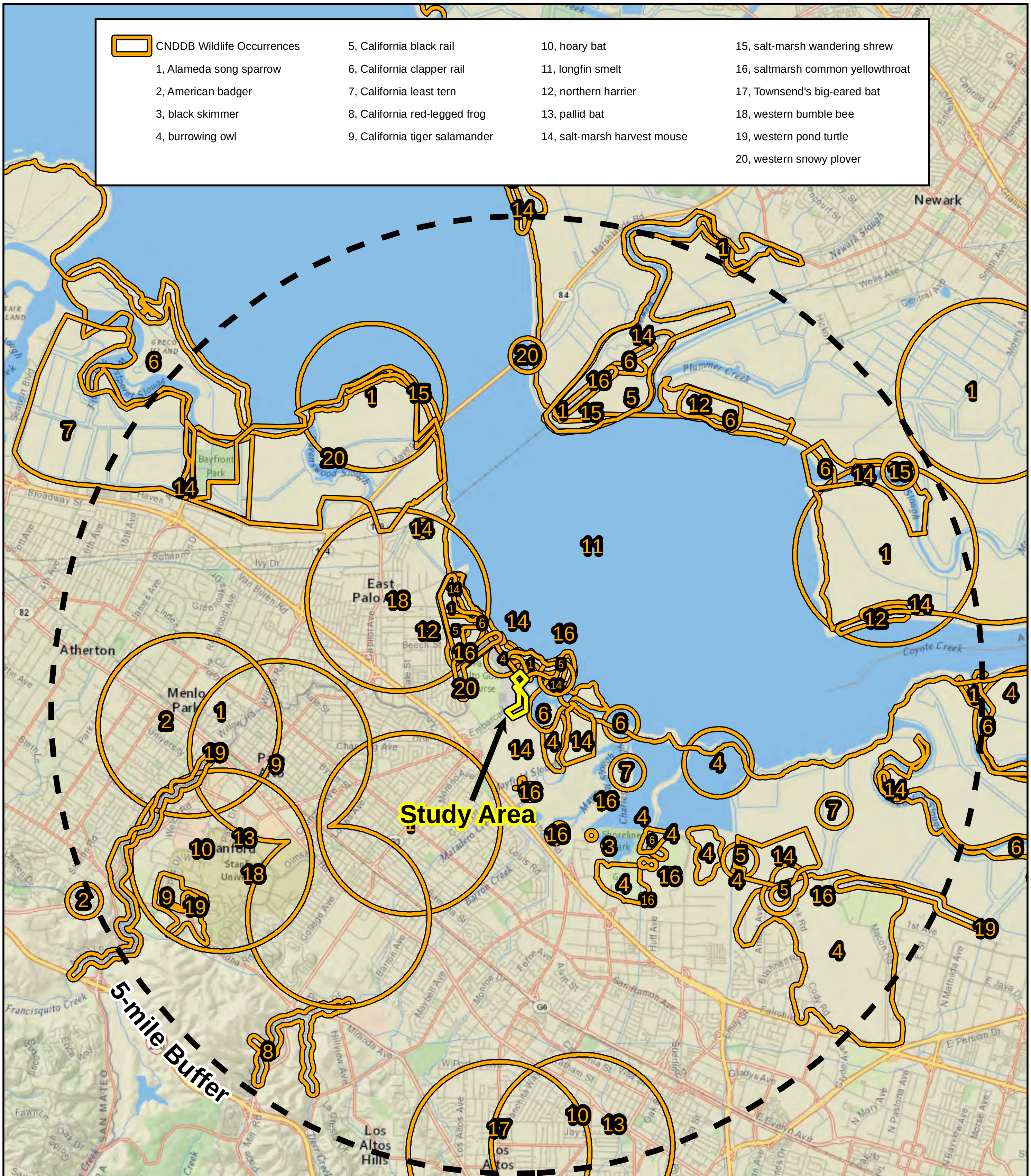

Figure 4. Special-status Wildlife Documented within 5 Miles of the Study Area

City of Palo Alto Regional Water Quality Control Plant New Outfall Project
Palo Alto, California

ENVIRONMENTAL CONSULTANTS

Map Prepared Date: 5/19/2017
Map Prepared By: czumwalt
Base Source: National Geographic
Data Source(s): CNDDB January 2017

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Salt Marsh Harvest Mouse and Salt-Marsh Wandering Shrew

SMHM and salt-marsh wandering shrew have the potential to occur within the Study Area due to the presence of tidal wetlands and pickleweed mats, as described in Section 3.2 above. Suitable habitat for SMHM and salt-marsh wandering shrew includes dense vegetation in tidal wetlands in the San Francisco Bay Area. SMHM may also be present in diked wetlands if suitably dense vegetation is present. In tidal areas, these species require upland refugia to escape high tides, and SMHM is known to opportunistically forage in uplands up to 330 feet from their primary wetland habitat (USFWS 2013). Therefore, the pickleweed mats adjacent to the airport runway may also provide suitable habitat for these species as upland refugia with vegetation. These two species are known to occur in the wetlands along the Palo Alto shoreline, and SMHM has been documented in marshes outboard of the Palo Alto Airport along the San Francisquito Creek Trail (CDFW 2017).

California Ridgway's Rail and Black Rail

CRR and CBR have the potential to occur in the Study Area due to the presence of tidally influenced salt marsh habitat, specifically near the proposed RWQCP outfall location. CRR and CBR are found in lowland wetlands in the San Francisco Bay Area. CBR is more restricted to tidal salt marsh habitats than CBR, which may also be found in diked wetlands with suitable vegetation composition. Both of these species have been documented in the marshes outboard of the Palo Alto Airport along the San Francisquito Creek Trail (CDFW 2017). CRR is known to breed there and an individual CRR was observed by WRA biologists during the March 27, 2017 site visit (CDFW 2017). CBR breeds rarely in south San Francisco Bay, but this species has been detected in the marshes adjacent to the Study Area in April, during the nesting season and may thus use these marshes within and adjacent to the Study Area for nesting (CDFW 2017).

Burrowing Owl

Burrowing owl has the potential to occur in the Study Area due to the presence of grasslands with the airport apron and along the adjacent levee berm top. Burrowing owl inhabit small mammal burrows year-round, primarily those of the California ground squirrel (*Otospermophilus beecheyi*) in the region, or other suitable burrow surrogates such as pipes, culverts, and some debris piles. This species typically occupies burrows in annual grassland habitats or other open spaces with sparse or non-existent tree or shrub canopies and short vegetation, usually under 18 inches in height. This species has been previously documented at the Palo Alto Airport in 1983 and at Byxbee Park southwest of the Study Area (CDFW 2017). However, no breeding occurrences have been documented at these locations. Ground squirrels are active in the grassy portion of the Study Area south of the airport terminal. If this vegetation is regularly mowed, in these areas, conditions are suitable to support burrowing owl.

Other Special-Status Bird Species

The remaining special-status bird species with potential to occur in the Study Area all nest in wetland vegetation, and are known to the vicinity (CDFW 2017, Shuford and Gardali 2008). These birds may forage or nest within the salt marshes and adjacent uplands within the Study Area.

Special-Status Lamprey and Fish Species

The two lamprey species (pacific lamprey and river lamprey) and three fish species (green sturgeon, white sturgeon, and steelhead) listed above are known to occur widely in San Francisco Bay waters. These species may be opportunistically present in the unnamed slough within the Study Area adjacent to the San Francisquito Creek Trail, near the located of the proposed

RWQCP outfall. Adult and juvenile fish may enter the existing outfall location from bay waters to forage or shelter. However, the outfall location does not contain or connect to spawning habitat for any of these species, and does not provide foraging or sheltering habitat of any particular value and any occurrences of these fish species would be incidental and short-lived in duration.

3.4 Trees

An arborist survey was conducted on May 2, 2017 by WRA to identify trees that are regulated or protected under the City of Palo Alto Municipal Code, Title 8, Trees & Vegetation and Title 18, Zoning Code. The regulated trees of Palo Alto refer to all those trees or groups of trees included in the following three categories: 1) Protected Trees, 2) Street Trees and 3) Designated Trees. These categories are discussed further in the City of Palo Alto's *Tree Technical Manual*, which also provides information regarding the City's tree permits and mitigation requirements. The arborist survey identified 65 trees within the Study Area, shown in Figure 5 (Arborist Survey) below. These species included:

- Kurrajong (*Brachychiton populneus*)
- She-oak (*Casurina cunninghamiana*)
- Loquat (*Eriobotrya japonica*)
- River red bum (*Eucalyptus camaldulensis*)
- Blue gum (*Eucalyptus globulus*)
- White ironbark (*Eucalyptus leucoxylon*)
- Swamp gum (*Eucalyptus rudis*)
- Manna gum (*Eucalyputus viminalis*)
- Honey myrtle (*Melaleuca nesophila*)
- Lollypop tree (*Myoporum laetum*)
- Breeder River yellowwood (*Podocarpus elongatas*)Coast live oak (Quercus agrifolia)
- Italian buckhorn (*Rhamnus alaternus*)

No trees observed within the Study Area are considered "Protected Trees" under City of Palo Alto's Municipal Code based on species and diameter requirements. The Study Area includes street trees within the City's right-of-way that are regulated under the City's Tree Ordinance. However, because this is a City-sponsored project, compliance with the City tree ordinance is not required.

City of Palo Alto
Regional Water Quality
Control Plant New
Outfall Project
Palo Alto, California

Figure 5.
Arborist Survey

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Map Prepared Date: 5/8/2017
Map Prepared By: czumwalt
Base Source: Esri Streaming - NAIP 2014
Data Source(s): WRA

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4.0 PRELIMINARY IMPACT ASSESSMENT AND RECOMMENDATIONS

4.1 Wetlands and Waters

As described in Section 3.0 above, the Study Area includes jurisdictional features including tidal and non-tidal wetlands and non-wetland waters. Permits from BCDC, the Corps, and the RWQCB are anticipated to be required for the project. Temporary impacts to wetland vegetation would be required to be restored to pre-construction conditions. The Project should avoid permanent impacts from fill or dredging to avoid the need for mitigation through wetland creation or purchase of mitigation bank credits.

Avoidance and Minimization Measures

Based on our current knowledge of site conditions and the proposed project, the following avoidance and minimization measures are recommended:

- Include requirements in construction documents for the restoration of temporary excavations in wetlands back to preconstruction grade, and revegetation of temporarily disturbed areas using appropriate native vegetation. Appropriate native vegetation may include pickleweed, saltgrass, Atriplex, and other salt tolerant wetland plant species. Pickleweed and saltgrass may be selectively harvested from adjacent tidal marsh and seasonal wetland areas for transplantation to temporarily impacted areas for restoration.
- Clearly mark limits of construction, wetlands, and buffers with high-visibility construction fencing.
- Site access of machinery should be restricted to as few areas as possible to prevent soil compaction.

Indirect impacts to wetlands, waters, and sensitive biological communities can be avoided through implementation of the following measures:

- Use of appropriate erosion control measures around soil stockpiles, graded slopes, and slurry management facilities. Erosion control materials should be wildlife friendly and avoid the use of plastic netting or fixed aperture netting.
- A spill prevention and control plan should be required as part of project specifications to minimize the chance of toxic spills. Spill kits shall be present for any work adjacent to open waters. All spills of oil and other hazardous materials would be immediately cleaned up and contained. Any hazardous materials cleaned up or used on-site would be properly disposed of at an approved disposal facility.
- Litter and Waste Management – Waste collection areas will be designated onsite. Only watertight dumpsters and trash cans will be used and inspected for leaks. Dumpsters and cans will be inspected at the end of each work day when it is raining or windy. Waste collection will occur regularly. Litter will be picked up daily.

4.2 Special Status Plant Species

Based upon a review of the resources and databases listed in Section 3.0, it was determined that three special-status plant species have moderate or high potential to occur within the Study Area. These species include: Point Reyes bird's-beak, California seablite, and Saline clover. Special-status plant species that have been documented in the CNDDB within a 5-mile radius of the Study Area are depicted in Figure 3.

The three special-status plant species with potential to occur within the Study Area are generally observed within marshes, and have potential to occur within the tidal marsh habitat located within the Mayfield slough in the northeastern portion of the Study Area. The Project could potentially impact habitat suitable for the special-status species listed above.

Avoidance and Minimization Measures

Protocol level rare plant surveys are recommended during the blooming periods of each of these three species, in order to confirm the presence or absence of these species within the Study Area. Surveys for Point Reyes bird's beak and California seablite would be conducted during the late season, June through October, and surveys for saline clover would be conducted between April and June, based on the individual specie's blooming season. If these rare plant species are observed during surveys, they may need to be avoided by construction, seed collected for replanting, or whole individuals transplanted prior to construction to avoid impacts.

4.3 Wildlife Impacts

Salt Marsh Harvest Mouse

As described in Section 3.2 above, wetland vegetation communities in the Study Area contain suitable habitat for SMHM. Disturbance of vegetation within or adjacent to these communities has the potential to directly impact this species (including injury and mortality) or to indirectly (including reduced use of refuge areas) impact this species through temporary increases in human traffic, vibration, and noise during project activities.

<u>Avoidance and Minimization Measures</u>

Standard measures currently required by USFWS to avoid and minimize potential impacts to SMHM require any vegetation removal be conducted by hand (or hand held power tools) and exclusion fencing to be installed following vegetation removal. In addition, a biologist is required to be onsite during vegetation removal and exclusion fence installation within suitable habitat. Work in and adjacent to tidal areas is typically to avoid work within two hours before or after a tide greater than 6.5 feet at the Golden Gate bridge. Avoidance measures for SMHM would also be suitable for avoiding impacts to salt-marsh wandering shrew.

California Ridgway's Rail and California Black Rail

As described in Section 3.2 above, tidal salt marsh communities at and surrounding the outfall have the potential to support CRR and CBR, and project-related activates within 700 feet of tidal marsh may affect these species during nesting. Based on a review of historic occurrences, as well as observations of CRR by WRA during the site visit, it is likely that nesting rails will be present in the tidal marsh surrounding the outfall. Ongoing activities at the airport are an important consideration in assessing the potential for project activities to affect rails in adjacent tidal areas. The Palo Alto Airport is among the busiest of all General Aviation airports in the United States, and air traffic is a source of consistent background visual and auditory disturbance. Thus, construction within the airport grounds may be viewed differently from construction in the adjacent tidal marsh areas from the perspective of potential impacts to CRR. Construction within the airport may not result in disturbance to nesting rails because individuals are accustomed to a relatively high level of disturbance from airport activities. Construction in tidal areas could potentially affect nesting rails because it would occur in areas that are not associated with normal air traffic and airport maintenance activities.

Avoidance and Minimization Measures

The USFWS typically requires avoidance of construction activity within 700 feet of nesting rails. The rail nesting season occurs between February 1 and August 31 in any given year. For projects occurring in and adjacent to tidal marsh in San Francisco Bay, the USFWS requires protocol-level surveys during the early nesting season to determine if rails are nesting within 700 feet of construction areas. If the survey results are negative, work within the buffer zone during the nesting season is permitted. If surveys indicate rails are nesting[1] within 700 feet of construction areas, typical USFWS measures require construction be delayed in areas of nesting rails until the end of the nesting season. Given the background conditions present at the active airport, it may be possible to apply this standard requirement only to work occurring immediately adjacent to and within tidal marsh at the outfall. This could allow for work to occur within airport grounds during the nesting season. The final determination with regard to CRR constraints could only be made by the USFWS.

Burrowing Owl

Grassland areas adjacent to the airport runway and airport terminal that are regularly maintained by mowing have the potential to support burrowing owl. There are records of burrowing owl in at the Palo Alto Airport and adjacent parklands, however, no breeding was documented at these occurences. If construction activities were to occur these areas, potential direct (injury and mortality) and indirect impacts (nest abandonment) could occur to this species.

Avoidance and Minimization Measures

In accordance with the 2012 CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012), a Pre-construction survey for burrowing owl is recommended prior to any construction activities. The CDFW Staff Report also contains guidance pertaining to avoidance and minimization measures for this species if active burrows are found on the site. If active burrows are found, avoidance measures typically include no-work setbacks during the nesting season, and exclusion of owls from active burrows during the non-breeding season. Consultation with CDFW may be required if burrowing owl is observed during the nesting season.

Other Special-Status or Nesting Birds

Other special-status and non-special status bird species have the potential to nest within the Study Area. Most nesting birds in California are protected by the Migratory Bird Treaty Act and California Game and Fish Code, which prohibit the removal of active bird nests.

Avoidance and Minimization Measures

To avoid disturbance to active nests, construction and/or vegetation removal can be scheduled to be initiated outside of the breeding bird season (February 1 through August 31). As an alternative to this schedule restriction, preconstruction surveys and bird deterrence measures may need to be implemented. The risk of relying on preconstruction surveys is that if nesting birds are found, those nests cannot be removed and are at minimum required to be monitored during construction to ensure that construction is not affecting nesting success. Bird deterrence measures, such as netting, acoustic disturbance mechanisms, and reflective materials, can be

[1] Presence of nesting rails is typically determined by the presence of an active “calling center”, indicating an attempt to nest.

put in place to deter some but not likely all bird nesting prior to construction. These measures can help prevent some nesting but are unreliable at completely preventing nest establishment.

Special-Status Fish Species

As described in Section 3.4 above, special-status fish species may occur incidentally within the unnamed slough at the proposed outfall location. Potential in-water work as part of the project would have a very limited potential to impact these special-status fish species. The Study Area does support core habitat for any special status fish species, and any occurrence of special status fish in or adjacent to the Study Area would be short lived and incidental. The Project is not anticipated to have any real or lasting effects on fish populations.

<u>Avoidance and Minimization Measures</u>

Due to the potential for impacts to special-status fish species within the unnamed slough located at the proposed RWQCP outfall location, NMFS may require any in-water work to be conducted between June 15 and November 30. Further measures may be required to minimize threshold sound levels, including vibratory pile driving and other sound attenuation measures if pile driving is necessary as a part of the Project. If in-water pile driving is necessary, an evaluation of potential hydroacoustic impacts to fish will be required as part of the consultation process. If hydroacoustic impacts exceed established thresholds for take, NMFS may require hydroacoustic monitoring by a sound engineer during in water pile driving work.

4.4 Tree Removal

The City of Palo Alto Municipal Code provides protection for regulated trees under Title 8 of the City's Municipal Code. As described above, regulated trees can fall under three broad categories; protected public and private trees, street trees, and designated public and private trees. Regulated trees are specifically defined as follows:

- **Protected Trees:** All Coast Live Oak (*Quercus agrifolia*) Valley Oak (*Quercus lobata*) trees that are 11.5-inches or greater in diameter and Coast Redwood (*Sequoia sempervirens*) that are 18-inches in diameter or great and Heritage Trees as designated by City Council. The project site contains one Coast live oak, however it is only 2.4-inches in diameter and is therefore not considered Protected.
- **Public/Street Trees:** All trees growing within the street right-of-way (publically-owned) outside of private property. All trees surveyed within the Study Area are located on public property.
- **Designated Trees:** All trees, when associated with a development project, that are designated by the City to be saved and protected on a public or private property which is subject to a discretionary development review. The proposed outfall and pipeline would be subject to site design review and approval. If the City were to designate any trees within the Study Area as a "Designated Tree", approval from the City's Planning Division would be required to remove the designated tree.

Based on the preliminary site plans, the proposed pipeline alignment from the RWQCP to the proposed outfall location would require the removal of one eucalyptus (56.0-inch DBH) and two lollypop trees (18.5-inch DBH and 3.8-inch DBH) within the RWQCP property (tree numbers 463, 406, and 405 in Figure 5). The trees within the Study Area are considered Street Trees under the ordinance. However, City-sponsored projects are not required to comply with the ordinance, and it is up to the City as to whether or not the removed trees would be replaced.

4.5 Public Access

As described above, the Study Area includes public access features including the San Francisquito Creek Trail. Projects within the Study Area have the potential to impact public access through temporary path closures requiring detours. The project would not trigger any potential impacts or mitigation under CEQA with regard to public access. However, BCDC will require details with regard to the plans for temporary public access closures or detours during construction, and may require improvements to existing public access amenities to compensate for temporary closures or access restrictions. The potential and extent of public access improvements would be determined by BCDC based on the nature, extent, and duration of any temporary public access closure. It is recommended that the City consider potential public access improvements early in the process if the nature, extent and duration of any public access closures warrants public access improvements.

4.6 Sea Level Rise

As the Study Area is located within BCDC jurisdiction and includes tidally influenced wetlands, projects have the potential to impact the Bay shoreline. BCDC permits require the project provide reasonable protection to persons and property against hazards of unstable geologic or soil conditions, of sea level rise, or of flood or storm waters. While BCDC sea level rise policies are not anticipated to be strictly applicable to the project, it is common for BCDC to require some analysis of sea level rise even for permits that do not require a full sea level rise risk assessment and adaptation plan. The level of analysis required for projects that do not require an adaptation plan typically involves analyzing the potential effects of anticipated sea level rise based on the life of the project. If the operation of the outfall is at risk of being effected by sea level rise during the life of the project, BCDC may require a list of actions that the City plans to implement to plan for this risk.

The estimated 100-year extreme tide elevation for this area is approximately 9.7 feet NAVD88 (AECOM 2016). The National Research Council (NRC 2012) projections of sea level rise provided below are appropriate for planning purposes because they encompass the best available science, have been derived considering local and regional processes and conditions, and their use is consistent with state guidance. Water surface elevations presented in Table 3 take into account estimates of future sea level rise on top of the 100-year tide event, but do not factor in wave runup.

Table 3. Sea Level Rise Estimates and Water Surface Elevation Relative to Year 2000

Year	Most Likely SLR (inches)*	Water Surface Elevation based on Most Likely SLR + 100-yr Tide (Feet NAVD88)	Upper Range SLR (inches)*	Water Surface Elevation based on Upper Range SLR + 100-yr Tide (Feet NAVD88)
2050	11” ± 4”	10.6’ ± 0.3’	24”	11.7’
2100	36” ± 10”	12.7’ ± 0.8’	66”	15.2’
**Source: NRC 2012.*				

Of primary consideration for the RWQCP outfall is whether or not the hydraulics would continue to adequately function with higher projected sea levels. WRA is aware the City is considering this issue and the outcomes of this review will be pertinent to the BCDC permit process.

5.0 CONCLUSION

Based on our review of the Study Area, the primary biological resources and permitting concerns include: (1) restoration of temporary construction impacts to wetlands; (2) avoidance and minimization of potential impacts to salt marsh harvest mouse; (3) known locally nesting California Ridgway's rail and California black rail and potential applicability of standard seasonal avoidance measures within 700 feet of tidal marsh areas; (4) project design to account for public access and sea level rise.

The Project is likely to require the issuance of a Section 404 permit from the Corps, a Water Quality Certification from the RWQCB, and a BCDC permit. The issuance of the Corps permit is expected to require consultation with the USFWS and NMFS under Section 7 of the federal Endangered Species Act for salt marsh harvest mouse, California Ridgway's rail, and federally-listed fish species. The consultation process with these agencies could result in additional avoidance and mitigation measures to those provided in this memorandum. The Corps and RWQCB permits will determine the final requirements for restoration of temporary impacts, including whether or not any additional mitigation is required. Special considerations for the BCDC permit are

Direct impacts to SMHM, CRR, CBR, special-status fish, as well as temporary impacts to habitat for these species, may occur during project construction if no avoidance measures are implemented. Similarly, project activities have the potential to impact nesting birds if no avoidance measures are implemented. With the implementation of suitable avoidance measures, such as pre-construction surveys during the avian breeding season, work windows, and biological monitoring, no significant impacts to special status species would be anticipated. In addition, protocol level rare plant surveys are recommended during the blooming periods of each of the three special-status plant species with moderate or high potential to occur within the Study Area, in order to confirm the presence or absence of these species within the Study Area.

Projects within the Study Area have to potential to impact regulated trees. All trees located on public property are regulated under the City's Tree Ordinance. Because the proposed outfall and pipeline is a City project, the specific processes in the ordinance are not required for the project. The City will determine the appropriate tree replacement, if any, for removed trees.

BCDC will require projects to consider public access and sea level rise in the project design and permit specifications may require additional design measure to those provided in this memorandum.

The avoidance and minimization measures provided above are intended to aid in project planning, and may be modified in their final form based on agency determinations and CEQA requirements. Through implementation of the avoidance and minimization measures listed above, projects within the Study Area would result in minimal impacts to protected resources and would minimize the level of effort required during the regulatory permitting process.

6.0 REFERENCES

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APPENDIX C

HISTORICAL RESOURCES STUDY FOR THE CITY OF PALO ALTO REGIONAL WATER QUALITY CONTROL PLANT NEW OUTFALL PROJECT

Historical Resources Study for the City of Palo Alto Regional Water Quality Control Plant's New 63-Inch Outfall Project Palo Alto, Santa Clara County, California

Eileen Barrow, M.A.

September 11, 2017

Historical Resources Study for the City of Palo Alto Regional Water Quality Control Plant's New 63-Inch Outfall Project Palo Alto, Santa Clara County, California

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Prepared for:

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September 11, 2017

ABSTRACT

Tom Origer & Associates conducted an historical resources survey for the City of Palo Alto Regional Water Quality Control Plant's New 63-Inch Outfall Project, Outfall No. 1 (700-HDPE-1001), Palo Alto, Santa Clara County, California. This study was requested and authorized by WRA, Inc, on behalf of the City of Palo Alto. This project will be subject to compliance with Section 106 of the National Historic Preservation Act and the California Environmental Quality Act. The purpose of this report was to identify historical resources other than Tribal Cultural Resources (see definition of historical resources in the Regulatory Context section). Tribal Cultural Resources are defined in Public Resources Code [PRC] 21074 (a)(1)(A)-(B).

This study included archival research at the Northwest Information Center, Sonoma State University (NWIC File No. 17-0516), examination of the library and files of Tom Origer & Associates, Native American contact, and field inspection of the study area. No historical resources were found within the study area. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 17-073).

Synopsis

Project:	New 63-Inch Outfall Project
Location:	Palo Alto, Santa Clara County
APN:	N/A
USGS Map:	Mountain View 7.5’ series
Study Type:	Intensive
Scope:	0.5 linear miles
Finds:	None

Project Personnel

Report preparation and project oversight was completed by Eileen Barrow. Ms. Barrow has been with Tom Origer & Associates since 2005. She holds a Master of Arts in cultural resources management from Sonoma State University. Her professional affiliations include the Society for American Archaeology, the Society for California Archaeology, the Cotati Historical Society, the Sonoma County Historical Society, and the Western Obsidian Focus Group.

Taylor Alshuth conducted the field survey. Mr. Alshuth obtained a Bachelor of Arts degree in Anthropology from Humboldt State University in 2014, after obtaining an Associate of Arts degree in Anthropology at Santa Rosa Junior College in 2012. He has been affiliated with the Society for California Archaeology, the Archaeological Institute of America, and the Archaeological Conservancy. Mr. Alshuth has been a part of northern California archaeology since 2014.

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FIGURES

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INTRODUCTION

The City of Palo Alto proposes to install a new 63-inch outfall pipe from their Regional Water Quality Control Plant (RWQCP) to an unnamed slough east of the Palo Alto Airport. The City is proposing this project to mitigate issues related to the aging existing outfall and anticipated sea level rise. The outfall will start at the RWQCP, cross Embarcadero Street where it will enter the Palo Alto Airport. The outfall will continue on the airport property to an unnamed slough that feeds into San Francisco Bay (Figures 1 and 3). The project will require compliance with Section 106 of the National Historic Preservation Act (Section 106) and the California Environmental Quality Act (CEQA). Documentation pertaining to this study is on file at Tom Origer & Associates (File No. 17-073).

REGULATORY CONTEXT

Under Section 106, when a federal agency is involved in an undertaking, it must take into account the effects of the undertaking on historic properties (36CFR Part 800). Compliance with Section 106 requires that agencies make an effort to identify historic properties that might be affected by a project, and gather information to evaluate their eligibility for inclusion on the National Register of Historic Places (National Register).

CEQA also requires that historical resources be considered during the environmental review process through an inventory of historical resources within a study area, and an assessment of potential project impacts to those resources. Note, the term “Historical Resources" encompasses prehistoric and historical archaeological sites and elements of the built environment (e.g., buildings, bridges, canals). Revisions to CEQA enacted in July 2015 call out a separate class of resources termed “Tribal Cultural Resources” (Public Resources Code Section 21074). Tribal cultural resources are those that are of

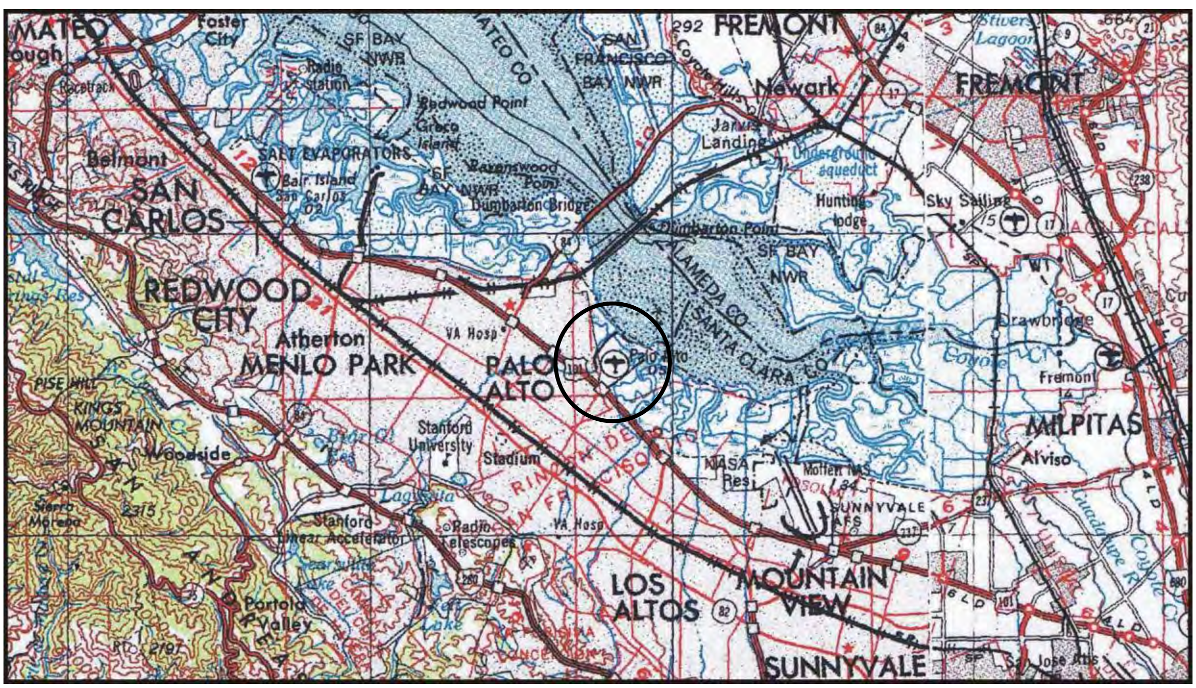

Figure 1. Project vicinity (adapted from the 1980 Santa Rosa and the 1969 San Jose 1:250,000-scale USGS map).

specific concern to California Native American tribes, and are identified through direct and confidential consultation between the Tribe and the lead agency (PRC §21080.3.1). This study does not include identification or discussion of tribal cultural resource. Letters sent to the Native American Heritage Commission and local Native American groups as part of this study were for informational purposes only.

Pursuant to Section 106 and the CEQA Guidelines, the goals of this study were to: 1) identify all historic resources within the project area; 2) provide an evaluation of the significance of identified resources; 3) determine resource vulnerability to adverse impacts that could arise from project activities; and 4) offer recommendations designed to protect historic resource values, as warranted.

Resource Definitions

The National Register defines a historic property or historic resource as a district, site, building, structure, or object significant in American history, architecture, engineering, archaeology, and culture, and that may be of value to the nation as a whole or important only to the community in which it is located. These resource types are described by the National Park Service (NPS) as follows (NPS 1995:4-5).

> **Site.** A site is the location of a significant event, a prehistoric or historic occupation or activity, or a building or structure, whether standing, ruined, or vanished, where the location itself possesses historic, cultural, or archaeological value regardless of the value of any existing structure.
>
> **Building.** A building, such as a house, barn, church, hotel, or similar construction, is created principally to shelter any form of human activity. "Building" may also be used to refer to a historically and functionally related unit, such as a courthouse and jail, or a house and barn.
>
> **Structure.** The term "structure" is used to distinguish from buildings those functional constructions made usually for purposes other than creating human shelter.
>
> **Object.** The term "object" is used to distinguish from buildings and structures those constructions that are primarily artistic in nature or are relatively small in scale and simply constructed. Although it may be, by nature or design, movable, an object is associated with a specific setting or environment.
>
> **District.** A district possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development.

Significance Criteria

For purposes of the National Register, the importance of a historic resource is evaluated in terms of criteria put forth in 36CFR60, as follows:

> The quality of significance is present in properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of persons significant in our past; or

C. That embody the distinct characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in prehistory or history.

Eligibility criteria for the California Register are very similar and will not be presented here.

Additionally, the OHP advocates that all historical resources over 45 years old be recorded for inclusion in the OHP filing system (OHP 1995:2), although professional judgement is urged in determining whether a resource warrants documentation.

PROJECT SETTING

Area of Potential Effects Location and Description

The study area is located in northwestern Santa Clara County, in the City of Palo Alto, as shown on the Mountain View 7.5' USGS topographic map (Figure 3). It consists of about 0.5 linear miles of flat, land. The land was once bay marsh that has been filled to contain the Palo Alto Airport, the City of Palo Alto's RWQCP, and various other industrial buildings (Sowers 2004). The nearest freshwater source prior to development of the area was San Francisquito Creek which flowed through the APE. San Francisquito Creek has been channelized and now flows north of the Palo Alto Airport

Review of the geologic maps for the APE shows that the geology of the study area consists of Holocene epoch (11,700 years ago to present) estuarine organic clay and silty clay (bay mud) (Dibblee 2007; Helley and LaJoie 1979).

Soils mapped for the study area are Aquic Xerorthents (SoilWeb 2017). Aquic Xerorthents consist of very deep, poorly draining bay mud. This soil is found in bay marshes. Cordgrass, pickleweed, and alkali heath are the chief vegetation supported by Aquic Xerorthents soils, and parcels with these soils have been used primarily for salt production (Gardner 1958: 125; Reed 2015:32).

Cultural Setting

Archaeological evidence indicates that human occupation of California began at least 11,000 years ago (Erlandson *et al.* 2007). Early occupants appear to have had an economy based largely on hunting, with limited exchange, and social structures based on the extended family unit. Later, milling technology and an inferred acorn economy were introduced. This diversification of economy appears to be coeval with the development of sedentism and population growth and expansion.

Sociopolitical complexity and status distinctions based on wealth are also observable in the archaeological record, as evidenced by an increased range and distribution of trade goods (e.g., shell

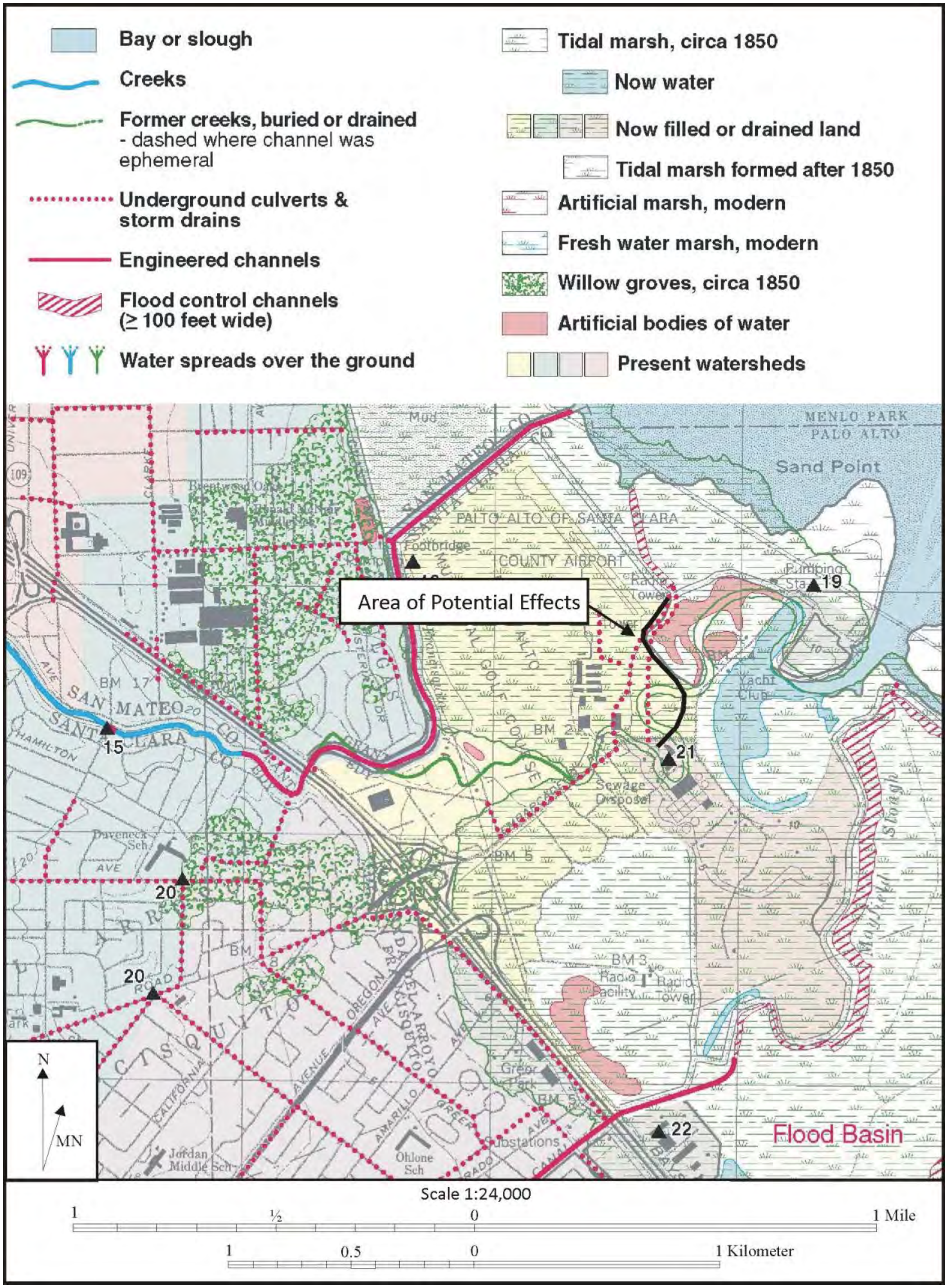

Figure 2. Location of APE within San Francisco Bay marshland (adapted from the Creek and Watershed Map of Palo Alto & Vicinity Sowers 2004).

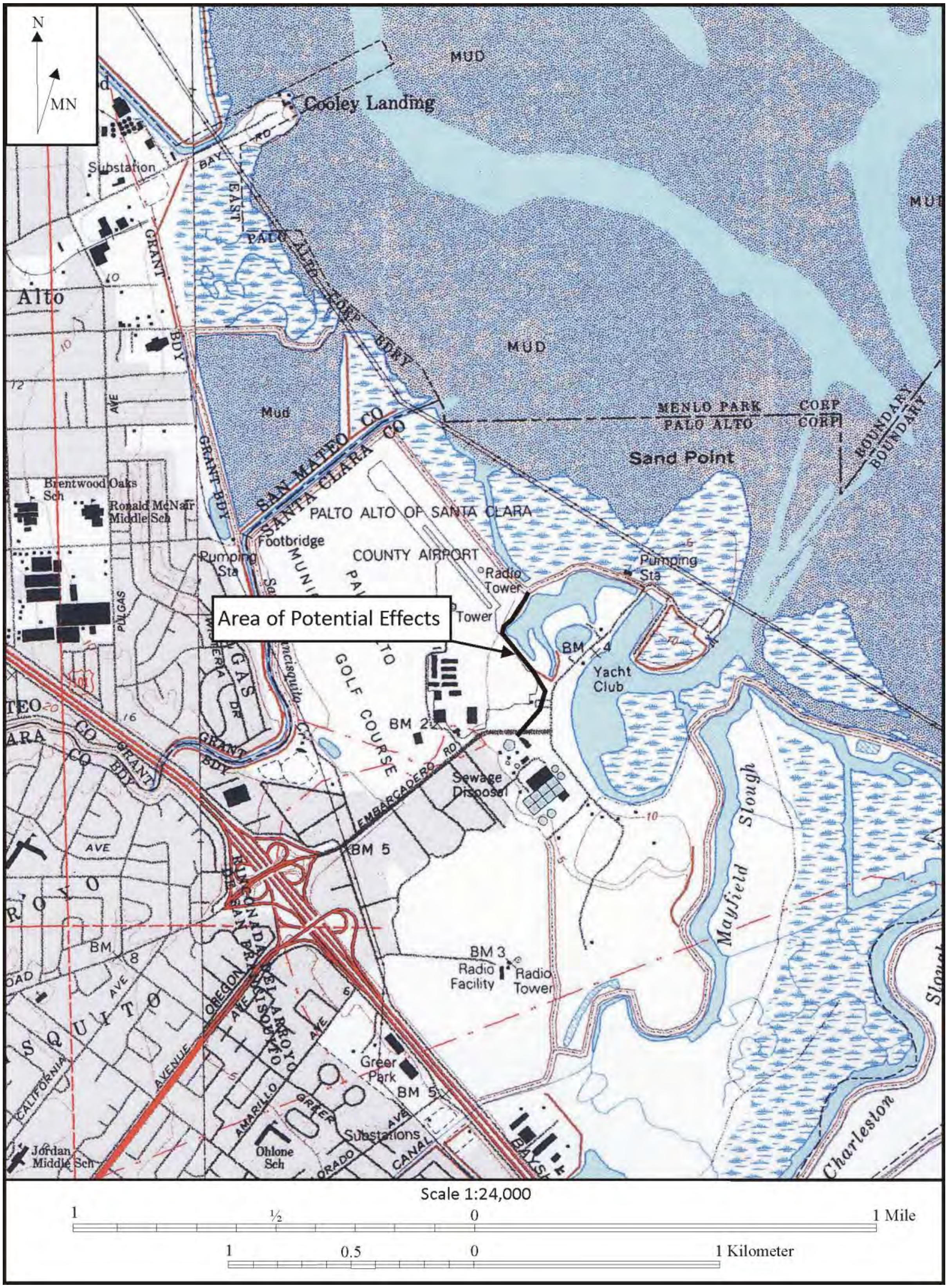

Figure 3. Study location (adapted from the USGS 1997 Mountain View 7.5' map).

beads, obsidian tool stone), which are possible indicators of both status and increasingly complex exchange systems.

At the time of European settlement, the study area was situated in an area controlled by the Ohlone, who are also referred to as Costanoans (Levy 1978:485-495). The Ohlone were hunter-gatherers who lived in rich environments that allowed for dense populations with complex social structures (Levy 1978:485-495; Kroeber 1925:462-473). They settled in large, permanent villages about which were distributed seasonal camps and task-specific sites. Primary village sites were occupied throughout the year and other sites were visited in order to procure particular resources that were especially abundant or available only during certain seasons. Sites often were situated near fresh water sources and in ecotones where plant life and animal life were diverse and abundant.

Historically, the study area lies within the lands owned by Mission Santa Clara de Asis which was located 14 miles southeast of the APE near the San Jose Airport. The mission was moved five times, eventually to its current location on what is now the Santa Clara University campus after the Guadalupe River flooded twice and two earthquakes (Hoover *et al.* 2002:422). The area around Palo Alto and Menlo Park was used as the mission's sheep grazing ranch (Hoover *et al.* 2002:431).

After secularization the APE was located within the Las Pulgas and the Rinconada del Arroyo de San Francisquito land grants (General Land Office [GLO] 1856, 1861). The Rancho de Las Pulgas was initially granted to José Darío Argüello and known as "Cachanigtac" but was later known as Las Pulgas (the fleas) (Hoover *et al.* 2002:402). The land consisted of 12 square leagues (over 69,000 acres). The western boundary of the land was disputed and 1856 a patent for 32,240 acres was finally issued to Argüello's widow, his two sons, and the attorney who provided his services in the dispute, Simon Monserrate Mezes (Hoover *et al.* 2002:403).

The Rinconada del Arroyo de San Francisquito land grant was granted to Rafael Soto in 1835 (Gullard and Lund 1989:45). The land consisted of 2,230 acres. Soto had sailed up San Francisquito Creek and established a pier (embarcadero) at the end of the bay marsh and higher ground. Soto and his family lived in the Palo Alto area for several years (Hoover et al. 2002:431).

The City of Palo Alto was officially established in 1894 (Hoover *et al*. 2002:445; Sawyer 1922:284). It was founded by Leland Stanford, Sr. following the death of his son. Stanford had bought land in the Palo Alto area to establish a horse ranch (Gullard and Lund 1989:82). After their son's death in 1884 Stanford and his wife Jane decided to build a university near their home to commemorate their son (Gullard and Lund 1989:82). When the nearby town of Mayfield refused to stop selling liquor and close its saloons, Stanford, through Timothy Hopkins, purchased additional land for the establishment of a city for students of Stanford University to use (Gullard and Lund 1989:59; Hoover et al. 2002:445.

In 1938 William Hewlett and David Packard began using Packard's one-car garage as a laboratory. Within 20 years Hewlett-Packard Company became the leader in manufacturing electronic and computer devices which lead to the beginning of "Silicon Valley" (Hoover *et al.* 2002:446). The draw of the technology industry in combination with the post-World War II population boom that the San Francisco Bay Area experienced, caused Palo Alto to expand. Like much of the San Francisco Bay Area, the 1950s and 1960s were a time when many orchards and farms turned into suburbs. Eventually, the town of Mayfield was subsumed into Palo Alto. In addition to the increase in houses, infrastructure, services, and industrial buildings were constructed to service and employ the larger population.

STUDY PROCEDURES AND FINDINGS

Native American Contact

A request was sent to the State of California's Native American Heritage Commission seeking information from the sacred lands files and the names of Native American individuals and groups that would be appropriate to contact regarding this project. Letters were also sent to the following groups:

The following groups were also contacted by mail:

Amah Mutsun Tribal Band of Mission San Juan Bautista
Indian Canyon Mutsun Band of Costanoan
Muwekma Ohlone Indian Tribe of the SF Bay Area
North Valley Yokuts Tribe
The Ohlone Indian Tribe

The purpose of contacting these groups was to provide notification of the proposed project so that they would have an opportunity to comment, if desired. It was not intended as, and does not constitute, consultation with tribes.

Native American Contact Results

The Native American Heritage Commission replied with a letter dated August 23, 2017, in which they indicated that the sacred land file has no information about the presence of Native American cultural resources in the project area. No other comments have been received as of the date of this report. A log of contact efforts and copies of correspondence are appended to this report (Appendix A).

In addition to the contact efforts conducted by Tom Origer & Associates, the City of Palo Alto received an AB52 request to consult from the Torres Martinez Desert Cahuilla Indians. However, subsequent communication between the Torres Martinez Desert Cahuilla Indians and the City of Palo Alto resulted in the tribe determining that the City of Palo Alto was outside their ancestral territory and they no longer had a wish to consult on projects overseen by the City of Palo Alto.

Archival Study Procedures

On August 24, 2017, Julia Franco completed a review of the archaeological site base maps and records, survey reports, and other materials on file at the Northwest Information Center (NWIC), Sonoma State University, Rohnert Park (NWIC File No. 17-0516). Archival research also included an examination of the library and project files at Tom Origer & Associates. Sources of information included but were not limited to the current listings of properties on the National Register of Historic Places, California Historical Landmarks, California Register of Historical Resources, and California Points of Historical Interest as listed in the Office of Historic Preservation's *Historic Property Directory* (OHP 2012).

The Office of Historic Preservation has determined that structures in excess of 45 years of age should be considered potentially important historical resources, and former building and structure locations could be potentially important historic archaeological sites. Archival research included an examination of historical maps to gain insight into the nature and extent of historical development in the general vicinity, and especially within the study area. Maps ranged from hand-drawn maps of the 1800s (e.g., GLO) to topographic maps issued by the United States Geological Survey (USGS) and the United States Army Corps of Engineers (USACE).

In addition, ethnographic literature that describes appropriate Native American groups, county histories, and other primary and secondary sources were reviewed. Sources reviewed are listed in the "Materials Consulted" section of this report.

Archival Study Findings

Archival research found that only a small portion of the southern end of the APE had been previously surveyed (Strother *et al.* 2007). Twenty-nine studies have been conducted within one mile of the APE (see Table 1). These studies have resulted in the finding of seven resource within one mile of the APE (see Table 2).

There are no reported ethnographic sites within one mile of the survey area (Kroeber 1925; Levi 1978).

A review of 19th and 20th century maps shows no buildings within the study area (Arnold 1874; Bromfield 1894, 1910; GLO 1858, 1861; Thompson and West 1876; USACE 1943; USCGS 1857, 1862, 1910; USGS 1897, 1899, 1923, 1948a, 1948b, 1961a, 1961b; Wislocki 1890). County histories state that Rafael Soto had a pier (embarcadero) just west of the APE possibly as early as 1835. Buildings are shown on the 1857 map, but by this time, the location is called Wilson's Landing (USCGS 1857).

Historical maps show a levee in the vicinity of the APE as early as 1923 (USGS 1923). This levee is located west of the APE. The 1943 USACE map shows additional levees, one of which is within the APE; however, the 1953 USGS map shows the majority of the levees in their current location; outside the APE (USACE 1943; USGS 1953). At some point after 1968 the airport expanded to the east, and shrank the Duck Pond so that the terminal building and additional tie-downs could be constructed. At this time, the levee that was located along the western edge of the pond was moved east, outside the APE (USGS 2017).

The Palo Alto Airport was constructed between 1934 and 1936. The original runway was located on what was the Palo Alto Golf Course just west of where the current the airport is located. During World War II the airfield was closed to the public until 1956. After the airport reopened to the public the runway was moved to its current location. Over the next 20 years other developments at the airport took place including construction of the current terminal building, paved tie-down areas, several hangars, and the airport tower (Starovoytov and Laduzinsky 2011; USGS 2017).

Table 1. Cultural Resources Studies conducted within 1-mile of the APE.

S#	Title	Author	Date
No #	Supplemental Historic Property Survey Report for the East Palo Alto Safe Routes to School Project.	Origer, T.	2015
3023	A Preliminary Reconnaissance of the Archaeological Resources of the East Palo Alto Redevelopment Project Area No. 1	Dotta, J.	1974
3033	Letter report regarding an archaeological reconnaissance for the proposed Palo Alto Post Office in East Palo Alto, California	Holman, M.	1976
3123	An Assessment of the Archaeological and Paleontological Resources as May be Impacted by the South Bay Dischargers Authority's Proposed Joint Outfall Pipeline	Archaeological Consulting and Research Services, Incorporated	1975
3163	Letter report regarding the results of an archaeological reconnaissance of the proposed Dumbarton Bridge replacement project.	Dietz, S.	1973
4201	Archaeological Reconnaissance of the Proposed Palo Alto Yacht Harbor Expansion.	Anonymous	N.D.
4279	Archaeological Reconnaissance: Proposed Site of Sanitary Land Fill, Santa Clara County, California	Riley, L.	N.D.
4411	Archaeological Reconnaissance and Literature Survey for the City of Palo Alto Regional Wastewater Treatment Works	Dietz, S.	1977
7452	Cultural Resources Investigations, Air Products Liquid Nitrogen Facility Project, Santa Clara County, California	Maniery, J.	1985
8345	Archaeological Survey Report 04-SCL-101 Portions of P.M. 38.3/52.5 Improvements to Route 101 between Route 17 in San Jose and Embarcadero Road in Palo Alto, Santa Clara County, 04393 - 389131 04393 - 396171	Melandry, M.	1980
9442	Cultural Resource Evaluation of the Matadero Creek Flood Control Project in the City of Palo Alto, County of Santa Clara	Cartier, R.	1987
18047	Letter report regarding an Archaeological Field Inspection of the Palo Alto Golf Course, Palo Alto, Santa Clara County, California	Holman, M.	1994
25159	Archaeological Investigations for the 2950 West Bayshore Road Wireless Communications Site, CA 2287H.	Nadolski, J. and M. St. Clair	2002
25330	Letter report regarding the Nextel Communications Wireless Telecommunications Service Facility - Santa Clara County	Billat, L.	2000
29698	Request for SHPO Review of FCC Undertaking PG&E City of Palo Alto / SF-05252A	Thal, E. and L Billat	2005
33697	Palo Alto Regional Water Quality Control Plant Reuse Pipeline, Santa Clara County, California, Cultural Resources Inventory	Martorana, D.	2007
34074	Cultural Resource Assessment Palo Alto Regional Water Quality Control Plant UV Disinfection Project, Palo Alto, Santa Clara County, California.	Strother, E., A. Arrigoni, D. Bailey, J. Allan, and W. Self	2007
34175	Letter report regarding the San Francisquito Creek Pump Station, Santa Clara County, California	Holman, M.	2006
37075	Historic Resources Compliance Report for the U.S. 101 Auxiliary Lanes (Route 85 to Embarcadero Road) Project, Santa Clara County, California: 04-SCL-101 PM 52.17-48.97 EA 04-4A330.	Whitaker, A.	2008
39085	Cultural Resources - Existing Conditions Ravenswood/4	Basin Research Associates,	2010

	Corners Transit Oriented Development Specific Plan, City of East Palo Alto, San Mateo County, California	Inc.	
39088	Letter report regarding a Cultural Resources Review - Records Search, Limited Literature Review, and Native American Consultation: Sewer Rehabilitation Project - East Palo Alto Sanitary District, Santa Clara County	Busby, C.	2010
39266	Cultural Resources Study for the Line 101 South ILI Upgrade Project, Santa Clara County, California	Thomas, J.	2012
41536	Final Survey Report: Palo Alto Historical Survey Update	Corbett, M. and D. Bradley	2001
41600	Collocation ("CO") Submission Packet FCC Form 621: Utility Poles Along Waverly Street, Lincoln Avenue, Emerson Street, Bryant Street, Park Avenue, Rinconada Avenue, Arrowhead Way, and Dennis Way, Palo Alto, Santa Clara County, California.	Supernoqicz, D.	2012a
43191	Historic Property Survey Report: State Route 85 Express Lanes Project, Santa Clara County, California, EA 4A7900; EFIS 0400001163 US 101 PM 23.1-28.6 SR 85 PM 0.0-24.1 US 101 PM 47.9-52.0	Kubal, K.	2013
43328	New Tower ("NT") Submission Packet FCC Form 620: Baylands/Palo Alto, Project No. CNU4060.	Supernowicz, D.	2013a
43979	Letter report regarding Cultural Resources Review - Runnymede Storm Drain Phase II, City of East Palo Alto, San Mateo	Busby, C.	2012
45231	Environmentally Sensitive Area (ESA) Action Plan for the Oregon-Pagemill Expressway Project, Palo Alto, California: 04-SCL-0-0-CR	Cartier, R.	2012
45670	Historic Property Survey Report: US 101 Express Lanes Project, Santa Clara County, California, Project No. 0412000459/EA 2G7100 04-SCL-101 PM 16.00/52.55 OF-SCL-85 PM 23.0/24.1	Kubal, K.	2014

Table 2. Cultural Resources within 1-mile of the APE

Resource Designation	Resource Description	Author	Date
P-43-002809	Utility pole	Supernowicz, D.	2012b
HUD061122B	Single-family residence	Murillo-Garcia, E.	2006
HRI 4302-0604-0000	Sea Scout Base	Corbett, M.	2000
HRI 4302-0133-0000	Harbormaster's House	Anonymous	1978
P-43-000578	Midden	Bocek, B. and J. Rutherford	1985
P-43-003004	Airport tower	Supernowicz, D.	2013b
P-43-003140	Green Gables District	Arbunich, M.	2005

The Palo Alto Treatment Plant was constructed in 1934. The plant was upgraded in 1957 to meet the needs of the San Francisco Bay Area's post-World War II population increase. In 1966, a long-range plan was adopted which recommended that the water treatment in the area should be consolidated.

The cities of Mountain View and Los Altos agreed to retire their treatment plants, and East Palo Alto Sanitary District, Stanford University, and Los Altos Hills agreed to share the costs of upkeep for a regional facility. In 1972, the Palo Alto Regional Water Quality Control Plant was completed. Since that time the facility has been subjected to upgrades between 1975and 2010 (Carollo 2012).

Since the original construction in 1934, only five buildings/structures remain that were constructed more than 50 years ago. These buildings include the Influent Box and Septage (1966), the Headworks Old Pumping Plant Nos. 7, 8, and 9 (1956), the Recycled Water Chlorine Contact Tank (1934, remodeled in 1976), Recycled Water Filters (1948, remodeled in 1976) the Abandoned Chlorine Contact Tank (1956, remodeled in 1972) (Carollo 2012).

Field Survey Procedures

An intensive field survey was completed by Taylor Alshuth on September 1, 2017. The project area was examined by walking in a zigzag fashion within corridors 15 meters wide. Ground visibility was good to poor with vegetation, asphalt, and imported gravel being the chief hindrances. A hoe was used, as necessary, to clear small patches of vegetation so that the soil could be inspected.

Based on the results of the prefield research, it was anticipated that prehistoric resources, and to a lesser degree historic-period resources, could be found within the study area. Prehistoric archaeological site indicators expected to be found in the region include but are not limited to: obsidian and chert flakes and chipped stone tools; grinding and mashing implements such as slabs and hand-stones, and mortars and pestles; and locally darkened midden soils containing some of the previously listed items plus fragments of bone, shellfish, and fire affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

Field Survey Findings

Archaeology

No prehistoric or historical archaeological deposits were found during the survey.

Built Environment

There are no buildings or structures within the APE.

RECOMMENDATIONS

Known Resources

Archaeology

No archaeological site indicators were found during the survey and no resource-specific recommendations are warranted.

Built Environment

There are no buildings or structures within the APE and no resource-specific recommendations are required.

Accidental Discovery

Consideration was given to the possibility of buried archaeological sites within the study area. A model for predicting a location's sensitivity for buried archaeological sites was formulated by Meyer and Kaijankoski (2017) based on the age of the landform and the presence of certain environmental elements. A location is considered to have high sensitivity if it is on a Holocene-era landform with relatively gentle terrain (slope of 1 to 8 percent), and is within 100 meters of water. Given those criteria, there is the possibility that the study area could contain buried archaeological sites. However, because the landform was bay marsh until the 20th century, it would have been subjected to daily inundation due to tides; therefore there is a <1% probability of there being buried cultural resources within the APE.

If buried materials are encountered, all soil disturbing work should be halted at the location of any discovery until a qualified archaeologist completes a significance evaluation of the find(s) pursuant to Section 106 of the National Historic Preservation Act (36CFR60.4) and CEQA guidelines (§15064.5 [f]). Prehistoric archaeological site indicators include: obsidian and chert flakes and chipped stone tools; grinding and mashing implements (e.g., slabs and handstones, and mortars and pestles); bedrock outcrops and boulders with mortar cups; and locally darkened midden soils. Midden soils may contain a combination of any of the previously listed items with the possible addition of bone and shell remains, and fire-affected stones. Historic period site indicators generally include: fragments of glass, ceramic, and metal objects; milled and split lumber; and structure and feature remains such as building foundations and discrete trash deposits (e.g., wells, privy pits, dumps).

The following actions are promulgated in the CEQA Guidelines Section 15064.5(d) and pertain to the discovery of human remains. If human remains are encountered, excavation or disturbance of the location must be halted in the vicinity of the find, and the county coroner contacted. If the coroner determines the remains are Native American, the coroner will contact the Native American Heritage Commission. The Native American Heritage Commission will identify the person or persons believed to be most likely descended from the deceased Native American. The most likely descendent makes recommendations regarding the treatment of the remains with appropriate dignity.

SUMMARY

Tom Origer & Associates completed an historical resources survey of an approximately 0.5 linear mile for the City of Palo Alto's RWQCP's New 63-Inch Outfall Project. The study was requested and authorized by WRA, Inc., on behalf of the City of Palo Alto. This study was designed to meet the requirements of Section 106 and CEQA. No historical resources were found within the study area and no resource-specific recommendations were made. Documentation pertaining to this study is on file at the offices of Tom Origer & Associates (File No. 17-073).

MATERIALS CONSULTED

Anonymous

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APPENDIX A

Native American Contact

Copies of Correspondence

Native American Contact Efforts
RWQCP's New 63-Inch Outfall Project
Palo Alto, Santa Clara County

Organization	Contact	Action	Results
Native American Heritage Commission		Form 8/21/17	A response was received via email stating that a search of the Sacred Lands File resulted in a negative finding. A list of additional contacts was provided.
Amah Mutsun Tribal Band	Valentin Lopez Irenne Zwierlein	Letter 8/25/17	No response received as of the date of this report.
Indian Canyon Mutsun Band of Costanoan	Ann Marie Sayers	Letter 8/25/17	No response received as of the date of this report.
Muwekma Ohlone Indian Tribe of the SF Bay Area	Rosemary Cambra	Letter 8/25/17	No response received as of the date of this report.
North Valley Yokuts Tribe	Katherine Erolinda Perez	Letter 8/25/17	No response received as of the date of this report.
The Ohlone Indian Tribe	Andrew Galvan	Letter 8/25/17	No response received as of the date of this report.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: RWQCP New 63-Inch Outfall Project: Outfall No. 1 (700-HDPE-1001)
County: Santa Clara

USGS Quadrangles
Name: Mountain View
Township T5S Range R2W Section(s) N/A MDBM (within the Rinconada Del Arroyo de San Francisquito land grant)

Date: August 21, 2017
Company/Firm/Agency: Tom Origer & Associates
Contact Person: Eileen Barrow

Address: P.O. Box 1531
City: Rohnert Park Zip: 94927
Phone: (707) 584-8200 Fax: (707) 584-8300
Email: eileen@origer.com

Project Description: The project proponent is obtaining permits from the RWQCP for a new outfall pipe.

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

August 23, 2017

Eileen Barrow
Tom Origer and Associates

Email to: Eileen@origer.com

RE: New 63 Inch Outfall Project, Santa Clara County

Dear Ms. Barrow,

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not preclude the presence of cultural resources in any project area. Other sources for cultural resources should also be contacted for information regarding known and/or recorded sites.

Enclosed is a list of Native Americans tribes who may have knowledge of cultural resources in the project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these tribes, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at frank.lienert@nahc.ca.gov.

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

Native American Heritage Commission
Native American Contacts
8/23/2017

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt , CA 95632
vlopez@amahmutsun.org
(916) 743-5833
Ohlone/Costanoan
Northern Valley Yokuts

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister , CA 95024
ams@indiancanyon.org
(831) 637-4238
Ohlone/Costanoan

Amah MutsunTribal Band of Mission San Juan Bautista
Irenne Zwierlein, Chairperson
789 Canada Road
Woodside , CA 94062
amahmutsuntribal@gmail.com
(650) 851-7489 Cell
(650) 851-7747 Office
(650) 332-1526 Fax
Ohlone/Costanoan

North Valley Yokuts Tribe
Katherine Erolinda Perez, Chairperson
P.O. Box 717
Linden , CA 95236
canutes@verizon.net
(209) 887-3415
Ohlone/Costanoan
Northern Valley Yokuts
Bay Miwok

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791
Milpitas , CA 95036
muwekma@muwekma.org
(408) 314-1898
(510) 581-5194
Ohlone / Costanoan

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152
Fremont , CA 94539
chochenyo@AOL.com
(510) 882-0527 Cell
(510) 687-9393 Fax
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document and is based on the information available to the Commission on the date it was produced.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessments for the proposed
New 63 Inch Outfall Project, Santa Clara County

August 25, 2017

Valentin Lopez
Amah Mutsun Tribal Band of Mission San Juan Bautista
P.O. Box 5272
Galt, CA 95632

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Mr. Lopez:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

Enclosed is a portion of the Mountain View, California 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

August 25, 2017

Irenne Zwierlein
Amah Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Ms. Zwierlein:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

Enclosed is a portion of the Mountain View, California 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

August 25, 2017

Ann Marie Sayers
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Ms. Sayers:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

Enclosed is a portion of the Mountain View, California 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

August 25, 2017

Rosemary Cambra
Muwekma Ohlone Indian Tribe of the SF Bay Area
P.O. Box 360791
Milpitas, CA 95036

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Ms. Cambra:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

Enclosed is a portion of the Mountain View, California 7.5' USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

August 25, 2017

Katherine Erolinda Perez
North Valley Yokuts Tribe
P.O. Box 717
Linden, CA 95236

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Ms. Perez:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

Enclosed is a portion of the Mountain View, California 7.5’ USGS topographic quadrangles showing the project location.

Sincerely,

Eileen Barrow

Eileen Barrow
Senior Associate

August 25, 2017

Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

RE: Regional Water Quality Control Plant New 63-Inch Outfall Project (Outfall No. 1 [700-HDPE-1001]), Santa Clara County, California

Dear Mr. Galvan:

I write to notify you of a proposed project within Santa Clara County, for which our firm is conducting a cultural resources study. Our firm is surveying approximately 0.5 miles of land for the installation of a new sewer outfall pipe. A portion of the study area is located on the Palo Alto Airport. The City of Palo Alto is reviewing the project for CEQA compliance. The project will also be reviewed by the State Water Resources Control Board (for both CEQA and Section 106 compliance) and by the Federal Aviation Administration (for Section 106 compliance). This notification does not constitute consultation.

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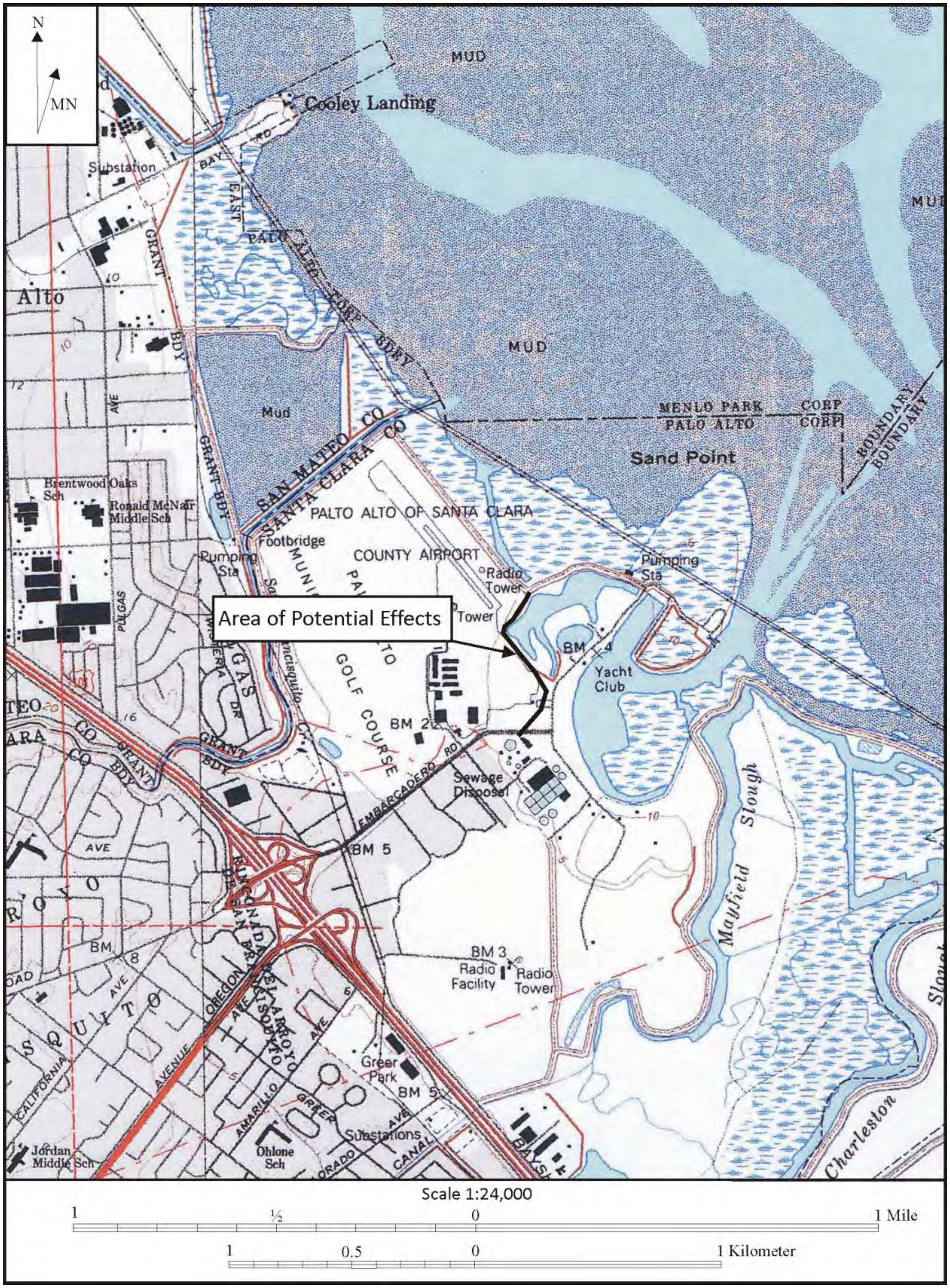

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Ronald McNair Middle Sch
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Pumping Sta
Radio Tower
Area of Potential Effects
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Yacht Club
GOLF COURSE
BM 2
EMBARCADERO RD
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BM 3
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Greer Park
BM 5
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Charleston
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1 0.5 0 1 Kilometer

APPENDIX D

GEOTECHNICAL ENGINEERING INVESTIGATION REPORT

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City of Palo Alto:
Regional Water Quality Control Plant
New Outfall No. 1 Project

DRAFT - Geotechnical Engineering Investigation Report

June 29, 2017

Prepared for: **Kennedy/Jenks Consultants, Inc.**

Prepared by:

McMillen Jacobs Associates
1350 Treat Blvd., Suite 100
Walnut Creek, California
94597

Distribution

To:	Xiangquan Li Kennedy/Jenks Consultants, Inc.
From:	Norman Joyal McMillen Jacobs Associates
Prepared By:	Norman Joyal McMillen Jacobs Associates
Reviewed By:	Rachel Martin and Dru Nielson McMillen Jacobs Associates
Issued Draft:	June 29, 2017

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1.0 Introduction

This geotechnical engineering investigation report presents geotechnical findings for the City of Palo Alto's Regional Water Quality Control Plant New Outfall Project in Santa Clara County, California. The project will include design and construction of a new outfall parallel to the existing 54-inch outfall from the City's Regional Water Quality Control Plant into an unnamed slough in the San Francisco Bay. The new HDPE outfall pipeline crosses through the Palo Alto Airport property and an existing levee under the jurisdiction of the San Francisquito Creek Joint Power Authority. While preliminary project design included evaluation of new outfall pipe sizes ranging from 36 to 54-inch diameter and several potential trenchless crossings, it is our understanding that the present level of project design is to construct a 54-inch outfall pipe. The new pipe will be constructed by open trench excavations that will be about 12 feet deep from Station (Sta.) 1+00 to about Sta. 14+50. At Sta. 14+50 the trench excavation transitions up to about 7 feet deep at the start of an existing levee that separates the airport property from the adjacent bay land and waters. The new outfall pipe parallels and follows the inboard side of the levee all the way to its eventual termination at the unnamed slough

2.0 Geotechnical Data

2.1 Project Test Borings

Three test borings were undertaken by McMillen Jacobs Associates near the project pipeline alignment on May 17, 2017 (Figure 2). Borings B-1 and B-3 were completed successfully to the planned drilling depths. At the location for Boring B-2, drilling was attempted at three different locations within the immediate planned boring location, all of which met refusal on concrete at depths of 2.5 feet. The nature of the obstruction at this location is unknown. The logs of the test borings are provided in Appendix B. A partial summary of data from the test boring logs is provided in Table 1.

Table 1. Partial Summary of Data from Test Borings

Test Boring	Drill Depth (ft)	Depth to GW (ft)	USCS Group Symbol[1] Soil Types Logged
B-1	36.5	9	CL, SC, SM
B-2	2.5	-	3 drill attempts met refusal on a concrete obstruction
B-3	26.5	9.5	CL, CH, SC, SM

[1] USCS - Unified Soil Classification System Group Symbols, defined in Appendix A figures.

The test borings were drilled with a CME 55 drill rig using 6-inch diameter hollow stem augers. Relatively undisturbed soil samples were obtained from test borings by pushing a 3.0-inch outside diameter, 2.9-inch inside diameter Shelby Tube Sampler (STS) or by driving a 2.5-inch inside diameter, 3.0-inch outside diameter Modified California Sampler (MCS) containing brass or steel liners into the bottom of the boring. Disturbed soil samples were obtained by driving a 1.4-inch inside diameter and 2.0-

inch outside diameter Standard Penetration Test (SPT) sampler (ASTM D1586) into the bottom of the boring. A 140-pound automatic hammer falling 30 inches per blow was used to drive all samplers. The number of blows required to drive the samplers the last 12 inches of an 18-inch drive is recorded on the boring logs as penetration resistance (blows/ft).

Soil samples retrieved from test borings were examined for classification, logged, and sealed to preserve their natural moisture content for laboratory testing. Classification systems used to log the samples are provided in Figure A-1 of Appendix A. Descriptions of soils provided in the boring logs are based on observations during drilling and sampling, and on the results of laboratory tests. At the end of drilling, borings were backfilled with cement grout.

2.2 Laboratory Tests

Moisture content, unit weight, Atterberg limits, grain size analysis, and direct shear tests were performed in the laboratory on soil samples retrieved from the test borings. Consolidation testing was planned for two test samples; however, after extruding the Shelby tube samples, the laboratory determined the samples were too disturbed for any meaningful consolidation testing. Test results are summarized on the logs of the test borings in Appendix B, and as test result figures in Appendix D.

2.3 Cone Penetration Tests

Five (5) cone penetration tests (CPT-1 through CPT-5) were driven and logged along the project pipeline alignment on May 17, 2017 (Figure 2). CPT-1, CPT-3, CPT-4, and CPT-5 were advanced to a depth of 35.4 feet, whereas CPT-2 was advanced to a depth of 40.4 feet. The CPTs were performed with a 20-ton compression-type cone with a 15-cm2 base area, an apex angle of 60 degrees and a friction sleeve with a surface area of 225 cm2. The cone and sleeve are advanced separately to obtain separate readings for cone and sleeve resistance. The cone was pushed into the ground at a constant rate of 2 cm per second in accordance with ASTM D-3441 and cone readings were taken at approximately 5-cm intervals. The same approach was used when the sleeve was pushed into the ground for the sleeve resistance.

The CPT logs are provided in C. The CPT logs have been hand annotated with our interpretation of the Young Bay Mud contact with the stiffer Old Bay Muds. A pore pressure dissipation test was performed as part of CPT-8. The results of the pore pressure dissipation test are provided in Appendix E.

2.4 Geologic Maps

Near surface soils (i.e., soils within about 5 feet of the ground surface) mapped by the Natural Resources Conservation Service (NRCS) within the project area are identified and described in Figure 3. The soils mapping shows the pipeline alignment primarily in the Aquic clay and sandy clay soils. The alignment is also adjacent to areas of Novato fat clay soils.

Deposits mapped by the U.S. Geological Survey (USGS) within the project area are identified and described in Figure 4. The project area is identified by the USGS to be in an area of artificial fill and Bay Mud deposits. Artificial fill is a man-made accumulation of various materials including soil (e.g., clay, silt, sand, and gravel) and rock fragments (e.g., cobbles and boulders), organic material (e.g., peat), concrete, asphalt, debris and rubbish (e.g., steel, rubber tires, etc.). Bay Muds are typically very soft, lightweight, organic-rich, highly compressible and weak silty clay estuarine deposits (with occasional sand lenses and stringers) that are corrosive to concrete and steel and which have been accumulating within the limits of the San Francisco Bay (including Richardson Bay) for several thousands of years.

The fill and native soils encountered in test borings for the project (see the logs of project test borings provided in Appendix B) are consistent with these mapped descriptions. A contour map of the base of Bay Mud by the California Division of Mines and Geology (Goldman, 1969; now known as the California Geological Survey) is provided in Figure 5. From straight line interpolation between the zero and 20 foot contour, the Young Bay Mud thickness is interpreted to be about ten feet thick. Adding the fill, it places the bottom of the Young Bay Mud about 15 feet below the ground surface. Considering the regional variability of these deposits, this correlates well with the borings and the Young Bay Mud contact interpreted on the CPT logs.

2.5 Groundwater

The depth to groundwater measured in test borings for the project is shown on the test borings in Appendix B. Additionally, a regional groundwater map modified from the Seismic Hazard Zone Report is provided in Figure 6. The mapping in this figure indicates that near-surface groundwater at the project area may be found at depths less than 5 feet from the surface.

3.0 Geotechnical Data Interpretation

3.1 Geotechnical Settings

Geotechnical settings along the new pipeline alignment identified in our investigation consist of Artificial Fill overlying soft Young Bay Mud which in turn overlies stronger Old Bay Mud. The Artificial Fill & Bay Mud setting along the new pipeline alignment is generalized as being about five to six feet of fill overlying soft to very soft, highly-compressible and often under-consolidated, water-saturated, organic-rich silty clay mud containing lenses of sand, oyster shells, and peat (Young Bay Mud). Underlying the Young Bay Mud is soft to medium stiff Old Bay Mud consisting of fine-grained cohesive (clays and silts) and granular non-cohesive (sands and gravels) alluvial soils (soil transported and deposited by creeks) and episodic fluvial soils (deposition through water).

The following is a summary of additional geotechnical conditions in Artificial Fill & Bay Mud setting of the project area based on the geotechnical investigation:

- Aquic and Novato soil units (described on Figure 3);
- Artificial fills comprised of clayey sands and silty sands with gravel, that may also contain deleterious debris;
- Young Bay Mud, with test results from test boring samples of:
    - Typical standard penetration blow count = 2 from borings, <5 from CPT interpretations;
    - Direct shear friction angle = 21 and 26 degrees
    - Cohesion = 30 and 190 psf °
    - Moisture content = 28 to 57% (4 tests)

    - Dry density =62 and 85 pcf

- Airport pavements;
- Buried concrete obstructions, which may be construction debris or unidentified utility; and
- High groundwater levels, likely influenced by tides.

Loads on the compressible Young Bay Mud cause the Bay Mud to consolidate (settle). Each episode of loading adds a new consolidation settlement cycle to any cycle that has not reached 100% consolidation. In a steady state, the rate of Bay Mud settlement is generally high in the early years (5 to 10 years) and will slowly decrease over time which could be tens of years depending on the load, Young Bay Mud thickness, and whether settlement occurs under single or double drainage conditions. Consequently, depending on the history of fill placement along the alignment, there very well may be on-going settlement from that loading history. Generally, the loading history of a Bay Mud site is not known so estimating residual settlement from prior loading is not practical. Therefore, discussions of settlement generally center around the placement of any new net load increase the ground has not felt before.

To illustrate the magnitude and duration of Young Bay Mud settlement over time, Figure 13 presents Young Bay Mud consolidation curves developed by the Army Corp of Engineers. From the curves, even a modest fill thickness of 5 feet on a modest 15-foot-thick Young Bay Mud layer results in about 12 inches of settlement with that settlement projected to occur over four to five years.

3.1.1 Groundwater

The measured depth to which groundwater accumulated in project test borings on completion of drilling was at 9 feet and 9.5 feet below ground surface as recorded on the individual boring logs in Appendix B and summarized in Table 1. The project test borings were backfilled with grout immediately upon drill completion to minimize disruption to the airport; therefore, the groundwater levels measured on completion of drilling do not represent static (i.e., equilibrium) groundwater levels. Equilibrium groundwater levels can take several hours to days to be established in an open borehole. Equilibrium groundwater levels will likely be higher (i.e., closer to the ground surface) than the groundwater levels measured on completion of drilling. In addition, groundwater levels in the project areas will fluctuate based on factors such as tides, seasonal rainfall, water levels in nearby drainages, and possibly other factors not evident at the time of writing this report. The entire project area is identified to be in Zone A, special flood hazard area inundated by the 1% annual chance flood as shown on the FEMA Flood Zone Hazard Map (Figure 7).

3.1.2 Faulting

No active fault (where active fault is defined by the State of California as one with known surface displacement within the last 10,000 years, see Hart and Bryant, 1997) is known to cross the project areas. The nearest active fault to the project areas is the San Andreas Fault, located between 6 and 7 miles to the southwest. The location of the San Andreas Fault, and other seismogenic faults relative to the project areas are shown on Figure 8.

3.1.3 Ground Shaking

The project areas will be subject to strong ground shaking during earthquakes on nearby faults, including those identified on Figure 9. It is estimated that the peak firm rock ground acceleration in the project areas, based on 10% probability of exceedance in 50 years (equivalent to a seismic recurrence interval of one event every 475 years), is 0.5g (see Figure 10). The actual ground shaking that will occur in the project areas during an earthquake will be dependent upon the earthquake magnitude, its distance, surrounding topography, and the geometric relationships and seismic response of the underlying soil and bedrock. Earthquake shaking in the Bay Area has been amplified in areas underlain by Bay Muds during historic earthquakes (e.g., the 1989 Loma Prieta earthquake). Bolt (1993) indicates that average peak ground accelerations greater than 0.5g results in ground cracks and breakage of underground pipes (Figure 11).

3.1.4 Liquefaction

Liquefaction is a phenomenon in which soils lose internal strength because of increased pore pressure generated by cyclic loading. This behavior is commonly induced by ground shaking during earthquakes. Soils prone to liquefaction are saturated (below groundwater), non-cohesive silts and sands of low to medium density. Liquefaction-prone soils encountered in project test borings consist of the loose silty clay sand in B-1 and the silty sand with gravel layer both encountered around the 14 to 20 feet depth below ground surface. The Association of Bay Area Governments has identified the project area as having a very high susceptibility to liquefaction (ABAG, 2017). Historically, we are aware of ??? Any history of liquefaction in project area

3.1.5 Conclusions

This geotechnical investigation encountered a variety of conditions along the new forcemain alignment that are documented herein. None of these conditions present "fatal flaws" to project construction. However, the geotechnical conditions encountered along the new forcemain alignment, as listed below, do present challenges that will require careful attention and coordination by designers and contractors in order to design and construct the project in a safe and economic manner and to ensure its useful long-term performance. Geotechnical conditions and challenges for the project include:

- Tidally and seasonably variable groundwater level depths.
- Porous and permeable soils and granular utility bedding and trench backfill (Embarcadero Road and Airport property).
- Vertically and laterally variable native soil composition including:
    - Silts and clays, and sands and gravels.
- Vertically and laterally variable native soil density and consistency including:
    - Loose to medium dense sands that are liquefiable; and
    - Very soft to stiff silts and clays, including highly-compressible Bay Muds.
- Vertically and laterally variable native soil behavior in excavations including:
    - Flowing and running, granular, non-cohesive sands that will have no stand-up time when exposed in vertical excavations;
    - Fast raveling cohesive fine-grained silts and clays that will have little to no stand-up time when exposed in vertical excavations; and
    - Squeezing and swelling cohesive fine-grained silts and clays (Bay Muds).
- Historic fills that potentially contain dumped uncompacted materials and oversized debris.

- Utilities and utility trench backfills with variable bedding and backfill types (typically granular), and geometries.
- Existing airport pavements and the proposed renovations of those pavements.
- Relatively low bearing capacity of native Young Bay Mud for pipeline thrust blocks, if any.
- Potential for unidentified buried man-made objects (e.g., abandoned pipelines, foundations, rip-rap, fill debris, etc.).
- Seismic ground shaking and related effects (soil liquefaction and lateral spreading).
- Construction vibrations.

4.0 Project Recommendations

During the pre-design phase, different alternative alignments were evaluated for an open cut installation as was the possibility of using trenchless methods to complete some of the new outfall installation. The 30% design has the alignment bordering the south and eastern sides of the airport tarmacs before the alignment begins to follow the levee that borders the east side of the airport. The new outfall will be constructed by open trench excavations that will be about 12 feet deep from Station (Sta.) 1+00 to about Sta. 14+50 which is where the outfall transitions into a parallel alignment with an existing levee. At Sta. 14+50 the trench excavation transitions up to about 7 feet deep at the start of the levee that separates the airport property from the adjacent bay land and waters. The new outfall pipe parallels and follows the inboard side of the levee all the way to its eventual discharge termination at the unnamed slough.

The 30% design envisions the deeper trench will be supported by sheetpiles driven down into the Old Bay Clays to provide a water cutoff. The plan is to sacrifice the lower part of the sheetpiles (typically below 5 feet) when the trench is backfilled. For the shallower 7-foot-deep trench, the plan is to use a benched or sloped open cut excavation.

In addition to the trench support recommendations, the following additional design recommendations were requested in your May 19 email to which were attached the updated 30% drawings and a draft of SaferBay report:

- Groundwater elevation to be used in design and construction and the long-term groundwater level after 50 years with an anticipated three-foot rise is sea level.
- Backfill material around the pipe for that portion of the alignment that is located within or at the toe of the existing levee to ensure a water conduit is not created along the pipe.
- Review settlement information for the airport project and provide an estimate of the settlement that can be expected at the pipeline outside of the levee (Sta. 1+00 to Sta. 14+50).

4.1 Support of Trench Excavations

Temporary excavations consisting of vertical-walled trench excavations for open-cut installation will be required for the new outfall from Sta. 1+00 to about Sta. 14+50. That station approximately coincides with where the new outfall begins to parallel the airport levee. The anticipated trench depth for the outfall along this series of stationing is about 12 feet and it is anticipated the trench shoring will consist of interlocking sheetpile for the initial excavation ground support. The design intent is to embed the sheetpile toe in the Old Bay Mud to cut off groundwater. The sheetpile interlock is assumed to be 'watertight' (typically defined with an allowance for seepage water as no system is ever watertight) such that during excavation the only water that has to be dealt with in the trench is that which is locked into the formation as a result of the sheetpile toe cutoff and that which bleeds through the sheetpile interlock. The upper five or so feet of the sheetpile will be removed and the rest will be abandoned in-place to avoid ground disturbance if extracted.

Where the open trench meets up with the levee, the trench will transition to a benched open cut that will be about 7 feet deep. At this depth, the trench bottom would be slightly above the groundwater level noted in our boring logs. For a benched excavation, a reasonable approach would be to sideslope the upper two to three feet of the trench followed by a four to five-foot vertical excavation that can be supported with trench boxes.

The proposed trench depths of 7 and 12-feet-deep will be in the Young Bay Mud. At the 7-foot depth just below the fill, the Young Bay Mud is generally stiffer due to episodic desiccation of the surface before fill was ever placed, as well as the consolidation that occurred when the fill was placed. Desiccation down to the current 12 foot depth (actually about 8 feet before any fill was placed) may have occurred historically, but the anticipation is the ground will be softer at a 12 foot depth than at 7 feet. A soft trench bottom in Bay Mud is often stabilized with a 'burrito wrap" (foundation material wrapped in filter fabric) which serves as the basal support for the pipe bedding. Refer to Figure 18 for excavation backfill details. This is not a problem for the deeper trench, but it is for the trench alongside the existing levee. The San Francisquito Creek Joint Power Authority does not want pervious backfill around the pipe that is adjacent to their levee, the trench backfill details shown in Figure 18 are not applicable. To ensure adequate support for the pipe and to ensure backfill around the pipe is not pervious, the most reasonable thing to do is to encapsulate the outfall pipe in a low density cellular backfill.

The project specifications should make the contractor solely responsible for the design, installation, performance and removal/abandonment of all shoring and related items (e.g., dewatering and ground improvement systems if used). The contractor should be required to submit his proposed shoring, dewatering and ground improvement systems to the owner for review prior to their implementation. The submittal should contain alternative and contingent systems that the contractor will be prepared to implement should the initial systems not achieve the minimum performance requirements described herein.

4.2 Excavatibility

Project excavations in trench backfill and areal fills as encountered in project test borings (see logs in Appendix B) can generally be made with appropriately-sized conventional excavators. Project excavations through hard debris or rubble fill are commonly associated with the land reclamation fill placed on top of Young Bay Muds may require special excavation equipment and methods (e.g., hoe-rams, jack hammers). Contractors must independently evaluate the excavatibility of the subsurface materials to be encountered during project construction and choose appropriate excavation equipment and methods.

4.3 Dewatering

All construction in project excavations should be performed in the dry. "Water-tight" shoring and dewatering of the ground isolated by the shoring toe embedment will be a critical component to successful construction of the project. The groundwater level within the bore holes is above the invert of the deeper portions of the outfall invert (or below the invert in the case of the shallower 7-foot-deep trench. Based on our groundwater findings and the anticipated project excavation depths, dewatering of the ground encapsulated by the water-tight shoring should be planned for the deeper trench excavations. Although groundwater would not be expected in the shallower excavations, the contractor should be prepared to handle groundwater in the event groundwater levels change from those reported at the time of our investigations. The contractor should be made solely responsible for the design, construction, and effects of temporary dewatering systems, and the contractor should be required to submit dewatering plans to the owner for review prior to implementation.

The design of the dewatering systems should be based on the actual groundwater inflow into excavations at the time of construction and the type of shoring used (e.g., interlocking driven sheet piles with adequate toe embedment is an effective way of reducing or eliminating external dewatering requirements). For short-term excavations (i.e., trench excavations open less than 24 hours) and where the groundwater level is at or below the invert of the planned outfall, a stable trench bottom may be maintained by an internal dewatering system consisting of regularly-spaced, rock-filled sumps excavated below the trench bottom. Submersible pumps within the rock-filled sumps will remove collected groundwater. The spacing and depth of these sumps and the foundation rock between sumps should be such that the trench bottom is relatively dry and stable, and capable of supporting compaction of pipe bedding material in the case of the deeper trench.

Where the invert of the planned outfall is below the groundwater level, a water-tight shoring system will be required. Water-tight shoring typically consists of continuous, pre-driven interlocking sheet piles which have been driven with sufficient toe embedment to prevent groundwater flow to and boiling (i.e., piping) in the excavation bottom. For the anticipated head differential of less than 5 feet in the deeper trench, a five foot toe embedment in the Old Bay Clay below the SM/SC layer just above a 20 foot depth in the geotechnical borings. A deeper toe embedment may be necessary to develop sufficient passive pressure to resist active loading on the system.

Even where water-tight shoring is used, we anticipate that limited internal dewatering (i.e., pumping from rock-filled sumps inside the excavation) will be required to remove nuisance water and minor seeps.

Dewatering methods will need to vary within the project areas to account for variations in subsurface conditions, proximity to drainageways, groundwater depth, required excavation depths, and dewatering method limitations related to the grain size of the soils being dewatered. The limitations of various methods of dewatering relative to the particle (grain) size of the water-bearing soils are illustrated on Figure 14. Grain size distributions for project soils to be dewatered are plotted on Plate C-2 in Appendix D. Based on a comparison of these plots with Figure C-2, there is a potential for high rates of groundwater inflow from the SM materials if they are not cutoff by the sheetpile toes.

Collectively, the contractor's project dewatering system(s), together with his project shoring systems, are to preserve the undisturbed bearing capacity of the existing subgrade soils at the bottom of excavations and meet all the following minimum performance requirements:

- Provide stable excavation walls and bottom;
- Provide a reasonably dry base of excavation;
- Filter native soil and prevent loss of ground from dispersion and erosion;
- Prevent piping (boiling) of the excavation bottom;
- Draw down the groundwater level to 3 feet below and beyond the excavation bottom and sidewalls where shoring is not designed to resist hydrostatic pressures;
- Prevent damaging settlement to nearby structures, utilities and/or pipelines;
- Be installed and removed in accordance with governing (e.g., County and State) requirements; and
- Allow for controlled release of groundwater to its static level in a manner that prevents disturbance of the bottom soils and prevents flotation or movement of structure or pipelines.

The project specifications should require that the contractor's dewatering, shoring and ground improvement submittals contain alternative contingent systems, and that the contractor be prepared to implement alternative systems should the initial systems not achieve these minimum performance requirements. Uncontrolled seepage of groundwater through excavation sidewalls or bottom will cause the excavations to be unstable and unsuitable for pipeline and related structural support. Consequently, the contractor should be prepared to locally dewater or modify (e.g., by ground improvement) construction excavations, if and where needed, to provide stable and reasonably dry excavations.

Prolonged dewatering will cause an increase in effective stress on the underlying Bay Mud which will lead to consolidation and area subsidence. External dewatering for any extended period is not allowed, but localized, targeted, short-term dewatering (days) will be allowed.

4.4 Shoring

The contractor should be required to shore the anticipated 12-foot-deep project excavations with interlocking sheetpiles in accordance with Cal/OSHA regulations. The contractor should be made solely responsible for the selection, design, construction, removal and effects of shoring noting the following:

- Project excavations will be located parallel to and/or across backfill for other existing utilities (Embarcadero Road crossing) and within areal fills all of which will be over soft compressible Bay Mud. Project excavations will therefore encounter various types of fill including granular, non-cohesive materials that will tend to run or ravel when dry or flow when saturated with groundwater (i.e. have little to no stand-up time in unshored vertical excavations). Unsupported vertical excavations in flowing, running or raveling ground will most likely experience excavation wall loss and related undermining of adjacent pavements, utilities, and structures. Therefore, the anticipated 12 foot excavation into these types of materials must have water-tight shoring (i.e., continuous interlocked steel sheet piles with toe embedment).
- Aluminum hydraulic speed shores with full solid sheet backing that covers all of the trench walls or trench boxes may only be used for supporting the vertical excavation made for the bottom of the anticipated 7-foot-deep trench that parallels the existing levee where the soils have sufficient

stand-up time for its safe and complete installation (i.e., not in running, flowing or fast-raveling soils).

- Absent an active global dewatering system along the alignment, the shoring systems must be designed to resist hydrostatic pressures and to extend below the base of the excavation to sufficient depths to (1) provide lateral stability at the base of the shoring system and (2) to prevent heave and/or piping (boiling) through the base of the excavation. The shoring designer should determine the minimum required toe embedment based on the depth of the excavation, the specific shoring system used, and the soil and groundwater conditions encountered in the field at the time of construction. For the purposes of sheetpile design, the average buoyant unit weight of area fill and Bay Mud soils in the project areas, to depths of the invert of the planned new sanitary sewer replacement pipeline, can be taken as 70 pcf and 40 pcf, respectively, with a critical hydraulic gradient of 1.0 and 0.8, respectively. We recommend that a minimum safety factor of 2.0 be used for design of project shoring and dewatering systems against base failure.
- Shoring systems that do not provide positive support to excavation walls (i.e., passive shoring like trench boxes or active systems like cantilevered shoring that allow inward movement of the trench wall) may cause surface settlement. A summary of the potential surface settlement of passively-shored excavations is provided in Table II-3. Unrestricted flowing, running, or raveling ground conditions will result in surface settlements significantly greater than that indicated in Table 2.

Table 2 - Potential Surface Settlement of Passively-Shored Excavations

Soil Type	Surface Settlement (% of Excavation Depth)	Lateral Zone of Disturbance (Multiples of Excavation Depth)
Sand	0.5%H	H
Soft to Medium Stiff Clay	1-2%H	3-4H
Stiff Clay	<1%H	2H

From Suprenant and Basham (1993).

- Preliminary design of braced shoring may be based on the preliminary lateral earth shoring pressure diagrams provided on Figure 16. These diagrams represent soil conditions encountered in project test borings. Final earth pressures and pressure diagrams for the contractor's design and implementation of individual shoring systems will be dependent on (1) the actual soil and groundwater conditions encountered during construction, (2) the contractor's shoring type, design, and installation method, and (3) surcharge pressures, including those from stockpiling, construction equipment, vehicle traffic (see F for minimum surcharge pressures).

A professional Structural or Civil Engineer licensed in the State of California and with experience in the design of shoring systems should design, sign, and stamp the contractor's proposed shoring plans. The plans should be required to be submitted to the owner for review prior to construction. The shoring plans should indicate interrelationships with dewatering and ground improvement systems. The shoring plans should contain alternative contingent systems, and the contractor should be prepared to implement these alternative systems should the initial plans not achieve the following minimum performance requirements:

- Protect personnel that enter the excavation.
- Comply with all governing regulations pertaining to excavation safety (e.g., the most current edition of Cal/OSHA Construction Safety Orders, Article 6).

- Be compatible with the surface and subsurface soil and groundwater conditions encountered in project test borings, and/or mapped in the project areas, and resist lateral earth pressures and hydrostatic pressures.
- Protect existing utilities, pavements, and structures.
- Excavation and installation of shoring must occur in a manner and sequence that does not damage existing structures, pavements, and utilities including through settlement, heave, or vibrations.
- Prevent caving (i.e., raveling, running, or flowing) or lateral movement of excavation walls and associated loss of adjacent ground and adjacent ground surface settlement, even when subjected to construction vibrations.
- Provide stable excavation walls and bottom (e.g., prevent bottom heave).
- Allow for removal or abandonment of shoring in a manner and sequence that (1) is in step with the backfilling sequence (i.e., shoring should not be removed ahead of backfilling), (2) does not cause disturbance (i.e., loosening) of pipe bedding and pipe embedment material, and (3) does not damage the existing pipeline or structures, pavements, and utilities including through settlement, heave, or vibrations (contractor to address removal/abandonment concerns specific to the type of shoring proposed in the shoring submittal). Any void space created by shoring removal should be completely filled with CLSM (see Section II.3.4.4) or approved equivalent.
- Resist lateral earth pressures including those from lateral loads from vehicular traffic, construction equipment and spoils, and hydrostatic pressures, if and where applicable.
- Soil conditions can vary widely over short lateral and vertical distances in the project areas; therefore, project excavations should be continually monitored and documented by the contractor's Cal/OSHA approved "competent person", and the contractor should be prepared to make changes and modifications to shoring requirements in response to these changes and consistent with governing regulations (e.g., the most current edition of Cal/OSHA Construction Safety Orders) pertaining to excavation safety. Cal/OSHA soil classifications include the following:

  Type A Soil: Excludes material that is part of a sloped or layered system dipping into the excavation at a slope ≥ 4H:1V, but includes cohesive soil with an unconfined compressive strength of ≥ 1.5 tsf that is:

  - Not fissured,
  - Not subject to vibration from heavy traffic, pile driving, or similar effects, and
  - Not been previously disturbed.

  Type B Soil: Excludes material that is part of a sloped or layered system dipping into the excavation at a slope ≥ 4H:1V, but includes the following:

  - Cohesive soil with unconfined compressive strength between 0.5 and 1.5 tsf,
  - Angular gravel and silt,
  - Previously disturbed soil, except that is otherwise classified as Type C,
  - Soil fissured or subject to vibration and not otherwise Type C soil, or
  - Dry rock that is not stable.

  Type C Soil: Excludes material that is part of a sloped or layered system dipping into the excavation at a slope ≥ 4H:1V, but includes the following:

- o Cohesive or disturbed soils low cohesion and friction angle,
- o Sand and non-angular gravel,
- o Submerged soil or soil from which water is freely seeping, or
- o Submerged rock that is not stable.

The subsurface soils encountered in test borings and mapped in the project areas were consistent with a Cal/OSHA soil classification Type C.

The contractor should be required to provide special shoring design for owner review in cases where excavations will be in close proximity (below an imaginary plane projected downward at an inclination of 1.5H:1V from the nearest foundation or utility edge) to critical structures or utilities in order to minimize potential excavation-related damage. Special shoring should account for surcharge pressures and should be designed to maintain positive lateral support for adjacent structures and utilities. Areas requiring special shoring should also receive preconstruction condition surveys to establish a baseline against which any claimed third-party damages can be compared.

4.5 Short-term and Long-term Groundwater Levels

We recommend a construction and short-term design (2-3 years) groundwater level at 5 feet below ground surface. The long-term groundwater level is predicated on a 3-foot rise in sea levels over the next 50 years. We recommend the long-term groundwater level be set at current ground surface elevation.

4.6 Backfill Recommendation for Pipe Under Levee

The San Francisquito Creek Joint Power Authority does not want pervious backfill around the pipe that is adjacent to their levee. That limits the options to compacting an impervious fill material below, around and above the pipe or placing a cementitious backfill around the new outfall. Compacting an impervious fill around the pipe is no easy feat, especially the haunches below the springline of the pipe. To achieve the support necessary for the outfall pipe where the backfill has to be impervious adjacent to the levee, we recommend the placement of a low density cellular backfill material. Low density backfill is preferred over traditional controlled low strength material (CLSM) because it is lighter and adds no new net load to the ground which can initiate a consolidation settlement cycle in the Young Bay Mud. The cellular backfill should consist of the following:

- A hand-excavatable mixture of cement, pozzolan, and water that has been mixed in accordance with ASTM C94 and is in a flowable state during placement;
- A maximum in-place density of 50 to 60 pcf;
- A minimum 28-day compressive strength of no less than 50 psi;
- A minimum 12-hour compressive strength of no less than 20 psi;
- Physiochemical properties that do not damage the pipeline; and
- Placed in appropriate lifts or with methods to prevent movement of the pipe, including by flotation.

Placement of backfill on top of cellular backfill should not be allowed until the backfill passes the ball drop test of ASTM D6024.

Where the cellular backfill is used as pipeline embedment material, the pipeline should be elevated off of the trench bottom or foundation material using cradles, sandbags, or other approved supports prior to backfill placement. Spacing of these supports is dependent on the pipeline material, diameter and structural properties, as well as the permissible amount of sagging which can be allowed between supports.

Pipelines backfilled using cellular backfill tend to float. This tendency can be mitigated using pipe anchors/weights and/or sequential backfilling (where the cellular backfill is poured in stages, and allowed to set in between stages). For sequential backfilling, the height to which the cellular backfill can be initially poured is a function of the buoyant forces imposed on the pipeline, and the amount of resistance provided by the pipeline anchoring/weighting system (if used).

4.7 Settlement Estimates for Areas Outside Levee

From a practical viewpoint, and except for ongoing, long-term, area-wide Bay Mud consolidation settlement, if any, the amount of settlement caused by the new outfall pipe will depend to a large degree how much new net load is added to the ground. The fluid weight in the pipe is less than the wet unit weight of soil displaced so that adds no net load to the ground. The biggest uncertainty lies with the outfall backfill. A traditional sand/gravel bed below the pipe and a baserock backfill around and on top of the pipe will add new load to the ground which will initiate consolidation settlement. Depending on how much new additional load added to the ground, long term settlement from that alone could amount to several inches. From a practical point of view, minimizing the amount of settlement resulting from the construction by compensation for the removal and addition of load, such as using light-weight fill materials, can be expensive and time consuming to ensure the pipe is adequately supported. For that reason, we recommend that consideration be given to using lightweight cellular backfill around the deeper segment of pipe, not just the segment that parallels the existing levee. If that were the case, we would expect less load on the ground than what it felt before thus mitigating any consolidation settlement for the construction itself. Consequently, the settlement of the pipeline outside the levee will depend to a large degree on how the outfall pipe is backfilled. If done in the traditional manner with granular bedding and backfill, the magnitude of settlement could be on the order of several inches. If, however, the outfall is backfilled with a cellular concrete backfill settlement of the pipe outside the levee would not be expected.

4.8 Other Trench Design Information

Attached to this report but not discussed in the body of the text are other typical pipe design charts, graphs and tables that are typically included with other pipe design geotechnical investigations. This information provides charts for Vertical Soil Pressure as a function of Live Loads (Figure 19), Marston's Coefficients for trench and embankment conditions (Figures 20 and 21), E'_c Modulus of soil Reaction (Figure 22), and Hydrostatic Uplift sketches (Figure 23) depicting how the ground can be engaged to resist hydrostatic uplift . The pipeline designers can assess the applicability of this information in their pipeline design.

5.0 Additional Services and Limitations

5.1 Additional Services

We recommend that McMillen Jacobs Associates be given the opportunity to provide the following additional services through the completion of project construction:

- Review of final plans and specifications prior to bid for conformance with geotechnical conditions and recommendations;
- Review of contractor submittals (e.g., shoring, dewatering, ground improvement, etc.) for conformance with geotechnical findings described herein;
- Review and response to contractor requests for information that relate to geotechnical issues; and
- Periodic construction observations during excavations to verify conformance of exposed surface conditions with the findings of this report.

We have prepared this report for the exclusive use of Kennedy Jenks Consultants and the City of Palo Alto, and their authorized agents for the City of Palo Alto's new outfall project in Palo Alto, California. Field work for this geotechnical engineering investigation report was planned and completed based on project information provided to us at the time of our subsurface investigation. This geotechnical engineering investigation report was formulated based on findings from our field work and the project information provided to us by the time this report was prepared.

5.2 Limitations

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations, and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, expressed or implied, should be understood. Studies of, and design recommendations related to soil corrosivity and soil and groundwater contamination in the project areas, and the mitigation thereof, is not part of our scope of services for this geotechnical investigation.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by McMillen Jacobs Associates and will serve as the official document of record.

6.0 References

ARMY CORP ENGINEED BAY MUD MAPS

ABAG 2017

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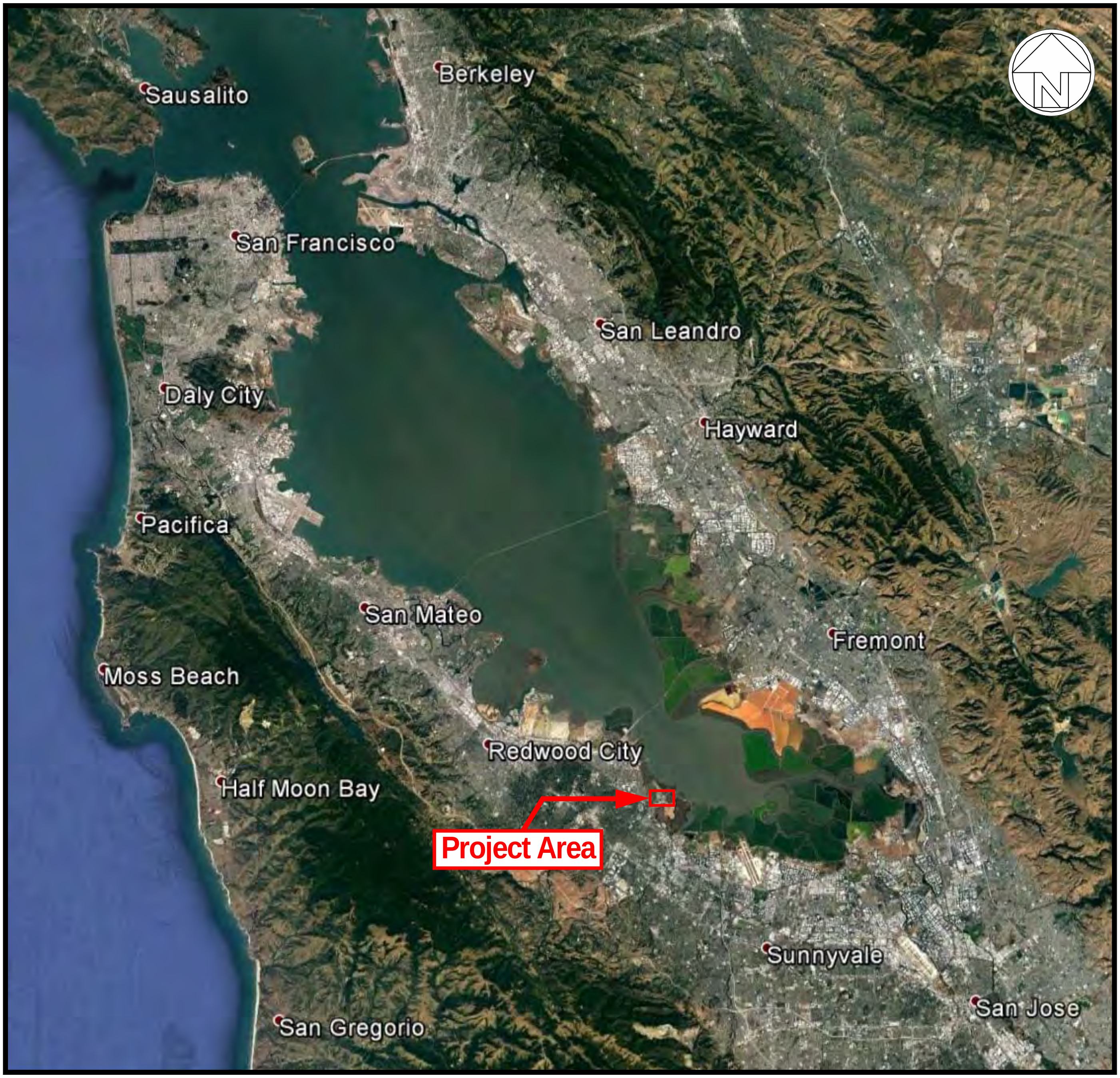
Figures



Modified from Google Earth (2017)

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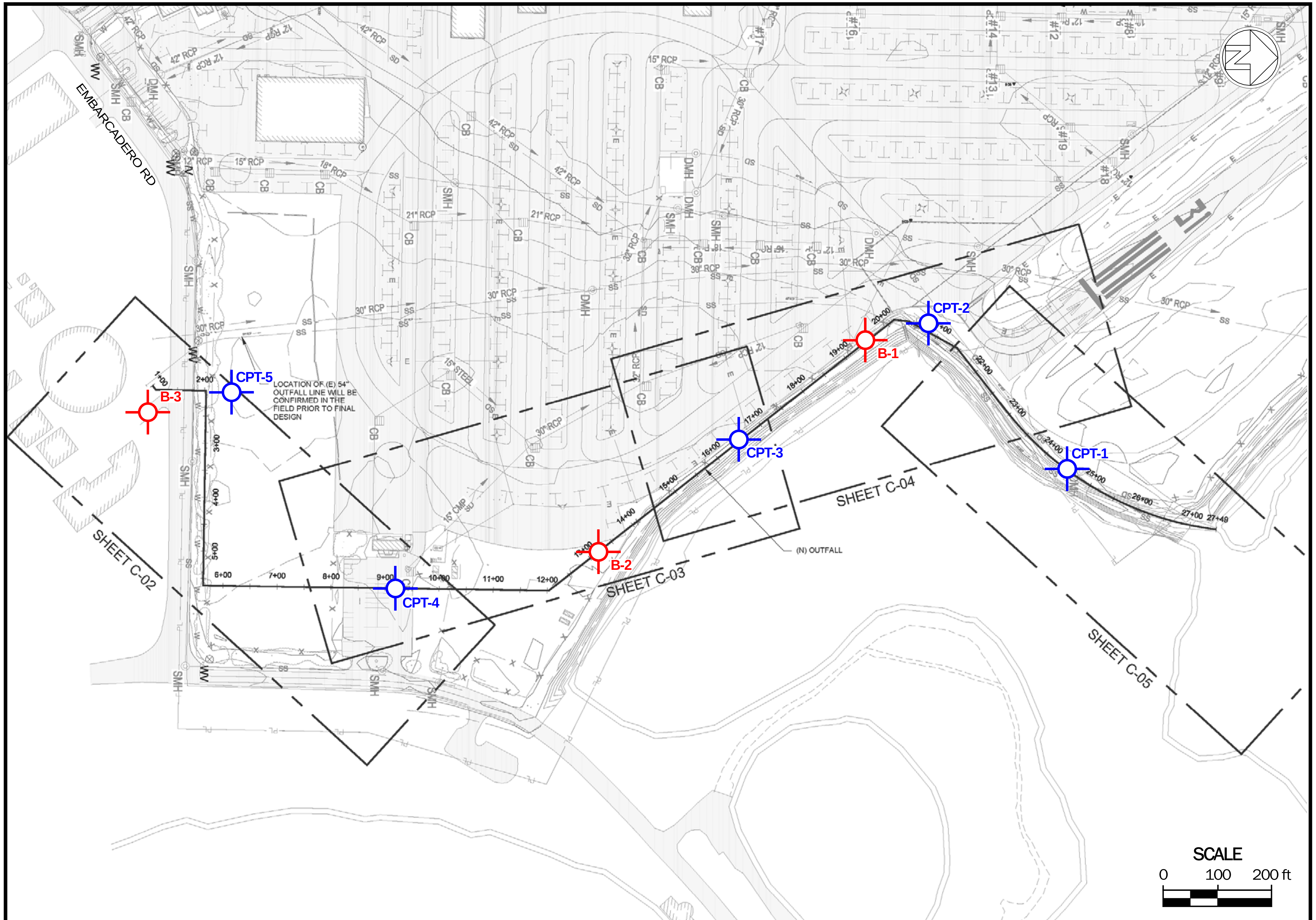
Vicinity Map

Figure

1



LEGEND:

1+00 - Project Alignment

B-1 - Project test boring (See Appendix B)

CPT-1 - Project cone penetration test (See Appendix C)

Modified from client 30% design plans plot dated 4/10/2017.

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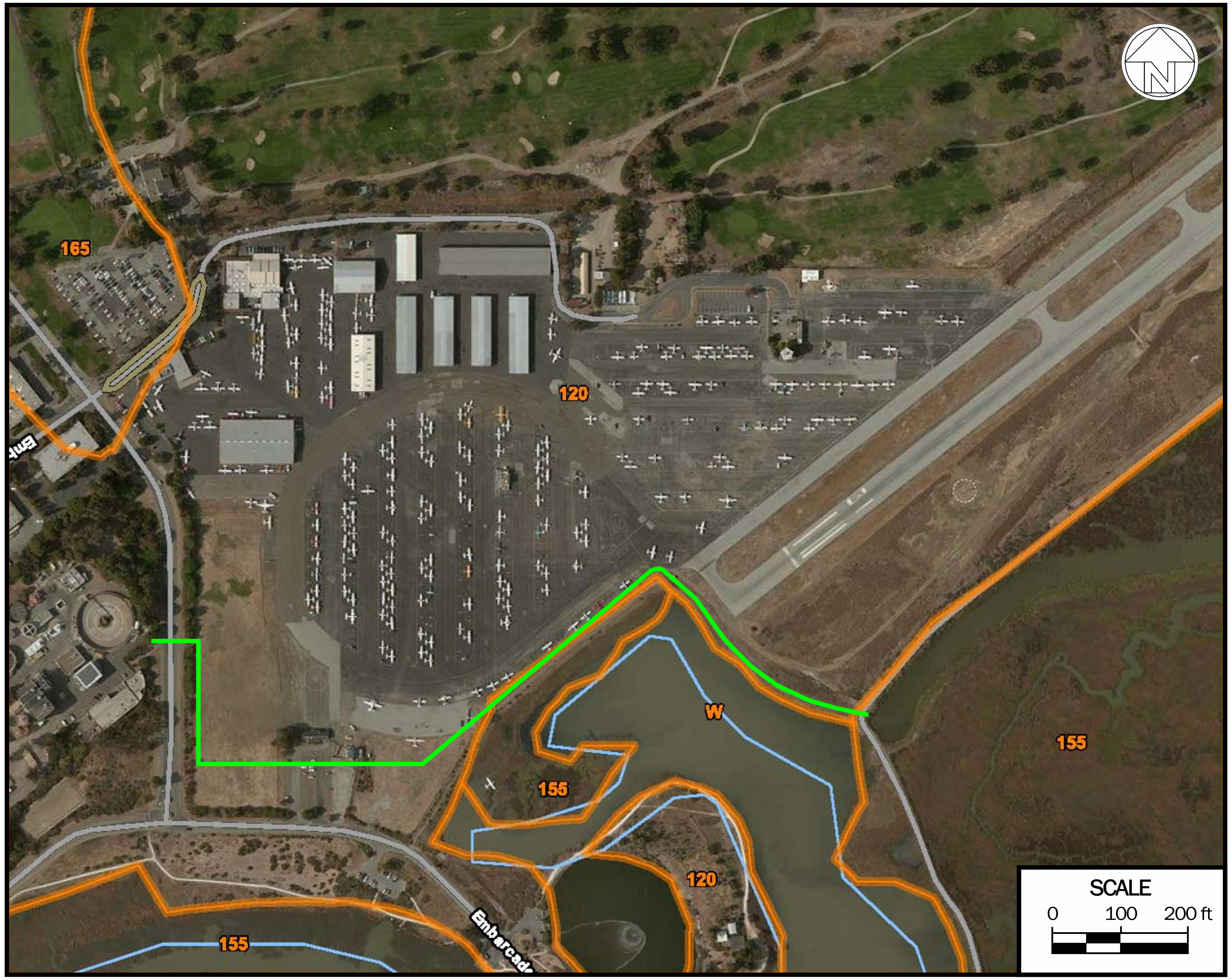
Test Boring Location Map

Figure

2



Modified from U.S. Soil/Natural Resources Conservation Service (2017)

Mapped Soil		Below Ground Depth (in)	USCS Group Symbol	% Passing Sieve:		Atterberg Limits		High Water Table (ft)	Risk of Corrosion	
ID	Name			No. 4	No. 200	Liquid Limit	Plasticity Index		Uncoated Steel	Concrete
120	Aquic	0-9	SC	61-100	21-56	25-44	9-24	2.6-3.0	High	High
		9-28	SC	49-100	19-60	25-44	9-24			
		28-35	SC	53-100	21-61	25-44	9-24			
		35-51	CL, CH	100	85-100	43-67	24-43			
		51-59	CL, CH	100	81-100	43-67	24-43			
155	Novato	0-4	CH	100	55-95	41-86	21-51	0	High	High
		4-11	CH	100	61-96	45-86	25-51			
		11-24	CH	100	67-100	45-86	25-51			
		24-39	CH	100	66-100	45-86	25-51			
		39-59	CH	100	68-100	45-86	25-51			
165	Campbell	0-10	ML	97-100	88-100	35-53	13-25	-	Moderate	Moderate
		10-24	CL	97-100	87-100	33-49	13-25			
		24-31	CL	97-100	83-100	33-49	14-25			
		31-38	CL	97-100	82-100	33-49	14-25			
		38-51	CL	97-100	82-100	33-48	14-25			
		51-71	CH	96-100	86-100	47-62	25-37			
		71-79	CH	96-100	82-100	47-62	25-37			
W	Water	-	-	-	-	-	-	-	-	-

LEGEND:

- Project Alignment

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Soil Map

Figure
3

Modified from Brabb, E.E., et all., Helley, E.J., et al., Geology of the Palo Alot 30 x 60 Minute Quadrangle (USGS, OFR 98-348)

LEGEND:

Af	**Artificial Fill** gravel, sand, silt, clay, rock fragments, organic matter and man-made debris in various combinations.
Qhfp	**Floodplain Deposits (Holocene)** sandy to silty clay with local lenses of coarse materials of silt, sand, and pebbles.
Qhbm	**Bay Mud (Holocene)** water-saturated esuarine mud of clay and silty clay underlying marshlands and tidal mud flats.
Qhbm	**Basin Deposits (Holocene)** silty clay to clay deposits and contains unconsolidated, locally organic, plastic silt and silty clay.

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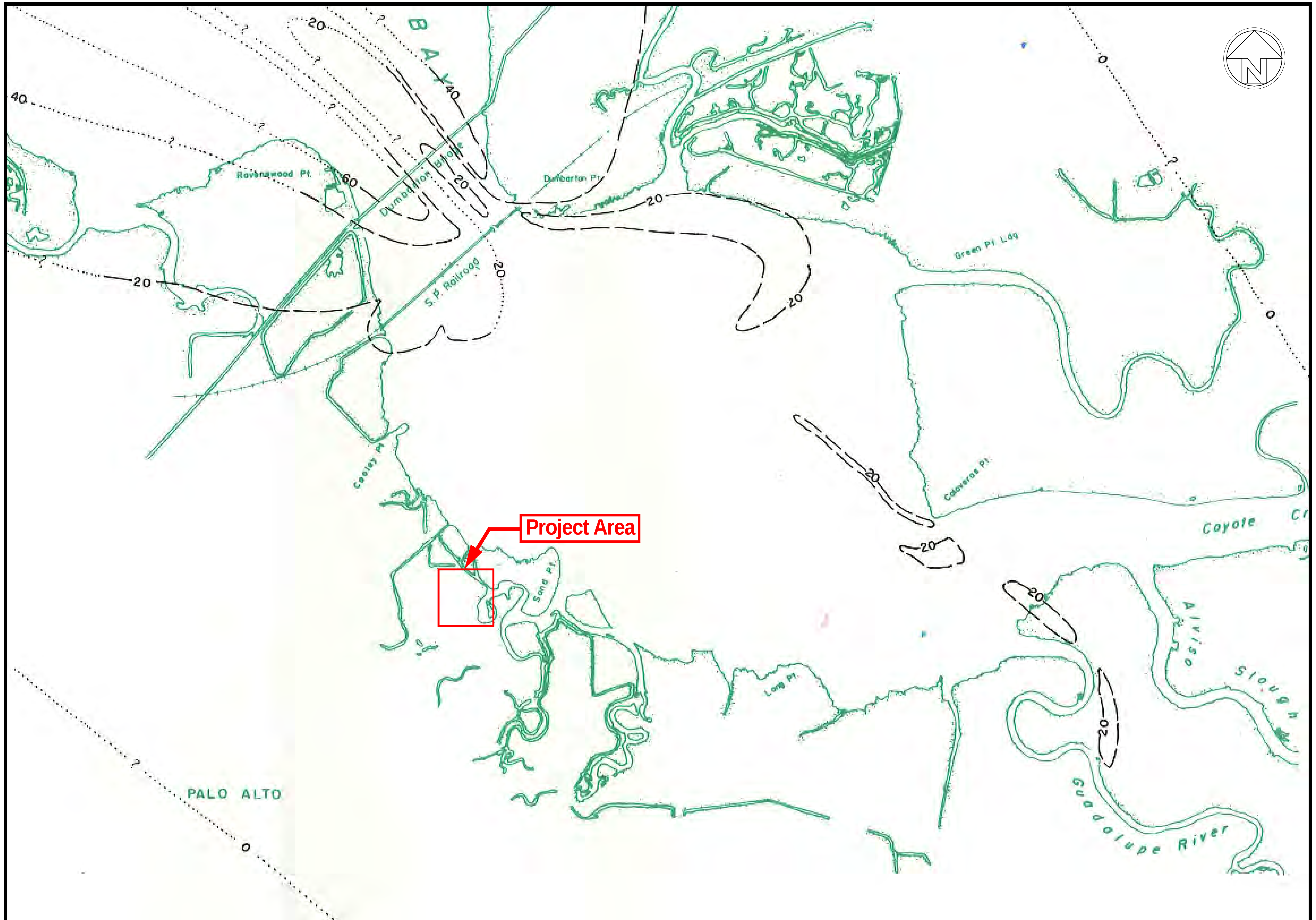
Geology Map

Figure
4



LEGEND:

— 20 — - Depth to Bay Mud

- - ? - - - Approximate Depth

Modified from Goldman (1969)

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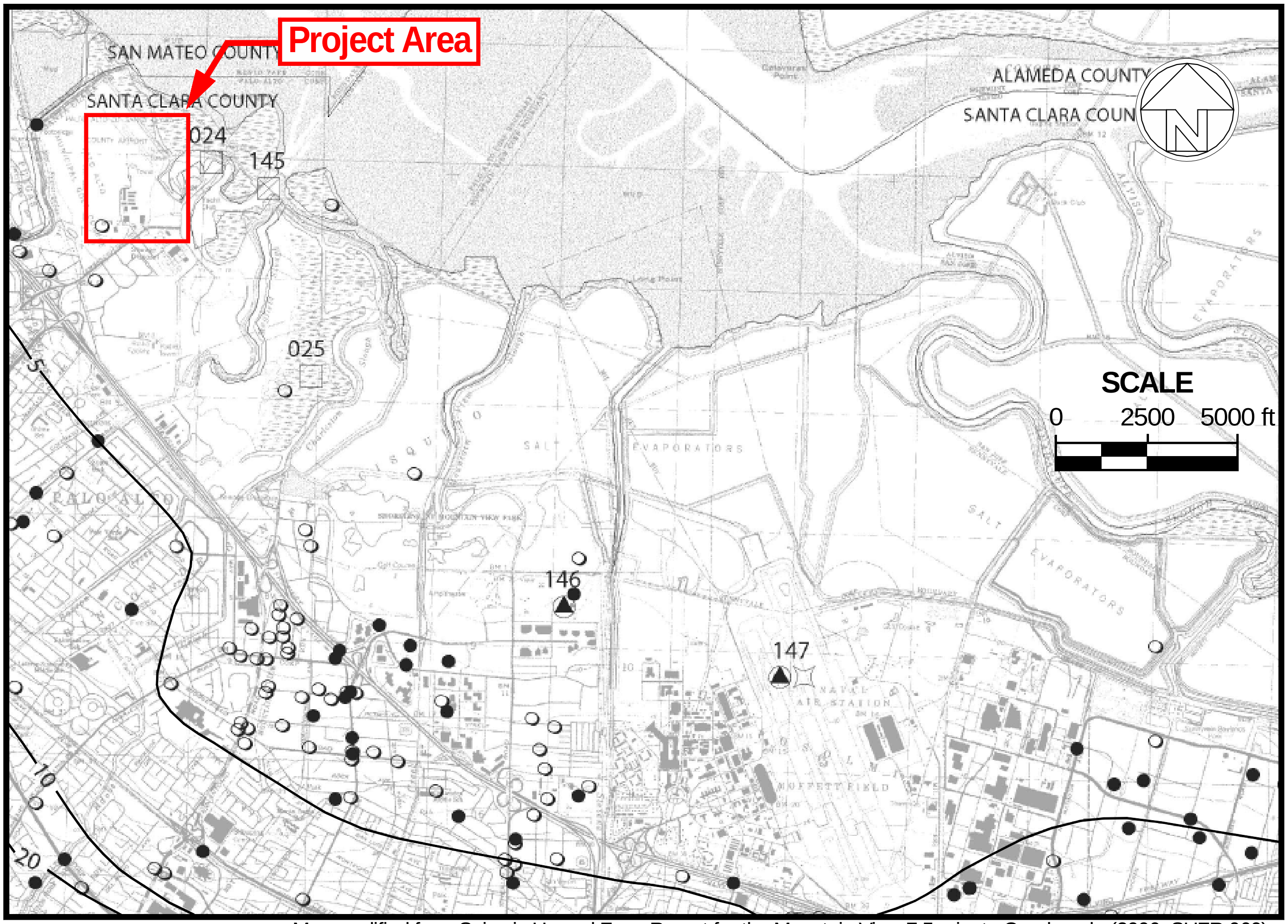
Thickness of Young Bay Mud

Figure

5



Map modified from Seismic Hazard Zone Report for the Mountain View 7.5-minute Quadrangle (2006, SHZR 060)

LEGEND:

x	Location of multiple ground effects. (See corresponding symbols)	●	Geotechnical borings used in liquefaction evaluation
	Ground settlement	○	Ground-water level data provided by the Santa Clara Valley Water District
	Disturbed well	B	Bedrock (Santa Clara Formation)
	Miscellaneous effects		Ground cracks
	Absence of ground failure noted	147	Number assigned to ground failure site (adapted from Youd and Hoose (1978) and Tinsley and others (1998) by Knudsen and others (2000))
50	Depth to ground water, in feet		

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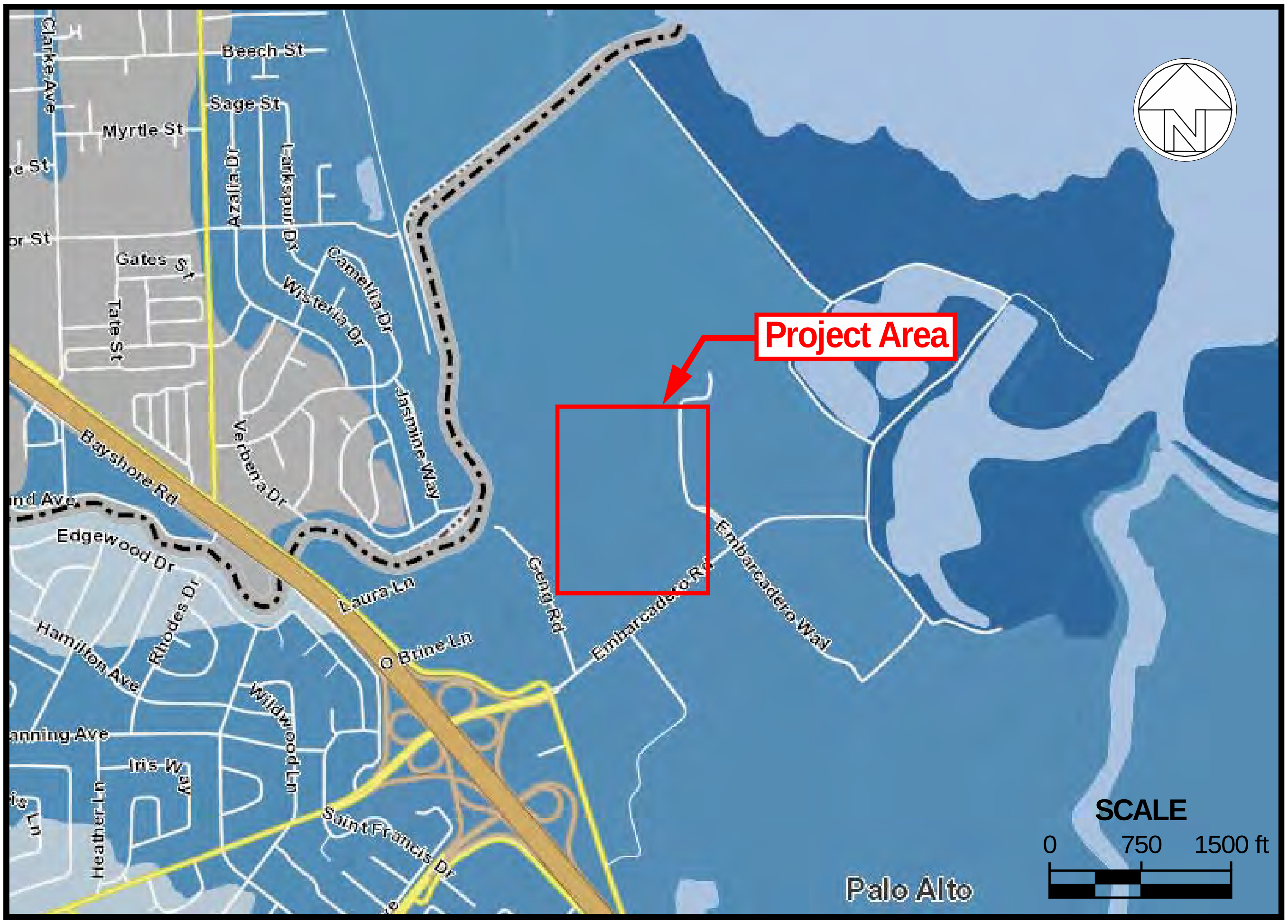
Groundwater Map

Figure

6



LEGEND:

ZONE V - Coastal flood zone inundated by the 1% annual chance flood with velocity hazard (wave action).

ZONE A - Special flood hazard area inundated by the 1% annual chance flood.

ZONE X - An area determined to be outside of the 0.2% annual chance floodplain.

ZONE X500 - An area inundated by the 0.2% annual chance flood with average flood depths less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

NOTES:

1. The flood zones of this map are based on Flood Zones - FEMA Q3 (2003) and DFIRM (2009)

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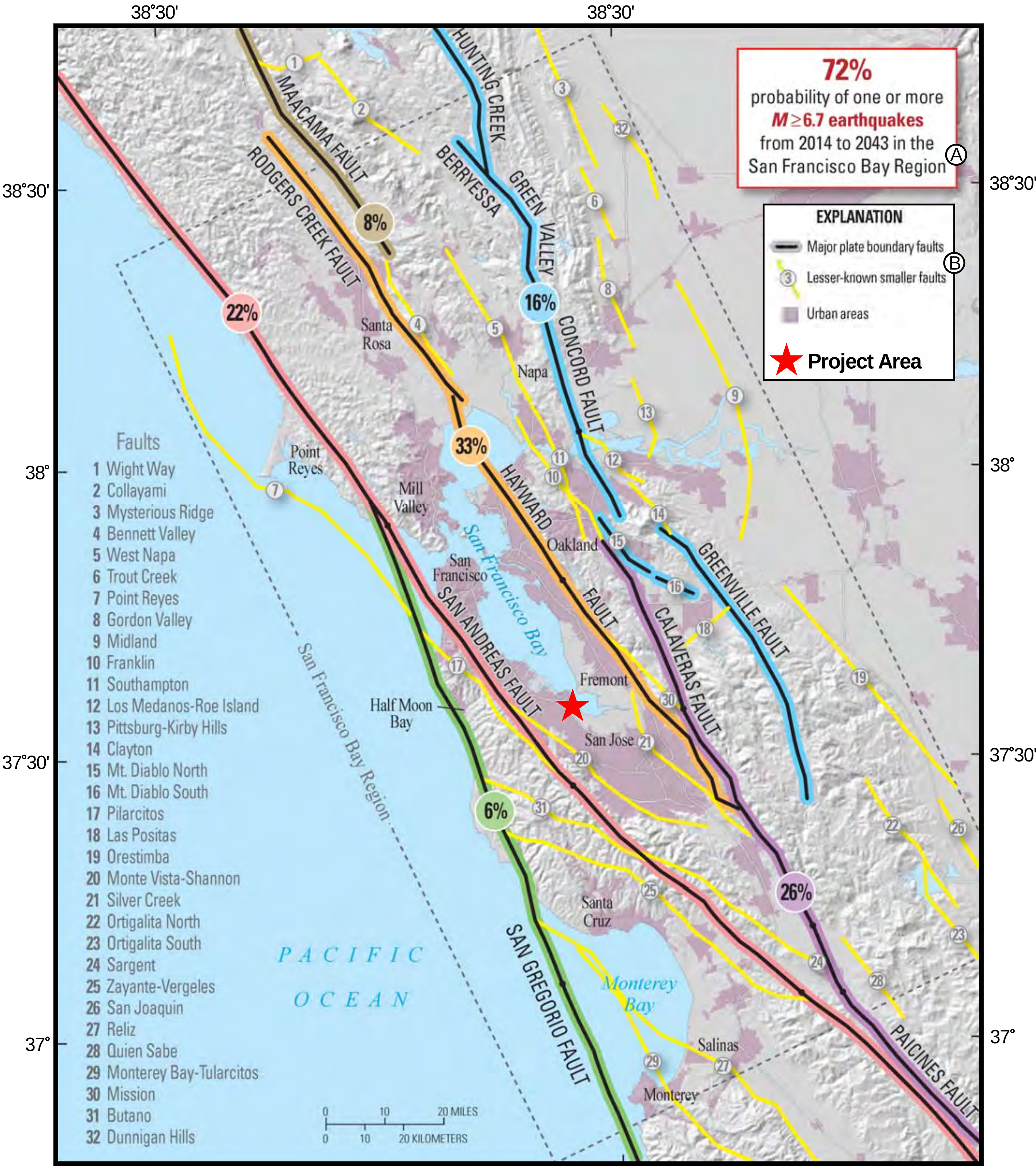
FEMA Flood Zone Hazard Map

Figure

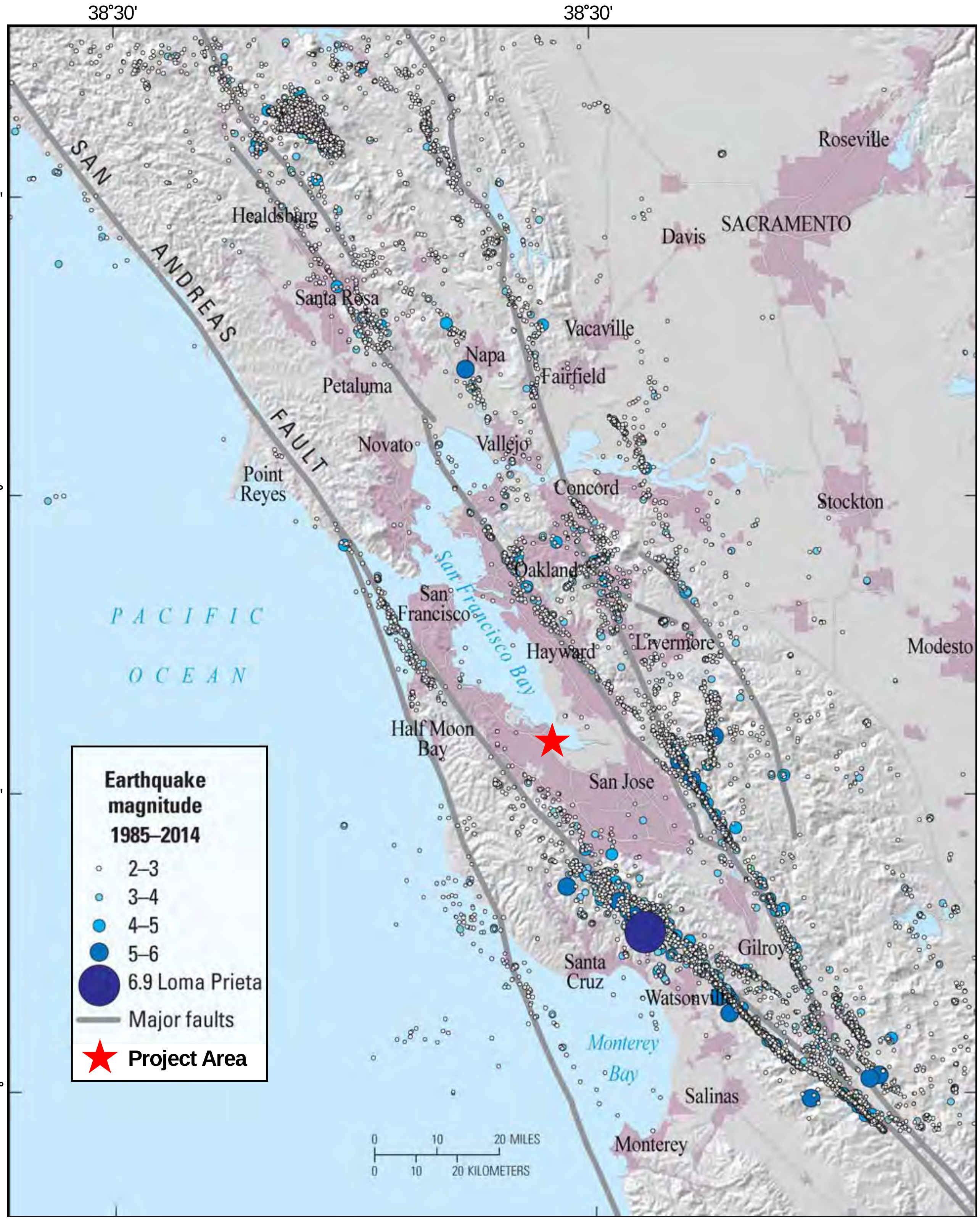
7



Map modified from USGS Fact Sheet 2016-3020

Ⓐ On major plate boundary faults, lesser-known faults, and unknown faults.
Ⓑ The probability that a M > 6.7 earthquake will involve one of the lesser known faults is 13%.

McMILLEN JACOBS ASSOCIATES	Kennedy/Jenks Consultants, Inc. City of Palo Alto WQCP Primary Outfall Line Design Palo Alto, California **Bay Area Faults Map**	Figure 8
File No. 5576.0 · July 2017		



Map modified from USGS Fact Sheet 2016-3020

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Bay Area Earthquakes Map

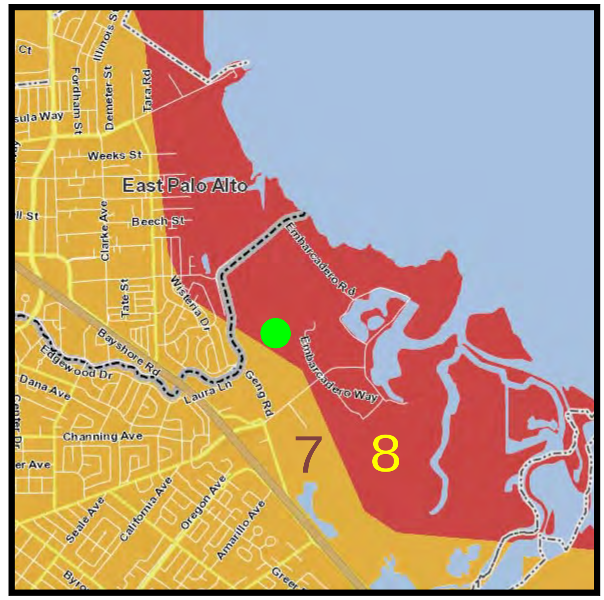
Figure

9

File No. 5576.0	July 2017

EARTHQUAKE SHAKING SCENARIOS

San Andreas Fault (M7.8)



Hayward Fault (M7.0)

Shaking Severity and Intensity

- **Light (MMI 5)**
- **Moderate (MMI 6)**
- **Strong - MMI 7**
- **Very Strong - MMI 8**
- **Violent - MMI 9**
- **Very Violent - MMI 10**

Latitude/Longitude	37.455741° N / -122.112609° W
Peak Ground Acceleration: (ASCE 7-10 Figure 22-7)	0.52 g

U.S. Seismic Design Maps (2016 CBC, USGS 2017).

NOTES:

1. See Figure 8 for the Modified Mercalli Intensity (MMI).
2. Map modified from the Association of Bay Area Governments (ABAG 2017, last updated 2014)

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Seismic Shaking Map

Figure
10

AVERAGE PEAK VELOCITY (cm/s)	MODIFIED MERCALLI INTENSITY VALUE AND DESCRIPTION	AVERAGE PEAK ACCELERATION (gravity 9.80 m/s^2)
	I. Not felt except by a very few under especially favorable circumstances.	
	II. Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing.	
	III. Felt quite noticeable indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing vehicles may rock slightly. Vibration like passing of a truck. Duration estimated.	
1 - 2	**IV.** During the day felt indoors by many, outdoors by few. At night some awakened. Rattling of dishes, windows, and doors; walls make creaking sounds. Hanging objects swing. Sensation like a heavy truck passing. Standing vehicles rocked noticeably.	**0.015 - 0.02g**
2 - 5	**V.** Felt by nearly everyone, many awakened. Some dishes, windows and so on broken; cracked plaster in a few places; unstable objects overturned. Disturbances of trees, poles and other tall objects sometimes noticeable. Pendulum clocks may stop. Buildings trembled throughout.	**0.03 - 0.04g**
5 - 8	**VI.** Felt by all, many frightened and run outdoors. Some moderately heavy furniture moved; a few instances of fallen plaster and damaged chimneys. Trees, bushes, shaken slightly to moderately. Damage slight in poorly constructed buildings. Broken dishes, glassware and some windows. Moved furnishings and overturned furniture.	**0.06 - 0.07g**
8 - 12	**VII.** Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; chimneys cracked to considerable extent. Noticed by persons driving vehicles. Waves on ponds, lakes, running water. Broke numerous windows, heavy furniture overturned. Dislodged bricks and stones.	**0.10 - 0.15g**
20 - 30	**VIII.** Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving vehicles disturbed.	**0.25 - 0.30g**
45 - 55	**IX.** Damage considerable in specially designed structures; well-designed frame structures thrown out-of-plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. Underground pipes broken. Reservoirs threatened.	**0.50 - 0.55g**
> 60	**X.** Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Railroad rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed, slopped over banks. Reservoirs greatly damaged. Open cracks in cement pavements and asphalt road surfaces.	**> 0.60g**
	XI. Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly. Dams, dikes, embankments severly damaged. Destroyed large well-built bridges.	
	XII. Damage total. Practically all works of construction damaged greatly or destroyed. Landslides, falls of rock, slumping of river banks extensive. Fault slips in firm rock, with notable horizontal vertical off-set displacements. Water channels, surface and underground disturbed and modified greatly. Waves seen on ground surfaces.	

REFERENCE: "Earthquakes & Volcanoes," Volume 21, Number 1, 1989
"Earthquakes A Primer," Bruce A. Bolt, W.H. Freeman and Company, San Francisco, Copyright 1993.

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City of Palo Alto
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Modified Mercalli Intensity

Figure **11**

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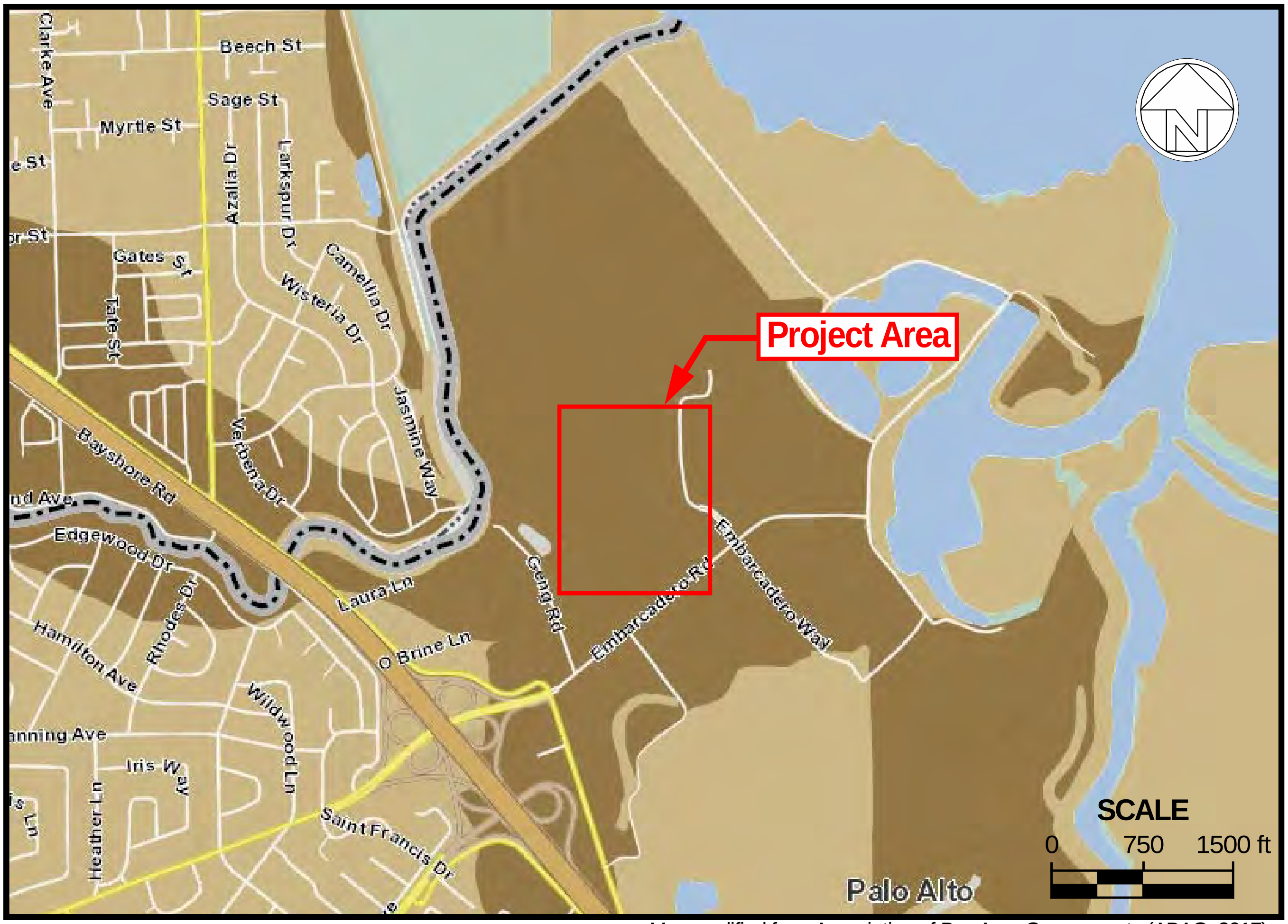

Map modified from Association of Bay Area Governments (ABAG, 2017)

LEGEND:

Very High Susceptibility

High Susceptibility

Moderate Susceptibility

Low Susceptibilty

Very Low Susceptibility

NOTES:

1. This map depicts the general hazard level of a neighborhood and the relative hazard levels from community to community. Hazard levels are less likely to be accurate for neighborhoods on or near the border between two zones.
2. This map is based on Knudsen & others, 2000 and Witter & others, 2006.

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City of Palo Alto
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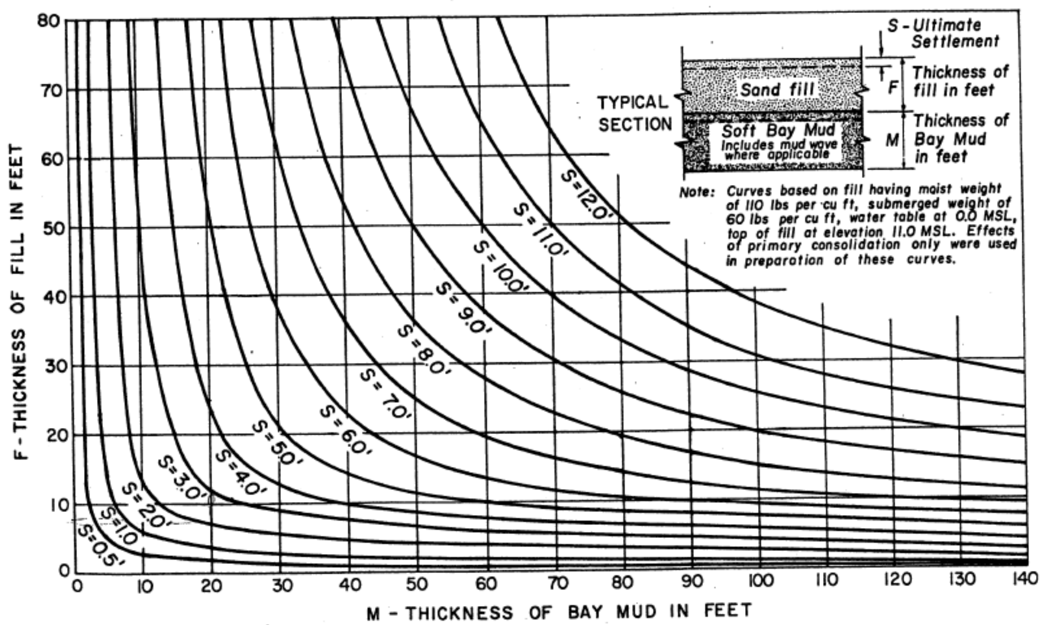
Palo Alto, California

Liquefaction Susceptibility Map

Figure

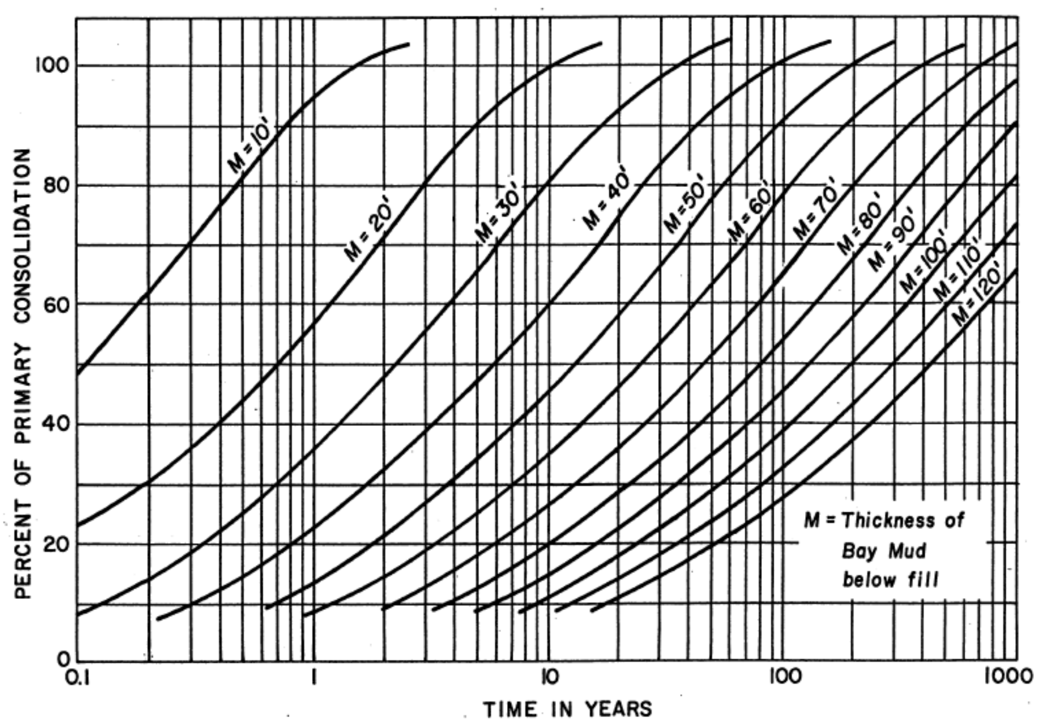
12

ULTIMATE AMOUNT OF SETTLEMENT OF FILLS ACCORDING TO THICKNESS OF FILL AND THICKNESS OF UNDERLYING BAY MUD.



Modified from CDMG (1969)

PERCENT SETTLEMENT OF FILLS OVER TIME ACCORDING TO THICKNESS OF MUD.



Modified from CDMG (1969)

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Bay Mud Settlement and Time Rate

Figure **13**

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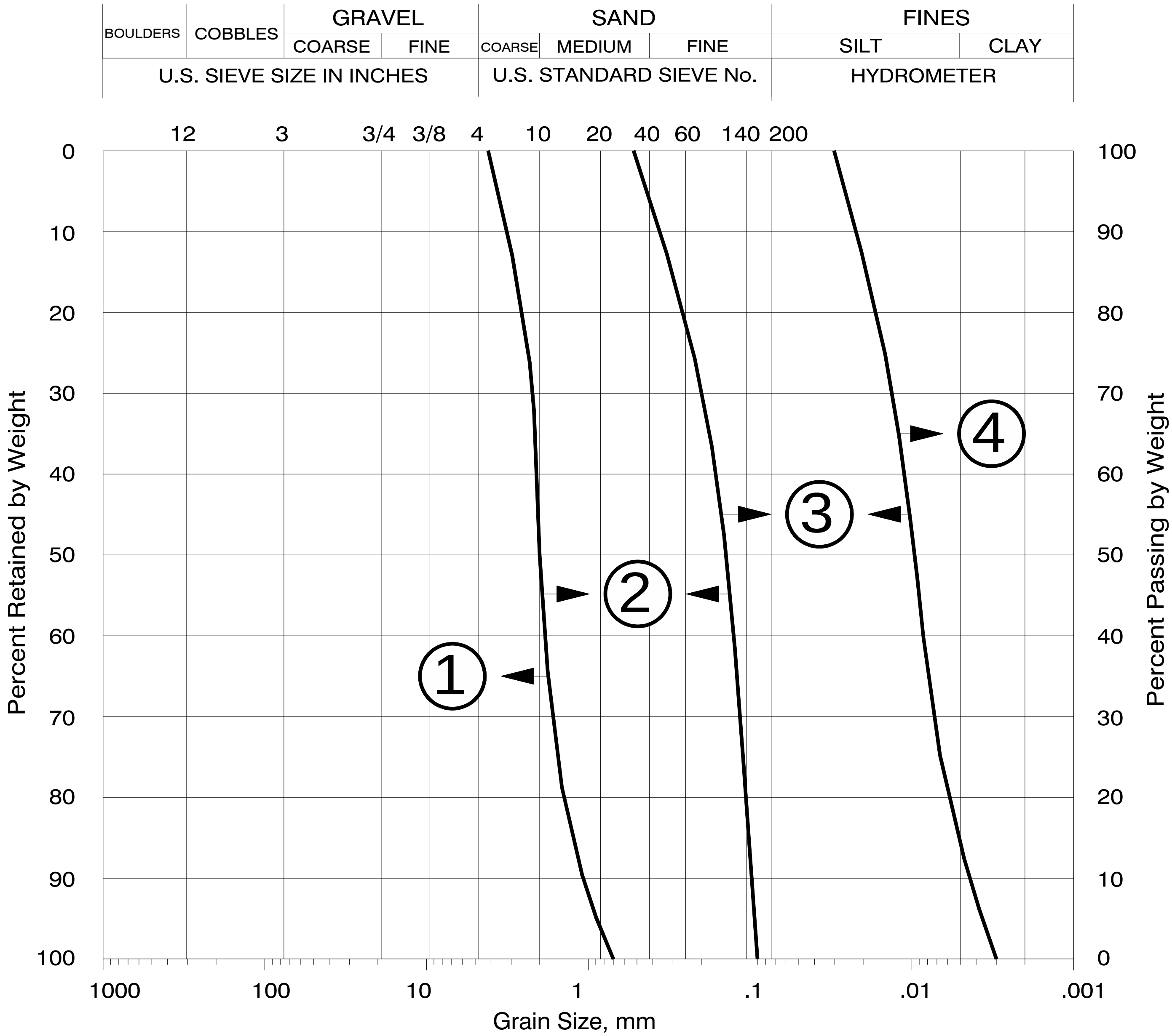

NOTES:

1 Subaqueous excavations or cutoff wall required.
2 Limits for gravity systems including sumps, well points, and deep wells.
3 Limits for well point vacuum methods.
4 Electro osmosis possible.

REFERENCE: Naval Facilities Engineering Command, 1986, Design Manual 7.02 Foundations and Earth Structures, Figure 14.

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Dewatering Limits vs. Grain Size

Figure **14**

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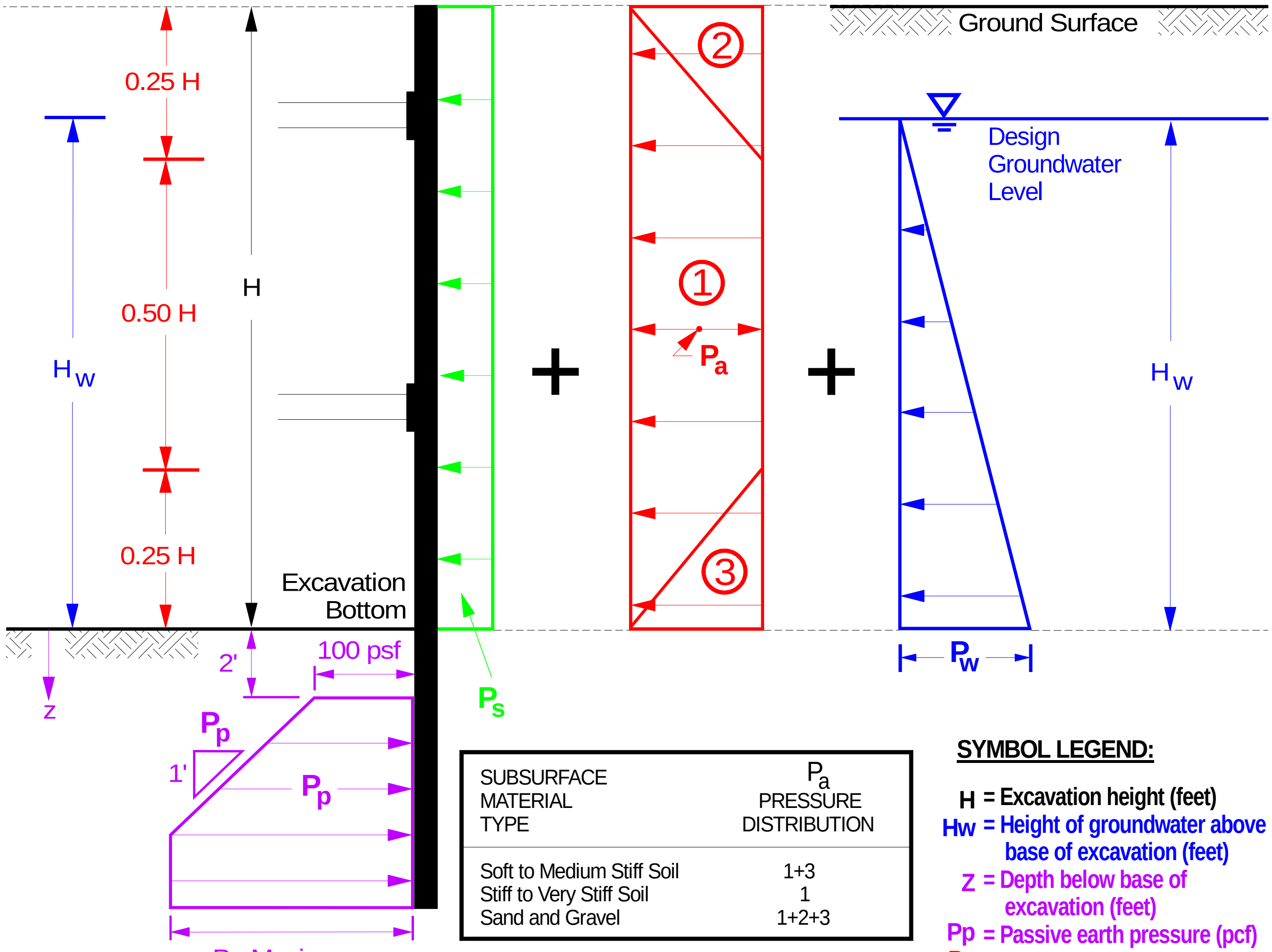
Preliminary shoring pressure diagrams for cantilevered shoring

Figure 15



Pp Maximum
= 1,000 psf (soft to medium stiff)
= 2,000 psf (medium stiff to stiff or medium dense to dense)

SUBSURFACE MATERIAL TYPE	P_a PRESSURE DISTRIBUTION
Soft to Medium Stiff Soil	1+3
Stiff to Very Stiff Soil	1
Sand and Gravel	1+2+3

SYMBOL LEGEND:

- **H** = Excavation height (feet)
- **Hw** = Height of groundwater above base of excavation (feet)
- **Z** = Depth below base of excavation (feet)
- **Pp** = Passive earth pressure (pcf)
- **Pa** = Active shoring pressure (pcf)
- **Pw** = Hydrostatic pressure = 62.4 pcf x Hw
- **Ps** = Lateral surcharge pressure from adjacent loads

Subsurface Material Type:	Soft to Medium Stiff Silt and Clay		Medium Stiff to Stiff Silt and Clay		Medium Dense to Dense Sand and Gravel	
Condition:	AGW	BGW	AGW	BGW	AGW	BGW
P_a	60H	30H	50H	25H	40H	20H
P_p (Ultimate)	220z	110z	280z	140z	360z	180z

AGW - Above Design Groundwater Level (requires full dewatering)
BGW - Below Design Groundwater Level (does not include hydrostatic pressure)

NOTES:

1. These preliminary pressure diagrams are for excavations of less than 20 feet in depth.
2. A minimum factor of safety of 2 should be used in passive pressure calculations.
3. Excavation base stability should be analyzed after base width has been selected.
4. Final design shoring pressure diagrams to be developed by the contractor based on the contractor's selection of shoring system and on the ground conditions encountered during construction.

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Preliminary Shoring Pressure Diagram for Braced Shoring

Figure 16

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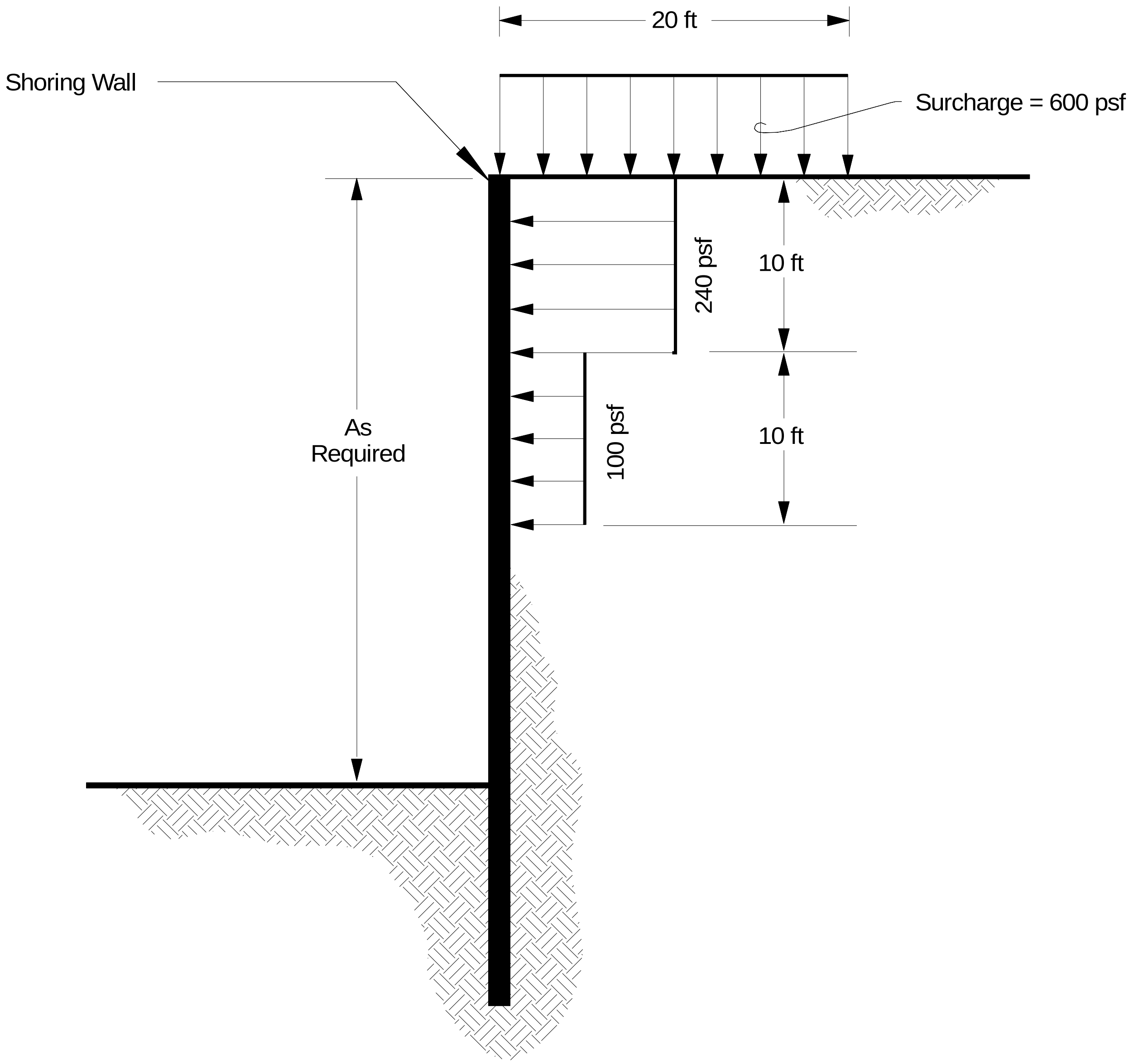

NOTES:

1. These are minimum shoring pressures to be used for traffic and equipment surcharges. Shoring pressures from construction activities or equipment that produce larger or different surcharge loadingpatterns than that shown should be determined by the shoring designer using geotechnical computational methods.

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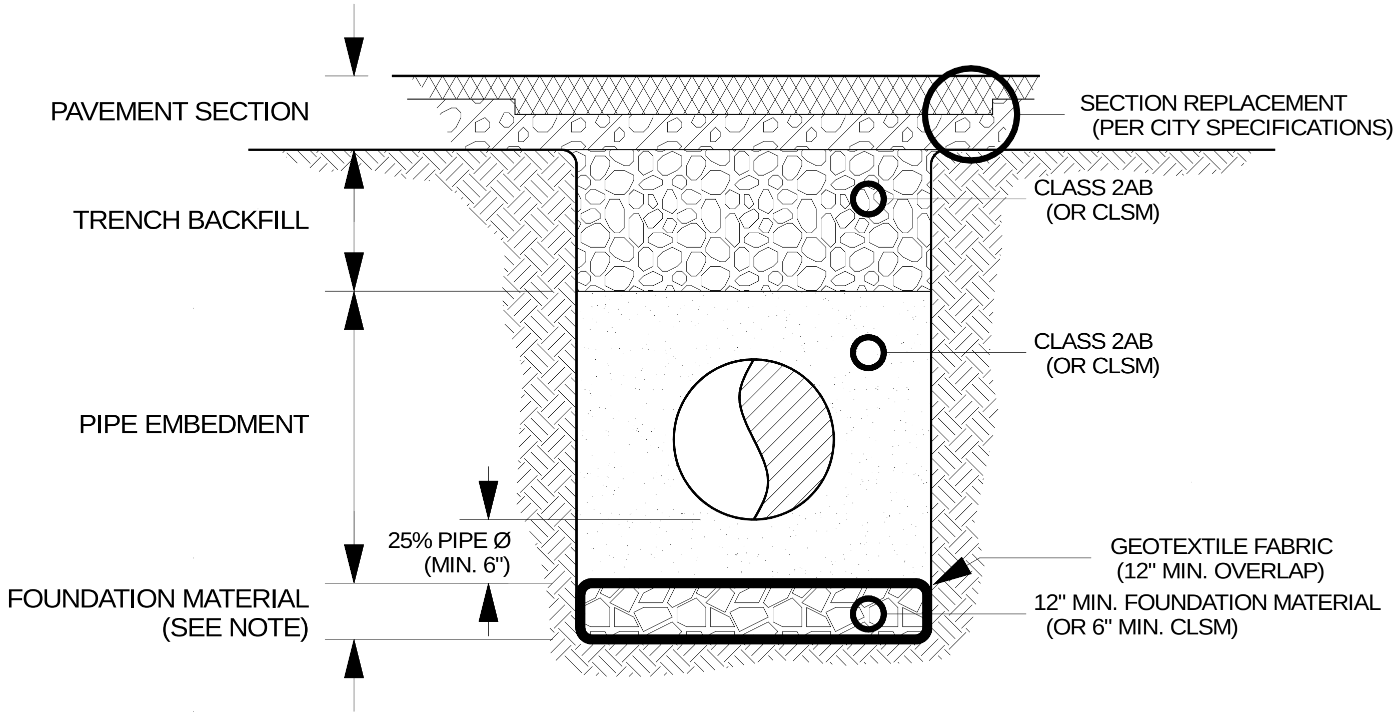
Minimum Shoring Pressure for Traffic and Equipment Surcharge

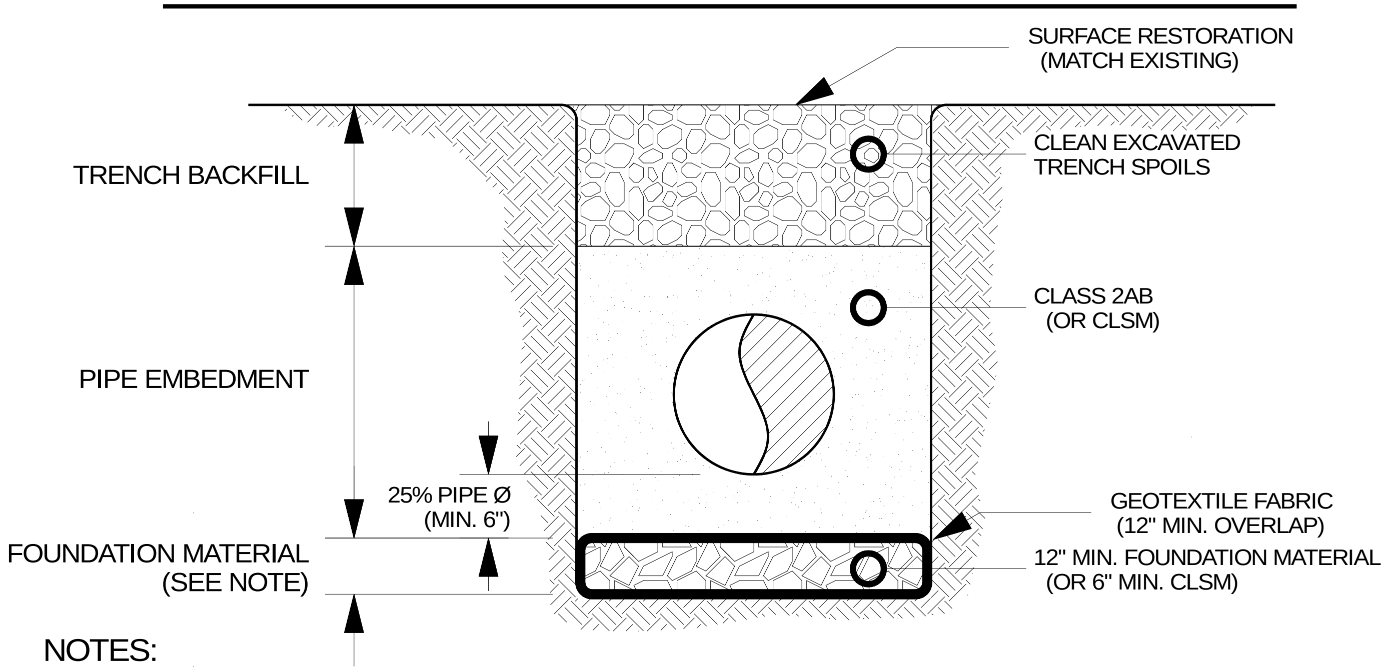
Figure

17

EXCAVATION BACKFILL
BELOW ROADWAYS & PAVED AREAS



EXCAVATION BACKFILL
BELOW AREAS OTHER THAN ROADWAYS & PAVED AREAS



NOTES:

1. Not to Scale.
2. See report text for material recommendations and compaction requirements.
3. Foundation material is required where trench bottoms are unstable or where disturbed by construction activity.

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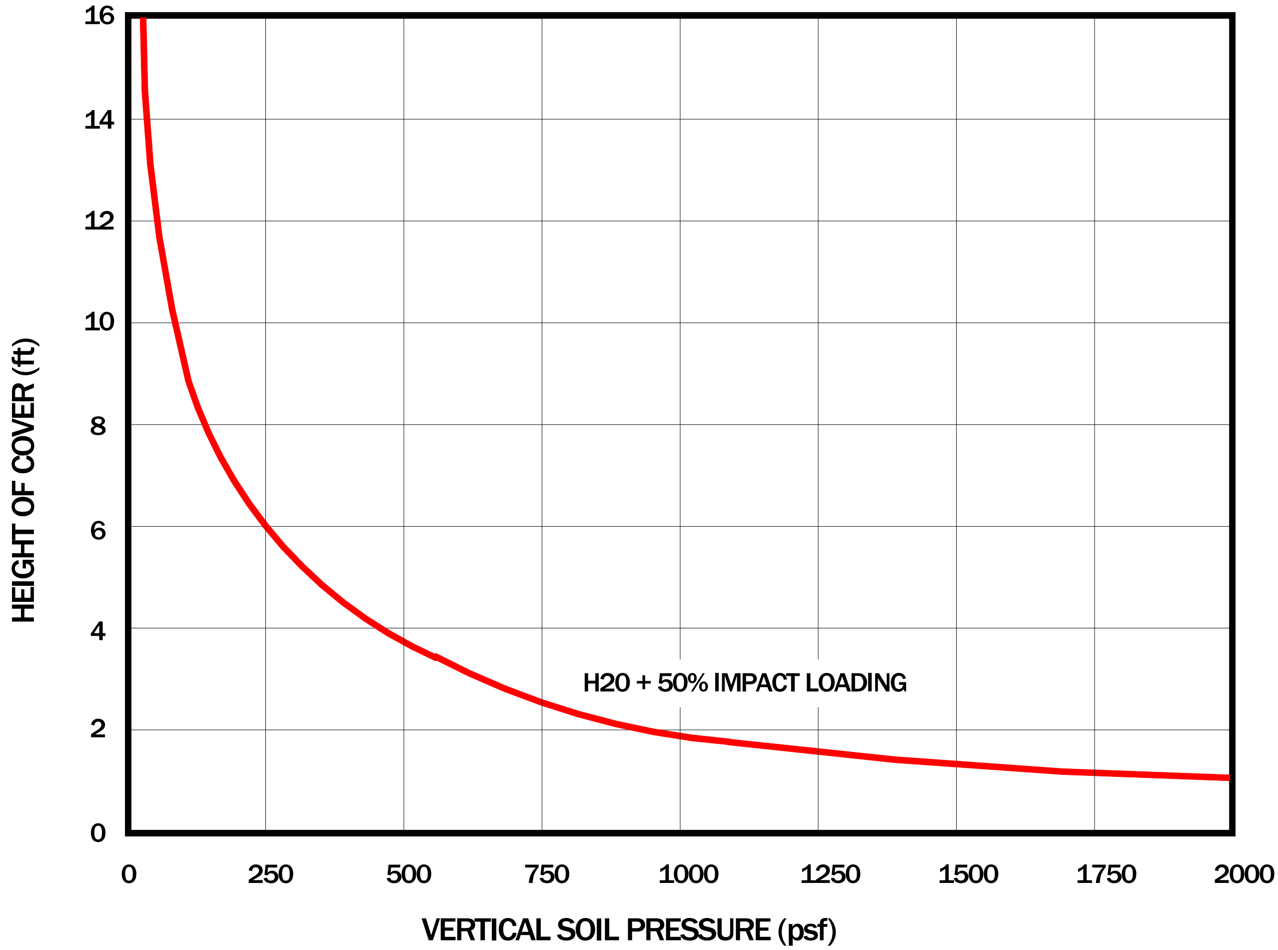
Excavation Backfill Details

Figure
18



NOTES:

1. Apply vertical soil pressure to diameter of pipeline (horizontal projection) to calculate vertical pipe load.
2. H20 + 50% IMPACT LOADING: Simulates a highway load of a 20-ton truck with a 50% impact factor to account for the dynamic effects of traffic.
3. Modified from "Buried Pipe Design," Moser, A.P. and Folkman, S. Mcgraw Hill, New York, 2008.

McMILLEN JACOBS ASSOCIATES		Kennedy/Jenks Consultants, Inc. City of Palo Alto WQCP Primary Outfall Line Design Palo Alto, California **Vertical Soil Pressure Due to Live Loads**	Figure **19**
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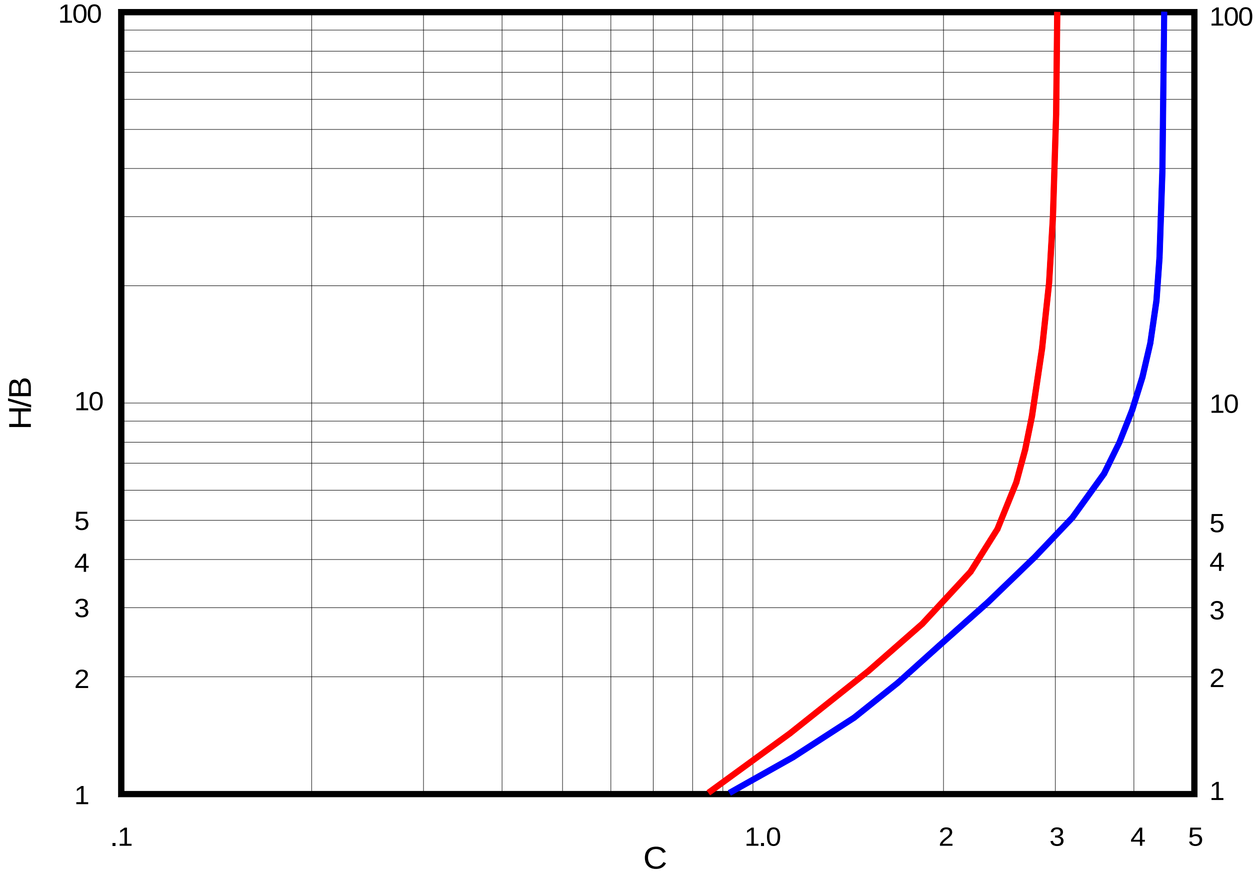

LEGEND:

- Compacted Granular Backfill (Class 2 AB) (red line)
- Excavated Fill Soil (blue line)

$$W = (C)(\gamma)(B^2)$$

W = Vertical soil load on rigid pipe due to trench backfill (lb/ft)
γ = Unit weight of trench backfill or overlying soil (pcf)
H = Depth of backfill (ft)
B = Width of trench (ft)

NOTES:

1. Marston's load coefficient is used to calculate vertical soil loads on rigid pipes installed by open-cut trenching. Refer to report text for soil loads on flexible pipes.
2. Modified from "Buried Pipe Design," Moser, A.P. and Folkman, S. Mcgraw Hill, New York, 2008.

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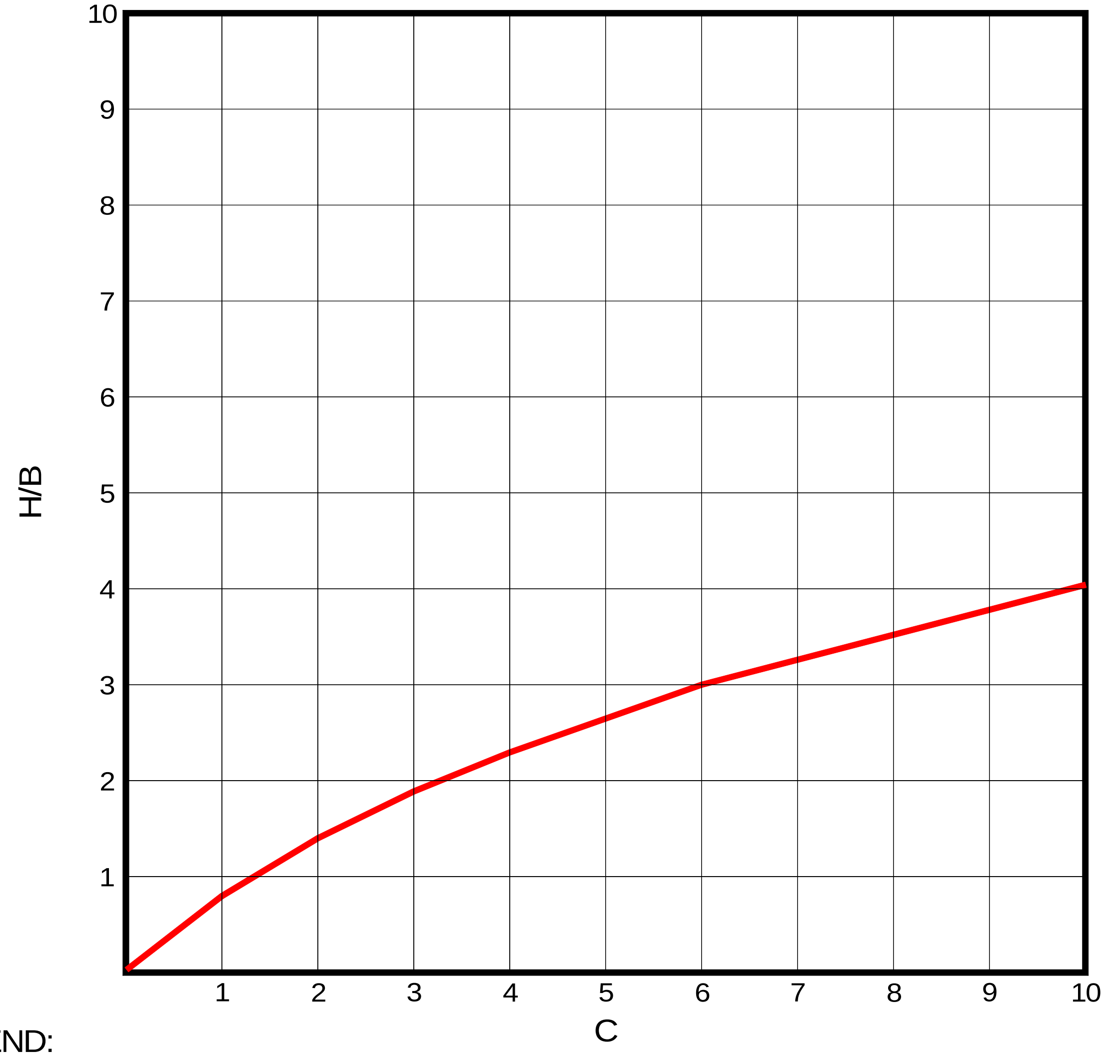
Marston's Load Coefficients for Trench Conditions

Figure **20**



LEGEND:

- Load Coefficient

$$W = (C)(\gamma)(B^2)$$

W = Vertical soil load on rigid pipe due to embankment (lb/ft)
γ = Unit weight of embankment fill (pcf)
H = Depth of embankment fill (ft)
B = Diameter of pipe (ft)

NOTES:

1. Marston's load coefficient is used to calculate vertical soil loads on rigid pipes installed due to embankment loading. Refer to report text for soil loads on flexible pipes.
2. Modified from "Buried Pipe Design," Moser, A.P. and Folkman, S. Mcgraw Hill, New York, 2008.

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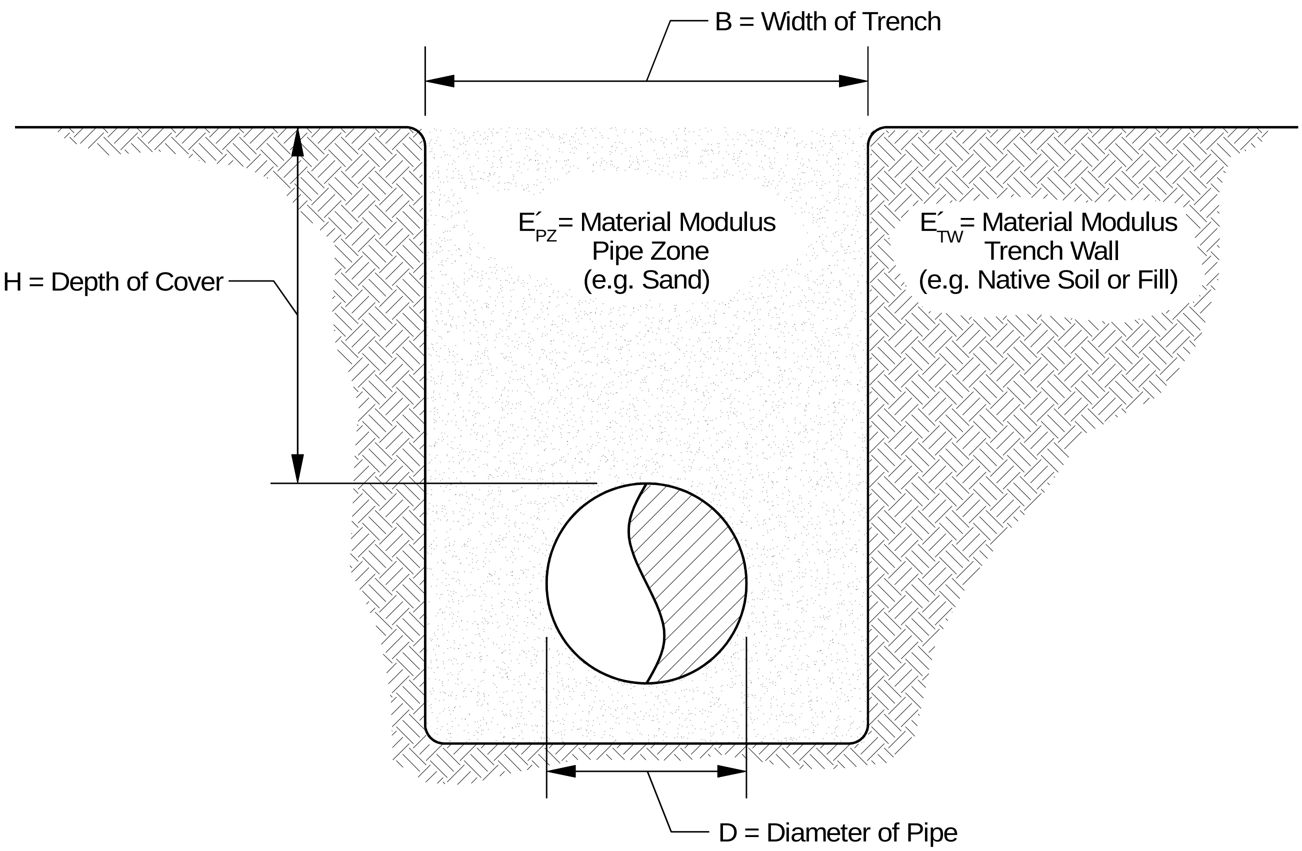
Marston's Load Coefficients for Embankment Conditions

Figure 21



$\frac{E'_{TW}}{E'_{PZ}}$	S_C for various B:D ratios					
	1.5	2.0	2.5	3.0	4.0	5.0
0.1	0.15	0.30	0.60	0.80	0.90	1.00
0.2	0.30	0.45	0.70	0.85	0.92	1.00
0.4	0.50	0.60	0.80	0.90	0.95	1.00
0.6	0.70	0.80	0.90	0.95	1.00	1.00
0.8	0.85	0.90	0.95	0.98	1.00	1.00
1.0	1.00	1.00	1.00	1.00	1.00	1.00
1.5	1.30	1.15	1.10	1.05	1.00	1.00
2.0	1.50	1.30	1.15	1.10	1.05	1.00
3.0	1.75	1.45	1.30	1.20	1.08	1.00
≥ 5.0	2.00	1.60	1.40	1.25	1.10	1.00

Modified from Jeyapalan (2001)

$$E'_c = S_c - E'_{pz}$$

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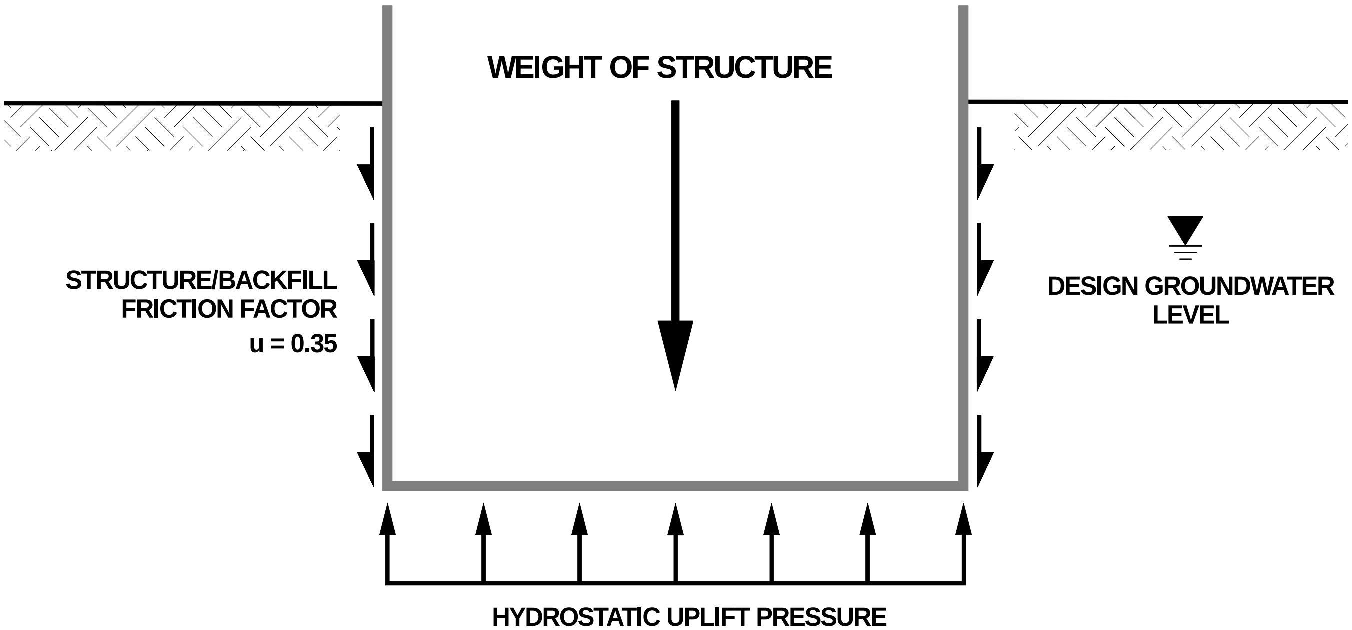
Composite Modulus of Soil Reaction - E'_c

Figure

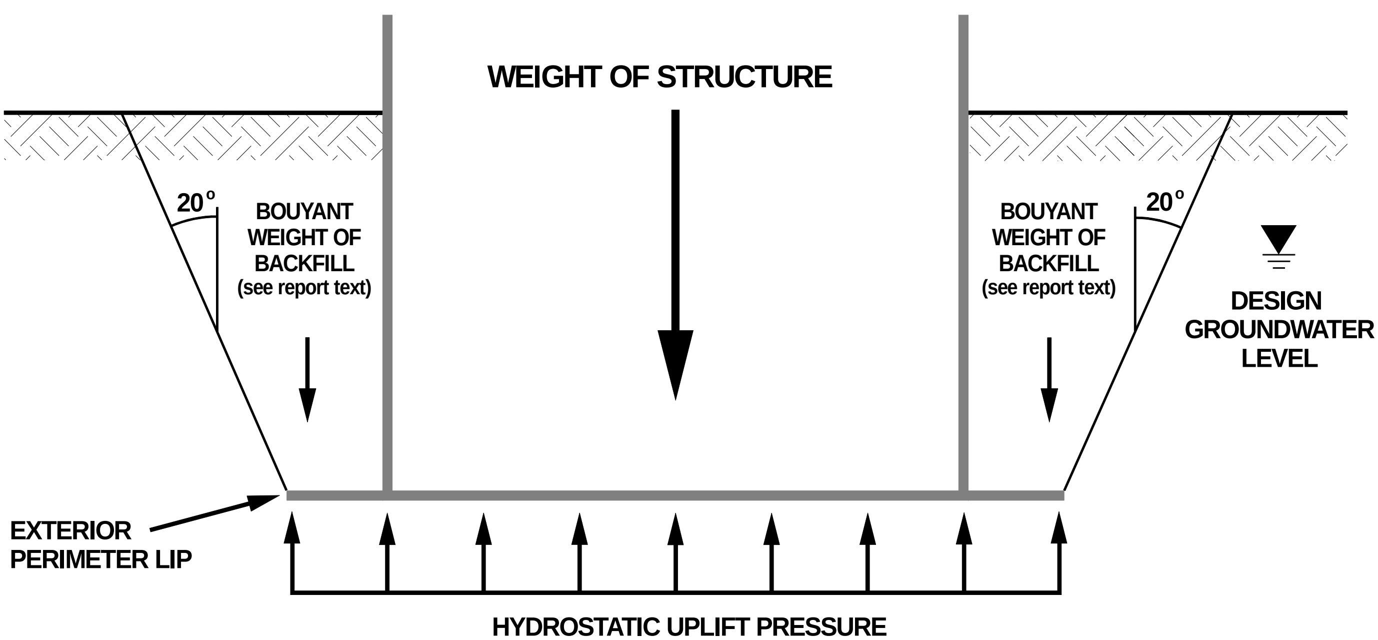
22

STRUCTURE WITHOUT EXTERIOR PERIMETER LIP



NOT TO SCALE

STRUCTURE WITH EXTERIOR PERIMETER LIP



NOT TO SCALE

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Hydrostatic Uplift

Figure

23

Appendix A

KEY TO TEST BORING LOGS IN APPENDIX B

- Grab sample
- 1.4" I.D./2" O.D. Standard Penetration Test (ASTM D1586) sampler (SPT)
- 2.5" I.D./3" O.D. Modified California sampler (MCS) with steel liners
- 3" O.D. Shelby Tube
- Depth of free groundwater first noted seeping into boring during drilling
- Depth of free groundwater measured in boring after drilling

RELATIVE DENSITY		CONSISTENCY		
SANDS AND GRAVELS	SPT, N	SILTS AND CLAYS	SPT, N	UNCONFINED COMPRESSIVE STRENGTH, tsf
VERY LOOSE	0-4	VERY SOFT	0-2	0-0.25
LOOSE	4-10	SOFT	2-4	0.25-0.50
MEDIUM DENSE	10-30	MEDIUM STIFF	4-8	0.50-1.00
DENSE	30-50	STIFF	8-15	1.00-2.00
VERY DENSE	50+	VERY STIFF	15-30	2.00-4.00
		HARD	30+	>4.00

Reference: Terzaghi, K. and Peck, R., SOIL MECHANICS IN ENGINEERING PRACTICE, 2nd ed., John Wiley and Sons, New York, 1967. Page 341 Table 45.1 and pp. 347 Table 45.2.

CONSTITUENT DESCRIPTIONS

DESCRIPTION	CRITERIA
TRACE	less than 5%
FEW	5% to 10%
LITTLE	15% to 25%
SOME	30% to 45%
MOSTLY	50% to 100%

Reference: ASTM D2488, Note 15

MOISTURE CONDITION

DESCRIPTION	CRITERIA
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

Reference: ASTM D2488, Table 3 - Criteria for Describing Moisture Condition

GROUND BEHAVIOR	CLASSIFICATION
Ground that can be excavated without initial support to shallow depths (typically less than 10 feet) and where shoring can be installed before the ground starts to move. For example, unfissured hard clay when not highly overstressed.	Firm
Ground of which chunks or flakes begin to fall off excavation walls. If raveling starts within a few minutes of excavation then it is "fast" raveling; otherwise, it is "slow" raveling. Silts and sands with clay binder may be fast raveling. Stiff fissured clays may be slow or fast raveling depending upon the degree of overstress.	Raveling
Ground that squeezes or plastically extrudes into excavations without visible fracturing. Can occur at shallow to medium depth in very soft to medium stiff clay, and can occur in stiff to hard clay under high overstress.	Squeezing
Ground consisting of clean dry granular material (e.g., sand and gravel) that moves by gravity to its angle of repose.	Running
Ground in a fluid-like condition (e.g., a disturbed mixture of predominantly silt, sand and/or gravel with water), that flows across pressure gradients.	Flowing
Ground that expands in volume due to the absorption of water (e.g., clays).	Swelling

Reference: Modified from Heuer, R.E., 1974, Important ground parameters in soft ground tunneling, Subsurface exploration for underground excavation and heavy construction, New England College, Henniker, New Hampshire, American Society of Civil Engineers, New York, P. 41-55.

NOTES:

1. Boring locations are approximate.
2. All borings were made with a CME 55 drill rig using 6-inch-diameter hollow stem augers. Lines separating strata in the logs represent approximate boundaries and are dashed where strata change depth is less certain. Strata change may be gradual. See figures in Appendix C for grain size definitions and nomenclature.
3. Penetration Resistance (blows/ft.) are the last 12" of an 18" drive using a 140-pound automatic hammer falling 30 inches per blow unless noted otherwise. The Penetration Resistance values noted on the logs are actual blows per foot of penetration for the respective sampler type (i.e., MCS sampler penetration resistance blow counts have not been reduced to SPT sampler "N" values).

KEY TO TEST BORING LOGS IN APPENDIX B (Cont'd)

CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES [A]				SOIL CLASSIFICATION: GROUP SYMBOL	SOIL CLASSIFICATION: GROUP NAME [B]
COARSE-GRAINED SOILS More than 50% retained on No. 200 sieve	**GRAVELS** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels** < 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]	**GW**	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]	**GP**	Poorly graded gravel [F]
		Gravels with Fines > 12% fines [C]	Fines classify as ML or MH	**GM**	Silty gravel [F,G,H]
			Fines classify as CL or CH	**GC**	Clayey gravel [F,G,H]
	SANDS 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands** < 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]	**SW**	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]	**SP**	Poorly graded sand [I]
		Sands with Fines > 12% fines [D]	Fines classify as ML or MH	**SM**	Silty sand [G,H,I]
			Fines classify as CL or CH	**SC**	Clayey sand [G,H,I]
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	**SILTS AND CLAYS** Liquid limit ≤ 50	**Inorganic**	PI > 7 plots on or above "A" line [J]	**CL**	Lean clay [K,L,M]
			PI < 4 plots below "A" line [J]	**ML**	Silt [K,L,M]
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	**OL**	Organic Clay [K,L,M,N]
					Organic Silt [K,L,M,O]
	SILTS AND CLAYS Liquid limit > 50	**Inorganic**	PI plots on or above "A" line	**CH**	Fat clay [K,L,M]
			PI plots below "A" line	**MH**	Elastic silt [K,L,M]
		Organic	$\frac{\text{Liquid limit-oven dried}}{\text{Liquid limit-not dried}} < 0.75$	**OH**	Organic Clay [K,L,M,P]
					Organic Silt [K,L,M,Q]
HIGHLY ORGANIC SOILS		**Primarily organic matter, dark color and organic odor**		**PT**	Peat

NOTES:

A Based on the material passing the 3-in. (75mm) sieve.

B If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.*

C Gravels with 5% to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

D Sands with 5% to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

E $Cu = \frac{D_{60}}{D_{10}}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

F If soil contains ≥ 15% sand, add "with sand" to group name.

G If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

H If fines are organic, add "with organic fines" to group name.

I If soil contains ≥ 15% gravel, add "with gravel" to group name.

J If Atterberg limits plot in hatched area, soil is a CL-ML (silty clay).

K If soil contains 15% to 29% plus No. 200,add "with sand" or "with gravel", whichever is predominant.

L If soil contains ≥ 30% plus No.200, predominantly sand, add "sandy" to group name.

M If soil contains ≥ 30% plus No.200, predominantly gravel, add "gravelly" to group name.

N PI ≥ 4 and plots on or above "A" line.

O PI < 4 or plots below "A" line.

P PI plots on or above "A" line.

Q PI plots below "A" line.

*See figures in Appendix C for grain size definitions and nomenclature. The largest particle that could have been sampled from the test borings is a function of the diameter of the boring, drill bit, and sampler. Intact cobble- and boulder-size particles, if any, are too large to have been able to retrieve from the test borings. Therefore, there may have been larger particles (e.g., cobble- and boulder-size) in the soils than were observed in samples and drill cuttings from the borings. Consequently, cobbles logged in the test borings, if any are also inferred from the drill-rig behavior during drilling and from observations of freshly-broken gravel-size particles in samples and cuttings.

PLASTICITY

Term	PI	Dry Strength	Field Test
Nonplastic	0-3	Very low	Falls apart easily
Slightly plastic	3-15	Slight	Easily crushed with fingers
Medium plastic	15-30	Medium	Difficult to crush
Highly plastic	30 or more	High	Impossible to crush with fingers

Reference: Sowers, George F., Introductory Soil Mechanics and Foundations: Geotechnical Engineering, 4th ed., Macmillan Publishing Co., Inc., New York. 1979, Page 83 Table 2:10.

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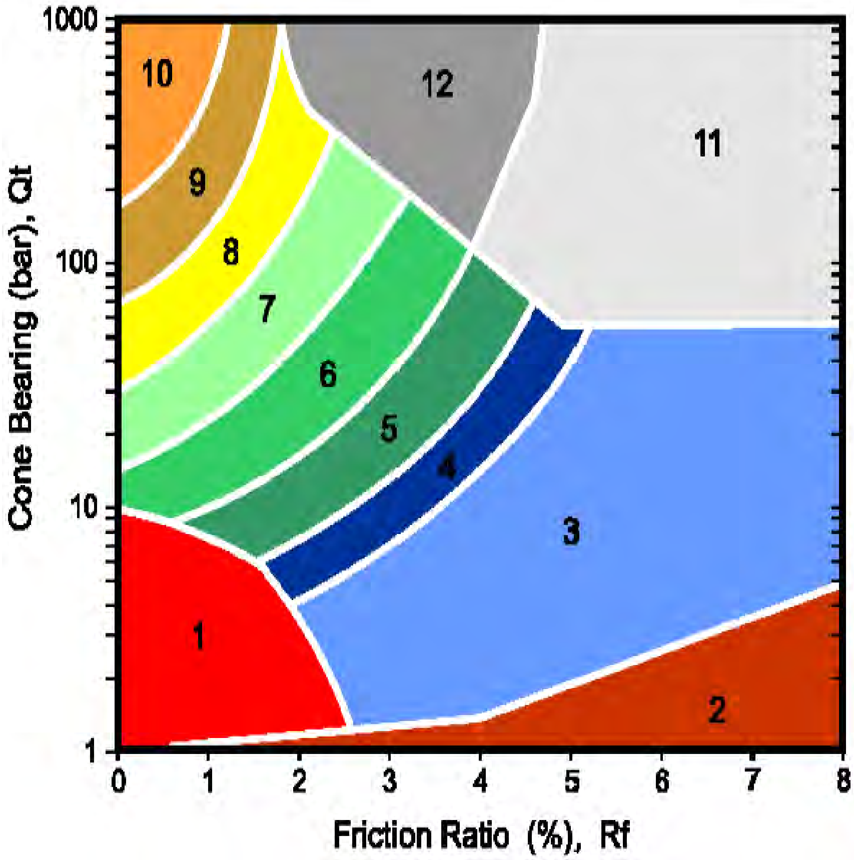
Boring Log Legend

Figure
A-1
(2 of 2)

KEY TO PROJECT CONE PENETROMETER TEST (CPT) SOIL BEHAVIOR TYPE



LEGEND:

1 - Sensitive fine grained
2 - Organic material
3 - Clay
4 - Silty clay to clay
5 - Clayey silt to silty clay
6 - Sandy silt to clayey silt
7 - Silty sand to sandy silt
8 - Sand to silty sand
9 - Sand
10 - Gravelly sand to sand
11 - Very stiff fine grained (overconsolidated/cemented)
12 - Sand to clayey sand (overconsolidated/cemented)

NOTES:

1. Modified from "Use of Piezometer Cone Data", ASCE Specialty Conference In Situ 86: Use of In Situ Tests in Geotechnical Engineering, Robertson, P.K., Campanella, R.G., Gillespie, D., and Greig, J.
2. A Soil behavior type (SBT), undrained shear strength and SPT N60 energy ratio shown on the CPT log are interpretations generated by the CPT-Pro software based on empirical relationships derived in the following references:

P.K. Robertson, R.G. Campanella, D. Gillespie, and J. Greig, 1986, Use of Piezometer Cone Data, Proceedings of the ASCE Specialty Conference In Situ '86: Use of In Situ Tests in Geotechnical Engineering; pp. 1263-1280.

P.K. Roberston, 1990, Soil Classification Using the Cone Penetration Test, Canadian Geotechnical Journal.27(l), pp. 151- 158.

T. Lunne. P.K. Robertson, and J.J.M. Powell, 1997, Cone Penetration in Geotechnical Practice. Taylor and Francis Publishing.

Appendix B

LOG OF BORING B-1 ①

LOCATION: (see Figure 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft. (psi)	GROUNDWATER ③	DESCRIPTION ②	% MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE: Gravel (>#4 sieve) %	GRAIN SIZE: Sand (#4 to #200 sieve) %	GRAIN SIZE: Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR: Cohesion p.s.f.	DIRECT SHEAR: Internal Friction Angle
					Airport Apron: 3 inches asphalt concrete										
	1				**SILTY SAND WITH GRAVEL (SM)** - tan - angular gravel - moist										
					CLAYEY SAND (SC) - olive gray - little silt - trace angular gravel - very loose - moist										
5	2		2		**LEAN CLAY (CL) and SILTY SAND WITH GRAVEL (SM)** - blue-gray - medium plastic and nonplastic - very soft and loose - wet	57		35	17						
10	3		2			25									
15	4		(100)		**SILTY CLAYEY SAND (SM/SC)** - gray - few gravel - very loose - wet - raveling borehole	23	85	NV	NP						
	5		(125)												
20			(300)		**LEAN CLAY (CL)** - green-gray - few sand - little silts - medium plastic - medium stiff to stiff - wet										
25	6		15		**LEAN CLAY WITH SAND (CL)** - olive-gray with yellow-brown and white mottling - little silt - medium plastic - stiff to medium stiff - wet	17	108								

BORING LOG CONTINUES ON FIGURE B-1 (2 OF 2)

NOTES
① Drilled 5/17/2017 using a CME 55, 6" diameter hollow stem augers, and a 30" drop by 140 lb. automatic sampling hammer.
② See report text and figures in Appendices A and D for definitions, lab test results, and additional soil descriptions.
③ Free groundwater was measured at a depth of 9' prior to boring backfilling on 5/17/2017. See notes in Figure A-1, Appendix A.

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Palo Alto, California
Log of Boring B-1

Figure **B-1**
(1 of 2)

LOG OF BORING B-1 (continued) ①

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER	DESCRIPTION	% MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	Sand (#4 to #200 sieve) %	Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	Internal Friction Angle
					BORING LOG CONTINUED FROM FIGURE B-1 (1 of 2)										
					LEAN CLAY WITH SAND (CL) - olive-gray with yellow-brown and white mottling - little silt - medium plastic - stiff to medium stiff - wet										
30	7		9			23					33	67			
35	8		4			36									
					BOTTOM OF BORING AT 36.5 FEET										
40															
45															
50															
55															

NOTES: ① See notes on Figure B-1 (1 of 2).

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Palo Alto, California

Log of Boring B-1

Figure **B-1** (2 of 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	LOG OF BORINGS B-2.1, B-2.2, B-2.3 ① LOCATION: (see Figure 2) DESCRIPTION ②	% MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE Gravel (>#4 sieve) %	Sand (#4 to #200 sieve) %	Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR Cohesion p.s.f.	Internal Friction Angle
					Airport Apron										
					CONCRETE										
					BOTTOM OF BORING AT 2.5 FEET (DRILLING REFUSAL)										
5					Note: Concrete was encountered at a depth of 2.5 feet in all three borings.										
10															
15															
20															
25															

NOTES
① Drilled 5/17/2017 using a CME 55, 6" diameter hollow stem augers, and a 30" drop by 140 lb. automatic sampling hammer.
② See report text and figures in Appendices A and D for definitions, lab test results, and additional soil descriptions.
③ No free groundwater was encountered prior to boring backfilling on 5/17/2017. See notes in Figure A-1, Appendix A.

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Palo Alto, California

Log of Borings B-2.1, B-2.2, B-2.3

Figure **B-2**

LOG OF BORING B-3 ①

LOCATION: (see Figure 2)

DEPTH feet	SAMPLE NO.	TYPE	PENETRATION RESISTANCE blows/ft.	GROUNDWATER ③	DESCRIPTION ②	MOISTURE %	DRY DENSITY lbs./ft.³	LIQUID LIMIT	PLASTICITY INDEX	GRAIN SIZE: Gravel (>#4 sieve) %	GRAIN SIZE: Sand (#4 to #200 sieve) %	GRAIN SIZE: Fines (<#200 sieve) %	UNCONFINED COMPRESSIVE STRENGTH kips/ft.²	DIRECT SHEAR: Cohesion p.s.f.	DIRECT SHEAR: Internal Friction Angle
					Airport Apron: 7 inches asphalt concrete										
					CLAYEY SAND WITH GRAVEL (SC) - olive-gray with yellow-brown mottling - little silt - angular gravel - loose - moist										
	1														
5	2		2		**FAT CLAY (CH)** - blue-gray to dark gray - few sand - little silt - medium plastic - very soft - moist to wet			69	46						
10	3		pushed			28	62							190	26°
15	4		6		**SILTY SAND WITH GRAVEL (SM)** - blue-gray to dark gray - little clay - very loose - wet					38	46	16			
20	5		2		**SANDY LEAN CLAY (CL)** - olive to blue-gray with yellow-brown with mottling - little silt - medium plastic - soft to medium stiff - wet										
25	6		12			15	75	36	16					30	21°
					BOTTOM OF BORING AT 26.5 FEET										

NOTES
① Drilled 5/17/2017 using a CME 55, 6" diameter hollow stem augers, and a 30" drop by 140 lb. automatic sampling hammer.
② See report text and figures in Appendices A and D for definitions, lab test results, and additional soil descriptions.
③ Free groundwater was measured at a depth of 9.5' prior to boring backfilling on 5/17/2017. See notes in Figure A-1, Appendix A.

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Palo Alto, California

Log of Boring B-3

Figure **B-3**

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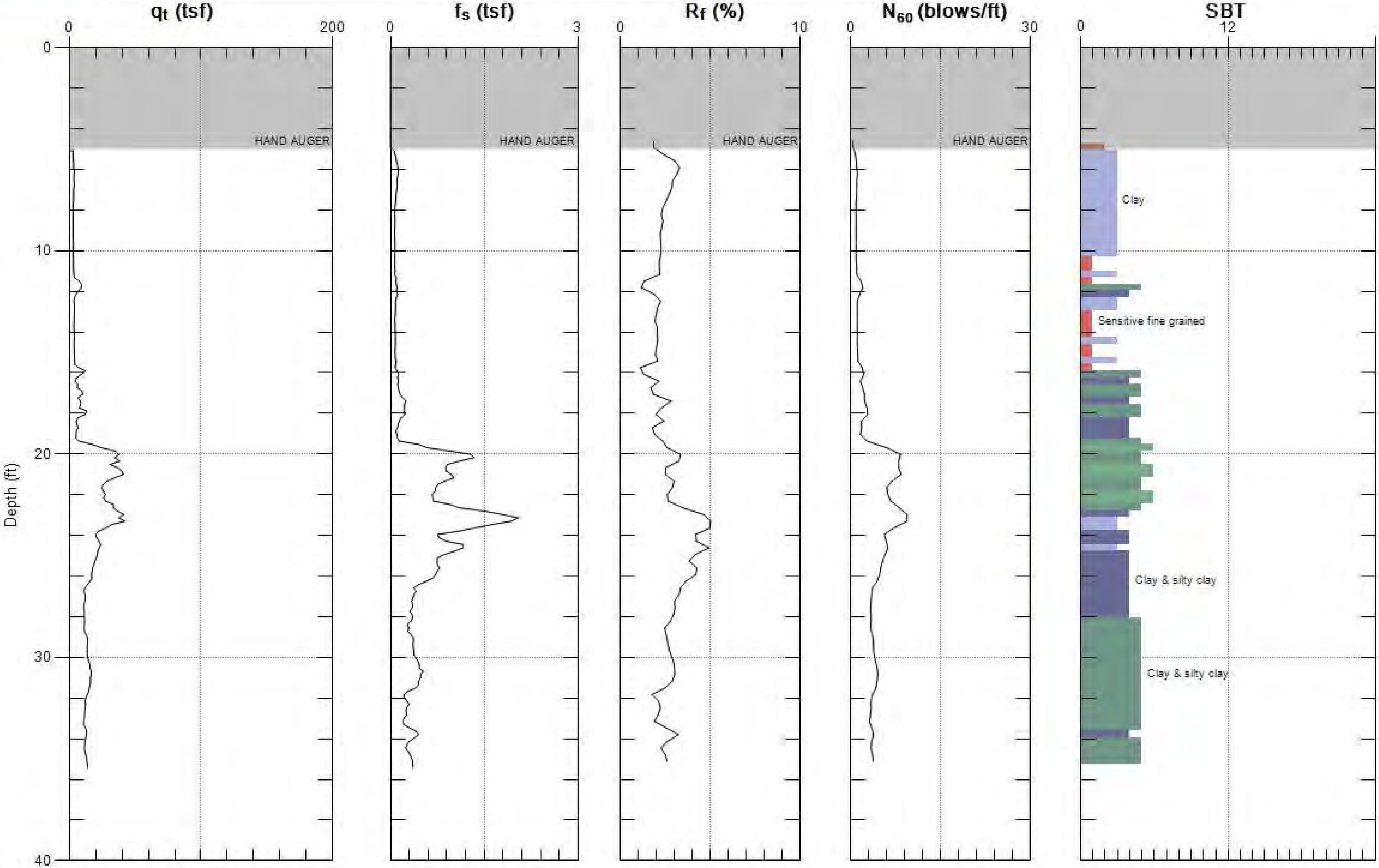
Appendix C

GREGG **MCMILLEN JACOBS ASSOCIATES**

Site: PALO ALTO OUTFALL | Engineer: T.SHU
Sounding: CPT-1 | Date: 5/17/17 10:38



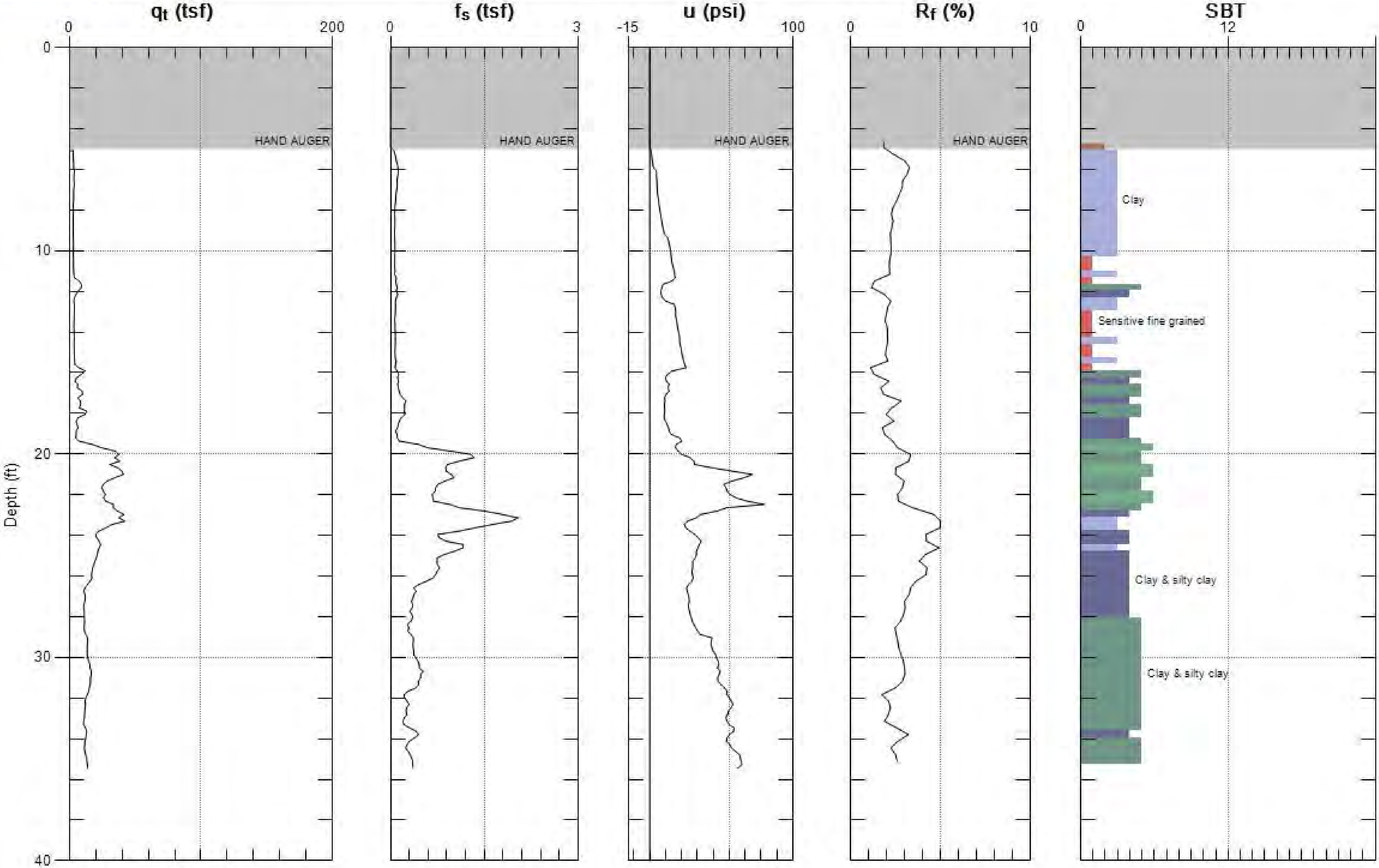
Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **MCMILLEN JACOBS ASSOCIATES**

Site: PALO ALTO OUTFALL
Sounding: CPT-1

Engineer: T.SHU
Date: 5/17/17 10:38

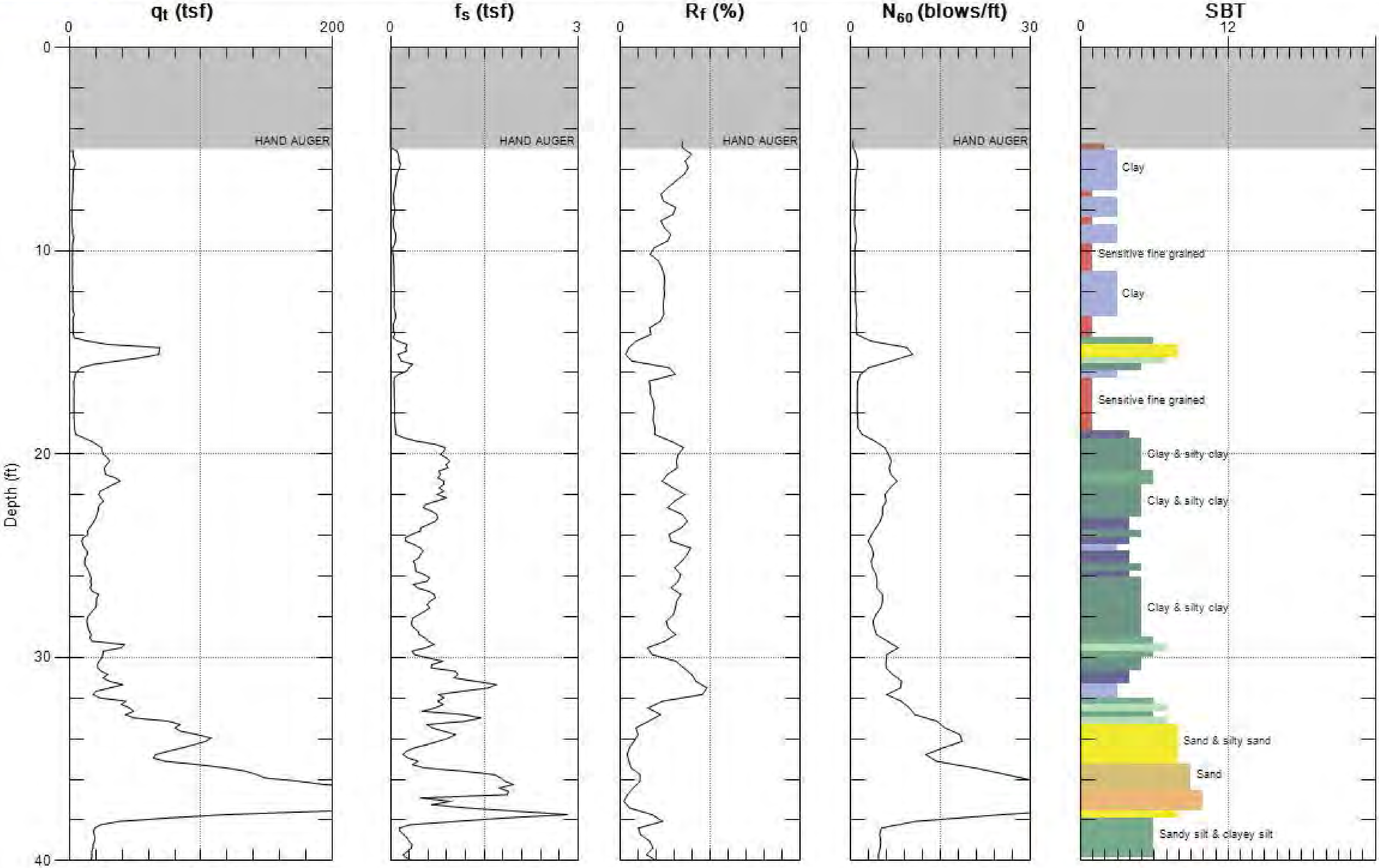


Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG **MCMILLEN JACOBS ASSOCIATES**

Site: PALO ALTO OUTFALL
Sounding: CPT-2
Engineer: T.SHU
Date: 5/17/17 09:34



Max. Depth: 40.354 (ft)
Avg. Interval: 0.328 (ft)

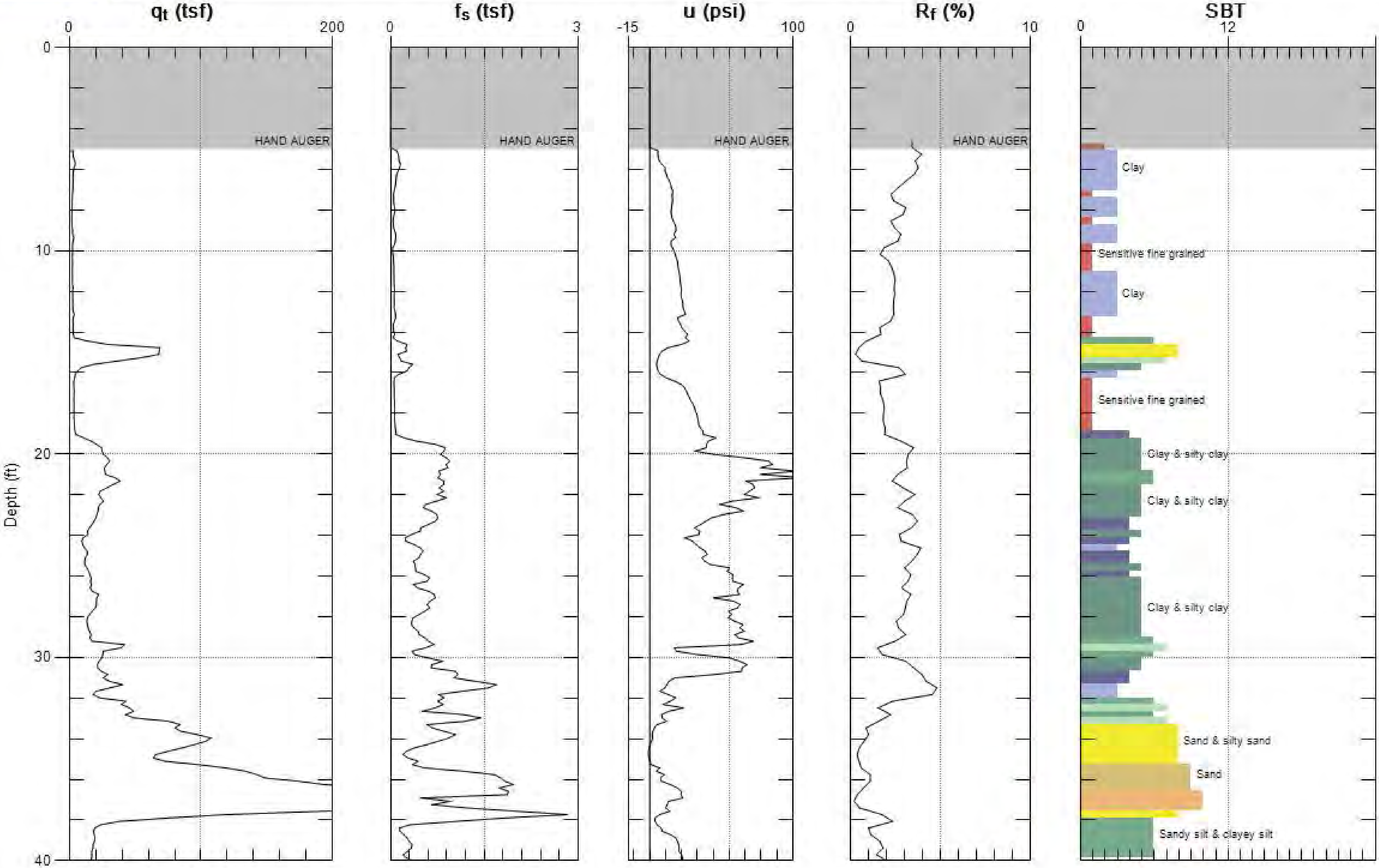
SBT: Soil Behavior Type (Robertson 1990)

GREGG

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-2

Engineer: T.SHU
Date: 5/17/17 09:34



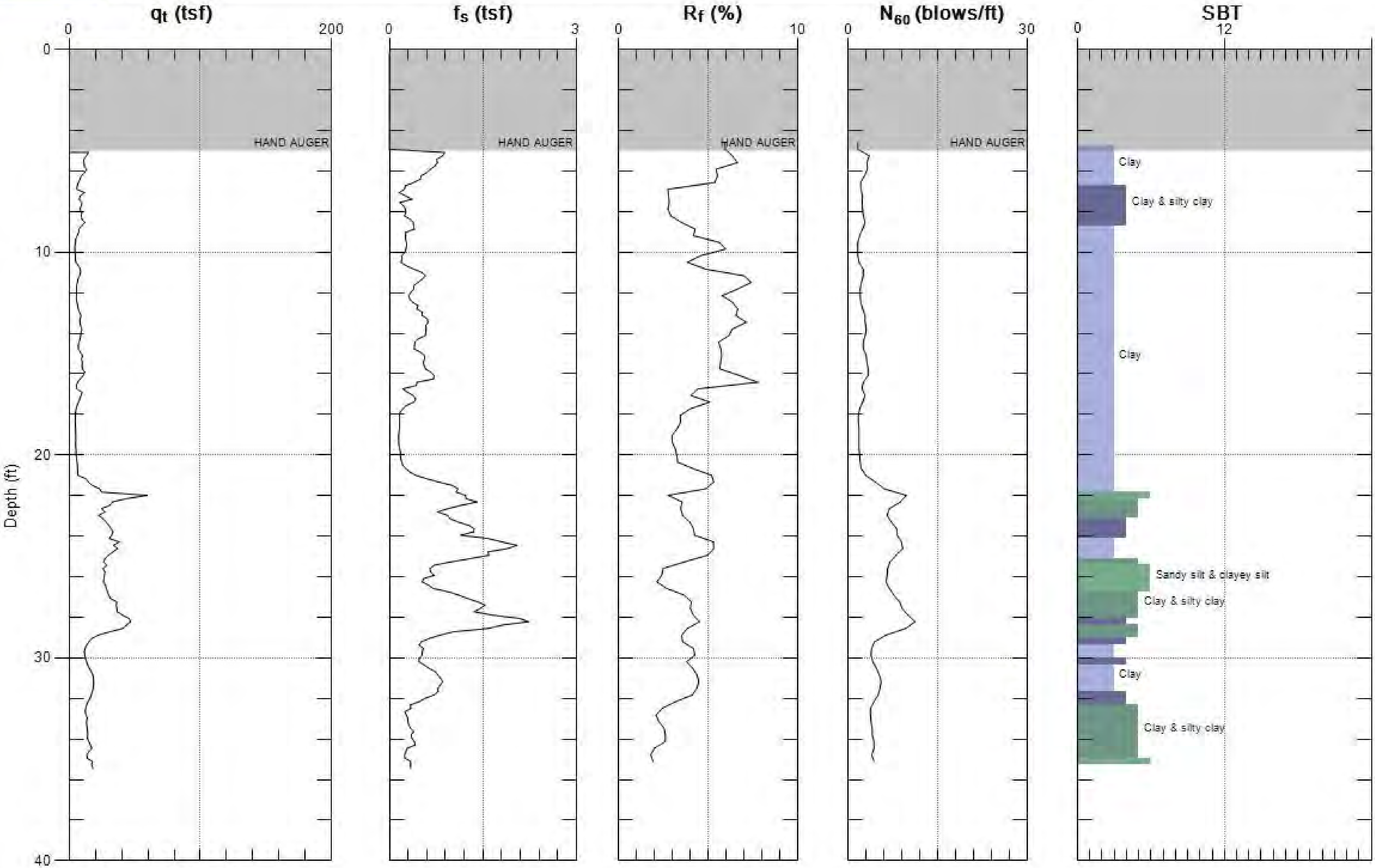
Max. Depth: 40.354 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-3

Engineer: T.SHU
Date: 5/17/17 11:57



Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

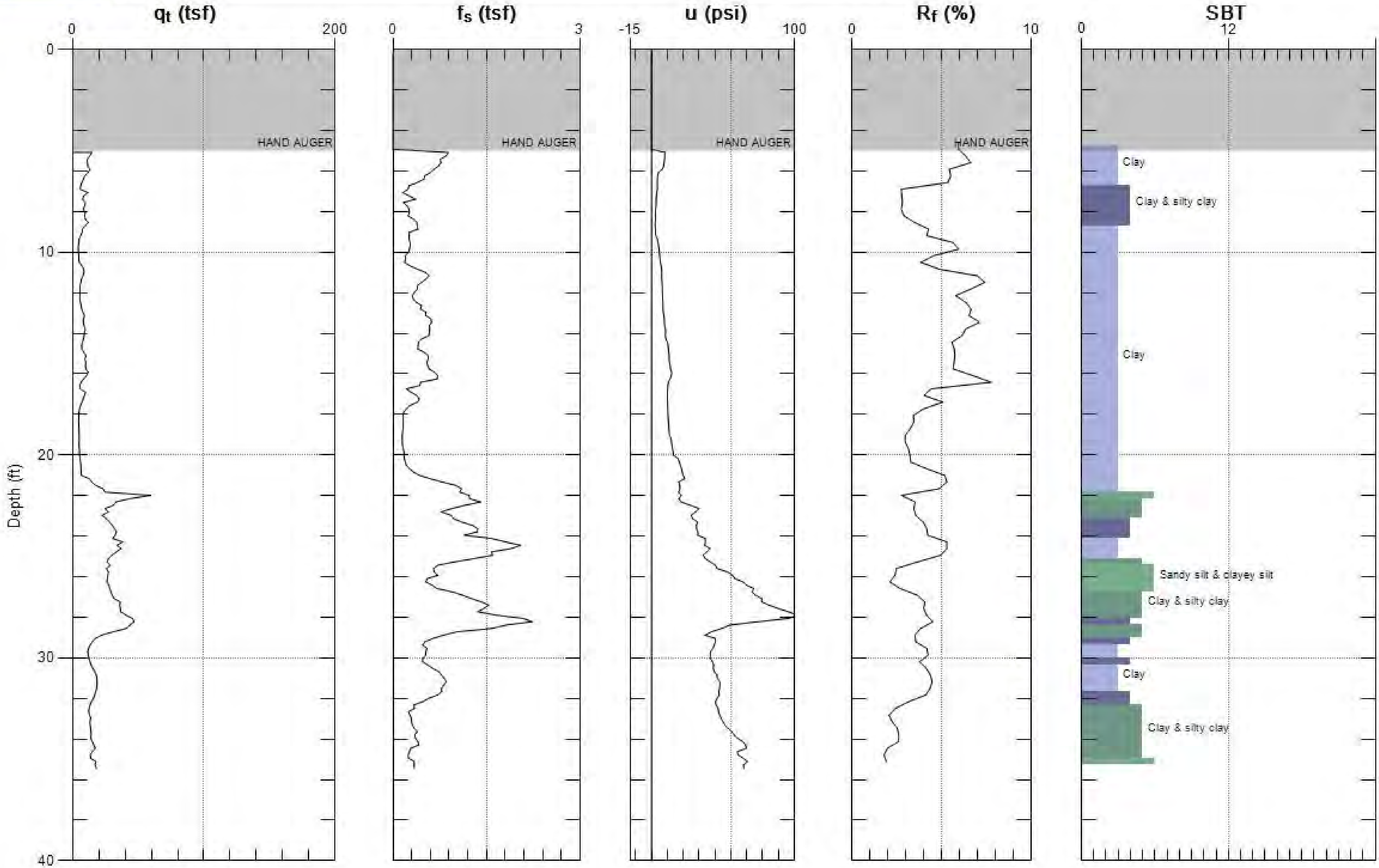
SBT: Soil Behavior Type (Robertson 1990)

GREGG

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-3

Engineer: T.SHU
Date: 5/17/17 11:57

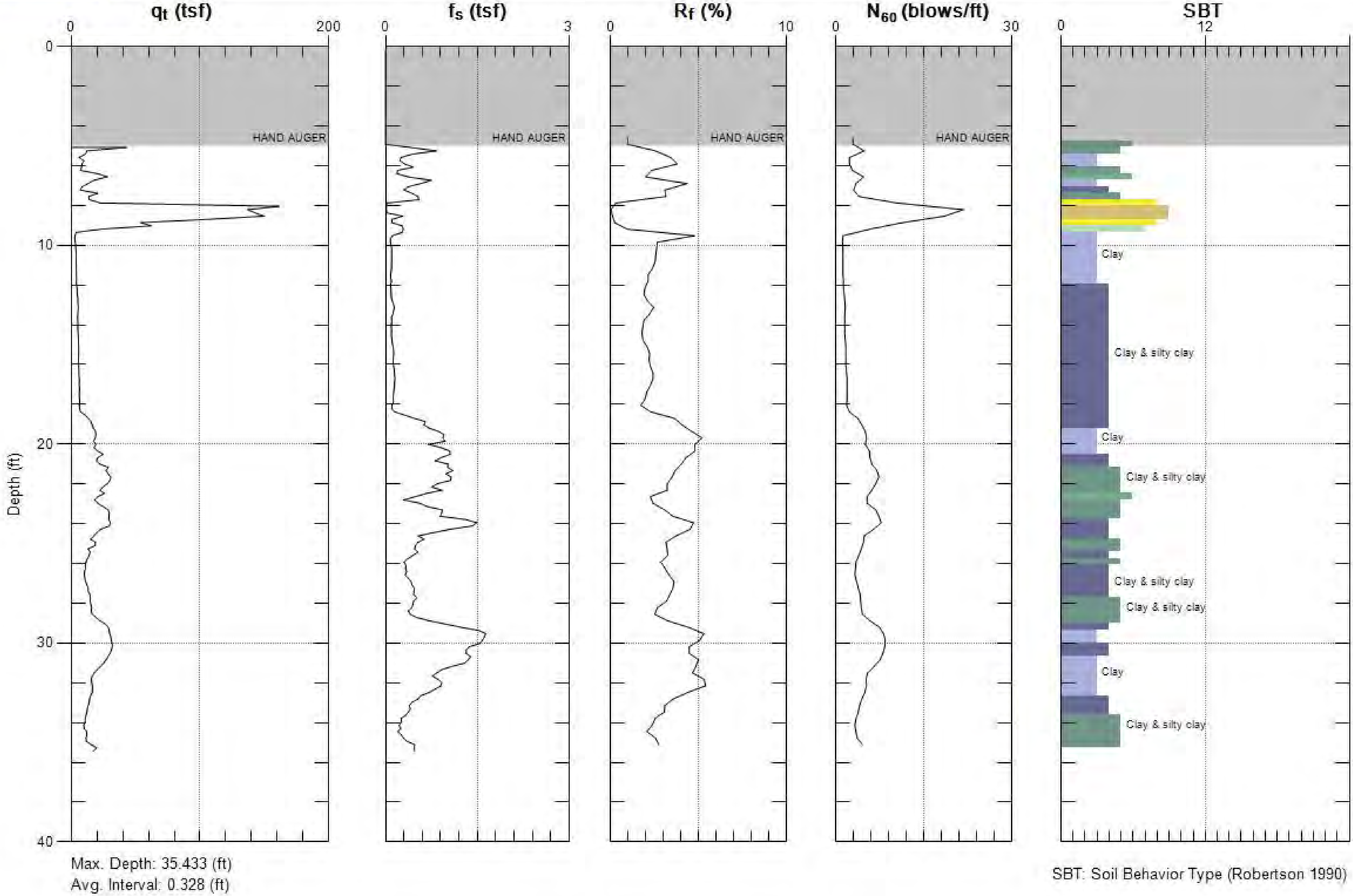


Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-4
Engineer: T.SHU
Date: 5/18/17 02:48



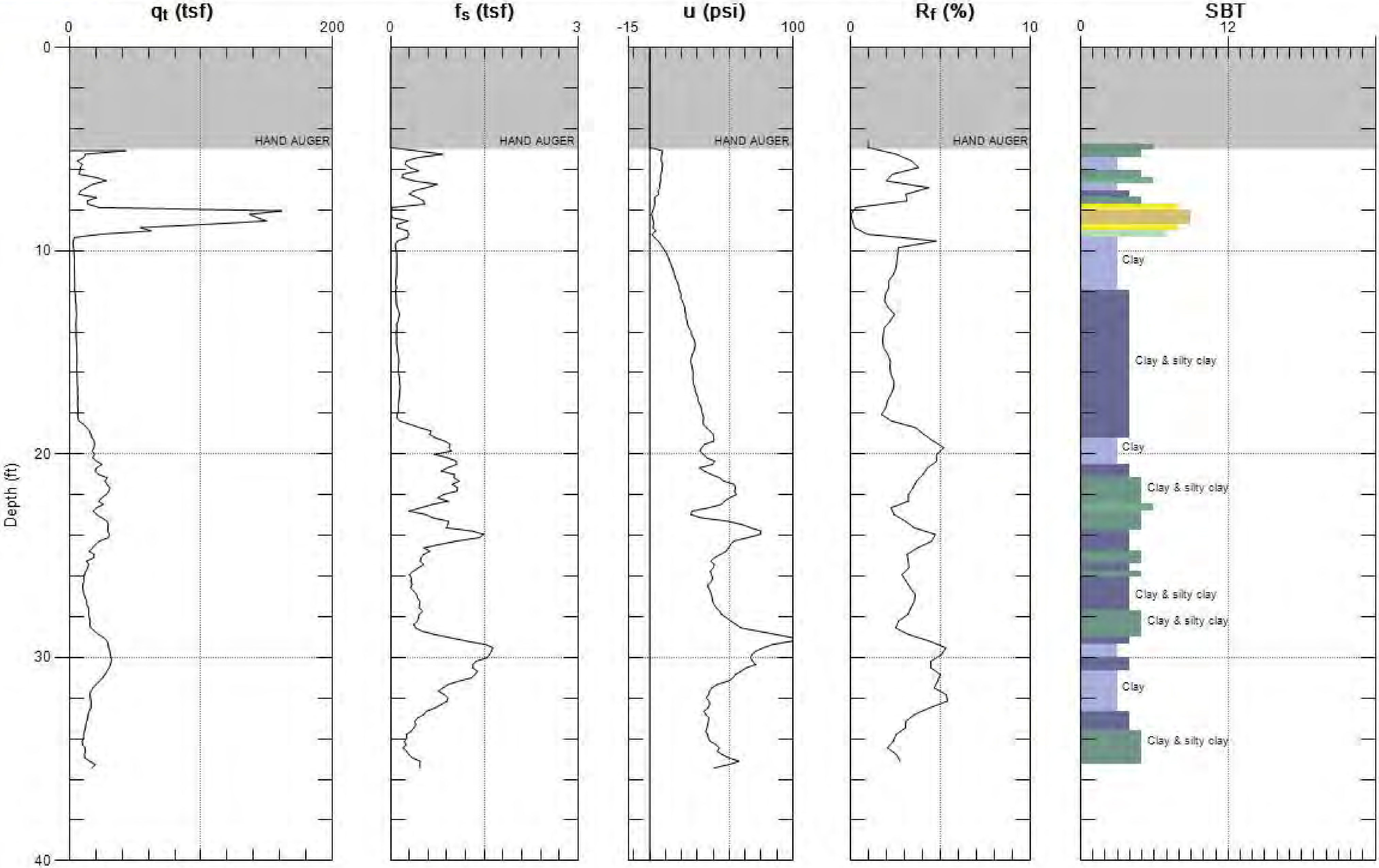
MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL

Sounding: CPT-4

Engineer: T.SHU

Date: 5/18/17 02:48



Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

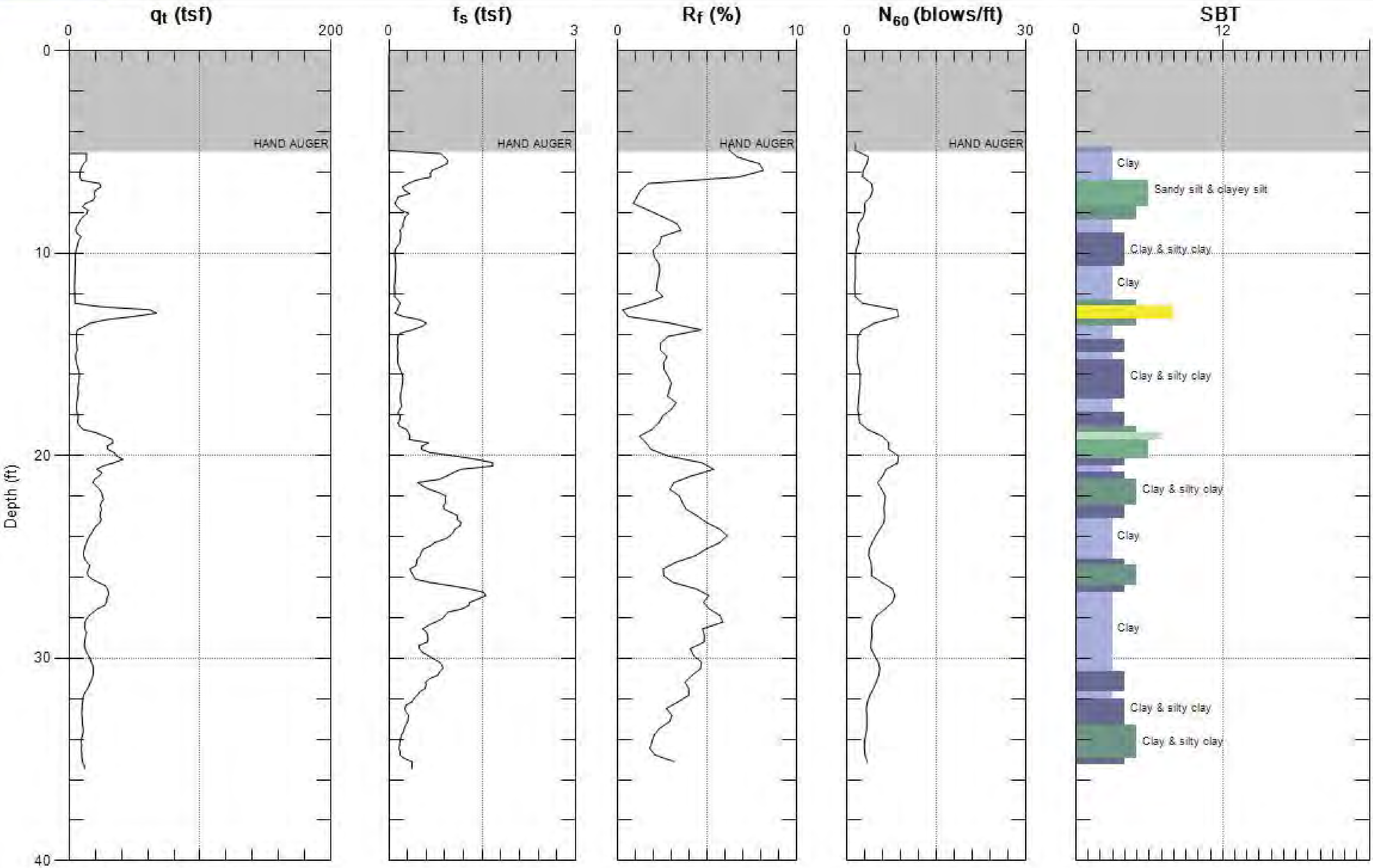
GREGG MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL

Sounding: CPT-5

Engineer: T.SHU

Date: 5/18/17 01:00



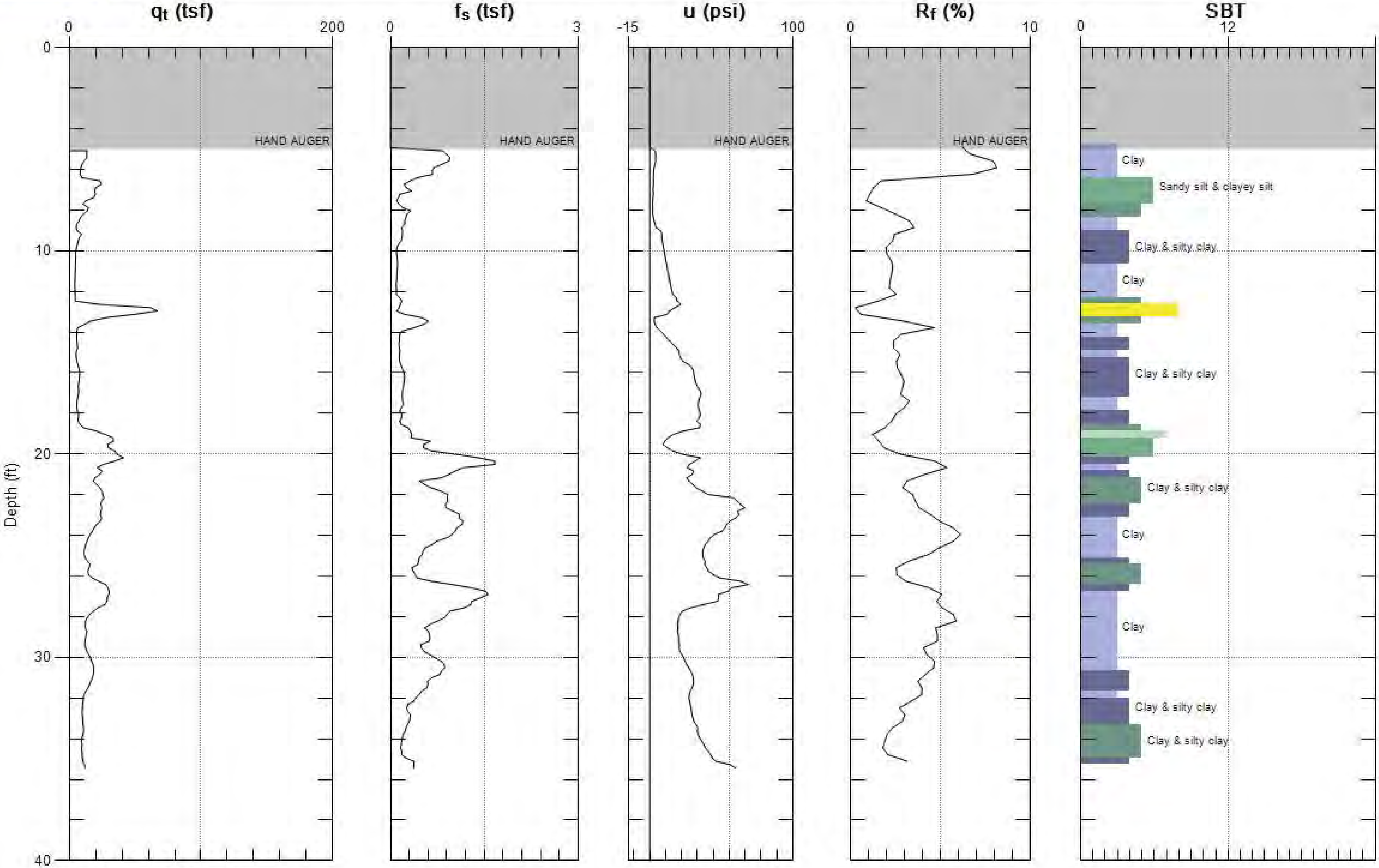
Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-5
Engineer: T.SHU
Date: 5/18/17 01:00

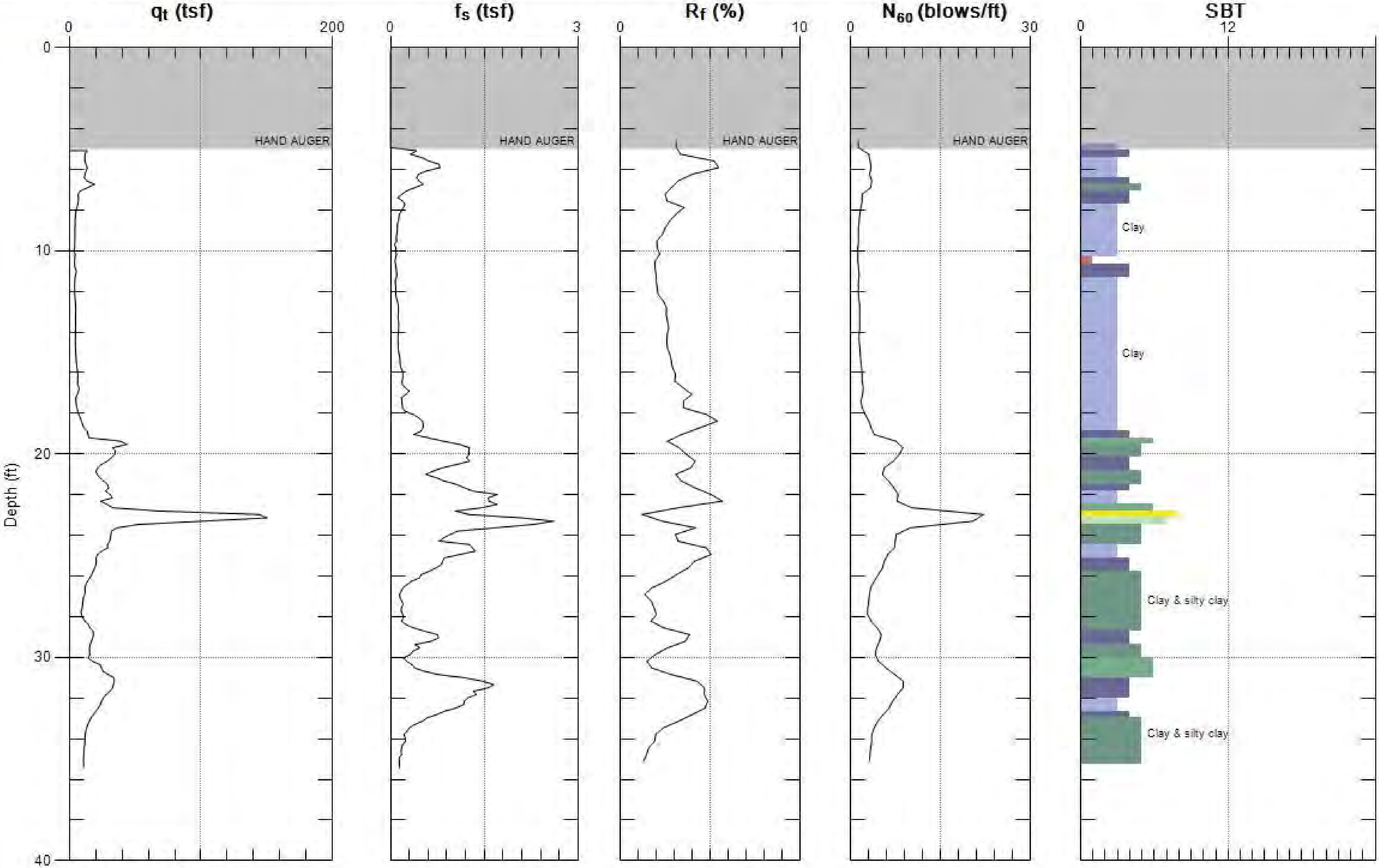


Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

MCMILLEN JACOBS ASSOCIATES

Site: PALO ALTO OUTFALL
Sounding: CPT-A1
Engineer: T.SHU
Date: 5/18/17 01:51



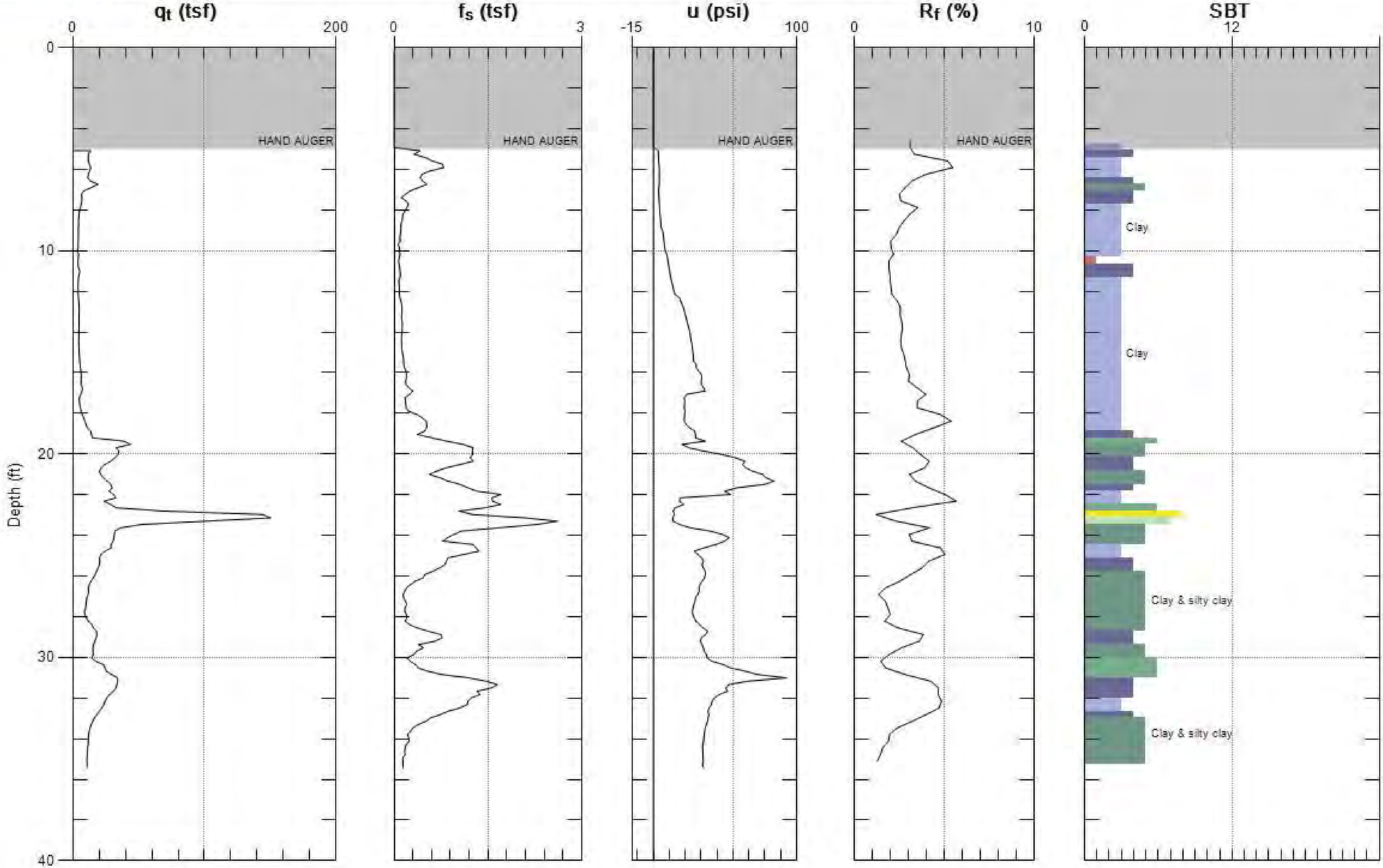
Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

GREGG

MCMILLEN JACOBS ASSOCIATES

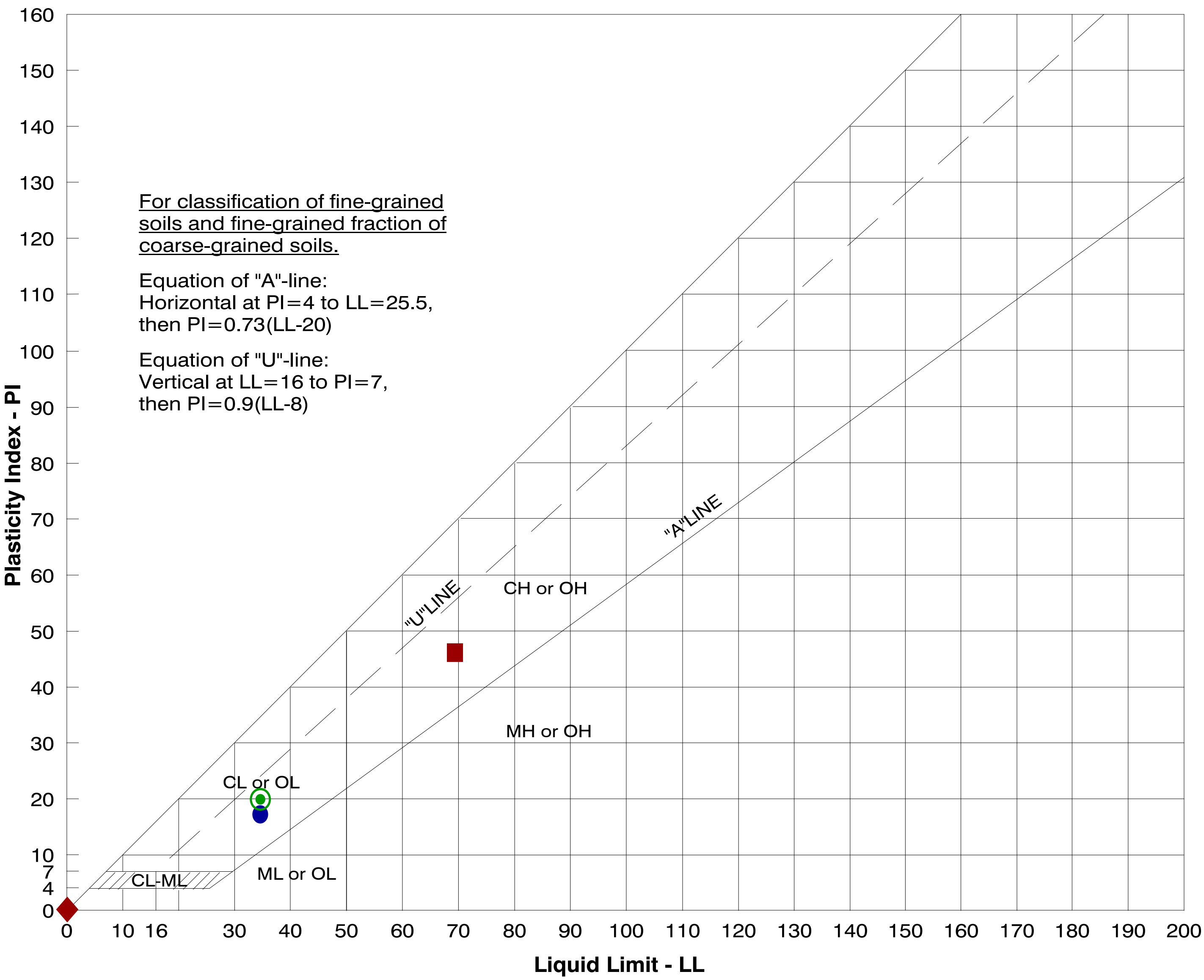
Site: PALO ALTO OUTFALL
Sounding: CPT-A1
Engineer: T.SHU
Date: 5/18/17 01:51



Max. Depth: 35.433 (ft)
Avg. Interval: 0.328 (ft)

SBT: Soil Behavior Type (Robertson 1990)

Appendix D



TEST SYMBOL	SAMPLE NO.	DEPTH (ft)	LIQUID LIMIT - LL	PLASTICITY INDEX - PI	USCS GROUP SYMBOL*
●	B-1-2	5-6½	35	17	CL
◆	B-1-4	15-18	NV	NP	CH
■	B-3-2	5-6½	69	46	CH
⊙	B-3-6	25-26½	36	20	CL

* Classification of fines < 0.425mm

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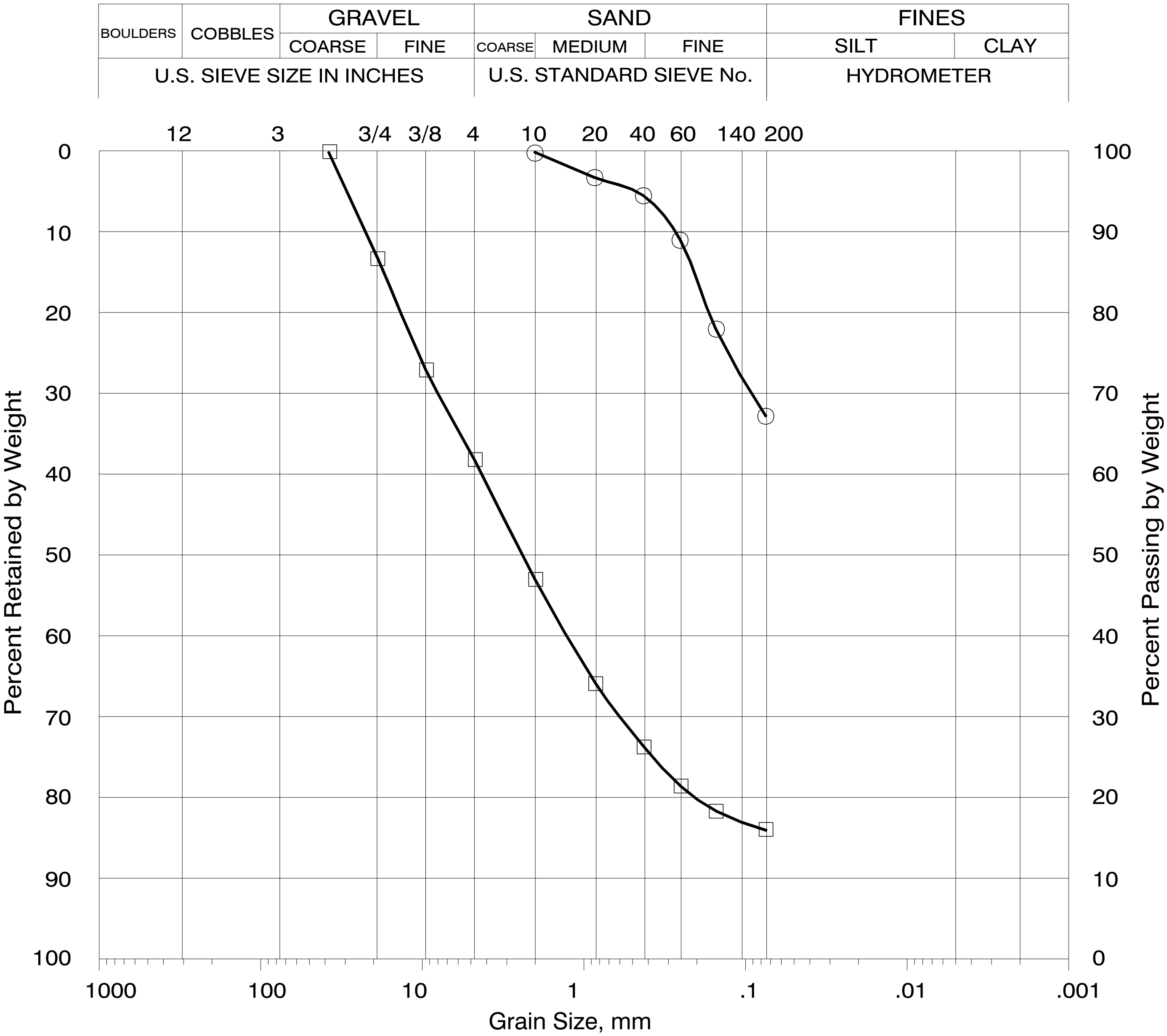
Plasticity Index

Figure

C-1



TEST SYMBOL	BORING SAMPLE NO.	DEPTH (ft)	USCS GROUP SYMBOL
○	B-1-7	30-31½	CL
□	B-3-4	15-16½	SM

NOTE: The largest particle (grain) size that could have been sampled from our borings by our sample barrels is a function of the inside diameter of the sample barrels used (see Figure A-1). Therefore, there may be larger particles (e.g., coarse gravel, cobbles or boulders) in the soils sampled than reflected on the boring logs and grain size distribution curves provided in this report.

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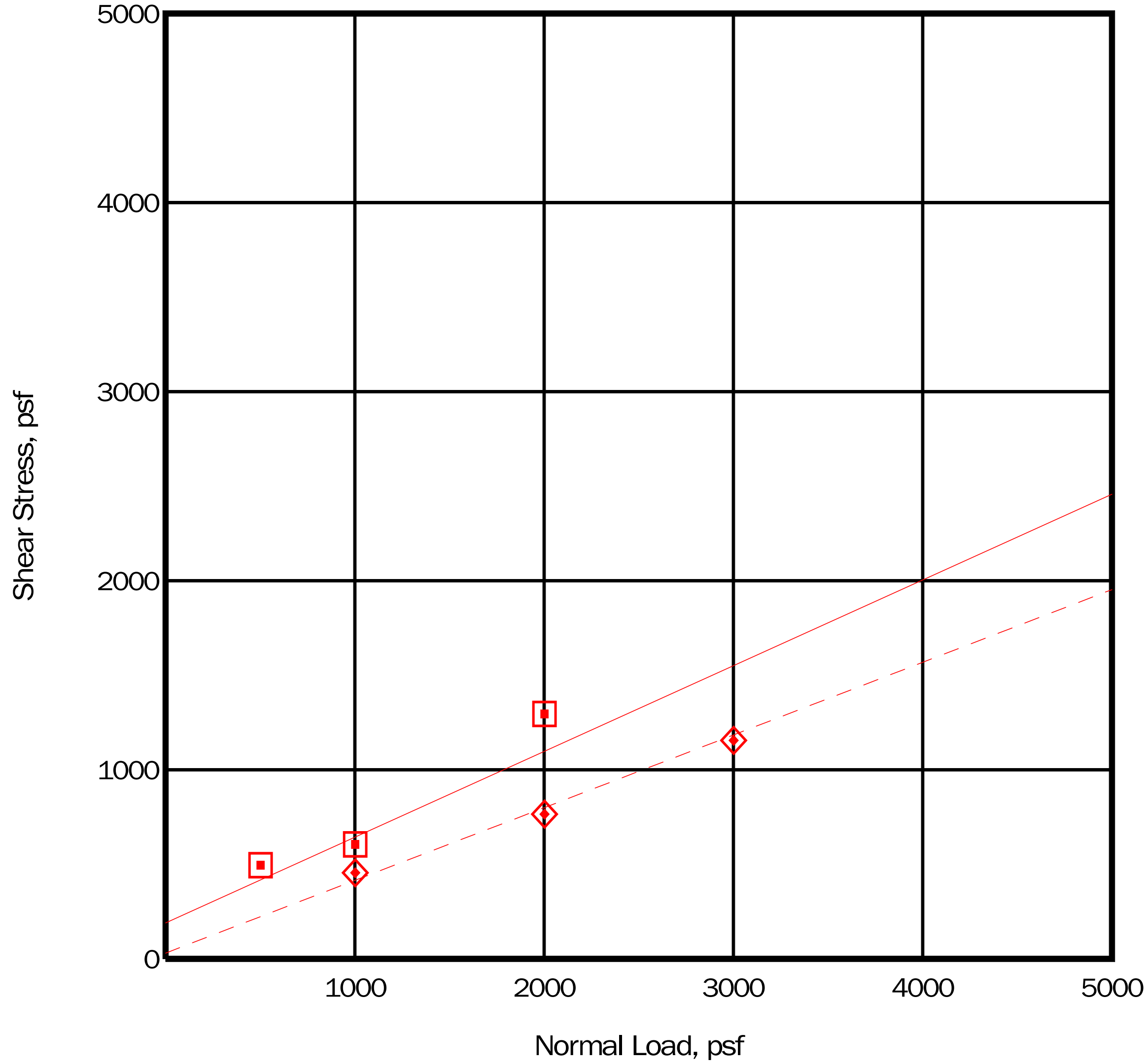
Grain Size

Figure

C-2



TEST SYMBOL	GRAPH LINE	BORING SAMPLE NO.	DEPTH (ft)	APPARENT COHESION (p.s.f.)	INTERNAL FRICTION ANGLE (degrees)	AVE. DRY DENSITY (pcf)/ MOISTURE CONTENT (%)	
						BEFORE TEST	AFTER TEST
▣	———	B-3-3	10-13	190	26	62/28	62/33
◈	– – –	B-3-6	25-26½	30	21	75/15	75/29

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Direct Shear

Figure

C-4